



# Intellectual Property Rights Regime in Green Technology: Way Forward to Sustainability

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## ABSTRACT

Climate change crises and environmental imbalances have been a significant concern globally in recent times. The climatic changes give rise to various issues such as global warming, depletion of the ozone layer, deterioration of natural resources, soil erosion, deforestation, and more. Many international and national agreements and policies have been created to protect the environment, from the UNFCCC to the recent Paris Agreement, aiming to control rising environmental issues. However, developed and developing countries must achieve desirable results in combating climate change. Industrial and technological developments are critical reasons for environmental pollution and degradation. Progress is necessary for planned developing countries, but growth and expansions shall also consider ecological sustainability. Technology shall be novel in adapting to the changes, considering the effects it can produce on the environment. Green technology combines technology with the environment, also called environmental technology, clean technology, or sustainable technology. It is a combination of science and technology together to mitigate climatic changes and protect the environment. Green technology is the modern sustainable solution to pressing environmental concerns. India is one of the countries globally showing rapid green technology developments. The authors of this paper have tried to highlight the dire need to modify technological developments vis-a-vis environmental sustainability to protect the environment. The research paper delves into and understands the interface between clean technology's importance and relevance for ecological sustainability and the role of patent law, particularly in dealing with issues of the environment. The paper shall also establish a harmonious relationship between patent law and its role in ensuring environmental sustainability.

## INTRODUCTION

Green technology means a technology that is environmentally friendly and sustainable. It is also sometimes referred to as clean technology. It means creating ecologically friendly, sustainable products. It aims to promote a sound and healthy environment. Therefore, green technologies are more appropriately called clean, environmental, or eco-friendly technologies. The adoption of green technologies is simply due to the community's global challenges against ecological crises. The harsh greenhouse gas emissions, unjustified use of fossil fuels, and carbon emissions lead to creating an imbalance in the environment, threatening the ecosystem as a whole, wherein there are repercussions such as depletion of the ozone layer, heat waves, forest fires, extinction of certain life forms of birds and animals they are the result of the extreme loss caused to our environment. Green technology is one such step taken to combat climate change. Rapid climate deterioration is one of the driving forces for the launch of

green technology, so going green is the need of the hour to address the global climate crisis. Green technology includes production and consumption technologies that would function to preserve the environment. Green technology uses the three R's, i.e., reuse, recycle, and reduce.

The importance of green technologies for climate change can be understood through its aims and objectives. First, green technology seeks to cater to society's needs by making it aware of the urgency to adapt to green technology (Su 2017). Second, the overconsumption of exhaustible resources like fossil fuels is aiding the influx of green technologies. Green technology has become essential for conserving natural resources. Green technology and sustainability sometimes mean two sides of the same coin, as both target environmental preservation (Wira & Abadi 2017). Sustainable development can be understood as the foundation of the evolution of green technology. Sustainable development is the judicious use of resources so future generations can benefit. Green

technology is the eco and environment-friendly processes and methods aiming to conserve the natural resources in the ecosystem, indirectly protecting our environment. Therefore, as the name suggests, green technology is a tool to reduce harmful environmental impacts by adopting environment-friendly products. The technologies work with the agenda for environmental preservation; they are the future of technologies by employing green energy sources to promote the environment. The 'clean tech' technology covers four major areas: energy, transportation, water, and materials. It focuses on limiting exhaustible non-renewable energy sources and reducing hazardous gaseous emissions. Green technologies can be referred to as 'environment sound technologies' by using products and equipment that are less polluting, adapting to sustainable usage of resources, recycling the products, and handling wastes more judiciously and responsibly. Green technology has a broad connotation to cover all these aspects. It is a general term that includes innovative ways to make environment-friendly technology. It works in a way that conserves natural resources. Incentives provided by intellectual property rights stimulate the growth of such technologies, leading to the expansion and improvement of such technologies, which will further contribute to developing green innovations. The combination of IPRs & green technology encourages & incentivizes innovations (Mustafi 2021). The TRIPS agreement acknowledges IPRs' contribution to innovation and growth, taking care of sustainability.

