

BRIDGING THE GAP: COORDINATING PATENT LAW AND ENVIRONMENTAL POLICY TO ACCELERATE GREEN INNOVATION IN INDIA

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ABSTRACT

Green technology, while not precisely defined, generally refers to innovations that enhance environmental sustainability by reducing pollution, improving resource efficiency, and promoting ecological balance. These technologies are crucial in the fight against global warming and climate change, particularly as human activities contribute to rising greenhouse gas emissions worldwide. India's proactive stance on climate change, demonstrated through its international commitments and ambitious renewable energy targets, underscores the importance of promoting green innovation. Intellectual Property Rights (IPRs), particularly patents, play a dual role in this context, encouraging the development of green technologies by granting exclusive rights to inventors while also raising concerns about access and affordability.

India's patent system, governed by the Patents Act of 1970 and aligned with the TRIPS agreement, supports green innovation through mechanisms such as expedited examinations for green technologies and compulsory licensing in the public interest. Between 2016 and 2022, India saw a significant increase in green patent filings, particularly in the areas of waste management and renewable energy. Judicial interventions further strengthen the protection and promotion of green technologies. Additionally, the Indian Constitution includes provisions related to the environment. Ultimately, the relationship between patent law and green technology should focus on promoting sustainable development while ensuring equitable access to environmental innovations.

Keywords: Green Technology, Patent, Environmental Sustainability.

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INTRODUCTION

There is no commonly accepted or internationally agreed-upon definition of green technology. The term can be broadly defined as technology that has the potential to improve environmental performance relative to other technologies significantly. It is related to the term "environmentally sound technology", which was adopted under the United Nations Conference on Environment and Development Agenda 21, although it is no longer widely used. Based on Agenda 21, environmentally sound technologies are geared to "protect the environment, are less polluting, use all resources more sustainably, recycle more of their wastes and products, and handle residual wastes in a more acceptable manner than the technologies for which they were substituted." Building on this definition, green technologies encompass a wide range of innovations aimed at minimising environmental harm. In terms of pollution, green technology includes both process and product technologies that generate low or no waste and increase resource- and energy-efficiency. The ultimate goal of green technologies is sustainability, ensuring present needs are met without compromising the ability of future generations to meet their own. This sustainable approach is crucial given the urgent challenges posed by global warming.¹

Green technology initiatives play an important role in addressing climate change. Greenhouse gas emissions from human activities (such as burning fossil fuels and deforestation) are producing unprecedented carbon dioxide levels in the Earth's atmosphere. These concentrations lead to global warming and its consequences, including rising sea levels, extreme weather events and ecosystem disruption. According to the Intergovernmental Panel on Climate Change (IPCC), immediate steps must be taken to limit global warming to 1.5°C (34.7°F) above preindustrial levels. Against this global backdrop, India's contribution to climate action deserves particular attention.² As a major developing economy, India is the world's third-largest emitter of greenhouse gases, accounting for 7 per cent of the global total annually. India's various climate Change Conference (COP21) in Paris. The first climate commitment by India was articulated in its National Statement at the United Nations

¹ United Nations Economic and Social Commission for Asia and the Pacific, Green Technology: Fact Sheet (UNESCAP 2012) <<u>https://www.unescap.org/sites/default/files/34.%20FS-Green-Technology.pdf</u> > accessed 14 May 2025.

² IBM, 'What is Green Technology?' (IBM, 16 July 2024) <<u>https://www.ibm.com/think/topics/green-technology</u>> accessed 15 May 2025.

