
Europäisches Patentamt
European Patent Office
Office européen des brevets
Patents paving the way to a more sustainable future
epo.org

Foreword from the President

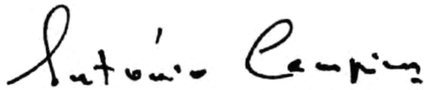
We have reached a turning point in history. We are confronted by unparalleled challenges that threaten sustainability including health crises, climate change, population growth, and wild-fires.

Innovation is essential in helping us to find solutions to these challenges, and intellectual property (IP) rights play a key role in ensuring that society reaps the benefits of these inventions. Research proves that IP rights promote knowledge-sharing, empower individuals, and support economic development. Our studies show that IPR-intensive industries foster 82 million jobs in the European Union, helping businesses large and small to create a more sustainable and brighter future. Moreover, companies that own at least one patent generate higher revenue per employee and pay higher wages.

The UN 2030 Agenda for Sustainable Development defines the world we are striving for and indeed need. In today's globalised economy, innovation, entrepreneurship, and patent knowledge-sharing are vital in delivering transformational ideas for sustainability. This comprehensive highlight report provides more details about the EPO's main sustainability initiatives, with timely examples of how patent knowledge drives inventive activity and fosters solutions to humanity's greatest challenges.

At the EPO, our core mission is to provide greater access to patent knowledge so that patents can play a full role in promoting innovative solutions to achieve the UN Sustainable Development Goals (UN SDGs). Digitalisation, bringing patent knowledge to the innovators' fingertips with just a few clicks, has powerfully driven accessibility to patent knowledge, from East to West, 24/7, ushering in new possibilities for ground-breaking inventions. This has, in turn, helped to enhance the global impact of technological progress and reduce inequalities by ensuring that every inventor, scientist, entrepreneur and researcher has access to high-quality patent knowledge resources. For example, the EPO's Espacenet provides free access to more than 160 million patent documents and received around 18 million visits in 2024. To strengthen collaboration throughout the innovation ecosystem and enhance the ability of key stakeholders to leverage IP rights, the EPO established the Observatory on Patents and Technology in October 2023. The current report features the economic studies, technology platforms, and online events that the Observatory has launched to date, along with the Deep Tech Finder, a free online tool enabling investors to easily find and assess European startups that have filed patent applications at the EPO.

By working together with innovators in the race to tackle global challenges, we will build a stronger global patent system that fosters groundbreaking developments in sustainable technologies, brings us closer to our sustainability goals, and paves the way to a smarter, safer and more sustainable world. We will also break down the barriers that prevent people from fully benefiting from the patent system. With sustainability as our guiding light and as the overarching goal of our Strategic Plan 2028, we are joining forces with creators, inventors, investors, IP professionals, academic researchers and policymakers to share patent knowledge that helps them solve the challenges facing humanity. In this way, we also demonstrate how the patent system is a force for good, leading to greater understanding, transparency and democratisation.



António Campinos,
President of the European Patent Office

Contributions to the UN Sustainable Development Goals (SDGs)

The EPO promotes innovation as a force for good: we support inventors who are pushing the boundaries in their efforts to solve global challenges and contribute to the United Nations Sustainable Development Goals (UN SDGs). Our joint studies with the EU Intellectual Property Office (EUIPO) on IPR-intensive industries prove that IP rights enhance creativity, foster jobs and help businesses to grow. Given the correlations between IPR ownership and growth, especially for SMEs, IPRs can promote a more sustainable economy and society.

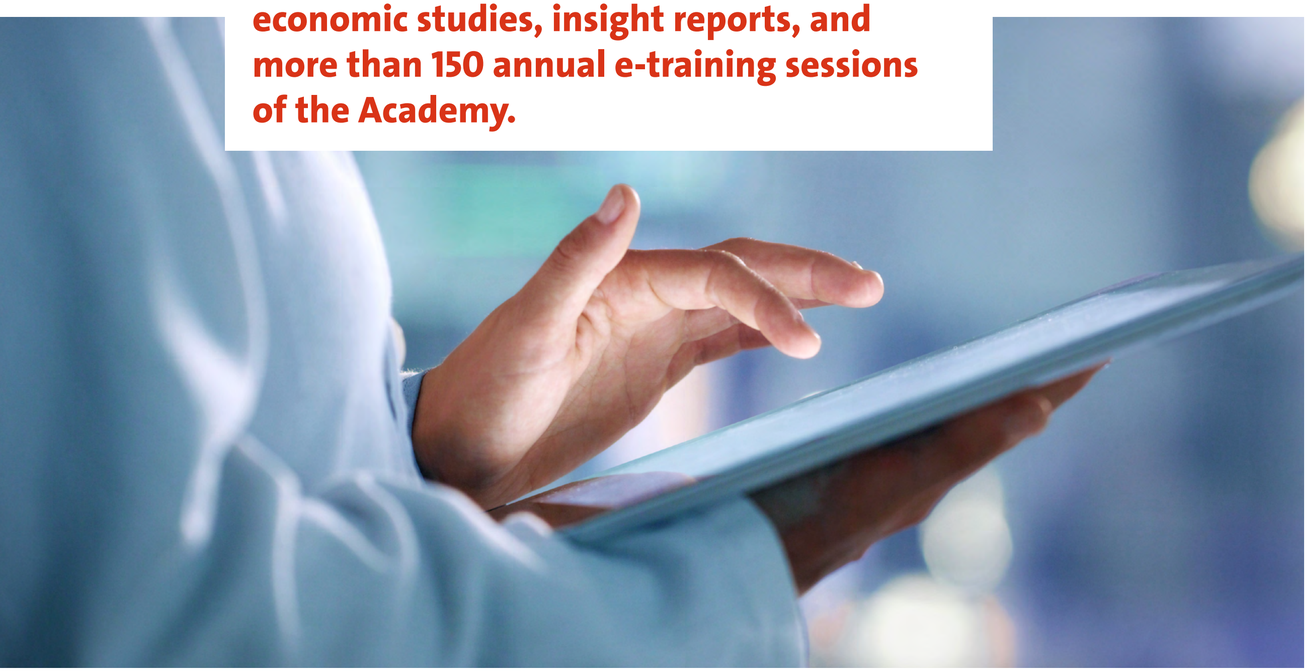
UN SDG	TITLE
	Combatting cancer platform (2024)
	Patents and innovation against cancer (2024)
	mRNA technologies (2023)
	Cancer case studies (2023)
	Fighting coronavirus platform (2021)
	The role of European universities in patenting and innovation (2024)
	Trilateral Booklet on UN SDG 4 (2024)
	Patent Index 2023 – women inventors (2023)
	Women's participation in inventive activity (2022)

UN SDG	TITLE
	Innovation in water technologies platform (2024)
	Innovation in water technologies study (2024)
	Financing and commercialisation of cleantech innovation (2024)
	Patents for enhanced electricity grids (2024)
	Offshore wind energy (2023)
	Hydrogen patents for a clean energy future (2023)
	Clean energy platform (2022)
	Green tech in focus (2022)
	Innovation trends for electrolysers in hydrogen production (2022)
	Patents and the energy transition (2021)
	Innovation in batteries and electricity storage (2020)

UN SDG	TITLE
	IPRs and firm performance (2025)
	Patents, trademarks and startup finance (2023)
	Intellectual property rights and firm performance in the EU (2021)
	IPR-intensive industries and economic performance in the EU (2019)
	Space innovation platform (2024)
	Propulsion systems for space (2024)
	Codefest on generative AI (2024)
	Quantum computing (2023)
	Deep tech innovation in smart connected technologies (2022)
	Space-borne sensing and green applications (2022)
	Quantum technologies and space (2021)
	Cosmonautics (2021)
	Patents and the 4IR (2021)

UN SDG	TITLE
	Assistive robotics for people with special Needs (2024)
	Innovation trends in additive manufacturing (2023)
	CodeFest on green plastics (2023)
	Patents for tomorrow's plastics (2021)
	Patents in additive manufacturing (2020)
	Firefighting platform (2023)
	IP5 offices' initiatives on climate change booklet (2023)
	The European patent system and the grace period (2022)

Global success depends on access to know-how and innovation trends such as those offered through the EPO's platforms, economic studies, insight reports, and more than 150 annual e-training sessions of the Academy.



