INTERNATIONAL JOURNAL FOR LEGAL RESEARCH AND ANALYSIS

Open Access, Refereed Journal Multi Disciplinary
Peer Reviewed

www.ijlra.com

ISSN: 2582-6433

DISCLAIMER

No part of this publication may be reproduced, stored, transmitted, or distributed in any form or by any means, whether electronic, mechanical, photocopying, recording, or otherwise, without prior written permission of the Managing Editor of the *International Journal for Legal Research & Analysis (IJLRA).*

The views, opinions, interpretations, and conclusions expressed in the articles published in this journal are solely those of the respective authors. They do not necessarily reflect the views of the Editorial Board, Editors, Reviewers, Advisors, or the Publisher of IJLRA.

Although every reasonable effort has been made to ensure the accuracy, authenticity, and proper citation of the content published in this journal, neither the Editorial Board nor IJLRA shall be held liable or responsible, in any manner whatsoever, for any loss, damage, or consequence arising from the use, reliance upon, or interpretation of the information contained in this publication.

The content published herein is intended solely for academic and informational purposes and shall not be construed as legal advice or professional opinion.

ISSN: 2582-6433

ABOUT US

The *International Journal for Legal Research & Analysis (IJLRA)* (ISSN: 2582-6433) is a peer-reviewed, academic, online journal published on a monthly basis. The journal aims to provide a comprehensive and interactive platform for the publication of original and high-quality legal research.

IJLRA publishes Short Articles, Long Articles, Research Papers, Case Comments, Book Reviews, Essays, and interdisciplinary studies in the field of law and allied disciplines. The journal seeks to promote critical analysis and informed discourse on contemporary legal, social, and policy issues.

The primary objective of IJLRA is to enhance academic engagement and scholarly dialogue among law students, researchers, academicians, legal professionals, and members of the Bar and Bench. The journal endeavours to establish itself as a credible and widely cited academic publication through the publication of original, well-researched, and analytically sound contributions.

IJLRA welcomes submissions from all branches of law, provided the work is original, unpublished, and submitted in accordance with the prescribed submission guidelines. All manuscripts are subject to a rigorous peer-review process to ensure academic quality, originality, and relevance.

Through its publications, the *International Journal for Legal Research & Analysis* aspires to contribute meaningfully to legal scholarship and the development of law as an instrument of justice and social progress.

ISSN: 2582-6433

PUBLICATION ETHICS, COPYRIGHT & AUTHOR RESPONSIBILITY STATEMENT

The *International Journal for Legal Research and Analysis (IJLRA)* is committed to upholding the highest standards of publication ethics and academic integrity. All manuscripts submitted to the journal must be original, unpublished, and free from plagiarism, data fabrication, falsification, or any form of unethical research or publication practice. Authors are solely responsible for the accuracy, originality, legality, and ethical compliance of their work and must ensure that all sources are properly cited and that necessary permissions for any third-party copyrighted material have been duly obtained prior to submission. Copyright in all published articles vests with IJLRA, unless otherwise expressly stated, and authors grant the journal the irrevocable right to publish, reproduce, distribute, and archive their work in print and electronic formats. The views and opinions expressed in the articles are those of the authors alone and do not reflect the views of the Editors, Editorial Board, Reviewers, or Publisher. IJLRA shall not be liable for any loss, damage, claim, or legal consequence arising from the use, reliance upon, or interpretation of the content published. By submitting a manuscript, the author(s) agree to fully indemnify and hold harmless the journal, its Editor-in-Chief, Editors, Editorial Board, Reviewers, Advisors, Publisher, and Management against any claims, liabilities, or legal proceedings arising out of plagiarism, copyright infringement, defamation, breach of confidentiality, or violation of third-party rights. The journal reserves the absolute right to reject, withdraw, retract, or remove any manuscript or published article in case of ethical or legal violations, without incurring any liability.

ISSN: 2582-6433

ROLE OF INTELLECTUAL PROPERTY LAW IN FOSTERING GREEN INNOVATION: SPECIAL REFERENCE TO PATENET LAW

AUTHORED BY - SANCHITA SANAND

ABSTRACT

Environmental imbalances and climate change crises have recently drawn a lot of attention from around the world. Global warming, ozone layer depletion, degradation of natural resources, soil erosion, and other problems are caused by climate change. Increase in the growth of environmental concerns have resulted in making Green Intellectual Property Rights (Green IPR), an essential instrument for addressing global climate challenges and encouraging sustainable innovation. Green innovation is essential in achieving the objectives listed in the 2030 Agenda for Sustainable Development and a key component for sustainable development. WIPO (World Intellectual Property Rights) explains that in order to establish the link between innovation and sustainable development, intellectual property (IP) rights are crucial for advancing green technology and creating a sustainable economy by drawing in foreign investment. Green innovation, which contributes to the larger goal of reducing environmental degradation, is the responsibility of both public and private entities. IPR, as a catalyst, can be extremely important in safeguarding and advancing green innovations by giving innovators exclusive rights and by providing incentives for research and development (R&D) that results in the development of new environmentally friendly technologies. But there are a number of difficulties when it comes to green innovation, IPR, and environmental protection. The paper examines the legal frameworks governing Green IPR, their function in promoting environmentally friendly technologies and striking a balance between providing incentives for innovation and guaranteeing that the general public has access to green solutions. This study assesses how well Green IPR promotes sustainable development by looking at national laws, international agreements, and court decisions. It also looks at issues like patent monopolies, barriers to technology transfer, and fair access to green innovations, offering suggestions for possible changes to an intellectual property system that is more inclusive and environmentally conscious. According to the paper's conclusion, a well-designed Green IPR framework can be crucial in coordinating environmental sustainability and economic growth.