Sustainable Development Summit (UNSDS) in 2015, where a target of 175 gigawatts (GW) of renewable energy by 2022 was declared. Since then, India has updated and redefined its climate commitments. India adopted three other quantitative targets for the period until 2030, including:

- Reduction in the emissions intensity of GDP
- Increase in non-fossil electricity generation capacity
- Creation of new carbon sinks

India's National Statement at COP26 in Glasgow signalled a stepping-up of the Paris commitments, with five targets labelled *Panchamrit*, the five "nectars for immortality." These targets included increasing non-fossil capacity to 500 GW, meeting half of the country's energy requirements from renewables, reducing carbon emissions relative to an unspecified baseline, a more aggressive reduction in emissions intensity concerning GDP relative to the Paris commitment, and a target for net zero by 2070. Substantial progress has been achieved, e.g., installing 174 GW of renewable energy capacity as of 2023 and lowering emissions intensity by 24 per cent by 2016. Yet, hurdles need to be overcome in scaling up renewable capacity, energy storage, and afforestation to achieve its ambitious targets. India's climate pathway is therefore critical to global action on climate change, providing a possible model for sustainable development in emerging nations.³ However, policy measures alone are not enough; technological innovation supported by patents is vital for achieving these targets. To achieve these climate objectives, India needs to develop an environment that encourages green technological innovation-intellectual property rights and patent law here assume a central role. India's renewable energy sector is experiencing unprecedented growth, driven by policy advancements, increasing investments, and emerging technologies. Amidst these ongoing uncertainties, patent law plays a significant and potentially complex role in fulfilling India's ambitious goals for clean energy. Patents provide the inventor exclusive rights, an incentive to innovate in, and support the research and development (R&D) in advanced renewable energy technologies. Patents can also hinder renewable energy transitions, monopolising innovative

³ Kaushik Deb and Noyna Roy, 'COP28: Assessing India's Progress Against Climate Goals' (Center on Global Energy Policy, 1 December 2023) <<u>https://www.energypolicy.columbia.edu/cop28-assessing-indias-progress-against-climate-goals/</u>> accessed 16 May 2025.

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technologies, and ultimately burden access, increasing technology costs, and stifling the advancement of use.⁴

PATENT LAW IN INDIA

The legal framework for patents in India is governed by the Patents Act, 1970, as amended to comply with India's obligations under the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). The Act lays down substantive and procedural requirements for patentability, granting, and enforcement of patent rights. It provides clear standards for inventions and applicants so that there is a balance between innovation and public interest.

The Act provides for the grant of patents on new, non-obvious, and industrially applicable inventions across all fields. The eligibility criteria of the patent must satisfy three primary requirements, which are,

1. Novelty: It should not have been made available to the public before the patent filing.

2. Inventive Step: It should not be known to someone with ordinary skill in the field of the invention.

3. Industrial Applicability: It must be useful in industries such as technology, health, or agriculture.⁵

IPRs grant monopoly rights to inventions, and green intellectual property gives protection and rights to environment-friendly technologies. Green IPR includes granting rights to environment-friendly innovations. The role of green IPR is strengthened by the TRIPS agreement that seeks to promote the creation and technological dissemination for the benefit of end-users & creators of specific technical knowledge, which is also compatible with the socioeconomic advantage of the society. In its 2030 Sustainable Development Agenda, the World Intellectual Property Organisation (WIPO) reaffirmed the significance of IP protections for green technology and sustainability, noting that IP and its supporting innovation are linked

⁴ Pooja Chatterjee, 'Powering Progress: The Role Of Green Patents In India's Renewable Energy Revolution' (King Stubb & Kasiva, 8 April 2025) <<u>https://ksandk.com/intellectual-property-rights/green-patent-renewable-energy/#:~:text=Furthermore%2C%20Section%2084%20of%20the,impede%20candidates%20from%20using% 20them</u>> accessed 16 May 2025.

⁵ The Legal School, 'Patent Act 1970' (The Legal School, 12 August 2023)

<<u>https://thelegalschool.in/blog/patent-act-1970</u>> accessed 16 May 2025.

to a country's capability towards innovation, investment-friendly FDI and encourage commercial products and services on the global horizon.⁶

As highlighted in the World Intellectual Property Organisation (WIPO) International Patent Classification (IPC) Inventory, "*Patent law facilitates the dissemination of green technology* by way of publication, which should consequently encourage the development of more technology."⁷

GREEN TECHNOLOGY

Green technology has become the first order of achieving the ambitious goal of being a zerocarbon emitter. In the timeframe between 2016 and 2022, A whopping increase in patents evidences a surge in green tech innovation, and India grants a patent every second in the green field. Over 61,000 patents of green tech have been filed, of which 90% are regarding waste management and alternative energy production, and the remaining are related to other areas such as energy conservation, transportation, nuclear power, agriculture, and forestry.⁸

