

Intellectual Property, Sustainability and Climate Change

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Introduction

The purpose of this paper is to provide a primer to the patent practitioner wishing to apprehend the intersection of climate change and patents. At present, the field is characterized by individual initiatives from patent offices and intellectual property rights (IPR) holders. The paper aims to provide a global and not exhaustive glance of these initiatives.

1. Role of IP in the environmental crisis

a. Climate urgency

When discussing climate, the notions of ‘climate change’ and ‘sustainability’ can often be confused and should be defined for the purpose of this paper.

Climate change refers to the long-term alteration of the Earth's average weather patterns and climate conditions. It involves shifts in temperature, precipitation, humidity, wind patterns, and other atmospheric and oceanic phenomena that occur over extended periods, typically decades to centuries. However, the term *climate change* is often used to describe the current global warming trend observed since the mid-20th century.

Sustainability, on the other hand, refers to the capacity of an activity, system, or process to be maintained or continued over the long term without causing significant depletion or harm to the environment, society, or economy. At its core, sustainability seeks to strike a delicate balance between economic growth, social equity, and environmental protection.

Efforts to address climate change often involve (1) mitigation, aiming to reduce greenhouse gas emissions and limit global warming, and (2) adaptation, which involves adjusting to the changing climate conditions and minimizing the adverse impacts on societies and natural systems. Sustainability is one of the tools to address climate change.

International agreements and initiatives, such as the Paris Agreement, seek to unite nations in combatting climate change and working toward a more sustainable and resilient future.

The Paris Agreement is an international treaty adopted on December 12, 2015, within the United Nations Framework Convention on Climate Change (UNFCCC). It represents a landmark global effort to combat climate change and address its impacts on a worldwide scale. The agreement was negotiated during the 21st Conference of the Parties (COP 21) in Paris, France.

The primary objective of the Paris Agreement is to limit global warming to well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even

further to 1.5 degrees Celsius. This goal is crucial to avoid the most severe consequences of climate change, such as extreme weather events, sea-level rise, disruptions to ecosystems, and threats to food and water security.

Since the adoption of the Paris Agreement in 2015, countries around the world have taken various actions to implement their climate commitments and address the challenges of climate change. They also have self imposed deadlines to achieve these goals.

In the wake of the Paris Agreement, Europe introduced the European Green Deal: a comprehensive and ambitious set of policies and initiatives proposed by the European Commission, the executive branch of the European Union (EU). Introduced on December 11, 2019, with the goal of making the EU climate-neutral by 2050 and promoting sustainable growth and environmental protection across the region, the European Green Deal is centered around the following key objectives: Climate Neutrality, Clean Energy Transition, Sustainable Industry and Circular Economy, Clean and Smart Mobility, Biodiversity and Nature Protection: The deal emphasizes the conservation and restoration of biodiversity and ecosystems to protect natural habitats and species, Farm to Fork Strategy, Pollution Reduction, Financing Sustainable Growth.

On the United States side, President Joe Biden launched the White House Task Force on Climate to coordinate and drive the administration's efforts to address climate change and develop policies and strategies to achieve the climate goals of the Paris Agreement. The task force aims to bring together experts and representatives from various government agencies to collaborate on climate-related initiatives and ensure a coordinated response across different sectors.

As the deadlines approach, there is a need for a collective push to innovation. To achieve these ambitious goals, new products, processes, and models have to emerge. And because intellectual property is at the heart of innovation, private and public actors have to contribute to the acceleration of green innovations.

b. Green inventions

Green inventions will play a crucial role in transitioning to a more sustainable and environmentally friendly future. It is through innovation that we will be able to limit realistically global warming.

There is no consensual definition of what a green invention is. A commonly cited definition is that of the Rio Declaration on Environment and Development of the United Nations dated 1992, which defines green technology as encompassing "*environmentally sound technologies that protect the environment, are less polluting, use all resources in a more sustainable manner, recycle more of their wastes and products, and handle residual wastes in a more acceptable manner than the technologies for which they were substitutes*". WIPO Green, for example, uses this definition¹.

