

Innovation driving  
human progress

# WIPO and the Sustainable Development Goals



**The UN Sustainable Development Goals provide an ambitious roadmap for human progress.**

**Innovation is essential to meet those goals.**



Our growing, interconnected populations need new ways to address the many social, economic and environmental challenges identified by the Sustainable Development Goals (SDGs).

We need innovation to help us rethink how to overcome poverty, hunger and premature mortality, how to combat climate change and preserve our natural world, how to optimize the use of artificial intelligence, and how to shape the future of work.

The World Intellectual Property Organization (WIPO), a specialized agency of the United Nations, exists to enable innovation and creativity. WIPO does this by working with governments, businesses, individuals and civil society around the globe to create a balanced and effective intellectual property (IP) system that gives innovation and creativity value.

The value embedded in intellectual property rights and supported by the global IP system boosts the inventiveness that drives progress, helping us meet our greatest needs and aspirations.



Photo: WIPO / E. Berrod

WIPO Director General  
**Francis Gurry**

**“Intellectual property as a policy exists to create an enabling environment for – and to stimulate investment in – innovation; to create a framework in which new technologies can be traded around the world and shared.**

**The economic imperative at the heart of innovation is fundamental to the process of societal transformation that the Sustainable Development Goals aim to achieve.”**

# Innovation and economic transformation

The link between innovation and economic and social progress is well established, and is expressly recognized in **SDG 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation.**

Successive eras of development have been associated with a mutually reinforcing dynamic of technological breakthroughs, follow-on inventions and social change. Typically, major new technologies have been associated with deeper capital investment, expansion of the labor force, increased employment and productivity, rising income levels, improved public health, easier transportation and better education – all underpinning new, more efficient economic structures and more prosperous societies.

The next generation of technologies in every field – from biotechnology, blockchain and digital connectivity to materials science, artificial intelligence and more – promise to further reduce poverty and improve the lives of billions of people. Innovation is more important than ever to this transformation.

Many factors nurture the innovation–transformation–progress cycle. History has shown that an effective intellectual property system is an essential and powerful tool to support this cycle.

## Intellectual property and innovation

Two hundred years ago, innovation success was largely a matter of luck. Today, the global IP system makes innovation a systematic and reliable endeavor by providing a set of rules and processes that are applicable to all. The global IP system is a framework of treaties, laws, policies and procedures that protects and monetizes the fruits of invention.

IP rights are rooted in national law. As a treaty-making organization, WIPO works with governments and other stakeholders to help countries align their legal IP framework with multilaterally negotiated global principles, norms and practices.

A well-functioning set of international IP rules and norms enhances the return on investment that encourages new discoveries and creations. These in turn accelerate growth, development and progress.

### **IP facilitates the growth of knowledge**

Public disclosure requirements ensure that innovative technologies are shared through a filing process, enabling follow-on innovations.

### **IP provides an economic incentive to invest**

The competitive advantage derived from innovation and monetized by the IP system promotes investment in research and development and new initiatives, further advancing innovation.

### **IP seeks to balance competing interests**

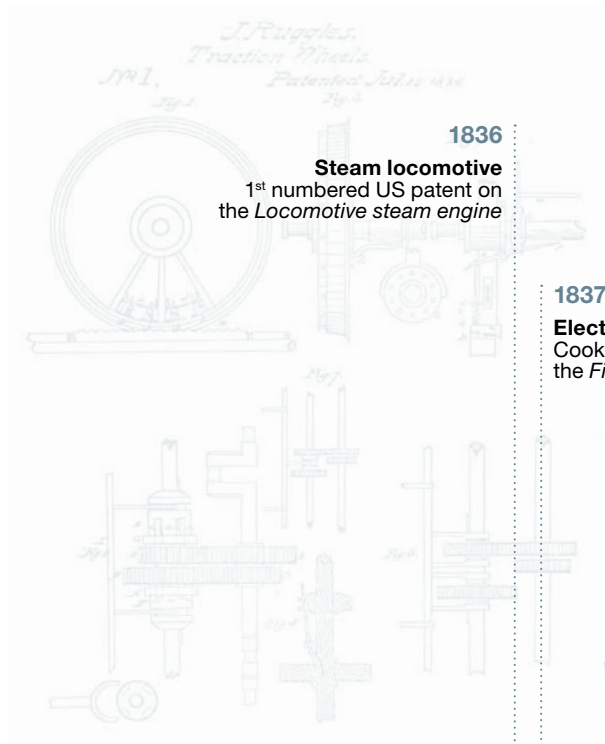
The global IP system is continuously refined through multilateral discussions. It seeks to balance the necessity of an innovation incentive and the need for access to knowledge, both of which contribute to a sustainable global innovation ecosystem.