Green technology covers a broad area of production and consumption technologies. The adoption and use of green technologies involves the use of environmental technologies for monitoring and assessment, pollution prevention and control, and remediation and restoration. Monitoring and assessment technologies are used to measure and track the condition of the environment, including the release of natural or anthropogenic materials of a harmful nature. Prevention technologies avoid the production of environmentally hazardous substances or alter human activities in ways that minimise damage to the environment; it encompasses product substitution or the redesign of an entire production process rather than using new pieces of equipment. Control technologies render hazardous substances harmless before they enter the

⁶ Z A Khan and S Singh, 'Intellectual Property Rights Regime in Green Technology: Way Forward to Sustainability' (2023) 22(4) *Nature Environment and Pollution Technology* 2145 <<u>https://neptjournal.com/upload-images/(40)B-4048.pdf</u>>accessed 16 May 2025

⁷ Sonja Alexandra Rapcanova, *Patent Law and Green Technology: The Role of Patent Law Mechanisms in the Development and Diffusion of "Green Technologies"* (Master's thesis, Lund University 2022)<<u>https://lup.lub.lu.se/luur/download?func=downloadFile&recordOId=9086289&fileOId=9086293</u> > accessed 15 May 2025

⁸ Neha Vivek A, 'The Rise of Green Patents: Driving Innovation for a Sustainable Future' (Global Patent Filing, 8 July 2024) <<u>https://www.globalpatentfiling.com/blog/The-Rise-of-Green-Patents-Driving-Innovation-for-a-Sustainable-Future</u>>accessed 15 May 2025.

environment. Remediation and restoration technologies embody methods designed to improve the condition of ecosystems degraded through naturally induced or anthropogenic effects.⁹



Figure 1 - The sectors of Green Technology in which patents are granted for the innovation.

GREEN PATENT

Green patents are a mechanism to combat climate change and promote sustainability. Green patents protect green technology globally, i.e., patenting technologies or inventions that enable ecological growth.¹⁰ In recognition of the global and national need for environmentally sound technologies, India has introduced procedural measures to encourage green innovation within the existing patent law framework.

Importance of Green Patents:

Incentivising Inventors: It is the core responsibility of green patents to encourage inventors to come forward with their technologies and grant them exclusive rights. This will help create innovative, new technologies in meeting environmental challenges while further fostering a culture of innovation and continuous improvement.

Environmental Impacts: By creating and generalising appropriate environmentally friendly technologies, green patents cause pollution to decline, resources to be conserved, and climatic conditions to be improved.

⁹ United Nations Economic and Social Commission for Asia and the Pacific, Green Technology: Fact Sheet (UNESCAP 2012) <<u>https://www.unescap.org/sites/default/files/34.%20FS-Green-Technology.pdf</u> > accessed 16 May 2025

¹⁰ Z A Khan and S Singh, 'Intellectual Property Rights Regime in Green Technology: Way Forward to Sustainability' (2023) 22(4) *Nature Environment and Pollution Technology* 2145 <<u>https://neptjournal.com/upload-images/(40)B-4048.pdf</u> >accessed 16 May 2025

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Economic Development: There is no doubt that clean technologies offer a tremendous economic opportunity. While the world market for green goods and services expands, green patents will create new employment opportunities, trigger economic development, and offer new market opportunities to companies.

International Cooperation: Most green patents require international cooperation, which results in resources and information sharing among nations. All the above arguments justify this global approach when dealing with transboundary environmental issues.