The enforcement of IPRs will help encourage and promote high-tech advancement and technology transfer that benefits end-users of technological knowledge, assists in socioeconomic welfare, and brings a balance between rights & duties (Article 7 of the TRIPS agreement). IPRs foster economic growth, inventions, and innovations by giving them monopoly rights over such creations. It generates investments in such innovations and inventions, and green intellectual property rights grant protection to environment-friendly technologies that protect green technology. The combination of IPR with technology is referred to as 'green intellectual property'; broadly, the term green intellectual property (from now on referred to as green IPR) covers legally the innovations that are beneficial to the preservation of the environment. The green IPRs are initiatives in the field of invention and science that can help mitigate climate crises. Green IP is quite a recent phenomenon, and it helps incentivize an eco-friendly environment, which further helps in the growth of research and development in this field. However, green intellectual property will shape how the resources and the technology will be used judiciously to care for environmental concerns (Deren 2022). One of the essential facets of green intellectual property is 'green patents.'

Green patents provide for the patenting of green technology in environmental protection (Chanda and Rao (2019). They are the technological answer to ecological problems. Patents are the exclusive monopoly rights granted to the owner of the invention. It is a protection granted upon the invention. Green patents are the legal right or protection given to the technologies that provide an environmental benefit, specifically to environment-friendly technology. Green patents are granted on technologies dealing with wastes, wind power, geothermal energy, solar energy, tidal energy, etc. Green patents are grabbing attention and importance due to the ongoing crises the world faces. Granting green patents to such technologies encourages innovation and promotion and is influential in the growth and expansion of green technologies. Since the issues and concerns regarding climate change are in the news, it is vital to consider these technologies. Green patents are a relatively new concept, with more debate. Green patents are granted to environmentally sound technologies; patents help attract investments in eco-innovations that further stimulate economic development (Lima 2013).

There have been initiatives at the global level, such as the WIPO Green, which is a global marketplace or a network place for green technology, innovation, and diffusion. WIPO Green aims to provide environmentally sustainable solutions with technology in developing countries. WIPO Green works through a network of companies, SMEs, investors, and government institutions, aiming to collaborate on activities relating to environmental sustainability. In addition, the Organisation for Economic Cooperation and Development (OECD) has been working to maintain green growth indicators. Containing data on environmental innovations, economic opportunities, and policy responses, it supports statistical patent data-analysis of patents in ecological technologies. In the Indian context, the Environment Protection Act of 1986 is a core legislation to provide for the protection and promotion of the environment that strives for mechanisms to uphold environmental protection by providing for penal provisions in case of deviations from any of the provisions of the act; the act aims to prohibit activities harming the environment. Furthermore, the Indian patent regime has adequate provisions to foster technical knowledge, innovations, and technology transfer (The Patents Act, 1970). Therefore, there is a requirement to develop a strategy for the advantage of end users of technological expertise and encourage socioeconomic benefit for society.

## GREEN TECHNOLOGY AND SUSTAINABLE DEVELOPMENT

Green technology is eco-friendly, which results in social,

economic, and environmental sustainability. These are ecological technologies because these technologies can significantly improve environmental concerns compared to other technologies. Green technologies are often considered a combination of science and human activities that aid in balancing both. Developing resources for the current generation without depletion is known as sustainable development. Sustainable development favors a healthy and stable environment and allows the resources to be used judiciously for future generations. According to the Brundtland Commission, sustainable development is “that satisfies present demands without compromising the capacity of future generations to meet their requirements.” With the rapid increase in the deterioration of the environment, including climate change and depletion of resources, there is pressure on the countries, be it developing or developed countries, to employ the technologies that are prone to less risk to the environment; it is not a choice anymore, but a necessity, the precipitated rise of the harm and damage has made it implied to bring about environment-friendly mechanisms. Green technology is one such mechanism where the countries would launch products and technologies that are more sustainable and eco-friendly. Now, growth and economic development have to be taken consciously with concepts such as eco-innovations. Green technology and sustainable development can now be called two interlinked concepts; nevertheless, green technology could be a means to attain sustainable development.

