



European Patent Office

Munich

Headquarters
Erhardtstr. 27
80469 Munich
Germany
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4560

Postal address

80298 Munich
Germany

The Hague

Patentlaan 2
2288 EE Rijswijk
Netherlands
Tel. +31 (0) 70 340-2040
Fax +31 (0) 70 340-3016

Postal address

Postbus 5818
2280 HV Rijswijk
Netherlands

Berlin

Gitschiner Str. 103
10969 Berlin
Germany
Tel. +49 (0) 30 25901-0
Fax +49 (0) 30 25901-840

Postal address

10958 Berlin
Germany

Vienna

Rennweg 12
1030 Vienna
Austria
Tel. +43 (0) 1 521 26-0
Fax +43 (0) 1 521 26-3591

Postal address

Postfach 90
1031 Vienna
Austria

Brussels

Avenue de Cortenbergh 60
1000 Brussels
Belgium
Tel. +32 (0) 2 274 15-90
Fax +32 (0) 2 201 59-28

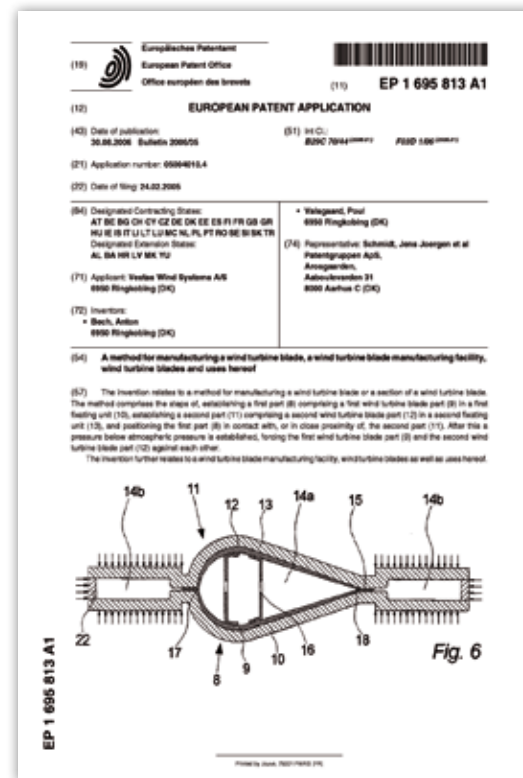
Clean energy and patents



What is a patent?

A patent is a legal title which protects a technical invention for a limited period. It gives the owner the right to prevent others from exploiting the invention in the countries for which it has been granted.

When filing an application for a patent, applicants must disclose the details of how their invention functions. All patents are published, so everyone can benefit from the information they contain.



Patent documents consist of

- a first page comprising basic information such as the title of the invention and the name of the inventor
- a detailed description of the invention indicating how it is constructed, how it is used, and what benefits it brings compared with what already exists
- claims containing a clear and concise definition of what the patent legally protects
- drawings.

Patent documents describe technologies more precisely and in more detail than almost any other type of literature, so if you are faced with a technical problem, there is no better way of finding out what solutions already exist than by looking at patents.

Climate change mitigation technologies are technologies aimed at controlling, reducing or preventing the anthropogenic emission of greenhouse gases.

With a growing awareness of the possible consequences of those emissions, there is increased political and social pressure to invest in continuing research into such technologies. Indeed, since the signing of the Kyoto Protocol in 1997 there has been a significant surge in research and development and thus also of patenting in the related fields.

However, up to now, it has not always been easy to find sector-related information on patented technologies, and in particular on new, emerging technologies, using the existing patent classification schemes. For this reason, the European Patent Office (EPO) has established a new classification scheme for technical attributes of technologies that can be loosely referred to as clean energy technologies – a specific sub-sector of climate change mitigation technologies – whose 200 or so new categories make it much easier to retrieve information.

The new categories were defined with the help of experts in the field, both from within and outside the EPO, including from the Intergovernmental Panel on Climate Change (IPCC).

This brochure explains how to get started if you want to search for clean energy technology inventions in the EPO patent databases.

Searching clean energy patents for information

Searching clean energy technology patents can help you to

- find out what already exists and build on it
- keep track of who's doing what
- avoid infringing other people's patent rights
- improve the quality of your patent applications.

To make searching easier, every patent is classified.

The total number of patents is so large that a classification system is essential. Patent offices worldwide use the International Patent Classification (IPC). This is a system of codes that describe the invention. There are approximately 70 000 different IPC codes for different technical areas.

The European Classification System (ECLA) is an extension of the IPC and is used by the EPO. Both the IPC and ECLA are divided into eight sections, A-H, and these are further subdivided into classes, subclasses, groups and subgroups. There are approximately 135 000 classification entries in ECLA.