India has made substantial progress in encouraging green technology innovations, particularly in the renewable energy sector. The country has become one of the world's leaders in green patent filings, with an increasing number of patent applications related to clean energy technologies, waste management, and energy conservation. India granted over 61,000 patents related to green technologies, with a significant portion of these patents focusing on waste management and alternative energy production. The Indian government has played a pivotal role in this growth by introducing policies and frameworks that support the development of green technologies. One key initiative was the introduction of the Patents (Amendment) Rules, 2016, which introduced an expedited examination process for patent applications related to green technologies. This initiative aimed to speed up the approval of green patents, ensuring that eco-friendly innovations reach the market more quickly and can be implemented to tackle pressing environmental challenges. Additionally, Section 84 of the Patents Act, 1970 allows for compulsory licensing of patented inventions in cases of public interest, including those related to environmental sustainability. This provision guarantees that green technologies are accessible to the wider public, especially in developing countries, where excessive patent licensing fees could otherwise hinder access to these essential innovations.¹¹

¹¹ Intepat Interns, 'Green Technology Patent: A Key to Sustainable Development' (Intepat, 31 December 2024) <<u>https://www.intepat.com/blog/green-technology-patent-a-key-to-sustainable-development/</u>> accessed 16 May 2025.

TRENDS IN PATENTS GRANTED			
Year	Total Patents	Green Tech Patents	Percentage of Green Tech *
2016-17	9,847	5,816	59.1%
2017-18	13,045	6,959	53.4%
2018-19	15,283	8,995	58.8%
2019-20	24,936	12,362	49.6%
2020-21	28,391	13,758	48.5%
2021-22#	-NA-	13,296	-NA-
Total	91,502	61,186	66.8%**

Figure 2 - showing the trends in patent granting, Source: Ministry of Commerce & Industry

COMPULSORY LICENSING UNDER PATENT LAW

Section 84 of the Patent Act, 1970 states about Compulsory Licensing. Compulsory licensing is a license given to a person to use a patented invention by paying a royalty to the patentee without the patentee's permission. It is a statutorily created license allowing access to the invention by a third party. TRIPS agreement and the Indian Patent regime.

The TRIPS agreement allows products under compulsory licensing to be available in the market for further use. The TRIPS agreement does not mention compulsory licensing but discusses the invention's use without the right holder's authorisation (Article 31 of the TRIPS agreement). The benefit under this clause has only been permitted if attempts have been made to secure consent from the rights holder on acceptable commercial conditions. The exception to this rule is a national emergency, a situation of extraordinary urgency, or a public non-commercial purpose. The period of such use shall be limited to the authorised purpose. The patent holder or the patentee has to be paid proper remuneration for the use by the third party. There have been deliberations that if climate change is considered a national emergency, granting compulsory licenses on green inventions can elucidate the problem of climate change and environmental degradation. Compulsory licensing of green technologies would not be prohibited by TRIPS because it is silent on what constitutes public interest or a national emergency. Speaking of patents and the environment, both fields are now interconnected and interlinked.

A crucial green technology litigation was *Paice LLC v. Toyota Motor Corp* (609 F. Supp. 2d 620, 623 (ED Tex. 2009). In this US case, the defendant used the plaintiff's hybrid automobile technology and gave him a royalty of twenty-five dollars in exchange for that technology. However, the defendant company argued that they should not be restricted from using that technology, as that would be antithetical to the public interest.

The General Electric Co. v. Mitsubishi Heavy Industries (No. 3:10-CV-00276-F, 2013 BL 141580 (ND Tex. May 28, 2013). This was another litigation for clean technology. General Electric (from now on referred to as GE) had obtained a patent for creating a wind turbine operating system that could function at variable speeds in disparate wind conditions. GE and Mitsubishi entered a dispute as GE brought an infringement action against Mitsubishi. The defendants counter-filed by accusing GE of dominating the sector by making these turbine machines; these cases showcased green technology. Compulsory licensing is thus considered an important tool to tackle the problem of the diffusion of green technology. Not all do favour compulsory licensing, as sometimes, compulsory licensing abridges the rights of the patentees if there is unauthorised use of the patentee's invention. Compulsory licensing is also harmful to the countries where they are granted because it obstructs the growth of an independent and research-based country, as it would obstruct its ability to innovate something of its own.¹²

CASE LAWS ON GREEN PATENTS

In India, the judiciary has played a critical role in shaping the legal landscape for green patents, particularly in ensuring the protection of intellectual property rights and addressing disputes involving green technologies.