ISSN: 2582-6433

KEYWORDS: *Green Intellectual Property Rights (Green IPR), Sustainable Innovation, Sustainable Development, Green technology, Environmental Protection*

1.1 Introduction

Innovation has long been acknowledged as the catalyst for economic expansion, supporting productivity gains, technological breakthroughs, and societal well-being. But innovation doesn't happen in a vacuum; it needs a strong framework that rewards originality, safeguards the results of intellectual labor, and guarantees that innovators will be able to benefit from their efforts. Intellectual property right is a key tool for promoting innovation and promoting long-term economic growth in this situation[1]. The term "intellectual property" (IP) describes works of literature, art, inventions, designs, and symbols that are utilized in business. A variety of IP protection mechanisms, such as patents, copyrights, trademarks, and trade secrets, have been developed to promote ongoing innovation and investment. The creators and owners of intellectual property are granted exclusive rights by these legal safeguards, which give them temporary control over how their inventions are used, distributed, and marketed. In exchange, by guaranteeing that artists can make money off of their creations, this promotes an innovative culture and encourages more funding for research and development (R&D).

The process of creating and applying technologies that lessen the negative effects of human activity on the environment is known as "green innovation." The problems of pollution, resource depletion, biodiversity loss, climate change, and social inequality can all be addressed with the aid of green innovation. Additionally, green innovation can open up new avenues for social welfare, job creation, and economic expansion[2]. Nevertheless, there are numerous obstacles to green innovation, including exorbitant expenses, market failures, unclear regulations, and a lack of awareness. Intellectual property (IP) rights are one of the main elements that can help or hurt green innovation. IP rights are legal protections for works of art, trademarks, inventions, and designs that come from the human mind. Green innovators may be encouraged by IP rights to cooperate, share their expertise, and make research and development investments. Green innovators may also be able to access markets, funding, and technology transfer through IP rights. However, IP rights may also present obstacles to green innovation, including limiting access to necessary technologies, fostering monopolies and disputes, and raising transaction costs and legal fees. As a result, it is critical to create and execute suitable

[1] https://greenly.earth/en-us/blog/ecology-news/everything-you-need-to-know-about-green-technology-in-2022
[2] Hall, B. H., & Helmers, C. (2010). The Role of Patent Protection in (Clean/Green) Technology Transfer. Working Paper 16323. National Bureau of Economic Research.

ISSN: 2582-6433

legal frameworks that strike a balance between the public interest and the interests of green innovators.

1.2 Research Objectives

Following objectives are to be achieved while preparing this paper:

1) To analyse the interface between IPR and green innovation.
2) To examine the role of Green patents in promoting sustainability.
3) To elucidate the national as well as international efforts in promoting patenting of Green Technology.

1.3 Research Questions

1) What role do IPR play in shaping green innovation ecosystems?
2) What kind of role does Green patent play in promoting sustainability?
3) What efforts are taken at national as well as international level in order to promote patenting of Green Technology?

1.4 Statement Of Problem

The role of Intellectual Property Rights (IPR) in fostering green innovation is complex and multifaceted, raising important questions about the balance between protecting innovation and promoting sustainability. While IPR can incentivize innovation by providing exclusive rights to inventors, they can also limit access to green technologies and hinder their widespread adoption. The exclusive rights granted by IPR can make green technologies less accessible and affordable, potentially limiting their adoption and impact on sustainability. IPR can create barriers to the diffusion of green technologies, particularly in developing countries, where access to clean technologies is crucial for sustainable development. The question remains whether the incentive by IPR is sufficient to drive meaningful innovation and adoption. This paper covers all the details regarding the above statement issues or gaps that have been established while preparing this research.

1.5 Review Of Literature

"Green IP-A Much Needed Interplay Between the Intellectual Property and Stability":

It highlights the need of a harmonization between innovation of technology, an expression of creativity and preservation of the ecological system. It analyses how the intellectual property rights have been a driving force for new innovations and how it impacts the growth of

ISSN: 2582-6433

sustainable development.

"Green Intellectual Property Rights: A Sustainable Approach to Innovation and Environmental Protection" by Raj Kumar Yadav and Asheesh Yadav: This paper examines the legal frameworks governing green IPR and their role in promoting environmentally friendly technologies.

"The Role of IP in Accelerating Green Tech Innovation" by Bao Tran: This article explores how IP helps green technology grow and why getting it right is essential for a cleaner future.

IP Strategies for Green Innovations - An Analysis of European Inventor Awards" by Pratheeba Vimalnath, Frank Tietze, Akriti Jain, and Viola Prifti: This study analyzes the IP strategies used by green innovators, particularly patenting and licensing.

Journals-

International Journal of Innovative Research and Scientific Studies: Publishes articles on innovation and sustainability, including the role of IP in green innovation.

World Patent Information: Features articles on IP strategy and green innovation.

Sustainability: Publishes research on sustainable development and the role of IP in promoting green technologies

1.6 Hypothesis

Here are some potential hypotheses for the role of IPR in fostering green innovation:

H1. IPR protection incentivizes green innovation: One potential hypothesis is that IPR protection incentivizes green innovation by providing a mechanism for firms and individuals to recoup their investments in research and development. By granting exclusive rights to inventors and innovators, IPR protection enables them to capture the economic benefits of their green innovations, which can lead to increased investment in green R&D. This, in turn, can result in the development of new green technologies and products that can help to address environmental challenges. For example, a firm that develops a new solar panel technology may be more likely to invest in further R&D if it can protect its intellectual property through patents. Stronger IPR protection leads to increased investment in green R&D, resulting in more green innovations.

H2. IPR protection limits access to green technologies: An alternative hypothesis is that IPR protection limits access to green technologies, particularly in developing countries. By granting exclusive rights to inventors and innovators, IPR protection can create barriers to access for

ISSN: 2582-6433

firms and individuals who may not be able to afford to license or purchase the technology. This can limit the widespread adoption of green technologies, which can hinder efforts to address environmental challenges. For example, a developing country may not be able to access a new green technology if it is patented by a firm in a developed country, which can limit its ability to develop its own green industries. IPR facilitates collaboration and knowledge-sharing among stakeholders, leading to more effective green innovation.

H3. The Impact of IPR on Green Innovation Varies by Industry : Another potential hypothesis is that the impact of IPR on green innovation varies by industry. Different industries may respond differently to IPR protection, depending on factors such as the nature of the technology, the level of competition, and the regulatory environment. For example, the renewable energy industry may be more responsive to IPR protection than the sustainable agriculture industry, which may be more dependent on open-source technologies. Understanding the industry-specific impacts of IPR on green innovation can help policymakers to develop more effective strategies for promoting green innovation.