The countries aim to achieve ‘green growth,’ according to OECD; green growth refers to promoting economic expansion and development while preserving the ability of the environment to benefit from natural resources. It shall encourage investments and innovation, leading to economic expansions and sustainable evolutions. Green growth is essential as it helps maintain a check on the rising growth of the environment. It makes sure that the development does not erode natural wealth. Green growth management helps create, use, and acquire green technologies, leading to sustainable development. Green, sustainable, and environmental technologies allow companies or firms to develop sustainable innovations. Sustainable innovations are high-quality products or machinery that efficiently reduce ecological footprints (Deren 2022). Green technology is not just limited to having sustainable and eco-friendly technology; it works through a series of green technology strategies, including green product strategy, green pricing strategies, availability of green products, green promotion strategies, and green consumer behavior strategies (Das 2018).

## **COP 27: THE UNITED NATIONS CLIMATE CHANGE CONFERENCE**

The Conference of Parties (COP) 27 contemplates various nuances of the adverse effects of climate change on food security and agriculture. It also focuses on an action plan for climate empowerment and appropriate preventive measures against damage incurred due to climate change. The parties’ conference invites the Least Developed Countries to process, create, and effectively implement adaptation plans and progress in implementing national adaptation plans in one of its reports on National Adaptation Policies. The Sharm El Sheikh Climate Implementation Summit, commonly known as COP 27, took place in Egypt in November 2022. The COP is also known as the “Implementation COP.” wherein many effective mechanisms for climate change have been discussed. One round table on “Investing in the future of energy: Green Hydrogen.” The COP mentions Green Energy playing a significant role. Energy has been a primary focus in the transition process, making a shift towards clean and green energy. COP 27 focuses on green energy development in transitions and encourages a healthy exchange of energy, proposing sustainable solutions to numerous climate-related challenges.

## **THE INTERFACE BETWEEN GREEN TECHNOLOGY AND IPR: DIFFUSION AND COOPERATION**

Clean or green technology is environment-friendly technology or innovation, also called ecological technology (Wira & Abadi 2017). With the constant climatic changes, there has been growth in what is called ‘green intellectual property. It is a broad term that combines green technology and IPRs. As already discussed, IPRs promote innovation and incentives in technological development. It is crucial for the recognition and growth of innovations and technological elopement. It is essential for the recognition and growth of innovations. The patent law is significant for the development and recognition of innovations. The ongoing rise in environmental degradation is climate change, a severe crisis the earth faces. Earlier intellectual property rights were only concerned with innovations or aspects that usually had some business perspectives; however, this is not the case anymore, and there is a shift toward protecting environmental sustainability. Clean technology is concerned with improving environmental quality and ensuring sustainability by launching environmentally sound and safe technologies, which could add to the measures taken to ensure environmental protection (Kumar & Kumar 2009). The new term coined to promote environmental protection and maintain the innovation business is ‘green intellectual property. Green IPR includes granting rights to environment-friendly innovations (Sultana 2019). This

combination incentivizes innovation while internalizing ecological degradation. 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 (Sharma 2021).