One significant case is *West Bengal Chemical Industries Limited v GTZ (India) Private Limited*, where West Bengal Chemical Industries Limited (WBCIL) alleged that GTZ (India) had infringed its patent for a chemical process. In this case, the Calcutta High Court granted an interim injunction in favour of WBCIL, emphasising the importance of protecting intellectual property rights to foster innovation. The court noted that WBCIL had established a strong prima facie case of patent infringement and that allowing the infringement to continue would cause irreparable harm to the company's interests. This case highlighted the importance of protecting

¹² Z A Khan and S Singh, 'Intellectual Property Rights Regime in Green Technology: Way Forward to Sustainability' (2023) 22(4) *Nature Environment and Pollution Technology* 2145

patents related to green technologies to ensure that innovators can benefit from their inventions and continue to develop new solutions to environmental problems.¹³

In *Enercon (India) Ltd. v. Enercon GmbH* (2014), a legal dispute arose concerning the unauthorised use of patented wind turbine technology. The Delhi High Court ruled favorably of Enercon GmbH, acknowledging the significance of intellectual property protection in the renewable energy sector.¹⁴

In *Tesla's Open Patent Initiative Case* - In 2014, Tesla Motors made a landmark decision to make its electric vehicle (EV) patents available to the public to further expedite the acceptance of sustainable transportation by other companies as they use Tesla's patented technology in good faith. In the automobile industry, the open patent initiative helped Tesla share information and overcome the barriers of electric vehicle adoption. Tesla shared its patents with rival companies to improve their technology relating to batteries, charging infrastructure, and electric drivetrains. Tesla's open patent strategy represents a bold approach to fostering industry-wide progress and underscores the importance of collaboration in tackling global environmental challenges. Thus, expanding the field of highly advanced EV technologies into the hands of other market players without the risk of patent warfare considerably grew the EV market.

In *Philips' LED Lighting Technology Case*, Philips has always been an innovator in LED lighting technology, with an extensive patent portfolio spanning the scope of LED design and manufacture. These patents have made it possible for Philips to design and develop energy-efficient lighting solutions very commonly adopted by residential, commercial, and industrial end users. The LED technologies developed by Philips hold great potential for the fact that energy utilisation has been highly minimised compared with older systems using incandescent and fluorescent lighting. Patented LED technology has led to the further development of long-lasting light sources that reduce the amount of wastage and the costs incurred for maintenance. Philips' large-scale patenting made the company be on top of the market in terms of LED lighting, thereby driving growth and profitability.

¹³ Intepat Interns, 'Green Technology Patent: A Key to Sustainable Development' (Intepat, 31 December 2024)
<<u>https://www.intepat.com/blog/green-technology-patent-a-key-to-sustainable-development/</u>> accessed 14 May 2025.

¹⁴ Pooja Chatterjee, 'Powering Progress: The Role of Green Patents in India's Renewable Energy Revolution' (King Stubb & Kasiva, 8 April 2025) <<u>https://ksandk.com/intellectual-property-rights/green-patent-renewable-energy</u>/> accessed 15 May 2025.

FAST TRACKING GREEN PATENT APPLICATION

Promoting environmentally-friendly innovation has become a key priority in national and international environmental policy. Intellectual property (IP) regimes, particularly patent laws, are perhaps the most important of the regulatory vehicles that promote technological innovation. For this reason, several national IP offices have put in place measures to fast-track "green" patent applications. The first program was established by the UK in May 2009. Australia, Israel, Japan, the Republic of Korea (ROK) and the US followed in the same year. More recently, Canada (in March 2011) and Brazil and China (in 2012) launched similar programs. Under these programs, the time needed to obtain a patent can be significantly reduced, from several years to just a few months.¹⁵

GREEN TECHNOLOGY PATENT IN OTHER COUNTRIES

One notable characteristic of the global green technology landscape is its significant concentration. When examining the geographical distribution of companies currently holding green patents, we find that 85 per cent of industrial companies involved in green patent activity are concentrated in only five countries. Japan's manufacturing firms occupy a leading position in this field with 32 per cent of patents, followed by China (19 per cent) and the USA (18 per cent). The remaining top-10 countries are all high-income industrial economies. Industrial firms from developing countries (excluding China) hold less than 2 per cent of green patents.¹⁶