1.7 Research Methodology

The methodology adopted in this paper is a doctrinal approach involving the analysis of specific industries or companies to gain in-depth insights into the role of IPR in green innovation. It is drafted by combining qualitative and quantitative methods to gain a comprehensive understanding of the relationship between IPR and green innovation. It involves reviewing existing research on IPR and green innovation to identify key themes, trends, and gaps.

1.8 Scheme of Presentation:

The scheme of presentation which is to be prepared are as follows:

Chapter 1: Introduction

Chapter 2: Background of IPR And Green Innovation

Chapter 3: Interface Between IPR And Green Innovation

Chapter 4: Role of Green Patents In Promoting Sustainability

Chapter 5: Conclusion And Suggestions

ISSN: 2582-6433

CHAPTER 2 – BACKGROUND OF IPR AND GREEN INNOVATION

2.1 All About Green Technology

Green technology is defined as sustainable and ecologically friendly technology[3]. It is also occasionally called "clean technology." It entails developing environmentally friendly, eco-friendly goods. It seeks to encourage a safe and healthy atmosphere. Thus, it would be more accurate to refer to green technologies as clean, environmental, or eco-friendly technologies. The community's worldwide efforts to combat ecological crises are the sole reason for the adoption of green technologies. Carbon emissions, harsh greenhouse gas emissions, and the unnecessary use of fossil fuels cause an imbalance in the environment that threatens the ecosystem as a whole[4]. The ozone layer is being destroyed, heat waves and forest fires occur, and some animal and bird species are going extinct as a result of the severe loss of our environment. One such measure to address climate change is the use of green technology. Going green is urgently needed to address the global climate crisis, as one of the factors propelling the introduction of green technology is the rapid deterioration of the climate. Environmentally friendly production and consumption technologies are referred to as "green technology." The three R's—reuse, recycle, and reduce—are applied in green technology. Through its goals and objectives, the significance of green technologies for climate change can be comprehended. First, by raising awareness of the need for quick adoption, green technology aims to meet the needs of society. Second, the proliferation of green technologies is being facilitated by the excessive use of finite resources, such as fossil fuels.

The preservation of natural resources now depends heavily on green technology. Since both sustainability and green technology aim to preserve the environment, they can sometimes be seen as two sides of the same coin. It is possible to think of sustainable development as the cornerstone upon which green technology is built. The prudent use of resources for the benefit of future generations is known as sustainable development. Green technology refers to environmentally friendly procedures and practices that are intended to preserve the ecosystem's natural resources, thereby safeguarding our surroundings.

Thus, as the name implies, green technology is a means of implementing environmentally friendly products to lessen negative environmental effects. By using green energy sources to support the environment, the technologies are the future of technology and align with the

[3] David Elliott, *Energy, Society and Environment: Technology for a Sustainable Future* 23–28 (2d ed. 2007).
4 Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2022: Impacts, Adaptation and Vulnerability* (2022).

ISSN: 2582-6433

agenda for environmental preservation[5]. The four main domains of "clean tech" technology are materials, water, transportation, and energy. Its main goals are lowering emissions of dangerous gases and restricting the use of non-renewable, finite energy sources.

Green technologies, also known as "environment sound technologies," use less polluting equipment and products, adjust to sustainable resource use, recycle their products, and handle waste more sensibly and responsibly[6]. The term "green technology" encompasses all of these elements. It is a broad term that encompasses creative approaches to creating environmentally friendly technology. It operates in a manner that preserves the environment. Intellectual property rights provide incentives that encourage the development of these technologies, which in turn spurs their improvement and expansion, which will further support the creation of green innovations[7].

Innovations are encouraged and incentivized when IPRs and green technology are combined. The TRIPS agreement recognizes the role that IPRs play in innovation, growth, and sustainability.

2.2 Enforcement of IPR In Green Technology

According to Article 7 of the TRIPS agreement, the enforcement of IPRs will support and foster high-tech development and technology transfer that benefits end users of technological knowledge, contributes to socioeconomic welfare, and strikes a balance between rights and obligations. By granting them monopoly rights over such creations, IPRs promote economic growth, inventions, and innovations. Investments are made in these kinds of discoveries and innovations, and environmentally friendly technologies are protected by green intellectual property rights. "Green intellectual property" is the term used to describe the combination of IPR and technology; in general, the term "green intellectual property," which will henceforth be referred to as "green IPR," encompasses legally the innovations that help preserve the environment[8].

Green intellectual property rights are scientific and inventive endeavors that can lessen the effects of climate change. Green IP is a relatively new phenomenon that encourages environmentally friendly practices, which in turn supports the expansion of this field's research

[5] World Comm'n on Env't & Dev., *Our Common Future*, U.N. Doc. A/42/427 (1987).
[6] Rainer Hinrichs-Rahlwes, *Renewable Energy: Paving the Way Towards Sustainable Energy Security* 41–56 (2013).
[7] Peter Drahos, *The Global Governance of Knowledge: Patent Offices and Their Clients* 198–202 (2010).
[8] Carlos M. Correa, *Trade Related Aspects of Intellectual Property Rights: A Commentary on the TRIPS Agreement* 88–94 (2007)

ISSN: 2582-6433

and development. However, the way resources and technology are used judiciously to address environmental concerns will be shaped by green intellectual property. "Green patents" are one of the key components of green intellectual property. According to Chanda and Rao, green patents allow for the patenting of environmentally friendly technologies[9]. They are the technological solution to environmental issues. The owner of an invention is granted exclusive monopoly rights through patents. It is a safeguard bestowed upon the innovation. Green patents are the legal privilege or protection granted to environmentally beneficial technologies, particularly those that are environmentally friendly.

The Environment Protection Act of 1986[10], which forbids actions that endanger the environment, is a fundamental piece of legislation in India that aims to protect and promote the environment. It does this by establishing procedures to enforce environmental protection and by imposing penalties for violations of any of its provisions. Additionally, according to The Patents Act of 1970[11], the Indian patent system contains sufficient provisions to promote technological advancements, knowledge, and transfer. Thus, it is necessary to create a plan that benefits end users of technological know-how and promotes socioeconomic benefits for society.