Each year the EPO focuses on certain UN SDGs.

2023:

2024:

2025:

Global success depends on access to know-how and innovation trends such as those offered through the EPO's platforms, economic studies, insight reports and more than 150 annual e-training sessions of the Academy (corresponding to 1 638 training hours, reaching more than 26 000 lifelong learners). The highlights of these initiatives are summarised below with a link to the SDG they contribute to. In addition to the SDGs in focus each year, this report links the EPO's patent knowledge sharing activities with Quality Education (UN SDG 4), Gender Equality (UN SDG 5), Decent Work & Economic Growth (UN SDG 8), Reduced Inequalities (UN SDG 10), Climate Action (UN SDG 13) and Peace, Justice & Strong Institutions (SDG 16).

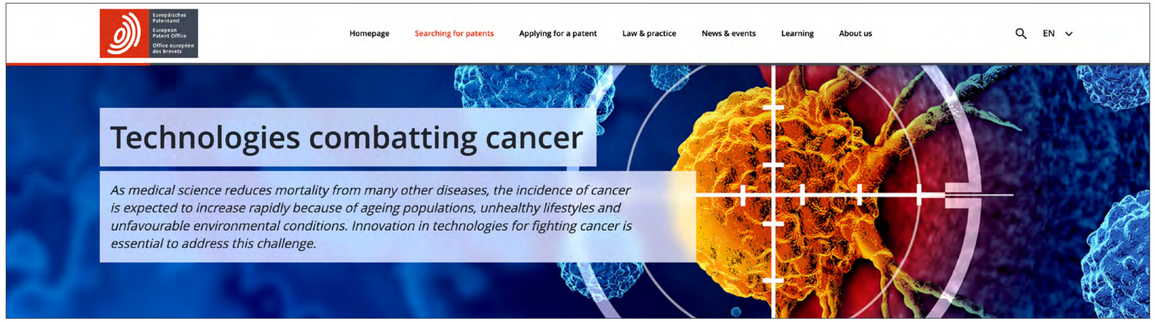
Good health and well-being

The search for innovation that can counter the spread of diseases and save lives is essential for a sustainable world. Cancer continues to pose a significant threat to global health, even with advances in research and technology. Each year, around 2.6 million people in the EU are diagnosed with cancer. Although Europe is home to less than 10% of the global population, it accounts for a quarter of all cancer diagnoses worldwide. With aging populations, unhealthy lifestyles and adverse environmental conditions, the incidence of cancer is expected to rise significantly. Breakthrough inventions are paramount to addressing this challenge.

The European Cancer Information System (ECIS) predicts that 31% of men and 25% of women in the European Union will be diagnosed with cancer before the age of 75. It is estimated that inventions in oncology have saved more than five million lives over the last three decades in the EU alone.

In February 2024, to coincide with World Cancer Day, the EPO organised an online event Combatting cancer: how innovation actors are changing the landscape, featuring exchanges with health tech startups, researchers and policymakers.

The event provided the opportunity to present a new economic study entitled Patents and innovation against cancer. The study revealed the latest technology trends in the sector, as well as the role of various actors such as universities, startups and industry in developing life-saving technologies. It showed that advancements in cancer treatment increased by 70% from 2015 to 2021, based on the number of international patent families (IPFs).



A new technology platform, Technologies combatting cancer, was also presented. Developed by EPO experts in collaboration with ten national patent offices in Europe, the platform features over 130 datasets divided into four main categories: prevention and early detection, diagnosis, therapies, and well-being and aftercare. It includes data on the 140 000 inventions analysed in the study, among many others.

In May 2023, the EPO published three new case studies to show how patents can help grow businesses that specialise in creating new technologies to detect, diagnose and treat cancer. The World Health Organization estimates that cancer is a leading cause of death in over 100 countries for individuals under the age of 70, highlighting just how essential medical ingenuity and new solutions are. With a focus on small and medium-sized businesses, researchers and entrepreneurs, the case studies highlight best practices in managing IP and strategies.

They also help innovators to better navigate the patent system as well as use other IPRs to facilitate commercialisation of their technologies. The studies feature startups and spinouts from France, Austria and Ireland that have developed new and unique cancer diagnostic and/or treatment technologies. Their publication complements the EPO's existing series of innovation case studies.

This report underlines a sharp increase in patent filings in this subfield dating back to the 1990s, well before the COVID-19 pandemic.

In October 2023, the EPO published a patent insight report on mRNA technologies, highlighting the significance of mRNA-based vaccines. The report underlines a sharp increase in patent filings in this subfield dating back to the 1990s, well before the COVID-19 pandemic, and remarkable growth over the past decade, surpassing growth rates in all other technology areas combined. The report's timeliness was underscored by the award of the 2023 Nobel Prize in Physiology or Medicine to mRNA pioneers Katalin Karikó (European Inventor Award Popular Prize Winner 2022) and Drew Weismann. Their work contributed to an enhanced understanding of mRNA and to the development of effective COVID-19 vaccines. Using publicly available patent data, the report reveals that related patent applications predominantly originate in the United States, Europe and P.R. China. Europe has a greater share in this field compared to other emerging technologies such as quantum technologies.

The EPO Espacenet Fighting Coronavirus platform, released in June 2021, provides about 350 smart searches which help users navigate in a targeted way, through millions of patent documents in just a few clicks. These easily accessible searches, combining keywords and classifications, help innovators and decision-makers to identify quickly the most important inventions to tackle global pandemics.

The Fighting Coronavirus platform supports the important work of clinicians, scientists, and engineers in finding solutions that can counter the spread of diseases and pandemics. This initiative also reflects the patent system's broader role of encouraging investment in scientific and technological breakthroughs for the benefit of all.

With the coronavirus pandemic hopefully behind us, this platform is still valuable for innovators pursuing solutions for good health, especially in the fields of vaccines, therapeutics, diagnostics and analytics, informatics and technologies relating to the new normal. The platform was updated in July 2022 to reflect the latest changes in these technology fields and we plan to update it again in July 2023.

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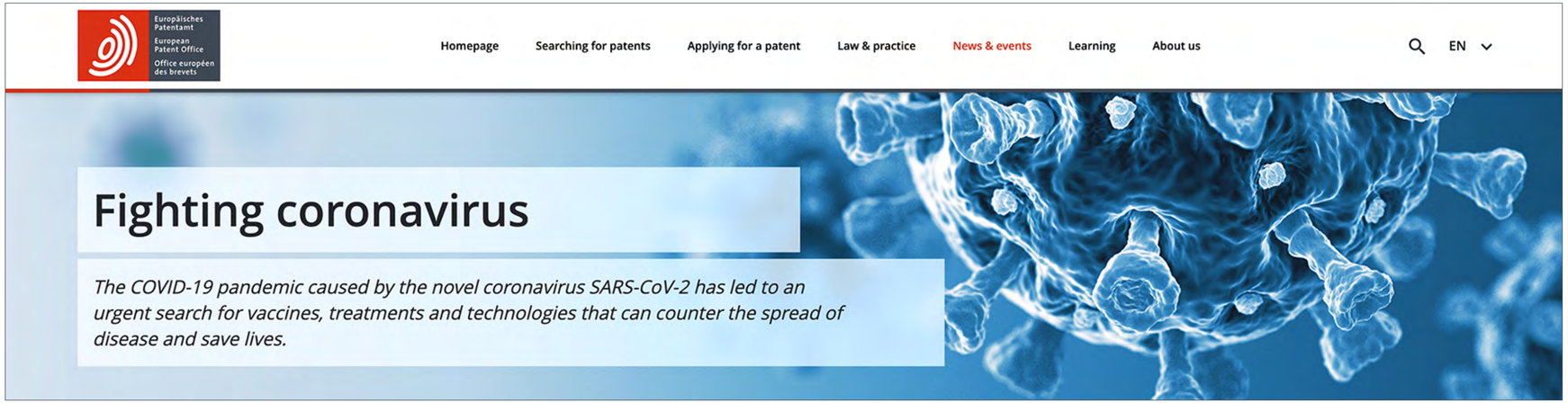

Quality education

In October 2024, the EPO published a study on the role of European universities in patenting and innovation. Bringing new inventions to market is key to fostering European growth and competitiveness. However, transferring knowledge to market has traditionally been a struggle for European universities, which are underrepresented in the patent landscape despite maintaining an international edge in terms of research, leading to what is referred to as a 'European paradox'.