# Transformative innovation

Humankind's pursuit of innovative solutions to problems has powered progress and transformed our world. As an illustration of this power, the chart on the following pages highlights some of the defining innovations of the last two centuries and the growth in per capita incomes over the same period.



# 200 years of transformative innovation driving human progress



1836

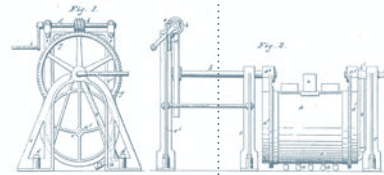
**Steam locomotive**  
1<sup>st</sup> numbered US patent on the *Locomotive steam engine*

1837

**Electric telegraph**  
Cooke and Wheatstone patent the *Five-needle telegraph*

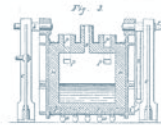


Fig. 750.—Cooke and Wheatstone's Five-Needle Telegraph.



1856

**Industrial steelmaking**  
Bessemer patents an *Improvement of the manufacture of iron and steel*



H. BESSEMER, MANUFACTURER OF STEEL. No. 16,082. Patented Nov. 11, 1856.

1856

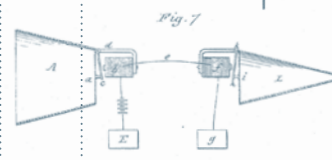
**Plastics**  
1<sup>st</sup> man-made plastic invented, patented and trademarked as *Parkesine*

1858

**Electric telegraph**  
1<sup>st</sup> transatlantic telegraph message

1876

**Telephone**  
Bell patents *Improvement in telegraphy*

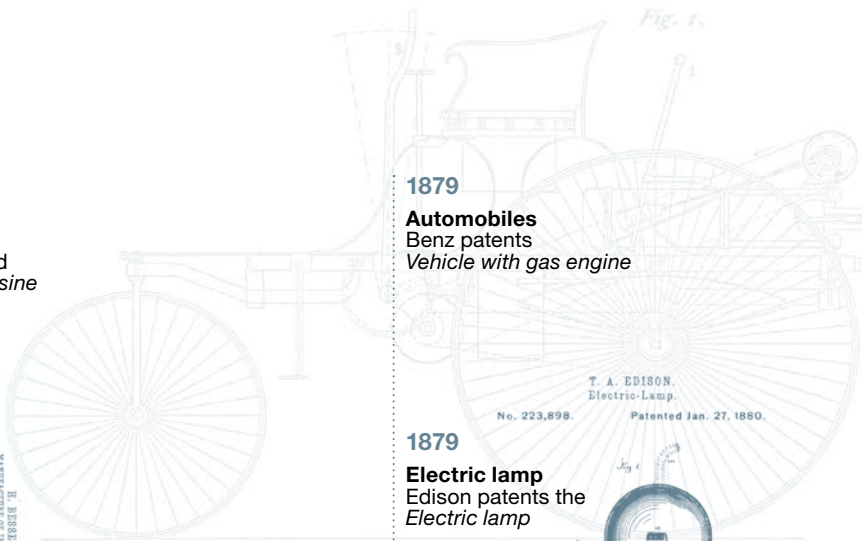


1866

**Scientific plant breeding**  
Mendel's pioneering publication on plant hybridization

1879

**Automobiles**  
Benz patents *Vehicle with gas engine*



1879

**Electric lamp**  
Edison patents the *Electric lamp*

T. A. EDISON, Electric-Lamp. No. 223,898. Patented Jan. 27, 1880.

1897

**Radio**  
Marconi patents *Transmitting electrical signals*



Photo: Smithsonian Institution

BENZ & CO. MANUFACTURER FÜR FAHRZEUGE MIT GAS- UND ELEKTROMOTOREN

1908

**Automobiles**  
Ford mass-produces the *Ford T*

1906

**Airplanes**  
Santos-Dumont flies his *14-bis*  
  
Wright brothers patent the *Flying machine*



Photo: John T. Daniels (US Library of Congress)