Patent offices have used their own definition of a green invention, mostly in the context of their acceleration programs. These definitions vary in scope from one office to another. For example, the United States Patent and Trademark Office (USPTO) focuses on climate change mitigation technologies defined as 'Product or process that mitigates climate change by being designed to: (a) remove greenhouse gases already present in the atmosphere; (b) reduce and/or prevent additional greenhouse gas emissions; and/or (c) monitor, track, and/or verify greenhouse gas emission reductions.' The UK Intellectual Property Office (UKIPO) has a broader definition

¹ <https://www3.wipo.int/wipogreen/en/>

and considers green any ‘Invention has an environmental benefit’. In contrast, the Japanese Patent Office (JPO) has a more restrictive approach considering for its acceleration program, green inventions those that have an energy-saving effect and contributes to CO2 reduction.

Since, at present, each patent office or governmental body uses a definition that is its own, for this paper, unless mentioned otherwise, we will consider, for the purpose of this paper, a green invention as one defined by the Rio Declaration.

c. Intellectual Property as monopoly rights

There is often a perceived tension between the monopoly conferred by an IPR, such as a patent, and the need of technology for the good of all. However, without IPRs, the rate of innovation needed to combat climate change would decrease.

The patent system plays a crucial role in driving innovation and progress in society. The Statute of Monopolies established in England in 1623 laid the foundation for the patent system by introducing the concept of granting a limited monopoly to inventors in exchange for disclosing their inventions to the public. This early form of patent law aimed to encourage innovation and the dissemination of knowledge. Without the reward of the monopoly, inventors might choose to keep their discoveries hidden, locking away valuable insights within their companies. Through the patent system, inventors are encouraged to share their inventions with the world, allowing others to build upon and improve upon their ideas.

The granted monopoly is limited in time (generally 20 years for patents). The concept of limited-time monopolies fosters value creation for companies while not blocking the rest of the society for ever. By granting exclusive rights to their inventions, companies gain a competitive advantage in the market, which motivates them to invest in research, development, and the production of innovative products.

Furthermore, the patent system has an indirect positive impact on job creation. Research and Development (R&D) activities related to patented inventions generate employment opportunities for scientists, engineers, and other professionals. Additionally, the production, marketing, and legal aspects of patent-related products also create jobs in various sectors of the economy, further contributing to economic growth.

Overall, the patent system acts as a catalyst for progress, enabling the free flow of knowledge while providing inventors with the incentive to develop groundbreaking solutions. By striking a balance between disclosure and limited monopolies, it encourages companies to invest in creating products that positively impact society. Additionally, this system generates a ripple effect on the job market, bolstering employment opportunities across various industries. Should one remove IPRs in the name of climate urgency, the consequences would be counterproductive for the society as a whole.

d. The patent system to adapt to the green revolution

The patent system is inherently flexible and can accommodate new technologies and innovations related to the green revolution.

The patent system already allows for the protection of green technologies, such as renewable energy systems, energy-efficient devices, waste management processes, and eco-friendly materials. As more sustainable solutions are being proposed, we see a shift of the core of the invention from a performance of a product to rather a reduction of carbon footprint it may provide.

Other evolutions of the patent system may arise to accommodate the changing type of technologies.

2. The current efforts to incentivize green inventions

Incentivising green inventions is currently done via individual efforts coming from the patent offices and IPRs holders.

Some patent offices have launched specific initiatives to prioritize and expedite the examination of patent applications related to climate change mitigation and adaptation. Other patent offices have put together specialized patent databases for green inventions, making it easier for stakeholders, researchers, and companies to access information about environmentally friendly technologies.

In addition, private companies and intergovernmental institutions have proposed Patent Pools to facilitate the widespread use and adoption of environmentally friendly inventions. These mechanisms allow multiple patent holders to license their technologies collectively, making it easier for companies to access and utilize green innovations.

a. Initiatives by the Patent Offices

i. Acceleration Programs

Some patent offices have set up acceleration programs based on green inventions. As mentioned earlier, the definition of what constitutes a green invention varies from one office to another, as well as the conditions and benefits granted by each program. We have highlighted below a few notable programs.