China: China has made the development of environmental technology a central measure in pursuing its "dual carbon goal", peaking carbon and reaching carbon neutrality. Since 2012, China has had an exclusive green patent system that guarantees essential legal protection for innovations involving energy conservation, emission reduction, clean energy, and carbon capture and storage. These green patents, mostly invention patents, are meant to encourage technological innovation that promotes the development of a low-carbon economy. The green patent system encourages businesses and research institutions to invest in clean technologies by improving patent protection and promoting the commercialisation and international transfer of such technologies. Consequently, China's pledge to strengthen its green patent system is a

¹⁵ Antoine Dechezleprêtre and Eric Lane, 'Fast-Tracking Green Patent Applications' (WIPO Magazine, 3 June 2013) <<u>https://www.wipo.int/en/web/wipo-magazine/articles/fast-tracking-green-patent-applications-38465</u> > accessed 16 May 2025.

¹⁶ Lavopa, A., & Menéndez, M. de las M. (2023). *Who is at the forefront of the green technology frontier? Again, it's the manufacturing sector*. UNIDO Policy Brief No. 6.

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driving force behind both its internal environmental policies and its international competitiveness in green technology.¹⁷

United States of America: In America, the United States Patent and Trademark Office (USPTO) has launched the Green Technology Pilot Program to accelerate the patent examination process for eco-friendly inventions. Under this initiative, environmental quality-related applications, applications related to energy conservation, renewable energy development, or the minimisation of greenhouse gas emissions may be processed out of turn, given special priority, even without meeting all of the traditional requirements of the accelerated examination process, including filing an examination support document. This program is designed to stimulate quick development and deployment of green technologies by shortening the time required for approval of patents. The USPTO initially put the program at the first 3,000 qualifying applications, highlighting a selective but strategic way of encouraging innovation in the green economy. By providing expedited patent processing, the United States will spur environmentally friendly technology commercialisation more effectively.

European Union: Within the European Union, green technology patents are directly related to the EU's overall goals under its circular economy and climate action policies. The European Patent Office (EPO) is a key player in managing and tracking green patent information, employing classification systems that assist in monitoring innovation within sustainability-related areas. To be eligible for patent protection under the EPO, inventions should be new, have an inventive step, and be susceptible to industrial application. Although this system helps in evaluating technological advancement, some criticisms have been raised about the limitations of existing classification methods, especially their limited ability to embrace the entire diversity of circular economy innovations. Scholars and policy experts have recommended more nuanced and comprehensive classification approaches to capture the complexity of green technologies. This would, in turn, enable more precise determinations and better policy and investment choices to underpin sustainable development throughout the EU.¹⁸

¹⁷ Aashna Sharma, 'Green patents as a strategic response to environmental challenges: insights from the global green innovation landscape' (2024) 11 *Humanities and Social Sciences Communications* 79 <<u>https://www.nature.com/articles/s41599-024-04279-5</u> > accessed 15 May 2025.

¹⁸ Anne Rainville & Irma Dikker anr., 'Tracking innovation via green patent classification systems: Are we truly capturing circular economy progress?' (1st January 2025) 486 *Journal of Cleaner Production*

^{144385&}lt;<u>https://www.sciencedirect.com/science/article/pii/S0959652624038344#:~:text=European%20Circular%20Economy%20progress%20is%20monitored%20using%20green%20patent%20classifications.&text=For%2 0a%20patent%20to%20be%20granted%20and,be%20industrially%20applicable%20(European%20Patent%20O ffice%2C%202022)</u>> accessed 16 May 2025

Japan: The Japan Intellectual Property Association (JIPA) proposed the concept of environmental technology transfer to the World Intellectual Property Organisation (WIPO) in 2009. Since the official launch of WIPO GREEN in 2013, JIPA has actively participated as a partner in promoting this initiative. In recent years, JIPA has conducted regular meetings with its members who are also partners and users of WIPO GREEN to exchange information and explore new opportunities. Additionally, JIPA has organised workshops aimed at addressing social issues and the Sustainable Development Goals (SDGs) through collaboration between technology and intellectual property, drawing from the "needs" identified in its database.