1911

**Nuclear energy**  
Marie Curie wins her 2<sup>nd</sup> Nobel Prize



Photo: Wellcome Library, London

1816

1880

1900

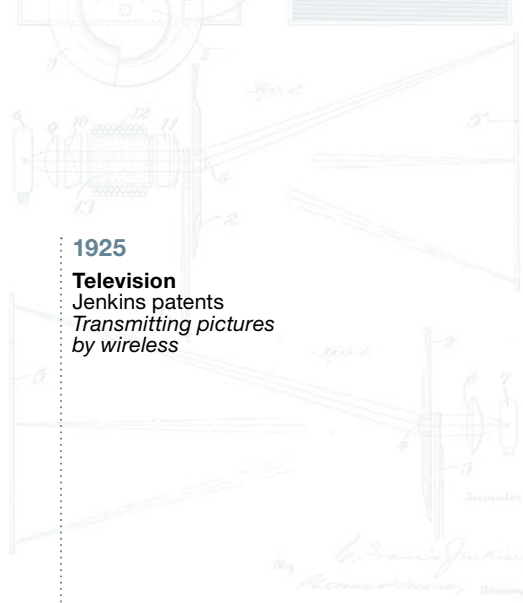
1914-1918

GDP per person (in 1990 USD)\*



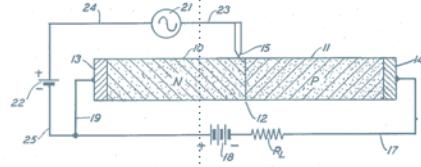
1925

**Television**  
Jenkins patents  
*Transmitting pictures by wireless*



1950

**Semiconductors**  
Bell Labs'  
*Semiconductor patent*



1969

**Internet**  
ARPANET network deployed

1981

**Nanotechnology**  
*Scanning probe microscopy developed*

1991

**Internet**  
WWW created at CERN

2005

**Nanotechnology**  
Bicycle with *nanotubes* frame in the Tour de France

1929

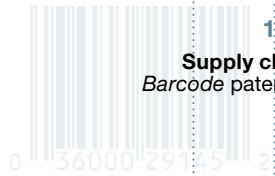
**Pharmaceuticals**  
Fleming discovers  
*Penicillin*



Photo: © WWM (TR 1468)

1947

**Pharmaceuticals**  
Mass production of *Penicillin*



1952

**Supply chain**  
*Barcode patented*

1953

**Just-in-time manufacturing**  
Toyota implements *Kanban* for lean production

1954

**Robotics**  
1<sup>st</sup> industrial robot

1957

**Sustainable energy**  
*Solar cells are patented*



Photo: Filograph / iStock / Getty Images Plus

1973

**Mobile phone**  
1<sup>st</sup> mobile telephone call



Photo: Rico Shen

1977

**Semiconductors**  
1<sup>st</sup> Commodore PET sold



Photo: Frank Hoffmann, DOE

1987

**3D printing**  
*Industrial 3D printers commercialized*



Photo: WIPO

1996

**Artificial intelligence**  
*Deep Blue beats chess master Kasparov*

2000

2000

2009

**3D Printing**  
*Low-cost 3D printers commercialized*

2010

**Biomedicine**  
1<sup>st</sup> implantable electronics

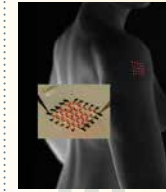


Photo: Bryan Christie Design

2013

**Wearable technology**  
1<sup>st</sup> smart watch

2016

2016

2016

**Genetic engineering**  
*Precise gene editing in plants*

GDP per person (in 1990 USD)\*

50,000

40,000

30,000

20,000

10,000

Source: First published in *World Intellectual Property Report 2015*; revised and updated based on Maddison Project Database, version 2018. Bolt, Jutta, Robert Inklaar, Herman de Jong and Jan Luiten van Zanden (2018), "Rebasing 'Maddison': new income comparisons and the shape of long-run economic development", Maddison Project Working Paper 10.