Nevertheless, over the past two decades, European universities have had a steadily increasing impact, accounting for more than 10% of patent filings at the EPO by 2019. Direct patent applications from universities themselves represent an increasing proportion of European universities' patent footprint, up from 20% in 2000 to 45% in 2019. There is a clear trend towards increased commercialisation of university research and advancements, which has been stimulated further by advances like the Unitary Patent.

The study draws on key findings in Mario Draghi's September 2024 report on EU competitiveness. The Draghi report has led to a drive to bring commercialisation of EU inventive activity back to Europe and away from the US, which hosts 10% of European academic startups in possession of patents. Also illuminated is the divide between the more industrialised regions of Europe, which host most of the universities to have filed large numbers of patent applications with the EPO, and regions with lower GDP per capita, which generate relatively small numbers of academic patents.

The Trilateral brochure on Inclusive Intellectual Property Initiatives, published in July 2024, outlines the activities undertaken by the EPO, JPO, USPTO and WIPO to inspire the next generation of innovators. This publication addresses two areas of great importance for the future of sustainable innovation: regional knowledge sharing and youth-oriented IP education. Through this strategic partnership, the Trilateral Offices put emphasis on young people and the importance of inclusive and equitable quality education in line with UN SDG 4.

Gender equality

Breaking barriers and bridging the gap in inventive activities is essential for a fair and equitable sustainable world. The EPO promotes women in science, technology, engineering, and mathematics (STEM) through several initiatives. These include International Women's Day on 8 March each year, International Girls Day, our mentoring programme, and by recognising inspiring examples of women inventors excelling in different fields for more than 16 years with the European Inventor Award and since 2022 with the Young Inventors Prize.

In addition, our EPO Chief Economist Unit (CEU) study Women's participation in inventive activity, published in November 2022, provides evidence on the presence of women inventors across different countries and time periods and in various technology fields. Although myriads of brilliant women innovators contribute to solving some of humanity's biggest challenges, there is still a gender gap that needs to be breached.

The good news for Europe is that the women inventor rate (WIR), which measures the percentage of female inventors among all inventors in patent applications each given year, has been increasing in EPO countries. From around 2% in the late 1970s it had reached more than 13% in 2019. Although the WIR in EPO countries is well above that in Japan (which was about 9.5% in 2019), it still remains below that of the United States (which is about 15%), and well below the rates in China (about 26.8%) and South Korea (about 28.3%). This denotes a lost opportunity for Europe's innovation performance.

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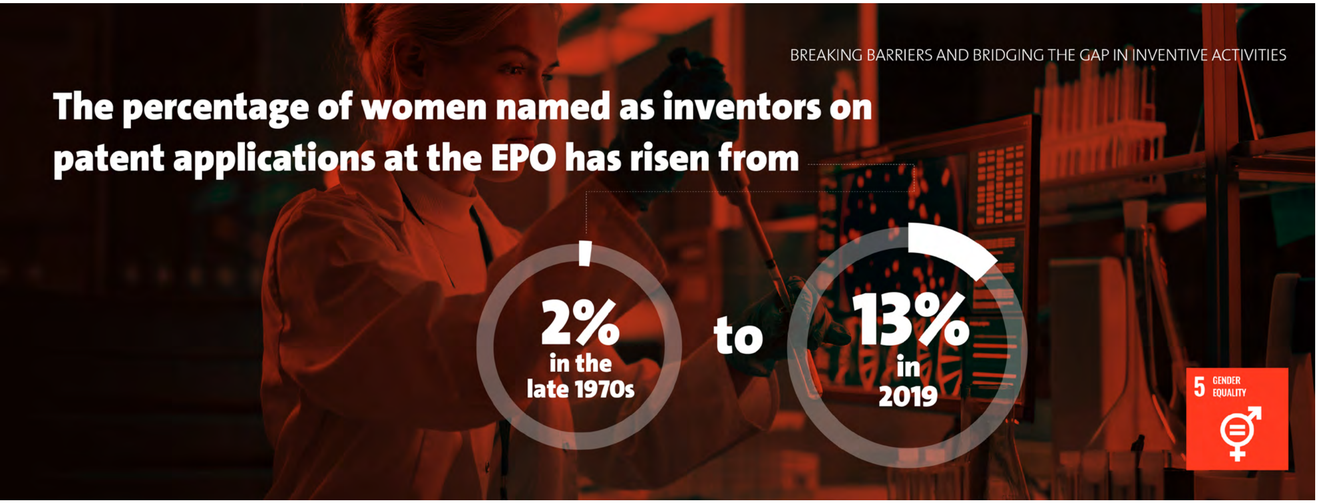

Among the EPC member states, Latvia (30.6% in 2010-2019), Portugal (26.8%), Croatia (25.8%), Spain (23.2%) and Lithuania (21.4%) have the highest WIR values, while Germany (10.0%), Luxembourg (10.0%) and Austria (8.0%) have the lowest. Research institutions and the chemicals and life sciences sectors appear to have the highest levels of women innovators.

Unfortunately, there is a consistent trend of a decreasing share of women in total employment, PhD enrolment, PhD graduates in STEM, R&D personnel and researchers, and patenting. Women in EPO countries face increasing obstacles when progressing in STEM careers and this must improve.

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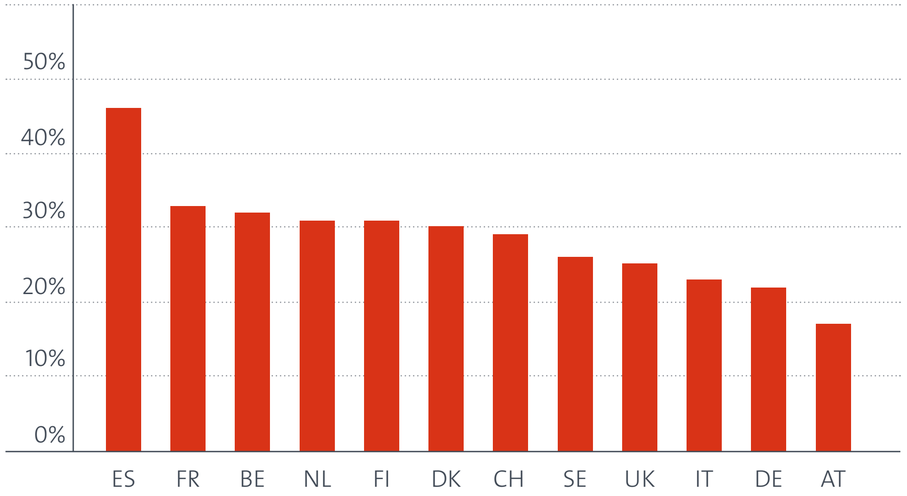
In March 2024, the EPO released the Patent Index 2023, the first edition to feature statistics on women inventors. These statistics highlight European patent applications from EPC countries that name at least one woman as an inventor. In 2023, 27% of patent applications filed by European applicants at the EPO included at least one woman inventor. This rate varies significantly across countries, with Portugal at 52%, Spain at 46% and Austria at 17%. Across technology sectors, the proportion of applications with at least one woman inventor ranged from 14% in mechanical engineering to 50% in chemistry.