1. Australia

In 2009, IP Australia started a free acceleration program for any environmentally beneficial technology. To benefit from the program, the Applicant has to file a statement that the technology provides some environmental benefits.

2. Brazil

Since 2012, the Brazilian Patent Office (INPI - Instituto Nacional da Propriedade Industrial) provides an accelerated examination for any technology following into the Green Inventory of the International Patent Classification² (discussed below). Qualifying patents are marked with an official “Patentes Verdes” (Green Patents) stamp.

More information at the following link:
https://www3.wipo.int/wipogreen/en/news/2021/news_0016.html

3. Canada

CIPO (Canadian Intellectual Property Office) provides since 2011, an acceleration program for any ‘technology that if commercialized would help to resolve or mitigate environmental impacts or to conserve the natural environment or natural resources’. A declaration stating that their ‘application relates to technology that if commercialized would help to resolve or mitigate environmental impacts or to conserve the natural environment or natural resources’ is needed to participate in the program. Participation to the program is free.

More info here: <https://ised-isde.canada.ca/site/canadian-intellectual-property-office/en/patents/patent-application-and-examination/advanced-examination-green-technologies>

4. China

The CNIPA (China National Intellectual Property Administration, formerly SIPO) proposes a free acceleration of the examination of any technology relating to ‘energy conservation and

² <https://www.wipo.int/classifications/ipc/green-inventory/home>

environmental protection, new-generation information technology, biologics, high-end equipment manufacturing, new energy, new material, new energy vehicle, intelligent manufacturing, etc.’. The known prior art has to be provided to CNIPA. If the request is approved, accelerated patent applications for inventions should receive a first Office Action within 45 days, and a final decision provided within one year.

5. Japan

JPO has a long standing history of helping green inventions. Since 2009, green inventions ‘that [have] an energy-saving effect and contribute to CO2 reduction’ can be accelerated upon request, at no additional fee.

Information is available here: <https://www.jpo.go.jp/e/system/patent/shinsa/jp-soki/>

6. Korea

Since 2015, the Korean Patent Office (KIPO) provides an accelerated examination for any green technology. ‘Green technology’ is to be broadly interpreted to include technologies that prevent or decrease pollution. Applicants requesting accelerated examination must provide documentation that demonstrates how the application qualifies as green technology accompanied by a statement of explanation. A small fee is however required.

7. United States

The Climate Change Mitigation Pilot Program, instituted in 2022 as a successor to the Green Technology Pilot Program, aims to expedite the examination of patent applications for innovations dedicated to mitigating climate change. While innovations dedicated to mitigating climate change mainly encompass reducing greenhouse gas emissions, starting from June 2023, the USPTO has broaden eligibility criteria to encompass a wider range of technologies, contributing to the objective of achieving net-zero greenhouse gas emissions, such as technologies for the reduction, removal, prevention, and/or monitoring of greenhouse gas emissions.

Applicants seeking to benefit from this program must file a petition to make special at no cost. The USPTO will accept petitions under this program until June 7, 2027, or until a total of 4,000 applications have been granted special status, whichever comes first.

ii. Classification

Patent offices have developed their own classification for green invention in order to facilitate third party searches of green technologies. As innovation is incremental based, having a tool dedicated to the public for efficiently discovering green patents is a benefit for all. In addition, the classification can be used to identify trends and as a tool for some governmental programs.

1. IPC Green Inventory

The ‘IPC Green Inventory’³ created by the IPC Committee of Experts, simplifies searches for patent information associated with Environmentally Sound Technologies (ESTs), as outlined by the United Nations Framework Convention on Climate Change (UNFCCC). Currently dispersed across various technical fields within the IPC, ESTs are consolidated in one accessible location through the efforts of the Inventory.