\* In economies considered "technology frontiers" over the past 200 years, namely the UK from 1800 to 1917 and the US from 1918 to 2016.

# WIPO – the innovation organization

As the specialized United Nations agency for innovation and IP, WIPO has a unique role to play in achieving **SDG 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation**. And by leading multilateral efforts to create the balanced and effective global IP system at the heart of innovation, WIPO actively supports the inventiveness and creativity required to achieve each of the SDGs.

WIPO is one of the oldest multilateral organizations. Its origins date back more than 130 years to the first international treaty on IP rights, the Paris Convention for the Protection of Industrial Property of 1883, which helped protect intellectual works across national borders. WIPO continues to serve as the forum where political, business, individual and civil society stakeholders broker agreements that propel worldwide progress.

As the world's innovative capacity evolves, WIPO's focus and activities continually adapt to meet emerging IP-related needs and challenges in an increasingly complex landscape.

WIPO's work, organized around four main clusters, is described on the following pages.



**The World Intellectual Property Organization promotes innovation and creativity for the economic, social and cultural development of all countries, through a balanced and effective IP system.**

# WIPO's four pillars of work support innovation

## International law and policy

WIPO is the neutral forum where governments and other stakeholders forge consensus on the rules and norms that make up the international IP system. WIPO's work helps countries to conclude new treaties on IP and to update and administer existing treaties, in order to keep pace with the needs of the modern world.

- **1880s: first treaty signed**
- **2013: latest treaty signed**
- **26 current international treaties**

## Global IP services

WIPO offers IP registration and management services to applicants seeking international protection for their inventions, designs, marks and other forms of IP. These globally competitive services generate more than 90 percent of WIPO's budget, financing its varied operations.

- **243,500 WIPO PCT (Patent Cooperation Treaty) patent applications in 2017**
- **56,200 WIPO Madrid trademark applications in 2017**
- **19,429 designs in WIPO Hague international applications in 2017**

## Cooperation and capacity-building

WIPO works with governments, industry, and civil society to develop the human resources, build the partnerships, align the practices, and lay the legal and technical foundations for the international IP system to function smoothly. WIPO's cooperation and capacity-building programs help ensure that both developed and developing countries can provide the effective and efficient IP administration that innovators, creators and industries require.

- **45 recommendations in WIPO's 2007 Development Agenda**
- **500,000+ WIPO Academy students since 1998**
- **684 Technology and Innovation Support Centers (TISCs)**

## Knowledge resources

WIPO provides decision-makers with the IP data and market intelligence they need to make strategic choices. WIPO's knowledge resources – publications, reports, databases and services – are distinguished by their comprehensive data sets and their rigorous analysis. Many are produced in collaboration with government, industry and academic experts, making WIPO publications the premier source for insights about IP statistics and trends.

- **71+ million patent documents in WIPO's global database, PATENTSCOPE**
- **36+ million mark records in the Global Brand Database**
- **126 economies tracked in the Global Innovation Index**
- **16 language pairs in WIPO Translate's AI-powered neural translation software, licensed pro bono to stakeholders**

# WIPO, innovation and the SDGs

WIPO's work enables innovation for the economic, social and cultural development of all countries. As such, innovation is key to achieving the SDGs. It is not only central to SDG 9, but also has a direct impact on SDG 2, SDG 3, SDG 6, SDG 7, SDG 8, SDG 11 and SDG 13.

As a policy setting, innovation can assist in achieving SDG 1, SDG 8, SDG 14 and SDG 15. And certain SDGs are relevant to the settings of an innovation policy framework, notably SDG 5, SDG 8, SDG 10 and SDG 12.

The remaining pages provide a more detailed look at selected WIPO programs and present examples of "Innovation in Action" to highlight some real-life contributions to the SDGs.