IPRs grant monopoly rights to invention, and green intellectual property gives protection and rights to environment-friendly technologies. The significance of intellectual property in promoting and disseminating green technologies will be thoroughly discussed in this study; in a broad spectrum, green intellectual property legally protects the environmental innovations that contribute towards sustainability. Green IPR, is a relatively new concept encompassing the needs of the current crises to safeguard ecological sustainability and promote businesses through eco-friendly innovations. It is a recent phenomenon but not a completely alien concept; the backdrop of the green IPR in every industry and firm would relate. It is making innovations that support the environment. It is the way forward toward achieving sustainability. With the ongoing climate crises, there is a need for realization towards going green. The concern for protecting the environment is not limited to one domain but extends to a few other departments like government agencies, corporate bodies, and consumers; the responsibility is divided amongst all. Green IPR, therefore, is needed for the interplay between IPR and sustainability.

In its 2030 Sustainable development agenda, the World Intellectual Property Organization (WIPO) reaffirmed the significance of IP protections for green technology and sustainability, noting that IP and its supporting innovation are linked to a country's capability towards innovation, investment-friendly FDI and encourage commercial products and services on the worldly horizon. For green technology to succeed, they need to have strong IP protection. Therefore, high-green technological innovations must be developed as a top priority, and a robust framework must be encouraged so that green development includes innovations.

## **GREEN PATENTS AND THEIR ROLE IN PROMOTING SUSTAINABILITY**

Patents grant the proprietor the 'sole authority' to prohibit others from exploiting the invention. The inventor's request to protect the specified innovation is granted. Patents are an individual right or a privilege because they promote the inventor's interest in investing, advertising, and selling his patented design. The invention acquires the right that nobody except him would have the right or a claim upon the invention. It is not only from the legal point of view but also helps in the

expansion of the business of the invention; granting patents is also referred to as creating incentives for investment. Incentives for investment mean that any company interested in investing in any green technology would examine a strong patent portfolio of the green technology, which includes their patent filing strategy and their patent positions in a particular market. Companies seek to invest in any specific green technology by assessing the financial, political, and associated risks associated with the technology. Since green technology is developing, patenting these technologies would help build these companies' confidence before investing in green technology (Hall & Helmers 2010). Green patents are an appropriate tool to incentivize and encourage investments in green technologies (Ring 2021).

Green patents are a mechanism to combat climate change and promote sustainability. It refers to patenting the technology that fosters environmental growth and development (Chanda & Rao 2019). Green patenting, therefore, promotes green innovations, those that seek to work for the environment. Although green patents cannot fit into a straight definition since the ambit of the term is quite broad, it means innovation in environment-friendly technologies that promote environmental sustainability (Mohan 2021). Green patents protect green technology globally, i.e., patenting technologies or inventions that enable ecological growth. Green patents are also referred to as green tech patents. Green patents provide a platform for innovations to promote their idea of a sustainable business. Green patents are crucial in incentivizing these technologies' business, allowing companies to stay alert for their environmental imprints. Even though green patents are a relatively new concept, countries have made efforts to recognize the role of green patents in promoting sustainability. Green patents are the patents to be given to the inventors of green technologies, which are the central component of green intellectual property; green patents determine the rights to be given to the inventors' playing field in green technology. Green patents are to be considered as the only alternative if economic and environmental incentives are to be considered. Although, as most understood, climate change is mainly considered an environmental law issue, contentions are there as to why to include it as an IPR issue. Still, there is a need to understand that current environmental problems also include many technological interventions. Hence, technological problems require technological solutions, and IPRs are the most technologically advanced law (Grajales et al. 2012). Green patents are one of the initiatives of the IPR regime for addressing environmental problems by allowing patenting of green technologies. Green patents work through green patent databases such as IPC Green Inventory, WIPO Green, etc. These databases maintain data on green patent inventions,



making it easier for the countries to connect with inventors and investors in green technologies.