2.3 Concept Of Green Innovation

Green innovation is defined as innovation that includes new or enhanced methods, procedures, systems, and goods that are environmentally friendly and support environmental sustainability[12]. Green product innovation is a subset of green innovation. The creation of a new good or service that has little to no adverse effects on the environment is known as "green product innovation."

Green process innovation is the use of environmentally friendly technologies to produce goods and services while modifying or improving the current production process. "Green Innovation does not need to be developed with the objective of reducing the environmental burden, rather to yield considerable environmental benefits. Innovation in hardware or software that involves green products or processes, including innovation in technology related to energy-saving, waste-recycling, design of green products, pollution-prevention, or corporate environmental management. Green innovation includes all innovations that contribute to the development of goods, services, or procedures that minimize negative environmental effects while also making

[9] P. Chanda & A. Rao, Green Patents and Their Role in Sustainable Development, 6 *J. Intell. Prop. L. & Prac*
[10] The Environment (Protection) Act, No. 29 of 1986, INDIA CODE.
[11] The Patents Act, No. 39 of 1970, INDIA CODE
[12] OECD, *Eco-Innovation in Industry: Enabling Green Growth* 17–19 (2009).

ISSN: 2582-6433

the best use of available natural resources. These days, this kind of innovation is essential because it directs the use of natural resources to enhance human welfare in general. Furthermore, sustainable development may result from the development and incorporation of modifications to goods and production methods.

2.4 Importance Of Green Innovation

Businesses are moving toward green innovation not just in response to competitive pressure or stringent government regulations, but also because putting environmental management policies into place gives them access to a variety of opportunities[13]. By reducing costs, waste, and other inefficiencies, incorporating green innovation improves economic and social performance and draws in new clients. Sixty-six percent of consumers are willing to pay more for sustainable products, according to the Nielson Global Corporate Sustainability Report.

It can give a business a competitive advantage, improving its market position. Businesses can make innovations by supporting environmental organizations and causes or increasing consumer Awareness.

2.5 Procedure To Accomplish Green Innovation

Businesses now see green innovation as both an opportunity and a challenge since they have come to understand its significance. Nowadays, a lot of businesses are redesigning their internal procedures to enhance the environmental performance of their products throughout their entire lifecycle, from acquiring the product's raw materials to using and disposing of them. However, making the transition from conventional[14] to green is not simple.

To get the most out of an organization, a clear roadmap is necessary. These are some crucial details regarding an organization's adoption of green innovation.

Start with minor adjustments: Within a predetermined protocol, new organizations should begin their journey by making minor adjustments to their manufacturing and development process.

Make a plan: This entails switching to more profitable and environmentally friendly machinery, new production concepts, and new raw materials. It will take some work to fully transition from "traditional" to "green."

[13] Michael E. Porter & Claas van der Linde, Toward a New Conception of the Environment-Competitiveness Relationship, 9 *J. Econ. Persp.* 97 (1995).

[14] Klaus Rennings, Redefining Innovation—Eco-Innovation Research and the Contribution from Ecological Economics, 32 *Ecol. Econ.* 319 (2000).

ISSN: 2582-6433

Develop support: Engage possible partners, including stakeholders and people whose financial support is crucial to your success and who will ultimately gain from your innovation. It is necessary to take into account the needs of the members[15] as well as those of the company. Adapt businesses' tactics to obtain a competitive edge: To get past obstacles that stand in the way of innovation, an organization's fundamental principles must be changed.

CHAPTER 3 – INTERFACE BETWEEN IPR AND GREEN INNOVATION

It is imperative that we move quickly toward a low-carbon, sustainable economy in response to the growing global environmental crisis. Green innovation, which includes the creation and application of technologies, goods, and services that lessen their impact on the environment, is a crucial part of this shift. The role of intellectual property rights (IPR), a legal framework designed to promote innovation and creativity, is central to this process. Because it affects how swiftly and fairly green technologies can be created and distributed globally, the intersection of these two domains is a topic of increasing scholarly and policy interest. This essay explores this relationship while providing a fair assessment of its advantages and disadvantages.

Green innovation and intellectual property rights (IPR) have a complicated and multidimensional relationship that can sometimes act as a barrier and other times as a catalyst. IPR, on the one hand, offers the crucial incentives required to promote the development, testing, and adoption of new, eco-friendly technologies. However, it can also result in monopolies that prevent these vital technologies from being widely adopted[16], especially in developing nations that most need them. Finding a delicate balance that safeguards innovators' interests while simultaneously guaranteeing that the world community has access to the resources required to fight climate change and environmental degradation is the difficult part.

3.1 IPR As A Green Innovation Catalyst

IPR is essential for encouraging green innovation, especially patents. The patent system gives inventors the short-term, usually 20-year, exclusive rights to their creations. Because it enables businesses to recover the substantial financial outlay and high risk involved in creating new

[15] Nielsen, *The Sustainability Imperative: New Insights on Consumer Expectations* (2015)
[16] Peter Drahos, *Intellectual Property, Innovation and the Environment*, in **Intellectual Property and Sustainability: Developing Countries and the WTO** 109, 115 (Thomas Cottier ed., 2009).

ISSN: 2582-6433

green technologies, this exclusivity is a potent motivator[17]. Many businesses wouldn't be willing to spend money on lengthy, costly research projects for things like carbon capture technologies, renewable energy systems, or sustainable materials if they didn't have the assurance of this exclusive time. Additionally, the patent system serves as a knowledge sharing tool. Inventors are required to make the technical details of their invention publicly available in exchange for the exclusive rights. This open disclosure speeds up innovation by adding to a large, searchable body of technical knowledge that other researchers and innovators can build upon.

Green innovation is also supported by other types of IPR besides patents. For instance, trademarks and eco-labels assist customers in recognizing and putting their trust in truly sustainable goods and services. For businesses dedicated to ecologically conscious operations, this enhances brand value and can boost customer loyalty. Additionally, the protection of ideas and confidential information by copyrights and trade secrets, respectively, promotes investment and cooperation in the green technology industry.