2. Y codes of the CBC classification

The EPO has developed a dedicated classification scheme for climate change mitigation technologies, which classifies patent publications under ‘Y’ codes⁴. The codes are intended to

³ <https://www.wipo.int/classifications/ipc/green-inventory/home>

⁴ <https://worldwide.espacenet.com/patent/cpc-browser#!/CPC=Y02>

allow third parties to search for climate change-related technologies in a more user-friendly fashion. The scheme covers a range of areas, including renewable energy, greenhouse gases (GHG) capture, buildings, industry (including agriculture), transport and waste and wastewater management. A classification scheme for smart grids, Y04S (a spinoff of Y02), has been also developed. Both classifications ease the access to patent documentation in sustainable technologies.

The classification comes in addition to the existing classes. While in the past, the classification has been made using keywords, it now uses AI as a helper to classify any new document.

3. Japan's GXTI

JPO has produced a Green Transformation Technologies Inventory (GXTI) classifying patents related to Green Transformation (GX). The GXTI includes the patent search formulae used to classify the documents in the database⁵. The patent search formulae use Logical Expression Input on J-PlatPat, a free patent search database provided by INPIT. The patent search formulae are not only valid for J-PlatPat but can be in other patent search databases.

4. Canadian Green Patents Database

CIPO proposes dedicated pages to find quickly Canadian green patents⁶. The classification is based on the IPC Green Inventory.

5. Lexis Nexis

Private analytics companies, such as Lexis Nexis, provide products that allow patent owners to map their patent portfolios against the UN's Sustainable Development Goals (SDGs). For example, LexisNexis⁷ offers patent analyses using a proprietary method, LexisNexis Patent Sight, to assess how sustainably focussed they and their competitors are.

iii. WIPO Green

WIPO Green is an initiative of the World Intellectual Property Organization (WIPO) established in 2013 with the primary objective of facilitating the diffusion of green technologies and promoting sustainable innovation worldwide. These matchmaking efforts for the green inventions take several shapes.

First, WIPO Green provides a technology matchmaking platform that connects technology seekers (users) with technology providers (inventors, companies, and research institutions) in the field of green technologies. It allows users to access a diverse range of environmentally friendly technologies, products, and services to address their specific sustainability challenges.

Second, WIPO Green maintains a comprehensive database of green technologies, which includes a wide array of patents, licenses, and know-how related to clean and renewable energy, waste management, water purification, sustainable agriculture, and more. This database enables users to search and identify technologies that align with their needs.

Third, WIPO Green helps a plurality of on the ground projects, called 'acceleration projects'. The acceleration projects focus on a particular geographical area or technological domain for the matchmaking. One example of such project deals with climate smart agriculture in Latin America. With the involvement of three dedicated consultants for each geographical zone of

⁵ <https://www.jpo.go.jp/e/resources/statistics/gxti.html#results>

⁶ https://www.ic.gc.ca/opic-cipo/cpd/eng/greenTechnologies/green_technologies.html

⁷ [lexisnexisip.com](https://www.lexisnexisip.com)

Argentina, Brazil, and Chile, the intensified crop rotation, soil re-carbonization, carbon sequestration, or forest management is studied. The overarching goal of this initiative is to mobilize innovative technologies in the dedicated region and foster tangible connections between entities seeking green solutions and potential technology providers (i.e. patent holders).

WIPO Green provides a few success stories. Thanks to the sharing of innovation, Shiseido, a Japanese cosmetics giant, gave a helping hand to young university innovators. In Tokyo, a determined group of students from Toyo University created a novel moisturizing hand serum utilizing locally sourced ingredients. A licensing arrangement with Shiseido, granted them access to the company's cutting-edge green technology, which was referenced in the WIPO Green database. This collaboration empowered them to manufacture their innovative product with remarkable success.