### THE ESG CONNECT WITH GREEN PATENTING

ESG is a concept that transcends environmental issues; it aims to look at sustainability from a broader perspective. ESG stands as an acronym for environment, social, and governance. It is a combination of all the aspects contributing towards sustainability. The concept of ESG is mainly associated with the corporate entities, companies, and organizations' financial activities that impact the environment. It deals with the company's activities that may have environmental impacts. ESG affects companies' investments to make sure that companies make sustainable investments (Cohen et al. 2021). ESG comes under the concept of sustainable financing. ESG works through the environmental, social, and governance pillars (Raghu & Savitha 2019). The components under the ecological pillars are greenhouse gas emissions, water, air, and land pollution companies engaging in recycled goods, whether the company causes soil erosion or deforestation. The social pillar covers the company's responsibilities towards the public; companies should be sure about the safety, quality, and health standards, how far the company provides services to underprivileged people, and whether the company is following ethical labor practices.

Finally, the governance pillar includes the internal organization of the company. It generally consists of corporate governance activities like shareholders' rights, corruption prevention, and other ethical behavior. Broadly, to sum up how the ESG works for a company is to determine the company's efforts for protecting the climate, addressing human rights issues and conditions, and workplace equality and opportunities (sustainable working conditions). The whole idea of ESG is that companies follow this strategy while engaging in business. Therefore, a company should be accountable for ESG. Today, because of the growing environmental concerns worldwide, investors also invest in a company that promotes activities that promote sustainability and adhere to climate change mitigation regulations. It is stated that investors in a company following an ESG strategy are guided more by the environmental benefits than the monetary ones. They want to put their contribution to environmental preservation and protection rather than profit sharing. The strategy for ESG was first incorporated in the "United Nations Principles for Responsible Investment" (UNPRI). At the latest COP 27, deliberations have been made regarding climate financing; the PRI focuses on achieving long-term and ambitious global climate financing. These targets must be met in keeping line with the Paris Agreement.

ESG is primarily concerned with enterprises working out in the field of environment as well as carrying out corporate works. The enterprises are working out by fulfilling the goals of the environment and time putting out CSR policies. This helps in the overall development of the companies. The enterprises or companies consider the CSR rules. ESG policies state the goals of achieving sustainable economic development. Although the concept of ESG in firms is still in the infancy stage, gradual developments are being undertaken; the idea of the companies is to improve the status of the economy for a sustainable position by focusing not just on economic development but also on green development. In the study conducted in China in the research paper (Zhang & Qin 2020), non-financial companies listed in the Shanghai and Shenzhen stock exchanges between 2012 and 2018 were taken as samples; after conducting analysis and empirical tests, it was held that green innovations could hasten and push economic benefits.

### INTERNATIONAL EFFORTS IN PROMOTING PATENTING OF GREEN TECHNOLOGY

WIPO Green is a global network or marketplace developed by WIPO that promotes green technology. It is an online platform for technology exchange. WIPO Green aims to bring together the key players of green technology innovation and diffusion. The USPTO launched the green pilot program in 2009; this program was an initiative by the United States to fast-track green patent applications. The program's task was to accelerate the process of green patenting by examining the green patent applications before the general applications. The Green Channel program is an initiative by the UKIPO in the year 2009 that provides for accelerated processing of patent applications for an invention that offers any environmental benefit. The green channel scheme provides for accelerated processing of patent applications if they intend to benefit the environment; this scheme also seeks to promote prompt communications from the UKIPO to accelerate the grant of patents on such applications. Japan has recently joined the line to encourage green patenting by joining the WIPO Green program. Japan has partnered with WIPO Green to promote the utilization of green technologies, and the JPO intends to work with WIPO to facilitate the spread of green technology. After partnering with WIPO, Japan has published the Green Transformation Technologies Inventory (GXTI), which will help enterprises explain their green transformation efforts. GXTI shows a way to categorize GX technologies and how to search for patent documents pertinent to respective GX technology. The inventory works with the recommendations of the Taskforce on /climate-related Financial Disclosures (TCFD). Companies must demonstrate the value created by

them that contributes to solving climate change issues. The GX inventory tries to make an effort to shift the economic, social, and industrial structures that have depended upon fossil fuels towards clean energy.