Percentage of patent applications per country naming at least one woman as inventor

EPO states filing more than 2 000 applications in 2023



Women inventor rate by technology

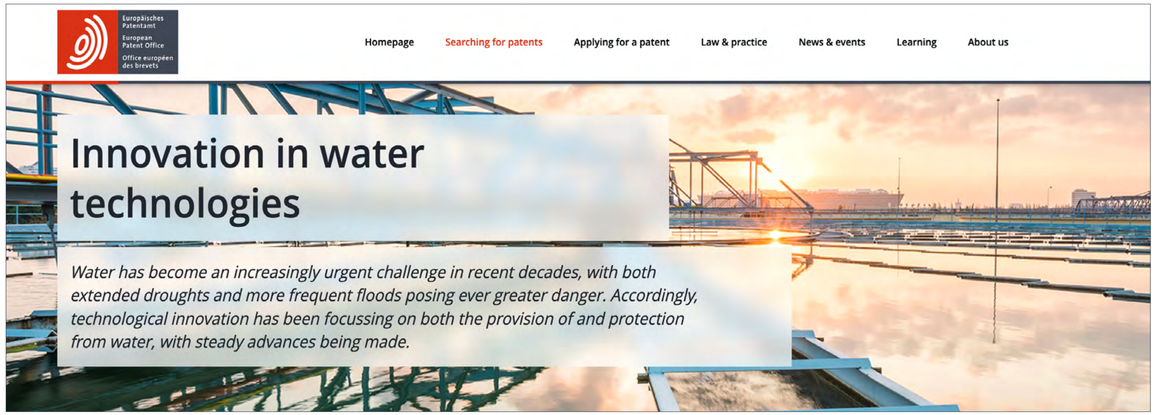
Technology	%
Electrical engineering	23%
Instruments	27%
Chemistry	50%
Mechanical engineering	14%
Other fields	16%

Clean water and sanitation

Each year, access to clean and safe water becomes increasingly critical as the global population continues to grow and environmental challenges intensify. Though the world's total water supply is vast, only a small fraction is accessible and suitable for human consumption. The United Nations estimates that 2.2 billion people lacked access to safely managed drinking water as of 2022, and that by 2025, nearly half of the global population will be living in water-stressed areas. Climate change is also making both floods and droughts more frequent and severe, affecting more people worldwide. Advancements in water technologies are essential to address these pressing issues.

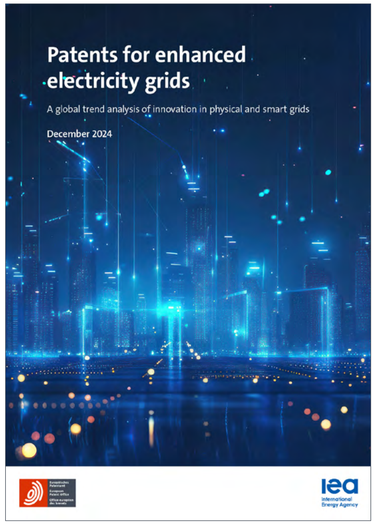
In July 2024, the EPO released a new technology platform on innovation in water technologies, developed in collaboration with ten national patent offices across Europe. This platform encompasses over 75 datasets divided into two main categories: clean water and protection from water.

In addition to the platform, the EPO published a study on innovation in water-related technologies, detailing the latest advancements and what remains to be done to tackle water-related hazards. The study was developed within the framework of the EPO's Observatory on Patents and Technology, in co-operation with experts from 14 national patent offices. With 40% of all international patent families originating in Europe, the continent leads in advancements in water technologies, though several other countries – especially those threatened by water shortages and flooding such as Australia and India – are leveraging technology to develop new solutions too.



Affordable and clean energy

Climate change is driving technological advancements in clean energy. New technologies are being developed to safeguard our planet and meet the climate targets set out in the European Green Deal, UN SDGs and Paris Agreement. The EPO supports the race against climate change with various initiatives to promote affordable and clean energy solutions, including the publication of reports on related technology trends.



December 2024 saw the EPO publish its report on patents for enhanced electricity grids, exploring an important field that contributes to UN SDG 7. Electricity is of critical importance to the global energy transition and electricity demand has grown at twice the pace of overall energy demand in the last decade. However, the world's electricity use needs to grow 20% faster than this in future, if countries are to be able to achieve their national energy and climate goals. Success will require modern, smart and expanded grids, the unsung heroes of the energy transition. Technological ingenuity needs to be fostered in the field to avoid bottlenecks in the development of energy production.

Patenting of electricity grid technologies has increased roughly sevenfold since 2005, with a dramatic acceleration of around 30% per annum from 2009 to 2013. While growth has since stabilised in most major regions, China overtook the EU for the first time in 2022 – ensuring continued growth in the field since 2017. Smart grids are driving the latest push in electricity grid patenting, alongside grid-related AI patenting which grew 500% from 2017 to 2021 and is currently the most active area in the field of enabling digital technologies.

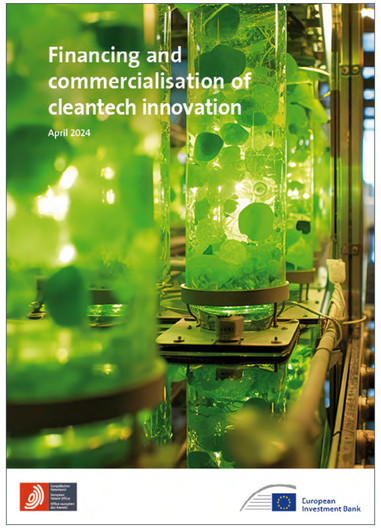
These findings highlight the crucial importance of pursuing new ideas in the field of energy grids to ensure that climate targets can be met. Patents are key to incentivising future breakthroughs.

The EU Green Deal highlights the critical need to transform industries if climate neutrality is to be achieved in the EU by 2050, making progress towards cleaner technologies essential for reshaping Europe's economy and maintaining competitiveness. Over 750 000 inventions related to clean and sustainable technologies were published in the period from 1997 to 2021, comprising nearly 12% of all inventions during this time.

These insights are detailed in the EPO-EIB joint report, Financing and commercialisation of cleantech innovation, published in April 2024. From 2016 to 2021, cleantech inventions increased by 33%, with nearly 55 000 recorded in 2021 alone. The report also features an extensive survey of European cleantech innovators, showcasing their work in clean technologies and the support needed to bring these ideas to market. These insights from the study were discussed by a panel of economists and experts in sustainability and development in Europe at the online EPO event Bringing cleantech innovation to market, with over 1 000 attendees.

Climate change impacts the whole world, from the largest to emerging economies, necessitating urgent corrective actions from decision-makers and stakeholders. The energy transition is crucial, but its current pace is insufficient; achieving a net-zero scenario by 2050 requires a profound transformation of energy systems and massive deployment of renewable capacity.

In November 2023, the EPO and the International Renewable Energy Agency (IRENA) released a joint patent insight report on offshore wind energy. The report reveals that approximately 17 000 offshore wind energy patent families were published between 2002 and 2022, with an average annual growth rate of 18%. China leads, accounting for 52% of all patent families, followed by Korea (6%), Germany (5%), Japan (5%), the US (4%) and Denmark (4%). The report, like other patent insight reports, is accompanied by additional support materials including search strategies, interactive workbooks and data for users to further explore and analyse independently.



Our study on hydrogen patents for a clean energy future, released in January 2023 in partnership with the International Energy Agency (IEA), shows that the patenting of hydrogen production technologies has massively shifted towards alternative, low-emission methods such as electrolysis.