In another example, the Lake View Hotel Beijing found a solution for its kitchen waste provided by Beijing SINOENC Engineering Technology Co., Ltd, a company with expertise in sustainable waste management solutions, which was reference on the WIPO Green platform. The Lake View Hotel Beijing faced significant challenges related to the management of its large amount of kitchen waste. As a commercial venue, it struggled to cope with the increasing volume of food waste and the emergence of new regulations related to waste sorting and management. Locally available services were inadequate to address their specific need for efficient food waste management solutions. The successful waste management provided with the implementation of the technology solution provided by the company not only eased the burden on the hotel's operations but also aligned with national ambitions to reduce carbon emissions, contributing to broader environmental goals. The technology solution offered an additional benefit. The by-product of the waste management process created useful fertilizer for soil enrichment. This contribution to local soil health further enhanced the sustainability and positive environmental impact of the solution.

iv. Awards

Boosting innovation can also come in form of public recognition.

1. USPTO Patent for Humanity Award

The Patents for Humanity initiative is an awards competition hosted by the USPTO, acknowledging innovators who employ revolutionary technology to address global humanitarian issues. This program offers valuable business incentives to those making a significant impact, including an acceleration certificate to fast-track specific processes at the USPTO and public acknowledgment of their contributions.

In 2023, the USPTO focused the awards on green initiatives for inventions which address climate change through green energy technologies, including through wind, solar, green hydrogen, hydropower, geothermal, and biofuel technologies. The competition is open to any patent owners, patent applicants, or patent licensees.

2. Earthshot Prize

Inspired by President John F. Kennedy's 'Moonshot' challenge in 1962 to land a man on the moon within a decade, the Earthshot Prize was launched by Prince William in 2020 to search for and scale the most innovative solutions to the world's greatest environmental challenges.

The Earthshot Prize covers 5 categories: Protect and Restore Nature; Clean our Air; Revive our Oceans; Build a Waste-Free World; and Fix our Climate. Every year, five winners are awarded £1 million each to scale their solutions, with all 15 finalists receiving tailored support from Earthshot's global alliance of partners.

The UK's Chartered Institute of Patent Attorneys (CIPA) is an official nominator of the Earthshot Prize, and, in the last few years, many of the finalists have been nominated by the organisation. CIPA members also provide IP due diligence for candidates on a pro-bono basis.

In 2022, one of CIPA's nominees, Notpla, won the prize in the 'Build a Waste-Free World' category. You can read more about their biodegradable alternative to plastic here: <https://earthshotprize.org/winners-finalists/notpla/>. This year, one of CIPA's nominees, Colorfix, is a finalist in the same category. You can read about their sustainable dyes here: <https://earthshotprize.org/winners-finalists/colorifix/>.

b. Private initiatives

The most notable initiatives in terms of patent and climate change for companies have been various patent pledges, some of which are highlighted below.

i. Low Carbon Patent Pledge

Launched on Earth Day, April 22, 2021 by Hewlett Packard Enterprise, Microsoft, and Facebook, the Low Carbon Patent Pledge⁸ aims to make patents with low carbon technology applications freely available to all. The Pledgors include now also, notably, Lenovo, UPS, Panasonic, and partners with institutions, such as the University of Utah and the World Economic Forum.

Almost 600 patents are currently pledged. The list can be found here: <https://lowcarbonpatentpledge.org/pledged-ip/>

Under the pledge, the pledgor grants a royalty-free license to any person or entity to practice the patented technologies for the use, generation, storage, or distribution of low-carbon energy from solar, wind, ocean, hydropower, or geothermal sources.

ii. Eco-Patent Commons

One of the earlier initiatives was the Eco-Patent Commons of IBM. Active between 2008 and 2016, the initiative aimed to disseminate green technologies to developing countries. The patents pooled covered energy conservation, pollution control, environmentally friendly materials, water or materials use, and reduction and recyclability.

Anyone could use the patents of the Eco-Patent Commons royalty-free.

3. Tax incentives

Many countries offer tax incentives and grants for the development and use of environmentally friendly technologies, such as those which accelerate decarbonisation or reduce negative environmental impacts (PWC Green Taxes and Incentives Tracker⁹). In some cases, R&D tax credits are restricted to certain technologies – for example, in Belgium, tax credits on R&D investments are subject to obtaining a certificate confirming that the investment does not have

⁸ <https://lowcarbonpatentpledge.org/>

⁹ <https://www.pwc.com/gx/en/services/tax/green-tax-and-incentives-tracker.html>

a negative impact on the environment (EY Worldwide R&D Incentives Reference Guide 2023¹⁰).