## COMPULSORY LICENSING OF GREEN TECHNOLOGY

Compulsory licensing is a license given to a person to use a patented invention by paying a royalty to the inventor without the patentee's permission. Compulsory licensing is an essential concept in IPR law. It is a statutorily created license allowing access to the invention's third party. TRIPS agreement and the Indian Patent regime also have a relevant discussion on the basic features of compulsory licensing. The TRIPS agreement allows products under compulsory licensing to be available in the market for further use. However, the TRIPS agreement does not mention compulsory licensing but discusses the invention's use without the right holder's authorization (Article 31 of the TRIPS agreement). However, the benefit under this clause has only been permitted if attempts have been made to secure consent from the right holder on acceptable commercial conditions, provided such attempts have not been successful within a reasonable time. 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 authorized purpose. In addition, the patent holder or the patentee has to be paid proper remuneration for the use by the third party. The most crucial point about compulsory licensing under TRIPS is that it can be allowed only in a 'national emergency' (Nanda 2009). What national emergency, though, is not specified by the TRIPS agreement? Environmental degradation can be considered a national emergency. The severity of the environment, like resource depletion and climate change, accelerates the degradation. These are the pressing issues adding up to the catastrophic consequences. 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 (Fair 2020). Under the backdrop of climate change, compulsory licensing of green technologies would not be prohibited by TRIPS because it is silent on what constitutes public interest or a national emergency. Nonetheless, it is up to the countries or member states to demonstrate the presence of such an emergency or urgency; it is up to the member states to show that a given circumstance qualifies as a national emergency or an extremely urgent matter.

Article 27 of the TRIPS agreement allows the member states to exclude from the domain of the patentability

inventions those inventions the commercial exploitation of which is necessary to protect public order and morality or to avoid severe prejudices to the environment; however, again, no clear explanations are given to understand these. Speaking of patents and environment both fields are now interconnected and interlinked, by now few green technology litigations have also been there. 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. Again, in the case of eBay v. Merc Exchange (LLC, 547 US 388, 391-92 (2006), this case said that public interest is one of the factors to be contemplated by the courts while determining the injunction cases. These two cases underpin the patentability and granting of compulsory licensing of green technologies.

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 at 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 were showcasing green technology.

However, the countries or the member states should prove the existence of such an emergency or urgency. It should entirely be upon the member states to prove that a particular situation is a national emergency or extreme speed. Compulsory licensing is thus considered an important tool to tackle the problem of diffusion of green technology. Furthermore, since green technology prices are very high, especially in low-income countries, compulsory licensing can be considered a measure to solve this problem. Thus, if a law complies with the requirements outlined in Article 31, it may be passed in a member state that allows or supports compulsory licensing for green technology. For example, compulsory licensing of green technology is permitted if each case of green technology is a separate and individual one, the authorization has been sought from the patent holder, the scope and duration should specifically be for green technology, the use of such compulsory licensing fits the interests of green technology transfer, following these conditions compulsory licensing could be made use for green technology transfer.

All do not favor compulsory licensing as sometimes they are detrimental to the inventor or the country where a patent is deemed to be granted on the product. Some authors argue that compulsory licensing abridges the rights of the patentees if there is unauthorized use of the patentee's invention. Compulsory licensing is also harmful to the countries 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. It is also challenging to determine whether the recipient country has enough infrastructure to accommodate the technology in their country; if it does, then the idea of compulsory licensing would fail.

## INDIAN LANDSCAPES OF GREEN TECHNOLOGY

India is swiftly attempting to overhaul the energy industry to achieve zero carbon emissions by 2070. Green energy is crucial in altering the current energy landscape for sustainable development. Goal 7 of the Sustainable development goals, which must be accomplished by 2030, is affordable and clean energy. According to the Ministry of New and Renewable Energy's year and review of 2022, India's action plan for promoting green technology is quite effective. India is ranked fourth in the world for installed renewable energy capacity, which includes massive hydro, wind, and solar generating capacity. In the nation, 172.72 GW of power derived from non-fossil fuel will soon be operational. Therefore, a sustainable shift towards green technology is the need of the hour.