3.2 Challenges of IPR With The Diffusion Of Green Technologies

Although intellectual property rights (IPR) are praised for encouraging innovation, they also pose serious obstacles to the broad adoption and diffusion of green technologies. The very exclusivity that spurs innovation may work against the quick and widespread adoption of climate change-fighting technologies. Because of the dual nature of IPR, a sophisticated strategy is needed to guarantee that the advantages of innovation are distributed fairly and successfully[18].

High Costs and Monopolistic Control

The possibility of monopolistic control is one of the biggest disadvantages of a robust IPR regime, especially for green patents. A business that owns a patent for a vital green technology has the authority to control how it is used. For potential users, particularly those in developing countries, this frequently translates into exorbitant licensing fees and royalties, rendering the technology unaffordable[19]. For instance, nations that must quickly develop their renewable energy infrastructure but lack the funds to pay a premium may not be able to access patented

[17] Christopher Heath & Anselm Kamperman Sanders, *Intellectual Property and Green Technologies: From Restriction to Cooperation* 57 (2012).
[18] Daniel Gervais, *Intellectual Property, Trade & Development* 233 (2d ed. 2014)
[19] Keith E. Maskus, *Private Rights and Public Problems: The Global Economics of Intellectual Property in the 21st Century* 172 (2012).

ISSN: 2582-6433

technology for a more effective wind turbine blade or a crucial part of a battery storage system[20]. This directly impedes the world's shift to a green economy by establishing a "paywall" for necessary knowledge. Smaller businesses and independent researchers may be harmed by the high expenses of licensing as well as the difficult process of obtaining and enforcing patents, which concentrates innovation in the hands of big businesses.

Innovation Stifling and Patent Thickets

The patent thickets phenomenon presents another difficulty. Many overlapping patents may be filed in a rapidly developing field such as green technology, resulting in a complex web of legal rights that can be expensive and challenging to navigate[21]. Potential innovators may be discouraged from entering the market or from advancing current technologies due to this complexity. Patent tangles can have a chilling effect, causing resource-draining legal disputes and postponing the development of subsequent innovations, rather than creating an atmosphere where a new idea can build upon an existing one. For instance, a business may develop a novel approach to recycling electronic waste, but if it violates multiple overlapping, pre-existing patents, the business may have to forgo its innovation or incur excessive costs and time for litigation and cross-licensing arrangements. At a time when speed is critical, this legal and bureaucratic burden may slow down the overall rate of green innovation.

Barriers to the Transfer of Technology

Although IPR is meant to make technology transfer easier through licensing, in reality, its stringent implementation can make it more difficult, especially for developing nations. Many potential users in the Global South may find licensing agreements unappealing or impracticable due to their high cost and stringent conditions. In order to preserve their competitive edge or to keep their prices high, some patent holders may also decide to deliberately exclude their technology from particular markets. This approach runs counter to the need for green technologies to spread quickly and widely in order to meet climate targets. International IPR agreements' "one-size-fits-all" approach frequently ignores the disparities in economic and technological capabilities among nations, resulting in a system that inadvertently widens the divide between technologically advanced and underdeveloped nations[22]. This lack of access can undermine international efforts to achieve sustainability by forcing developing countries

[20] Ruth L. Okediji, *Sustainable Development and the Role of Intellectual Property*, 8 U.C. Irvine J. Int'l, Transnat'l & Comp. L. 25, 33 (2022).
[21] Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 Tex. L. Rev. 1991, 2003 (2007)
[22] Carlos M. Correa, *Intellectual Property and Climate Change: Overview of Legal Issues* 27 (2010).

ISSN: 2582-6433

to rely on outdated, inefficient, and more polluting technologies.

3.3 Role Of Green Ipr In Sustainable Growth

Green IPRs are crucial for promoting the advancement and uptake of environmentally friendly technologies.

Investments in environmental research and development (R&D) are encouraged by IPR systems friendly technologies by giving innovators legal protection[23]. This is especially important when tackling global issues like climate change, for which there is an immediate need for sustainable solutions.

Green Innovation Incentive

IPR systems—in particular, patents—are essential for promoting green innovation because they safeguard businesses' and inventors' intellectual property. They can recover their R&D expenditures thanks to this protection, which encourages more innovation. Research has demonstrated, for example, that increased IPR protection can boost the production of green patents. Likewise, in China, the development of ecologically friendly resource extraction methods has been connected to IPR protection.

Encouraging the Transfer of Technology

Additionally, green IPR makes it easier for environmentally friendly technologies to be transferred, particularly to developing nations. According to the Paris Agreement, this is essential to reaching the world's climate goals[24]. However, different regions have different levels of IPR's efficacy in technology transfer. For instance, although technology transfer may be facilitated by IPR protection in host nations, its effects on innovation and development are still mixed.[25]

Keeping Public and Private Interests in Balance

Finding a balance between innovators' private interests and the public's need for access to green technologies is a major challenge when utilizing green intellectual property rights. This equilibrium is especially crucial in light of climate change, as attaining global sustainability objectives requires broad access to green technologies. By guaranteeing that green technologies

[23] Peter K. Yu, *Intellectual Property and Climate Change: Advancing Green Technology Innovation*, 45 Fla. St. U. L. Rev. 1, 18 (2018).
[24] Paris Agreement art. 10(2), Dec. 12, 2015, T.I.A.S. No. 16-1104
[25] Keith E. Maskus, *Encouraging International Technology Transfer* 51 (2004).

ISSN: 2582-6433

are available and offering incentives for innovation, mechanisms like compulsory licensing and patent pools can aid in addressing this issue.

Applications of Green IPR by Sector

There are uses for green IPR in a variety of industries, each with its own opportunities and challenges.

The Energy Sector

Green IPR greatly benefits the energy industry, especially when it comes to the advancement of renewable energy technologies like solar, wind, and geothermal. In order to protect these inventions and allow businesses to commercialize their technologies, patents are essential. For instance, robust IPR regimes have aided in the development of energy-efficient technologies and smart grids (Rimmer, 2011) (MADHUMITHA, 2024).