## IP services

### Law and policy

- 26 multilateral treaties
- National IP strategies
- Legal and policy advice
- IP policies for universities and research institutions
- PCT System (patents)
- Madrid System (trademarks)
- Hague System (industrial designs)
- Lisbon System (appellations of origin)
- WIPO Arbitration and Mediation Center



# The development and diffusion of innovative technologies is critical to achieving many of the SDGs.

## Cooperation

- WIPO Academy
- Accessible Books Consortium (ABC)
- WIPO Re:Search
- Pat-INFORMED
- WIPO GREEN
- Inventor Assistance Program (IAP)
- Technology and Innovation Support Centers (TISCs)
- Access to Research for Development and Innovation (ARDI)
- Access to Specialized Patent Information (ASPI)
- Industrial Property Automation System (IPAS)
- Centralized Access to Search and Examination (CASE)
- Digital Access Service (DAS)

## Knowledge resources

- PATENTSCOPE
- Global Brands Database
- Global Designs Database
- WIPO Lex
- IP Statistics Data Center
- *Global Innovation Index*
- *World Intellectual Property Indicators*
- *World Intellectual Property Report*





## SDG 3

# Ensure healthy lives and promote well-being for all at all ages

In many countries, life expectancy has soared over the past 100 years thanks to new diagnostic products, treatments and processes. Continuous innovation is needed to extend those benefits more widely and to tackle the challenges posed by aging populations.

The IP system supports innovation in health care by encouraging investment in new drugs and technologies. Medical research and development often involves significant upfront costs. Products can take years to develop and reach the market, and many fail in testing. Companies rely on IP rights to help them secure a return on investment.


But “market” problems within the health industry contribute to controversies related to IP protection and health care. For example, some diseases have comparatively few sufferers or predominate among poorer populations, which may have a negative impact on financial incentives for new medical products. These market failures threaten to create significant gaps in efforts to achieve SDG 3.

WIPO leads collaborative efforts engaging multiple stakeholder groups to bridge these gaps so that the innovations in health care can benefit everyone.





## **WIPO Re:Search A partnership to tackle neglected tropical diseases, malaria and tuberculosis**

A decorative graphic on the left side of the page, consisting of several thin, light blue lines radiating outwards from a central point, resembling a sunburst or a fan.

According to the World Health Organization (WHO), more than one billion people are affected by neglected tropical diseases, malaria and tuberculosis (TB) each year. Malaria, along with pneumonia and diarrhea, remains a leading cause of death among children under five. Ten million people – living predominantly in least developed countries – die from these diseases annually and millions of other sufferers are unable to work or care for themselves or their families.

The lack of feasible options to prevent and treat these diseases demonstrates the mismatch between the demand for innovative medical solutions and the motivation or capacity of market participants to meet that demand.

WIPO Re:Search is a public-private partnership that aims to tackle those mismatches by bringing market actors together. It catalyzes the development of medical products to prevent and treat neglected tropical diseases, malaria and tuberculosis through innovative research partnerships, knowledge sharing and a database of IP assets available for license or collaboration.

### **WIPO Re:Search**

- 138 members, spanning 40 countries
- 127 research collaborations in 2017
- 42 active collaboration agreements and 9 advancing agreements

# Innovation in action

## Rapid blood tests in remote locations

“Testing and treating patients immediately can significantly improve health outcomes.”

**Dr Helen Lee**  
Diagnostics for the Real World



### IP assets at a glance

**Patent EP1301628**

Improved capture and detection of target nucleic acid in dipstick

**Trademark 78463383**

Diagnostics for the Real World Ltd



Photos: Courtesy of Directorate, External Communications, European Patent Office



SAMBA II provides a simple and robust way to detect infectious diseases at the point of care in resource-poor settings. This patented innovation is built around nucleic acid testing, which not only allows earlier detection of infectious organisms such as HIV, but can also monitor the effectiveness of treatments.

Conventional nucleic acid testing is a complex process that can be very difficult to carry out in a setting with limited resources, as it requires highly trained personnel and sophisticated laboratory facilities. SAMBA II is the size of a small domestic coffee machine and converts the detection of nucleic acid into a simple visual signal, like a pregnancy test: two lines means positive; one line means negative.

The device offers health-care workers in challenging environments the opportunity to effectively test, diagnose and treat patients within hours, rather than days or weeks.

## SDG 4

# Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Education is both an important goal in its own right and a prerequisite for spurring economic growth, reducing inequalities, and promoting peace, justice and strong institutions.

The international copyright system supports education by encouraging the creation and sharing of new knowledge and information products.

But education is not always accessible to all. People with visual impairments and print disabilities often struggle to access study materials, hindering access to the knowledge that they may use for the betterment of society.