In addition to the statistics, India has also launched numerous national initiatives to support green technology and innovations, such as the introduction of AGNI, a program by the Indian government and a mission under the Prime Minister's Science, Technology, and Innovation Advisory Council (PM-STAIIC); it is a platform that aids in the commercialization of technological innovation. There have also been other initiatives, such as Climate Launchpad 17, the world's largest green company ideas competition that the European Union co-founded. They want to realize the clean tech potential of the planet to combat climate change. In addition, the National Science and Technology Entrepreneurship Development Board (NSTEDB) encourages knowledge-based, technologically advanced businesses that advance environmentally friendly innovations.

Furthermore, to ensure robust and sustainable systems for addressing climate change challenges, the Department of Science and Technology has been launching the year-by-year climate change program under the auspices of

the Ministry of Science and Technology, Government of India. In addition, the department launched the National Action Plan on Climate Change, a flagship program with numerous initiatives to address climate change challenges. Indian inventors have patents on their green inventions; in August 2022, PI Green Innovations was granted a patent for its carbon cutter technology. This carbon cutter technology creates retrofit devices to reduce particulate matter from the air. The company has already obtained patents in countries like the USA, China, and Singapore and has now secured a patent for its technology in India. SunHydrogen, a developer of green technology has received patents in India on its "Multi-junction artificial photosynthetic cell with enhanced photo-voltages." The company already holds patents in the USA, China, Europe, and Australia but has not received patents from the Indian Patent Office as well. These are, again, some remarkable developments being made by India in the field of green patenting and green technology. The companies developing green technology are being granted patents on their technologies and will raise the Indian patent landscapes on green technologies.

## CONCLUSION

The world is moving at an unprecedented pace with the need for technology, which has to be updated; it is impossible to take steps backward, but what can be done is to prevent further harm. Therefore, it is essential to address the environmental and climate change problems with specific academic or practical policies so that development can occur and the environment should not be harmed. Green technology is being adopted as an effective technologically advanced mechanism to address environmental concerns as well as to achieve the levels of technological advancements; green patenting, therefore, becomes an important concept because it deals with the protection of these green technologies; it means that the technologies which would be launched should be granted their recognition and the inventors should also enjoy the safety of their inventions. However, some things still need to be clarified about the easy transfer of these technologies, as the process could be more streamlined. The green technology transfer, regulated through compulsory licensing, and the related provisions still need to be clarified. There are other uncertainties associated with the legal aspects of green patenting, such as the concept of inherent participation, which makes patenting of green technologies complicated as deciding the novelty of the green inventions becomes strenuous because numerous inventors launch multiple inventions related to environmental technologies, so there has to be a streamlined and explicit provision for that since green technology is vast. In an emerging concept, there becomes a dire need to update or modify some of

the existing preconditions at the end; the efforts must be collaborative and aligned to achieve the goals. It is time for countries worldwide to work towards a common direction: achieving sustainable development goals.

Climate change-induced environmental pollution and other environmental concerns of the global community result in the sustainable degradation of the whole ecosystem. Thus, international legal instruments and organizations must acknowledge the adverse effect of climate change as a severe global emergency. Undoubtedly, such a complex problem can be addressed through the diffusion of green technology followed by an innovation-based partnership between technology producers and national members of such international legal organizations. Global patent regimes must acknowledge and promote the recognition of climate-friendly technologies and their further dissemination and transfer for sustainable, innovative growth and preventive action against environmental harm. Apart from compulsory licensing, it is also crucial that the state adopt other regulatory practices associated with the relaxation of trade barriers and the inclusion of a fast-track patent prosecution process for environmental-oriented inventions.

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