Food Security and Agriculture

In the agriculture industry, green IPRs are crucial for advancing climate-resilient crops and sustainable farming methods. In this situation, the rights of plant breeders and their access to genetic resources are especially crucial. To prevent compromising food security or limiting small-scale farmers' access to genetic resources, IPR use in agriculture must be properly controlled (Rimmer, 2018) (Khan & Singh, 2023).

Industry and Manufacturing

Another important industry where Green IPR is important is manufacturing. Green chemistry and cleaner production methods are examples of eco innovations that are essential for lowering industrial emissions and advancing sustainable development. Businesses may be encouraged to invest in these innovations by IPR protection, especially in sectors where technology imitation is a major worry (Chen & Chen, 2024).

Infrastructure and Urban Planning

Green IPRs can also be used in infrastructure development and urban planning. For instance, patents pertaining to sustainable urban planning and green building technologies can encourage the growth of environmentally friendly cities. Furthermore, IPR can help developing nations achieve their sustainable development goals by facilitating the transfer of these technologies to them (Yan et al., 2024).

ISSN: 2582-6433

CHAPTER 4: ROLE OF GREEN PATENTS IN PROMOTING SUSTAINABILITY

Innovative solutions are required to address the urgent global issues of resource depletion, climate change, and environmental degradation. Green patent technology is one of these solutions that has emerged as a vital instrument for advancing environmental sustainability. Green patents are intended to promote and safeguard environmentally beneficial inventions that have the potential to drastically lessen environmental damage. Inventors of technologies that support sustainable development, like waste management solutions, pollution control systems, and renewable energy technologies, are granted exclusive rights by these patents. A legal framework for patenting such technologies is provided in India by the Patents Act, 1970, which also protects inventors and encourages the development of innovations that support environmental preservation[26]. The idea of green patents, their importance, the development of green technologies, and the contribution of the Indian and international legal systems to innovation are all covered in this article. It also highlights significant case laws that have influenced India's legal system and talks about the difficulties facing green patent technologies.

4.1 Comprehending Green Patents

A patent is a legal right that gives the creator of a novel, practical, and non-obvious invention the sole authority to produce, utilize, market, or grant a license for a set period of time. The 1970 Patents Act, which was significantly amended in 2005 to conform to the TRIPS Agreement (Trade-Related Aspects of Intellectual Property Rights), governs patents in India[27]. India's intellectual property rights are now better protected thanks to this amended law, which also promotes innovation in a number of fields, including technology. Green patents are a subset of patents that concentrate on innovations created to solve environmental problems, like energy-efficient procedures, waste recycling technologies, and renewable energy systems. By providing legal protection and allowing inventors to commercialize their technologies without worrying about unauthorized use, these patents encourage innovation.

Green patents are important because they can encourage technological developments that lessen the negative environmental effects of human activity. By safeguarding inventions that reduce pollution, support renewable energy, and aid in resource conservation, they play a crucial part in promoting sustainable practices. Green patents are given in India for innovations

[26] The Patents Act, No. 39 of 1970, INDIA CODE (1970)
[27] Agreement on Trade-Related Aspects of Intellectual Property Rights arts. 7–8, Apr. 15, 1994, 1869 U.N.T.S. 299

ISSN: 2582-6433

that support the nation's environmental objectives and include waste management technologies, energy-efficient procedures, and renewable energy sources like solar, wind, and geothermal[28].

4.2 The Development of Green Patents In India

India has made significant strides in promoting innovations in green technology, especially in the field of renewable energy. With a growing number of patent applications pertaining to waste management, energy conservation, and clean energy technologies, the nation has emerged as one of the global leaders in green patent filings[29]. India awarded more than 61,000 green technology patents between 2016 and 2022, with waste management and alternative energy generation accounting for a sizable share of these patents. Through the introduction of frameworks and policies that encourage the development of green technologies, the Indian government has been instrumental in this growth.

The Patents (Amendment) Rules, 2016, which established a streamlined review procedure for patent applications pertaining to green technologies, was one significant initiative[30]. In order to ensure that environmentally friendly innovations can be implemented to address urgent environmental challenges, this initiative aimed to expedite the approval of green patents. Furthermore, in situations of public interest, such as those pertaining to environmental sustainability, patented inventions may be subject to compulsory licensing under Section 84 of the Patents Act, 1970. This clause guarantees that green technologies are available to the general public, especially in developing nations where access to these essential innovations may otherwise be restricted by high patent licensing fees.

Significance Of Green Patents

Green patents are crucial for advancing economic growth and technological advancement in addition to environmental sustainability. Green patents encourage research and development in the field of environmental technology by giving inventors exclusive rights. By giving businesses and individuals who invest in sustainable technologies a financial return on their investment, this promotes innovation. Additionally, the green sector offers substantial economic opportunities as a result of the commercialization of these green technologies[31], which also generates new industries and jobs. For example, the growth of renewable energy

[28] Ministry of Commerce & Industry, *Annual Report 2022–23: Intellectual Property India* 102 (2023).
[29] World Intellectual Property Organization (WIPO), *Green Technology Book: Solutions for Climate Change* (2023).
[30] Patents (Amendment) Rules, 2016, Gazette of India, pt. II, sec. 3(i).
[31] Christopher Heath & Anselm Kamperman Sanders, *Intellectual Property and Green Technologies* 72–73 (2012)

ISSN: 2582-6433

like wind and solar has helped to create jobs and boost the local economy in addition to reducing reliance on fossil fuels.

Green patents are important for solving global environmental issues in addition to their economic impact. Carbon emissions can be greatly decreased, natural resources can be preserved, and the effects of climate change can be lessened by implementing waste management techniques, pollution control systems, and renewable energy technologies. By offering a legal framework that safeguards innovators' rights and guarantees the commercialization of environmentally friendly inventions, green patents help these technologies become widely adopted. Additionally, by allowing nations to pool resources and expertise in the battle against global environmental problems like resource depletion and climate change, green patents promote international cooperation.

4.3 Obstacles in Green Patent Technology

Green patents face a number of formidable obstacles in spite of their significance. The high expense of research, development, and patent filing is one of the most urgent problems, as it may discourage startups, smaller businesses, and individual inventors from entering the green technology market. Large sums of money are needed to develop new green technologies[32], and smaller businesses may not be able to afford the costs of obtaining a patent, which restricts their capacity to innovate in this area. Many inventors who might have the ideas but lack the funds to protect and market them face a barrier to entry as a result.