WIPO works with its Member States to support equal access to education, including by implementing treaty-based adjustments to the IP system so that books for visually impaired and print-disabled readers can be more easily sourced and shared across national borders.





## **Accessible Books Consortium (ABC) Bringing books to persons with print disabilities**

According to the World Blind Union, more than 250 million people, many of whom live in least developed countries, have blindness or visual impairments. Less than 10 percent of all published materials are available in formats they can access. This “global book famine” means a lack of access to enriching printed material for visually impaired people – and an unrealized fulfillment of potential for our societies.

The WIPO-led Accessible Books Consortium (ABC) is a public-private partnership that works to harness the latest technologies to meet the needs of visually impaired people around the globe. ABC members collaborate to promote “born accessible” publishing so that books are designed from the earliest stages to be fully accessible. They also provide training and other capacity-building initiatives, and establish international standards for inclusive publishing.

In addition, the ABC Global Book Service provides an online catalogue of accessible works and facilitates inter-library loans across borders.

### **ABC**

- **355,000 titles in accessible formats listed on the ABC Global Book Service**
- **76 languages covered by the ABC Global Book Service**
- **4,000 accessible educational titles produced in national languages in seven countries**

# Innovation in action

## Evolving copyright to improve inclusivity

“I am just one example of someone who was abled differently and yet I beat the odds. [...] Imagine if others like me were given the opportunity to function at their full potential, how much better our world would be.”

Recording legend **Stevie Wonder** speaking on International Day of Persons with Disabilities 2016



The Marrakesh Treaty is WIPO's most recent treaty, agreed in 2013 in Marrakesh, Morocco. It is unique among the body of IP and copyright law treaties because it is acknowledged as both an intellectual property and a human rights treaty.

The Treaty addresses the needs of visually impaired people by facilitating greater access to information and educational resources that are specially adapted for their use. It establishes the basis for exceptions and limitations in copyright law, enabling collaborative efforts by diverse stakeholders to meet this group's needs.

The Treaty's ground-breaking provisions apply copyright law in an innovative way to enable cross-border transfer of specially adapted materials for use by the blind, visually impaired and print disabled.

It is the result of a consensus forged during five years of discussions among government delegates, representatives from organizations representing the blind, visually impaired and print disabled, the publishing industry, civil society, and other stakeholder groups. These diverse parties finally agreed that it was time for the international copyright framework to build on exceptions that already existed in some countries, but that only served eligible persons within the national territory.

The international consensus around the Treaty highlights the important role of multilateralism in addressing global challenges collectively. It is also a clear example of the benefits of multilateral cooperation: competing interests are balanced, helping deliver significant social benefit to people in need.

### **At a glance**

- 51 countries signed the Treaty at the close of the 2013 negotiations
- India was the first country to ratify the Treaty, on July 24, 2014
- The Treaty entered into force on September 30, 2016 with 20 contracting countries



## SDG 13

# Take urgent action to combat climate change and its impacts

Climate change is a borderless global challenge: it affects every country and can only be tackled effectively together. Action at both state and international levels is critical to addressing the causes of climate change and mitigating its devastating effects.

Technological solutions already exist to enable greener growth and support sustainable, resilient communities, but they need to be scaled up and rolled out. Investment must be channeled into the most promising inventions, supply matched to demand, and technologies transferred to those who can use them on the ground.

WIPO is working to promote an efficient global market for environmentally friendly technologies, building on the international IP system.

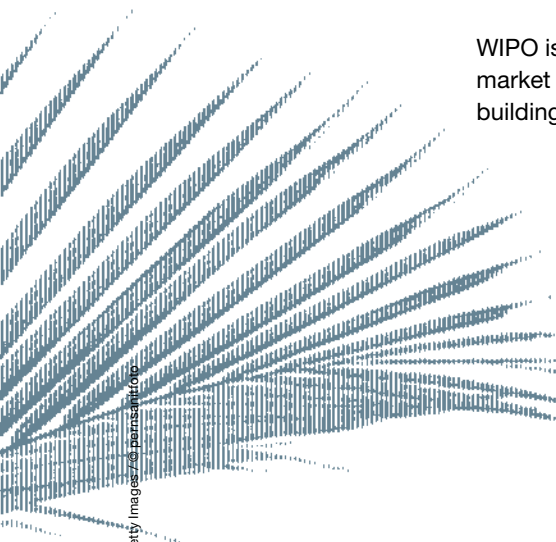


Photo: Getty Images / © pansamir.com



## **WIPO GREEN Stimulating the uptake of green tech**

By definition, environmentally sustainable technologies must be designed or adapted to function in particular local contexts.