The findings include good news for Europe: first and foremost, that organisations in Europe lead (28% of hydrogen patents), followed by those in Japan (24%) and the US (20%). Germany (11%), France (6%) and the Netherlands (3%) rank top in Europe for patenting hydrogen technologies, and Europe has gained an edge in electrolyser manufacturing capacity.

Among end-use applications, the automotive sector continues to see the highest rates of growth. Applications in other areas such as long-distance transport, power generation and heavy industry need to step up.

The study also found that patents enable growing businesses to secure financing: startups holding patents attracted about €5 billion in venture capital investment into hydrogen-related firms during the last decade.

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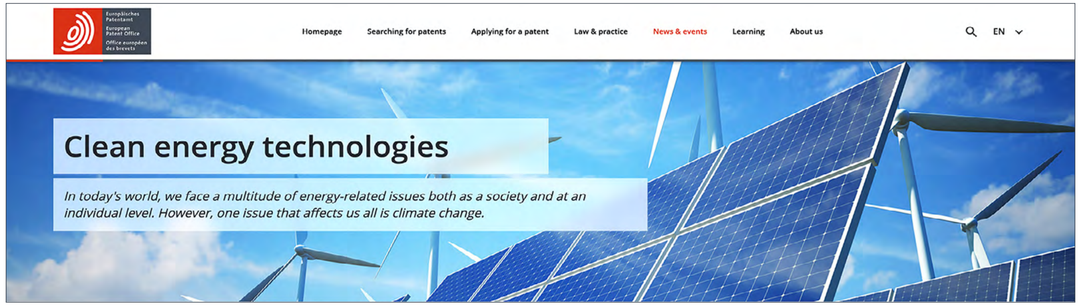
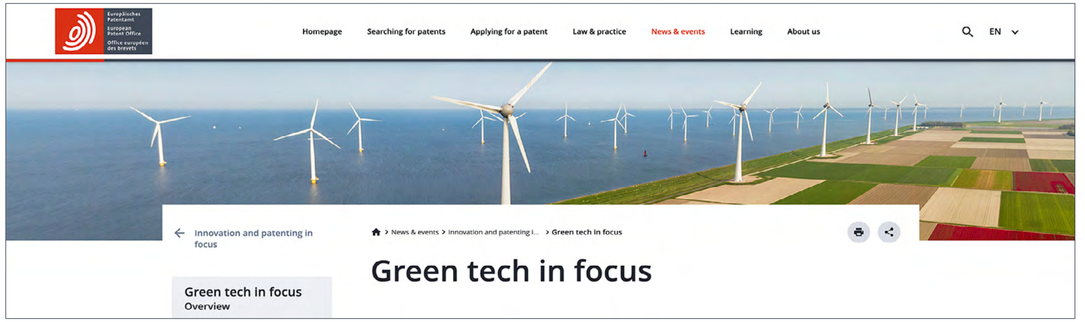
November 2022 saw the launch of our platform on clean energy technologies. This provided an initial selection of some 70 smart patent information searches that run on Espacenet, to support innovators with technical information in the race to tackle climate change.

In December 2023, the EPO hosted an event on a related set of clean technologies: carbon capture and storage (CCS). Experts discussed the latest trends in the patenting of these technologies, and their potential contribution towards climate neutrality. The clean energy technologies platform was also extended with a new section devoted to CCS.

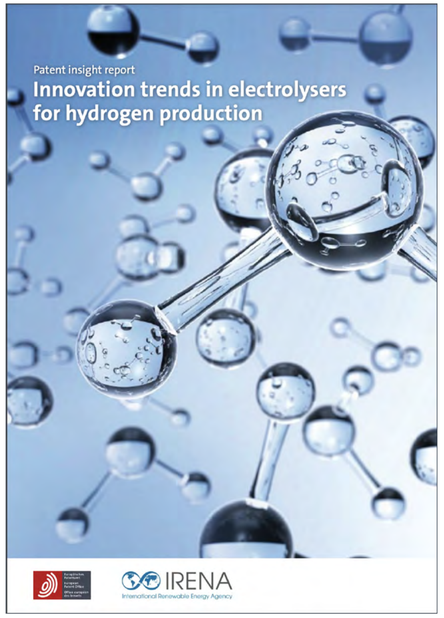
The EPO's Green tech in focus webpage helps inventors focus on areas where solutions are most urgently needed in renewable energy and energy transition technologies to build a greener future.





A patent insight report on innovation trends for electrolysers in hydrogen production (May 2022) was published in partnership with the International Renewable Energy Agency (IRENA). This revealed patent filing trends in the exciting field of electrolysers for hydrogen production using renewable energy.

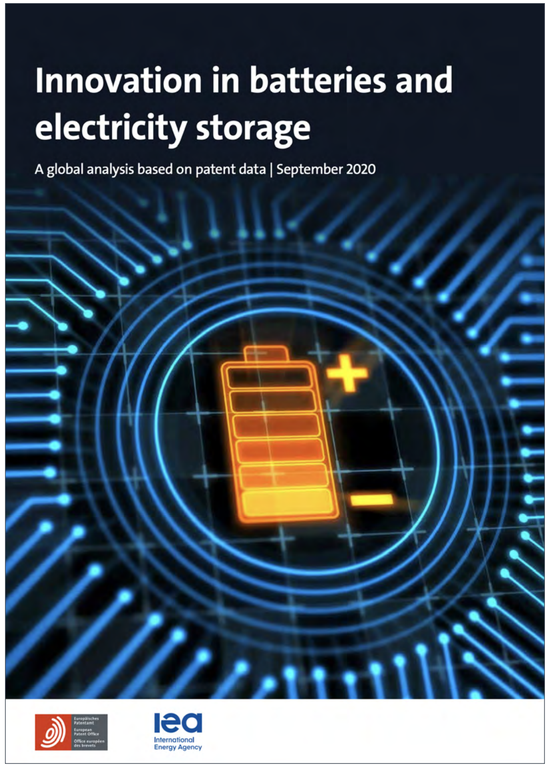
Global patent data shows inventive activity to have increased faster in low-carbon energy technologies than in fossil fuels during the past decade.



A joint EPO-EIA study of April 2021 on patents and the energy transition examined the transition to low-carbon energy technologies across all sectors of the economy.

This study reveals that global patent data shows inventive activity to have increased faster in low-carbon energy technologies than in fossil fuels during the past decade. New ideas are shifting from renewable energy supply to end-use and cross-cutting technologies such as batteries, hydrogen, smart grids and carbon capture. Clean energy technologies in end-use sectors such as transport, buildings and industry now account for the majority (60%) of all low-carbon energy inventions.

Again, the good news for Europe is that it is in the lead, with a 28% share of global low-carbon energy patents in the past decade, followed by Japan (25%), the US (20%), Korea (10%) and China (8%).



In September 2020, an EPO joint study with the IEA on innovation in batteries and electricity storage offered a global analysis that underlines the key role of battery solutions in the transition to clean energy technologies. The study showed that patenting activity in electricity storage technologies has grown much faster than patenting activity in general over the past decade, indicating a burst of inventive activity in this area, spearheaded by lithium-ion (Li-ion) batteries, particularly for electric vehicles. According to the study, Japan and Korea lead the global battery technology race, pushing other countries to develop competitive advantages in specific parts of the battery value chain. Nickel-manganese-cobalt (NMC) cathode chemistry has seen the most innovative breakthroughs related to Li-ion batteries since the launch of mass-market electric vehicles, but potentially disruptive competitors are emerging outside the big companies and with more regional variation.

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Decent work and economic growth

Research shows that IP rights contribute to the growth of the IP proprietor as well as the economies of their country of residence and the broader region.

A joint study published by the EPO and EUIPO in 2025 presented an updated analysis of IPR ownership and firm performance in the EU. Differences between SMEs and large firms were also explored.