Furthermore, it is still difficult to obtain patented green technologies, especially in developing nations. Low-income countries may not be able to take advantage of patented green technologies due to the high licensing costs, which could impede their attempts to address environmental issues. This problem is made worse by the fact that many green technologies are owned by big, international companies, who might put financial gain ahead of making sure that people in need can access them.

The enforcement of patent rights, which is frequently a drawn-out and expensive procedure, presents another difficulty. The implementation of vital technologies may be delayed by patent disputes, delaying prompt resolution of environmental issues. In order to settle these disputes, it is essential to strike a balance between the interests of patent holders and the general public[33]. In order to guarantee that patented green technologies are made available in the public interest, particularly during times of national emergency or environmental crisis, mechanisms such as

[33] Madhumitha R., *Green Technology Patents and Their Role in India's Sustainable Development*, 12 **Indian J.L. & Pol'y Rev.** 203, 210 (2024

ISSN: 2582-6433

compulsory licensing may be able to help.

4.4 Cop 27: The United Nations Climate Change Conference

The detrimental effects of climate change on agriculture and food security are discussed in detail at the Conference of Parties (COP) 27. Additionally, it emphasizes a plan of action for climate empowerment as well as suitable safeguards against harm brought on by climate change. In one of its reports on national adaptation policies, the parties' conference asks the Least Developed Countries to process, develop, and successfully implement adaptation plans. It also details the progress made in implementing national adaptation plans. In November 2022, Egypt hosted the Sharm El Sheikh Climate Implementation Summit, also referred to as COP 27[34]. The COP, also referred to as the "Implementation COP," has covered a wide range of practical climate change mechanisms. "Investing in the future of energy: Green Hydrogen" is the topic of one round table. Green energy is mentioned by the COP as being important. In the process of transitioning to clean and green energy, energy has been the main focus. In addition to encouraging a healthy energy exchange and concentrating on green energy development in transitions, COP 27 offers long-term answers to a number of climate-related problem.

CHAPTER 6 – CONCLUSION AND SUGGESTIONS

In the end, intellectual property rights (IPR) are a double-edged sword but a critical mechanism for promoting green innovation in the direction of a low-carbon, sustainable future. The main finding is that strong and balanced IPR systems are required to encourage the significant investment needed to create new green technologies and to facilitate their global adoption and diffusion.

IPR—in particular, patents offers the exclusivity that innovators need to obtain capital, recoup significant R&D expenses, and obtain a competitive advantage[35]. For the initial development and commercialization of environmentally friendly technologies, this financial incentive is essential. But if not properly handled, robust IPR can also create obstacles by limiting the dissemination and accessibility of important technologies, particularly in developing countries, which could impede the swift, international action required to slow down climate change[36].

[34] U.N. Climate Change Conference (COP 27), *Sharm El-Sheikh Implementation Plan* (2022).
[35] John H. Barton, *Intellectual Property and Access to Clean Energy Technologies in Developing Countries: An Analysis of Solar Photovoltaic, Biofuel and Wind Technologies*, ICTSD Issue Paper No. 2, at 9 (2007)
[36] United Nations Conference on Trade and Development (UNCTAD), *Trade and Environment Review 2023: Building a Sustainable and Resilient Future Through Trade and Investment*, at 75–78.

ISSN: 2582-6433

IPR should therefore act as a catalyst rewarding creativity and make sure that the benefits of green innovation are widely shared in order to achieve global sustainability goals.

6.1Case Laws Concerning Green Patents

The legal environment surrounding green patents in India has been greatly influenced by the judiciary, especially when it comes to safeguarding intellectual property rights and resolving conflicts involving green technologies. West Bengal Chemical Industries Limited v. GTZ (India) Private Limited is a notable case in which WBCIL claimed that GTZ (India) had violated its patent for a medicinal procedure. The Calcutta High Court highlighted the significance of defending intellectual property rights in order to promote innovation when it granted an interim injunction in favor of WBCIL in this case. The court stated that WBCIL had proven a strong prima facie case of patent infringement and that the company's interests would be irreparably harmed if the infringement were to continue. This case made clear how crucial it is to safeguard green technology patents so that creators can profit from their creations and keep coming up with fresh answers to environmental issues.

The case of *Enercon (India) Ltd. v. Enercon GmbH (2014)* is another noteworthy case in the Indian context. It mainly concerns intellectual property rights (IPR) and patent enforcement in relation to international technology transfer. The German company Enercon GmbH owned wind turbine technology patents that it licensed to Enercon (India) Ltd, its Indian subsidiary. The conflict started when Enercon GmbH claimed that its Indian counterpart had used the patented technology without the required authorization, in violation of the terms of the licensing agreement, resulting in patent infringement. The primary question on the Delhi High Court's agenda was whether Enercon (India) Ltd. could legally use the patented technology to produce and market wind turbines without violating the intellectual property rights of Enercon GmbH. The court determined that Enercon (India) Ltd. had in fact infringed upon the exclusive patent rights owned by its parent company, underscoring the significance of contractual agreements in guaranteeing adherence to patent rights[37]. However, the court ordered the parties to arbitrate their disagreement rather than pursue additional legal action. This ruling underlined the value of using efficient legal procedures to enforce intellectual property rights and highlighted arbitration as a successful method of settling cross-border IPR disputes, particularly in light of international technology partnerships.

[37] *W. Bengal Chem. Indus. Ltd. v. GTZ (India) Pvt. Ltd.*, 2001 SCC OnLine Cal 50

ISSN: 2582-6433

6.2 The Future Landscape

As governments and organizations work to meet climate targets and environmental commitments, the role of green patents has become more widely recognized on a global scale. Nations such as the US, China, and EU members have implemented frameworks and policies to use patents to encourage green innovations. Clean energy and sustainable technology development is aided in the United States by tax breaks, grants, and accelerated patent examination procedures for green technologies[38]. By making significant investments in green technologies and renewable energy and enacting laws that expedite the patenting of environmentally friendly inventions, China has also become a leader in the filing of green patents.