JIPA has recently established a working group for WIPO GREEN to investigate new business opportunities. This includes considering the creation of a patent pool and an open innovation circle for environmental technology, as well as how to disseminate and license the technologies registered under WIPO GREEN. JIPA aims to strengthen co-creation among its members and encourages widespread participation in its activities.

CHALLENGES

India does not clearly define or acknowledge "green technology" or "green patents" in its patent law. The Patents Act, 1970 merely has a general and vague definition of "invention" under Section 2(1)(j) and excludes certain things under Section 3, without making any explicit mention of environmentally friendly technologies. Notwithstanding this legislative silence, India has made significant international commitments, especially under the Paris Agreement, to limit greenhouse gas emissions and combat the effects of climate change. Given these responsibilities, there is a strong need for India to frame legal and policy instruments that specifically highlight the encouragement and protection of green technologies via the patent system. This can be done through statutory recognition or classification of green inventions, and patent policy aligned more closely with environmental goals. In addition, the government needs to consider providing stronger institutional and financial assistance to startups developing sustainable technology, particularly in resolving the high expenditure of patent filing and prosecution. Encouraging public-private partnerships will also boost green technology innovation. These measures will not only develop a strong innovation ecosystem but also allow India to move towards a sustainable and environmentally friendly development process. Enforcement of patent rights often leads to costly and time-consuming legal battles, resulting in delays in the deployment of necessary green technologies. Extensive litigation restricts timely input on important environmental issues, invalidating the potential of innovation. Patents facilitate innovation, but some innovation must weigh the legal implications of public interest. Compulsory licensing may be an example of a mechanism to balance patent holders and public interest, while not ignoring the need to protect public welfare.¹⁹

RECOMMENDATION

The increasing degradation of the environment and the rising impacts of climate change, coupled with advancements in technology, necessitate more effective patent policies and laws in India to mitigate environmental effects and reduce greenhouse gas emissions. India should introduce a precise definition of "Green Technology Patent" to encourage open innovation and the establishment of patent pools for public-interest green technology. This initiative can provide greater visibility for new innovators and foster collaborative efforts in the development of environmentally friendly solutions. Learning from practices in China and the European Union, India can create a domestic classification system for green patents. By collaborating with other countries that have successfully implemented green patent policies, India can strengthen its approach to combating climate change. As globalisation increases, so does environmental damage, leading to rising concerns about global warming, climate change, and greenhouse gas emissions in India. To protect the environment, which is vital for the survival of all species, including humans, animals, and plants, India must enhance its policies and laws aimed at reducing heat and the impacts of climate change. The Indian Constitution already contains several provisions related to the environment, including Articles 48A, 51A(g), 21, and 253, which can serve as a framework for more comprehensive environmental action.

CONCLUSION

Green technology, backed by a supportive intellectual property regime, is crucial for tackling global climate challenges and promoting sustainable development. India's proactive initiatives, including renewable energy targets and green patent facilitation, highlight the country's commitment to an eco-friendly growth model. However, legal and policy frameworks need to continue evolving to ensure that the benefits of innovation are accessible to everyone, particularly in developing economies. Tools such as compulsory licensing and fast-track patenting are essential for balancing proprietary rights with the public interest. As climate

¹⁹ Pooja Chatterjee, 'Powering Progress: The Role of Green Patents in India's Renewable Energy Revolution' (King Stubb & Kasiva, 8 April 2025) <<u>https://ksandk.com/intellectual-property-rights/green-patent-renewable-energy</u>/> accessed 16 May 2025.

change knows no borders, international cooperation, open innovation models, and strategic patent regulations will be vital for fostering a greener and more inclusive future. Successfully integrating green technologies into mainstream markets relies not only on innovation but also on fair, transparent, and equitable legal systems that support both environmental and economic sustainability.