In the EU, fewer than 10% of SMEs own any kind of IPR, while nearly 50% of large firms own at least one type of IPR. On average, firms that own IPRs were shown to generate revenues per employee that are 23.8% higher than for companies with no IPRs. Moreover, the premium enjoyed by SMEs owning IPRs is +44% higher than those without IPRs. The premium for large companies was +16%.

The study reveals the clear benefits of IPRs for business success and economic growth, which contribute in turn to UN SDG 8.

The EPO launched its Observatory on Patents and Technology in October 2023 and to coincide with the launch, also published a joint study with the EUIPO on Patents, trademarks and startup finance. The publication emphasises the significant impact of patents and trademarks on the success of European startups. The report reveals that startups that have secured these intellectual property (IP) rights in their early stages are up to 10.2 times more likely, to successfully secure funding. To ensure the maximum impact of patents in facilitating access to finance, the EPO also released the Deep Tech Finder, a new free online tool enabling investors to easily find and assess European startups that have filed patent applications at the EPO.

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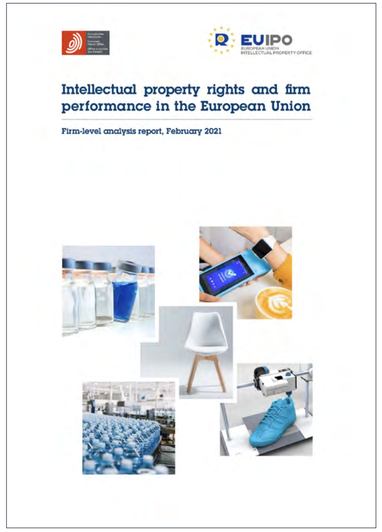
The fourth edition of our joint study with the EUIPO on IPR-intensive industries and economic performance in the European Union, released in October 2022, showed that intellectual property fosters 82 million jobs in the EU. This edition of the study assesses the contribution to the European economy of industries that make an above-average use of IP rights. It covers a broad range of IP rights (patents, trademarks, designs, copyright, geographical indications, and plant variety rights) and considers multiple economic indicators, with a focus on Gross Domestic Product (GDP), employment, wages, and external trade.

The third edition of this joint study by EPO and EUIPO, published in February 2021, on Intellectual property rights and firm performance in the European Union, analysed the performance of SMEs and larger firms in the European Union with regard to their ownership and use of patents, trademarks, and designs. It showed that although only a small proportion of SMEs (about 9%) own or use patents, trademarks, or designs when compared to larger firms (about 60%), the advantage that these IPRs provide in terms of revenue per employee is far greater for SMEs (+68%) than for larger firms (+18%).



Furthermore, on the hot topic of commercialisation of inventions, the EPO scoreboards of European SMEs, universities, and public research organisations (PROs) aim to monitor the commercialisation of inventions that have been patented at the EPO by small applicants. On top of using patents to protect and market inventions, small applicants also leverage them to secure higher margins, license technology, establish collaboration agreements with partners and attract investors. Roughly two thirds (67%) of the inventions for which SMEs have filed a patent application with the EPO are exploited for commercial purposes, half of the time via collaborations with external partners, via technology transfer, or through co-operation agreements. Research institutions already commercialise more than one third (36%) of the inventions for which they have filed a patent application with the EPO. Licensing is by far their preferred commercialisation channel (70% of commercialised inventions). However, the main challenges to successful commercialisation of science-based inventions are lack of proof of concept and failure to find interested partners.

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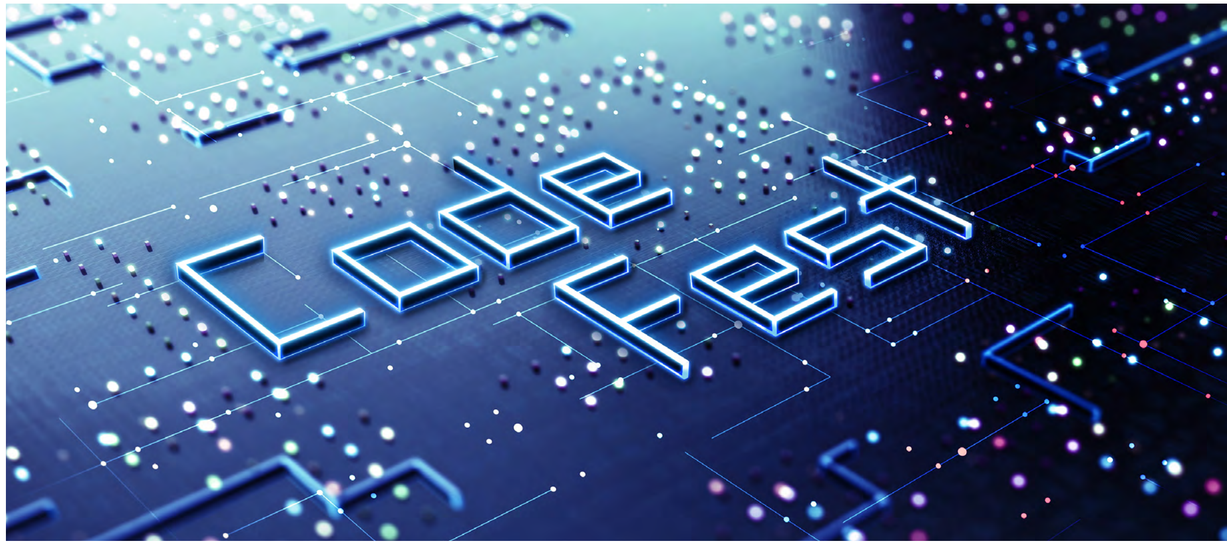
Industry, innovation and infrastructure

CodeFest 2024 invited talented coders and developers to harness the transformative potential of generative AI, with a view to deriving new insights from patent data. Technological advancements can be accelerated by the combination of generative AI and patent data, making the leveraging of AI central to the EPO's digital transformation. 120 participants submitted proposals to CodeFest 2024, leading to the selection six finalists by a jury of EPO experts in IT, data science, AI and patent information.

The InnoVisor team emerged as the winner, with a platform that visualises patent landscapes, assists users in drafting patent applications and evaluates patentability by providing a similarity score between the subject-matter and any relevant prior art documents. Initiatives such as CodeFest can contribute to achieving UN SDG 9 by potentially transforming the way we access patent data and use it to support strategic decision-making.



As we move into an increasingly digital world, space and satellite technology have become of crucial importance to sustainable development and economic growth. The communication technologies connect us to each other, while space technologies and earth observation technologies connect us to our planet and to space and allow us to have a better understanding of our ecosystem.

A joint study by the EPO with the European Investment Bank (EIB), Deep tech innovation in smart connected technologies, identified unique obstacles that small businesses face in developing advanced digital technologies in the EU. Despite impressive patent activity, Europe's small deep-tech businesses still have a long way to go in comparison to their US counterparts. While the US has 6 517 SMEs patenting in smart, connected devices, the EU with 2 634 has less than half that number.

Moreover, SMEs in the US contribute to a larger share of overall patent activity relating to the Fourth Industrial Revolution (4IR) – 16% – compared to Europe, where they contribute to only 10% of the bloc's activity in the field.

Furthermore, 57% of the EU's 4IR SMEs cite Europe as top market for growth and in fact 24% consider the US as their future primary market. About 80% of EU's 4IR SMEs have less than 50 employees and 42% are less than ten years old. Their activities span the healthcare, transport, and cleantech sectors, as well as data analytics, and they are frequently (44%) involved in manufacturing. Access to finance and lack of skilled talent are cited as barriers by three quarters of deep-tech SMEs in the EU and US.

The study identified unique obstacles that small businesses face in developing advanced digital technologies in the EU.

The EPO patent insight report on quantum computing, published in January 2023, provides an overview of recent trends in the field. It concludes that the number of inventions in quantum computing has increased exponentially in recent years.