Various countries have also implemented so-called ‘patent box’ systems, which consist of reduced corporate tax regimes to incentivise R&D and the use of the patent system in general. Under such schemes, revenues from patented technologies are subject to a reduced rate of corporate tax. One example is the UK’s Patent Box scheme, which allows UK-based companies to apply a reduced corporation tax rate of 10% to profits earned from patented inventions. This is a significant reduction on the standard corporation tax rate of 25% (as of April 1st, 2023).

The reduced tax rate can apply to the profit made from sales of a product that incorporates a patented component, even where the patented component is itself only a minor part of the product. This means that the profit from an entire range of products that each incorporate a particular patented component can be included in the Patent Box. As a result, a single UK patent can be enough for all the worldwide profits generated by a particular product to benefit from the UK Patent Box, even if the profits are from sales in countries where no patent is held.

However, there appears to be little overlap between tax incentives for green technologies and tax incentives which promote the use of the IP system in general. One exception is Australia, where a Patent Box scheme was introduced in 2022, specifically in relation to innovations in medical technology and biotechnology and was subsequently expanded on July 1st, 2023 to cover ‘low emissions technologies’¹¹. This followed a consultation¹² to establish whether such a system would provide an effective way of incentivising the development of technology which would assist Australia in meeting its greenhouse gas emission commitments under the Paris Agreement.

4. What to expect in the future: the role of AI in accelerating the development of green technology

In recent years, the role of Artificial Intelligence (AI) in the development and deployment of green technologies has seen exponential growth, made possible by the development of AI technologies such as Large Language Models (LLMs), which enable to process huge amounts of data to identify patterns and enable more accurate decision making in a number of domains. AI also provides the ability to model complex processes and to simulate complex systems to enable accurate predictions from a vast number of possibilities. There are already a huge number of applications of AI tools which aim to improve the world we live in, and more are constantly being discovered. For example, AI has been used for environmental modeling, to optimize the production of renewable energy sources and to reduce overall energy consumption, to reduce waste, to decrease traffic congestion, to enable precision agriculture, to predict and manage natural disasters, such as wildfires, and to design new eco-friendly materials. Thus, AI has already proven to be a powerful tool for helping to generate and accelerating the development of green technology in a number of different sectors that contribute to environmental sustainability and conservation.

¹⁰ https://www.ey.com/en_gl/tax-guides/worldwide-r-and-d-incentives-reference-guide

¹¹ <https://www.industry.gov.au/news/announcing-2023-24-budget>

¹² https://treasury.gov.au/sites/default/files/2021-07/c2021_177849.pdf

For example, in smart city applications, AI systems can be connected to a city-wide sensor network (e.g., environmental sensors, area monitoring equipment such as cameras or drones), smartphones, building sensors, IoT devices, etc.) to collect data which can be processed by an AI model to provide a wide variety of predictions such as energy demands, traffic congestion, building occupancy, ridership, etc. to optimize decision-making with respect to goals such as energy consumption and emissions.

However, it is important to understand that AI itself is not “green technology” and presents a number of challenges to ensure its safe and effective application. In particular, training and hosting AI models requires significant computational power, which consumes energy and generates carbon emissions. Studies estimate that training ChatGPT’s language model consumed 700,000 liters of freshwater, that the training process for a single AI model can emit more than 626,000 pounds of carbon dioxide (about the amount emitted over a year by 62 gasoline automobiles) and that data centers which host AI models consume 10-50 times as much energy per floor space as an average commercial building and currently account for ~2% of total US electricity consumption.¹³

Other challenges associated with using AI include:

- Safety
 - o Predictions can be inaccurate or based on hallucinations of fact, so relying on them in critical scenarios can be dangerous.
 - o Potentially dangerous queries and uses.
 - o Requires reliable, labeled training data for accurate predictions.
- Explainability and transparency
 - o Regulations are requiring transparency (cannot be a black box).
 - o Lack of explanations prevent trust in the system and inability to verify correctness.
- Data privacy concerns since data is often proprietary and confidential, and also protected in some cases by government regulations.
- Need to collect and store large amounts of data using a large sensor network.
- Potential job displacement and other unintended consequences.
- Lack of standards (e.g., data formats) and regulations.
- Bias in data and assumptions.