But the development and dissemination of these technologies pose challenges. Small-scale inventors and entrepreneurs struggle to access the funding and advice they need to take their ideas to the next level, and local communities may be unaware of available solutions that could benefit them.

WIPO GREEN is a marketplace and networking forum that promotes innovation and the spread of green technologies by bringing investors, innovators and potential users together.

Through a database of technologies and a network of partners and experts, WIPO GREEN connects owners of new technologies with individuals or companies looking to commercialize, license or otherwise access or distribute a green technology. The database includes technologies at all stages of development, from upstream research to marketable products, maximizing the flow of information and thus increasing efficiency in the market.

### **WIPO GREEN**

- 3,000 technologies catalogued
- 83 partners
- 378 experts registered
- 390+ connections facilitated

# Innovation in action

## Fog harvesting for clean water

“This is a win-win for everyone involved. On the one hand, we see innovation and technology transfer working in practice, and on the other, the local people have more clean drinking water at their disposal.”

**Peter Trautwein**  
Aqualonis and WasserStiftung®



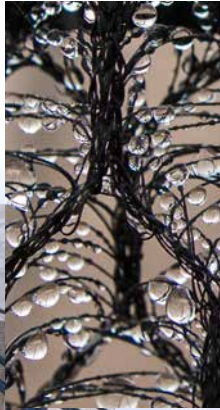
### IP assets at a glance

**Patent WO2016062877**

Fog Collector

**Trademark 013822093**

CloudFisher®



Photos: Courtesy of Aqualonix, GmbH

A pioneering new water technology called the CloudFisher® offers an affordable and sustainable source of clean water to communities in arid but foggy coastal or mountainous regions that face severe water shortages.

The CloudFisher® technology was developed by the German Water Foundation (WasserStiftung®) and commercialized through Munich-based Aqualonix. The structure of the fog-collector is remarkably robust, able to withstand strong winds of up to 120 kilometers per hour.

**The CloudFisher®'s patented 3D mesh is very fine, trapping more water vapor from the air and making it possible to harvest between 10 and 22 liters of water per square meter of net, depending on the region and time of year.**



# More about IP, innovation and progress

WIPO produces information resources that help novices, generalists and specialists understand and leverage IP and innovation. The following products are a sample of WIPO's knowledge contributions to understanding and using IP and innovation effectively.



## Overviews

### ***WIPO: Making IP Work***

An introduction to WIPO's activities

### ***Using IP for Development***

A presentation of selected success stories

### ***WIPO Re:Search – Sharing Information in the Fight Against NTDs***

An overview of strategy and activities

### ***WIPO GREEN – Connecting Sustainable Technology Users and Providers***

An overview of strategy and activities

### ***WIPO Academy – Celebrating 20 Years of IP Education and Training***

Year in Review 2017

### ***Technology and Innovation Support Centers***

Report 2017

### ***Introducing WIPO's Global Databases***

### ***Report on WIPO's Contribution to the Implementation of the Sustainable Development Goals and its Associated Targets***

Committee on Development and Intellectual Property,  
Twenty-First Session, May 2018 (CDIP/21/10)

## Analysis and insight



The **Global Innovation Index** is the authoritative annual survey of innovation around the world, benchmarking the performance of 126 economies against a detailed framework of 80 indicators.



The biennial **World Intellectual Property Report** analyzes key aspects of the relationship between innovation, IP and the global economy. The World Intellectual Property Report 2015 studies the links between breakthrough innovation and economic growth. The 2017 report presents new evidence on the value of intangible assets in global value chains.

## Statistical reviews



WIPO's statistical reports provide a coherent picture of the use of IP rights in different countries and world regions. For a quick overview, see the latest **WIPO IP Facts and Figures**. Or for a more in-depth examination, read **World Intellectual Property Indicators**.

For more information, go to [www.wipo.int/reference/en](http://www.wipo.int/reference/en)



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Photo: NASA