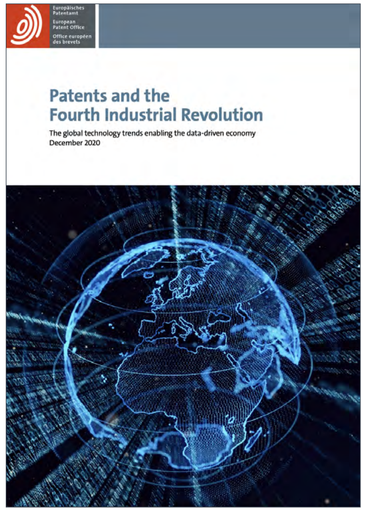
A third joint patent insight report, on space-borne sensing and green applications, was released in October 2022. This report focused on remote sensing data applications that can help to mitigate climate change, including when it comes to weather forecasting, detecting pollution, protecting biodiversity and monitoring the environment more generally. The report also explored the potential of space-borne sensing as an indispensable tool for the effective implementation of green policies and objectives.

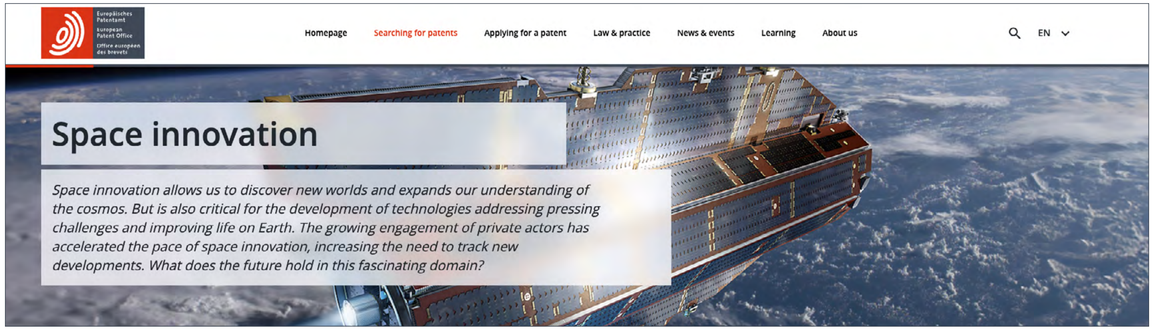
In July 2021, the patent insight report on cosmonautics conducted by the EPO and the European Space Policy Institute (ESPI) in collaboration with the European Space Agency (ESA), took a giant leap forward and investigated the development of technologies for travel beyond Earth's atmosphere into outer space.

A further joint report followed on quantum technologies and space in November 2021, providing insights into the patenting of quantum technologies relating to the space sector. These technologies are primarily used in secure communications, in time and frequency transfer, as well as in Earth observation and sensing.

Space and satellite technology have become crucially important to sustainable development and economic growth.

The EPO study Patents and the Fourth Industrial Revolution (4IR), published in December 2020, provided insights into how 4IR inventive activity has dramatically accelerated in recent years, with an average annual growth rate in patenting close to 20% for the period from 2010 to 2018. In fact, 4IR inventive activity accounted for more than 11% of global innovation in 2018. The US remained the world leader in 4IR technologies, while Japan and Europe were losing ground to Korea and China. The dynamism of national industry champions and regional clusters in 4IR technologies could explain the domination of the US and the rise of Korea and China.





Space breakthroughs are vital for advancing our understanding of the universe and addressing pressing challenges on Earth. While states and government agencies have traditionally driven advancements in the space sector, the growing involvement of private actors has accelerated growth, increasing the need to monitor developments. In May 2024, the EPO hosted an event entitled "Space technologies: tracking innovation and startup development", where speakers from space startups, industry and academia discussed the latest technology trends revealed by patent data and the growing role of IP in the sector. There was also an opportunity to launch a new platform and patent insight report.

The space innovation platform enables users to easily access patent documents covering over 60 technical topics in cosmonautics and space observation. It helps inventors, scientists, engineers, companies, policymakers, space agencies and scholars to access advanced technical information on space inventions.

Published to coincide with the platform's release, the patent insight report on propulsion systems for space was jointly compiled by the EPO and the European Space Policy Institute (ESPI) in collaboration with the European Space Agency (ESA). Space propulsion systems have seen strong growth in patenting activity over the last 20 years, averaging 9% per annum and primarily concentrated among traditional space sector leaders, including from the US, Europe, China and Russia.

Reduced inequalities

In December 2024, the EPO published a report on assistive robotics for people with special needs and the impact inventions can have on reducing inequality. Multiple concepts were explored, including robotic walkers and assistive exoskeletons, from among more than 25 000 inventions identified in the assistive robotics field. The number of inventions has greatly increased over the last decade, with above-average growth compared to that for all technology fields.

The report found that applicants in the field pursue various application routes, including international patent applications, US applications, EP applications and more. The most active applicants are companies and universities from the US, Europe and China.

Inventors such as Elena García Armada have made inspiring leaps towards a more inclusive world. García, who won the 2022 European Inventor Award in the research category, applied robotics to develop an exoskeleton for children in wheelchairs – allowing them to walk during rehabilitation.

Enhancing independence and providing rehabilitation for people with disabilities is crucial to reducing inequality. Assistive robotics is one key front on which such needs can be addressed.

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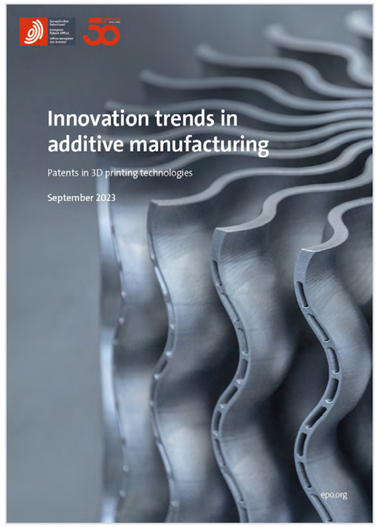
Responsible consumption and production

In September 2023, the EPO published the study Innovation trends in additive manufacturing (AM). The study revealed that patenting activity in 3D printing technologies is surging at eight times the rate of all other technology fields as a whole. It also highlights the transformative impact of AM technology, particularly in the health, medical and transportation sectors. Unlike the EPO's previous 2020 study on the topic, which focused on Europe and European patents (see below), this latest study adopts a global perspective based on international patent families (IPFs).



Getting rid of plastic waste is one of today's key sustainability challenges. Innovation in green plastics is needed more than ever. The EPO supports inventors, investors, and policy makers in the race to achieve zero waste through three main initiatives:

The CodeFest on Green Plastics was a coding competition to develop creative and reliable artificial intelligence (AI) models for automating the identification of patents related to green plastics and making the know-how contained in patents concerning green plastics more readily available to innovators everywhere.

This edition of the CodeFest drew on the EPO's study on patents for tomorrow's plastics, released in October 2021. The study focused on new technologies that can help recycle waste plastic or create bioplastics which quickly decompose, as well as alternatives to fossil sources as raw materials for new plastics, such as plants and fungi.

The US and Europe stand out as global hubs of inventive activity for a circular plastics industry. Chemical and biological recycling generated the highest level of patenting activities. Fundamental research is key to further progress in chemical and biological recycling. Europe's good performance in this respect shows the potential to bring new technologies to market. For example, bioplastics provide alternatives to conventional fossil raw materials and rapidly emerging technologies allow for novel designs of durable plastic materials.

The EPO study Patents in additive manufacturing, published in July 2020, revealed trends in 3D printing technologies, demonstrating that innovation in AM increased at an average annual rate of 36% from 2015 to 2018, with more than 4 000 patent applications for inventions relating to AM filed at the EPO in 2018 alone. Europe and the US had a strong lead in AM, accounting respectively for 47% and 35% of all AM inventions for which a patent application was filed with the EPO since 2010. The leading sectors for AM patent applications were health, energy and transportation.