Accordingly, to ensure a net positive effect of AI, these challenges need to be addressed and it must be insured that the net contribution of the AI to the environment is positive considering any negative consequences of the use of the AI itself. This requires to provide for explainable AI decisions, increase model accuracy by providing high-quality training data, implement safety mechanisms, improve computational efficiency of AI methods, and to ensure data privacy and security, as well as providing for checks on ethical use and mechanisms for identifying and removing bias. It also requires cooperation by companies, governments and research institutions to ensure that these challenges are appropriately addressed. In this regard, many governments and institutions are working to collaborate. For example, the European Green Deal proposes to invest 125bn EUR per year to the digital transition with AI as a key technology also regulated by the EU AI Act defining risks and requiring accountability.¹⁴

¹³ Aliza Chasan, “Some experts see AI as a tool against climate change. Others say its own carbon footprint could be a problem,” CBS News (August 26, 2023)

¹⁴ European Parliament, AIDA committee, “The role of Artificial Intelligence in the European Green Deal,”

Moreover, in order to appropriately incentivize the development of AI for green initiatives, there needs to be a robust patent system that protects these initiatives.

Although many of the international patent offices encourage AI as an emerging technology, not all AI developments of green technology will be eligible for patent protection. Further, patent eligibility standards relating to computer-implemented inventions vary across the world due to a lack of harmonization. For example, in the U.S., it can be required for the invention to enhance computer functionality or provide an improvement to a technical field if your claim is deemed to include a so-called “abstract idea” such as a mathematical concept, which can be a difficult standard to consistently apply, especially given the lack of definition for an abstract idea. In Europe, the invention should provide a technical solution to a technical problem. These standards beg the question of what is “technical”, and what is a “technical field”? Indeed, the EPO’s view that natural language processing is not technical, but image processing is, seems illogical. Accordingly, further clarity on the standards applicable to AI inventions and some degree of harmonization would further incentivize AI developments of green technology by providing greater certainty that investments in research will yield some patent rights.

Despite some issues with the standards for what should be considered patentable, there are a number of patent success stories, for example a number of which are highlighted by the EPO’s Inventor of the Year awards. The EPO Young Inventor Award of 2022 was awarded to an AI-based waste sorting system using image-based classification for picking priority, to increase the recycling yield. The inventors set up the company Recycleye set up to commercialize the technology. Other winners of the award include Mobileye and Stingray. Mobileye is an advanced driver assistance AI tool used to detect road faults on-board. This technology was developed by an Israeli garage start-up in 1999 and was later purchased by Intel for \$15.3bn. Stingray is an AI tool that implements image-based classification to detect sea lice and model movement of Salmon underwater to control a laser to eliminate the sea lice. The technology has been applied to fishing farms to ensure healthy salmon. These examples show the wide range of applications of AI for green developments, and that patents can indeed be an effective tool to incentivize such innovations and ensure they are introduced and made available to the public.

5. Conclusion

The finite nature of traditional energy sources has intensified the urgency to transition towards renewable energy alternatives. The recent energy crisis in Europe serves as a stark reminder of the need to counteract the shortage by embracing sustainable energy solutions. However, developing and implementing these new solutions requires significant time and investment. In this context, IPRs play a crucial role as a reward for the innovators and inventors who dedicate their time and resources to finding transformative green technologies. By granting exclusive rights through patents, the IP system incentivizes the development of renewable energy innovations, fostering a sustainable future and ensuring that humanity can overcome the challenges posed by the finite nature of traditional energy sources. As we forge ahead, nurturing an environment that supports and protects IPRs becomes imperative in driving the green revolution and securing a cleaner, more resilient, and energy-abundant world for generations to come.