Globally, the World Intellectual Property Organization (WIPO) has started programs like WIPO Green, which makes it easier for countries to share eco-friendly technologies. This platform acts as a green technology marketplace, assisting creators in locating collaborators and possible licensees for their innovations. Because they promote knowledge exchange and cooperation between nations and industries, such international initiatives are essential in tackling global environmental issues.

Green patent technology's future depends on resolving issues with accessibility, affordability, and enforcement. Policies that reduce the financial burden on innovators and guarantee that green technologies are available to everyone, particularly in developing countries, must be developed in collaboration between governments and international organizations. To guarantee that green patents contribute to a sustainable and just future for everybody, it will be essential to fortify international cooperation and improve the enforcement of patent rights.

By promoting the creation and commercialization of environmentally friendly innovations, green patent technology is essential to the shift towards a more sustainable future. India's dedication to tackling environmental issues and promoting technological advancement is demonstrated by the rising number of green patents in the nation. It is impossible to overestimate the contribution that green patents make to environmental sustainability, even in the face of persistent obstacles like exorbitant costs, restricted access, and patent enforcement. Green patents will remain a vital instrument in the pursuit of a cleaner, greener, and more sustainable world as environmental concerns become more pressing.

[38] U.S. Patent & Trademark Office (USPTO), *Green Technology Pilot Program*, 74 Fed. Reg. 64666 (Dec. 8, 2009)

ISSN: 2582-6433

6.3 Suggestions To Promote Green Innovation

In order to optimize the beneficial effects of intellectual property rights on green innovation, the following systemic and policy recommendations are suggested:

1. **Make Green R&D Incentives Stronger**

   Establish fast-track examination procedures for patent applications pertaining to environmentally sound technologies as part of the "Green Patent" initiatives. This shortens the time to market and speeds up the commercialization of environmentally friendly innovations. Offer Fiscal Incentives: Make the financial advantages of IPR for environmentally conscious innovators more obvious by tying R&D tax credits, subsidies, or government procurement contracts to the successful filing or licensing of green patents. Strengthen Enforcement: By lowering the risk of illegal use and free-riding, establish efficient and consistent enforcement of green IPR to inspire confidence in investors and innovators, especially in global markets.

2. **Encourage the spread and accessibility of technology**

   Promote Voluntary Licensing and Technology Transfer: Provide patent holders with incentives to sell their green technologies, such as royalty-free or preferential rate licenses, particularly for use in developing nations. Support platforms such as WIPO GREEN, which link suppliers and buyers of sustainable technology. In order to promote cooperative R&D and quick standardization, it is recommended that patent pools and open innovation models be established. This will allow innovators to share key patents on predetermined terms in "green technology patent pools." The use of TRIPS flexibilities, such as compulsory licensing (as per international agreements), as a "last resort" mechanism to address pressing public needs or market failures in obtaining necessary green technologies should be clearly outlined in the IP law.

3. **Build Knowledge and Infrastructure for IP**

   Enable researchers, entrepreneurs, and policymakers worldwide to easily access patent databases and technical information on green technologies. This will allow them to "invent around" existing patents and prevent research duplication. Capacity Building: Offer SMEs, research institutions, and entrepreneurs in the green technology sector IPR training and support that is specifically designed to help them use IPR for protection and commercialization.

4. **Align Climate Objectives with IPR Policy**

   Make sure that national and international climate action plans clearly acknowledge the strategic role that IPR plays in achieving sustainability and emissions reduction goals.

ISSN: 2582-6433

To ensure that a balance between innovation and diffusion is maintained across various economies, it is important to encourage international cooperation by promoting global discussions and agreements to harmonize IPR approaches related to climate technologies.

BIBLIOGRAPHY

WEBSITES:

https://greenly.earth/en-us/blog/ecology-news/everything-you-need-to-know-about-green-technology-in-2022

RESEARCH ARTICLES:

- Hall, B. H., & Helmers, C. (2010). The Role of Patent Protection in (Clean/Green) Technology Transfer. Working Paper 16323. National Bureau of Economic Research.
- David Elliott, *Energy, Society and Environment: Technology for a Sustainable Future* 23–28 (2d ed. 2007).
- Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2022: Impacts, Adaptation and Vulnerability* (2022)
- World Comm'n on Env't & Dev., *Our Common Future*, U.N. Doc. A/42/427 (1987).
- Rainer Hinrichs-Rahlwes, *Renewable Energy: Paving the Way Towards Sustainable Energy Security* 41–56 (2013).
- Peter Drahos, *The Global Governance of Knowledge: Patent Offices and Their Clients* 198–202 (2010).
- Carlos M. Correa, *Trade Related Aspects of Intellectual Property Rights: A Commentary on the TRIPS Agreement* 88–94 (2007)
- P. Chanda & A. Rao, Green Patents and Their Role in Sustainable Development, 6 *J. Intell. Prop. L. & Prac*
- OECD, *Eco-Innovation in Industry: Enabling Green Growth* 17–19 (2009).

LEGISLATIONS

- The Environment (Protection) Act, No. 29 of 1986, INDIA CODE.
- The Patents Act, No. 39 of 1970, INDIA CODE
- Paris Agreement art. 10(2), Dec. 12, 2015, T.I.A.S. No. 16-1104

ISSN: 2582-6433

BOOKS

- Michael E. Porter & Claas van der Linde, Toward a New Conception of the Environment-Competitiveness Relationship, 9 *J. Econ. Persp.* 97 (1995)
- Klaus Rennings, Redefining Innovation—Eco-Innovation Research and the Contribution from Ecological Economics, 32 *Ecol. Econ.* 319 (2000).
- Nielsen, *The Sustainability Imperative: New Insights on Consumer Expectations* (2015)
- Peter Drahos, *Intellectual Property, Innovation and the Environment*,
- Christopher Heath & Anselm Kamperman Sanders, *Intellectual Property and Green Technologies: From Restriction to Cooperation* 57 (2012)
- Peter K. Yu, *Intellectual Property and Climate Change: Advancing Green Technology Innovation*, 45 Fla. St. U. L. Rev. 1, 18 (2018).
- Keith E. Maskus, *Encouraging International Technology Transfer* 51 (2004).