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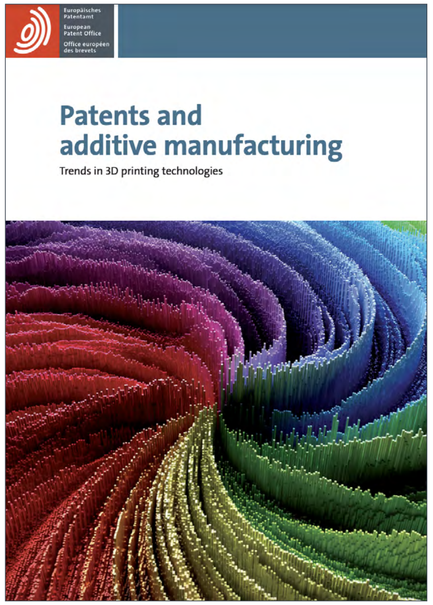

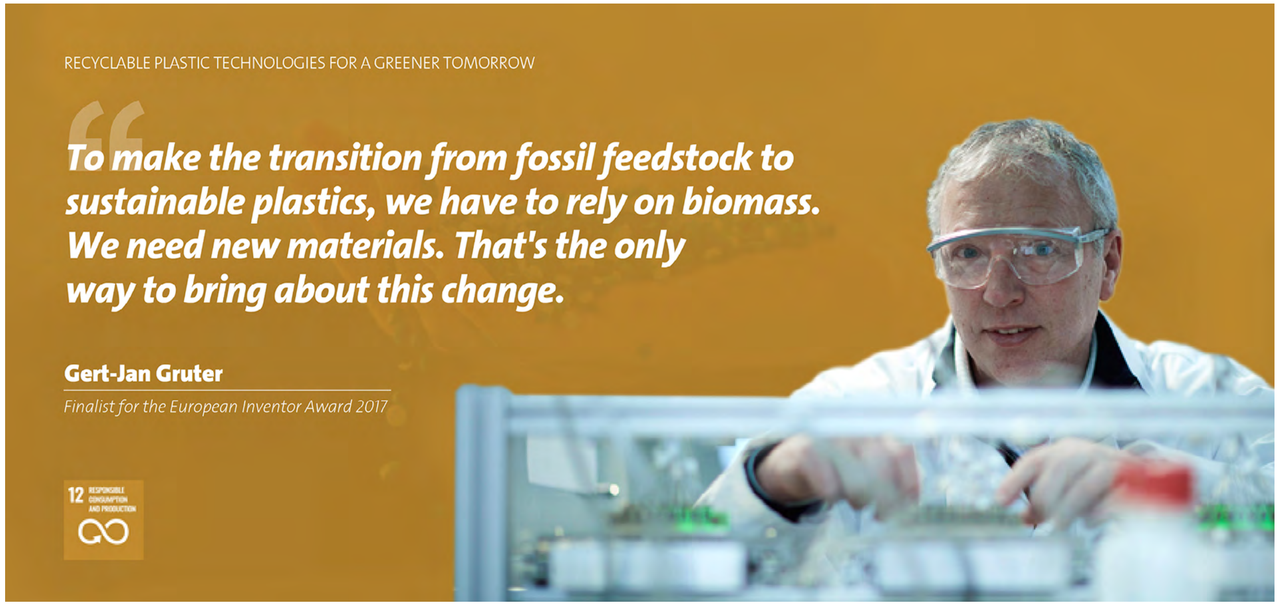

Climate action

The Firefighting technologies platform supports the vital tasks of fire prevention and firefighting, wildfire control and forest restoration. This is the third Espacenet platform and reflects the importance of making vital technical knowledge easily accessible, thereby enabling innovators to find solutions to global issues.

With over 8 300 km² of EU land burned during wildfires in 2022 alone, this platform is valuable for inventors looking to create solutions to detect, prevent and extinguish fires, as well as for protective equipment and effective post-fire restoration. The platform went live May 2023 and currently provides 31 ready-made search queries on topics such as aerial detection technologies, transportable hydraulic infrastructures, respiratory apparatuses for firefighters and soil stabilisation.

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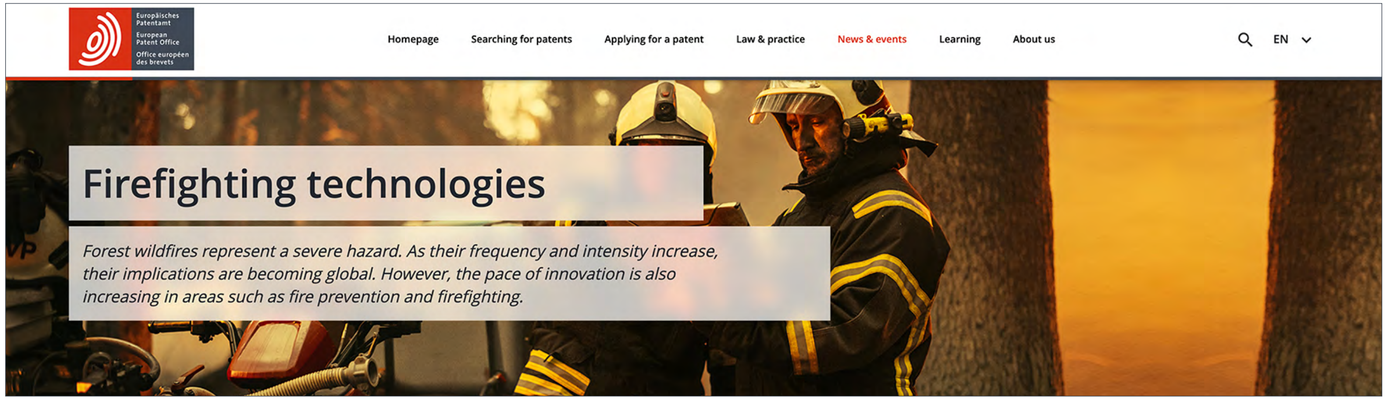
The 'IP5 Offices' initiatives on Climate Change' booklet, published in June 2023 following the 16th Annual meeting of the IP5 Heads of Office, details the IP5 Offices' contributions to the fight against climate change. This publication presents the various activities undertaken by the five largest Offices of the world, such as analytical reports and projects, promoting the realisation of UN SDG 13.



Peace, justice and strong institutions

The EPO CEU study on The European patent system and the grace period from June 2022 found that European EPO applicants generally manage to comply with the novelty requirement, although universities experience more frequent issues than other entities due to pre-filing disclosures. In the few cases where it occurs, failure to comply with the strict novelty requirement under the EPC may have serious economic consequences. Data shows that the strict novelty requirement creates problems for applicants in approximately 10 000 cases a year. Consequently, if the EPC made provision for a grace period, the baseline potential volume of EP-application-related requests invoking the grace period can be estimated at approximately 10 000 annually. This corresponds to 6% of European patent applications filed in 2021. While an unrestricted grace period in Europe would introduce significant legal uncertainty into the European patent system, a declaration requirement and prior user rights could help preserve the balance in the system.

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Conclusion

Innovation and intellectual property play significant roles in the quest for sustainable development. The EPO sustainability initiatives highlighted in this report demonstrate how viewing sustainability objectives through the lens of innovation contributes to the UN SDGs. At the EPO, we ensure that every scientist, inventor, and entrepreneur have access to high-quality patent knowledge resources that can help them bring their ideas to market. And, by building a network of expertise with innovators, investors, and IP professionals worldwide, we aim to democratise knowledge and unleash the true power of patents in finding creative solutions to unprecedented challenges.

The impact of inventions on human progress through technological revolutions is clear. We now have an opportunity to influence these revolutions in a way that supports sustainability. It is an opportunity we simply cannot afford to miss. Let us use the power of patents and join forces to create a better and brighter future for everyone, everywhere.

The EPO sustainability initiatives highlighted in this report demonstrate how viewing sustainability objectives through the lens of innovation contributes to the UN SDGs.

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