The eight IPC and ECLA sections

A	Human necessities
B	Performing operations; transporting
C	Chemistry; metallurgy
D	Textiles; paper
E	Fixed constructions
F	Mechanical engineering; lighting; heating; weapons; blasting engines or pumps
G	Physics
H	Electricity

Classifying clean energy patents

Because patent documents relating to climate change mitigation technologies can be found in so many areas of technology, they do not fall under one single classification section.

This made identifying and retrieving such documents difficult, so the EPO introduced a new **tagging system** which follows the structure of the ECLA classification scheme. Under this system, new fields of technology are classified under Y. Each time a document relating to a climate change mitigation technology is added to its databases, the EPO now assigns it the code **Y02**.

The **Y02** subclasses already searchable by the general public are the ones relating to clean energy technologies: **Y02C** (Greenhouse gases – capture or storage/sequestration or disposal) and **Y02E** (Greenhouse gases – emissions reduction technologies related to energy generation, transmission or distribution). The **Y02E** subclass looks like this:

Code Y02E	Description	Comment
10/00	Energy generation through renewable energy sources	Geothermal, hydro, oceanic, solar (PV and thermal), wind
20/00	Combustion technologies with mitigation potential	CHP, CCGP, IGCC, synair, cold flame, etc.
30/00	Energy generation of nuclear origin	Fusion and fission
40/00	Technologies for efficient electrical power generation, transmission or distribution	Reactive power compensation, efficient operation of power networks, etc.
50/00	Technologies for the production of fuel of non-fossil origin	Biofuels, from waste
60/00	Technologies with potential or indirect contribution to GHG emissions mitigation	Energy storage (batteries, ultracapacitors, flywheels ...), hydrogen technology, fuel cells, etc.
70/00	Other energy conversion or management systems reducing GHG emissions	Synergies among renewable energies, fuel cells and energy storage

Classifying clean energy patents

And here is the breakdown for a particular group (solar energy):

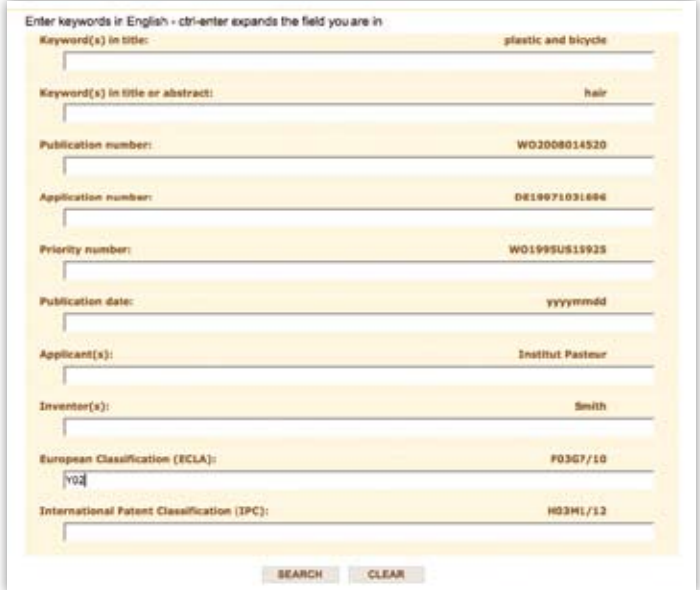
Code Y02E	Description
10/40	Solar thermal energy
10/41	Tower concentrators
10/42	Dish collectors
10/43	Fresnel lenses
10/44	Heat exchange systems
10/45	Trough concentrators
10/46	Solar-thermal plants for electricity generation, e.g. Rankine, Stirling solar-thermal generators
10/47	Mountings or tracking
10/48	Mechanical power, e.g. thermal updraft
10/50	Photovoltaic (PV) energy
10/52	PV systems with concentrators
10/54	Material technologies
10/54B	CuInSe ₂ material PV cells
10/54D	Dye sensitized solar cells
10/54F	Solar cells from Group II-VI materials
10/54H	Solar cells from Group III-V materials
10/54J	Microcrystalline silicon PV cells
10/54L	Polycrystalline silicon PV cells
10/54N	Amorphous silicon PV cells
10/56	Power conversion electrical/electronic aspects
10/56B	for grid-connected applications
10/56D	concerning power management inside the plant, e.g. battery charging/discharging, economical operation, hybridisation with other energy sources
10/58	M.P.P.T. systems (maximum power point tracking)
10/60	TPV hybrids

Searching clean energy patents in *esp@cenet*

You can use the Y02 codes to search for patent documents in the *esp@cenet* database at www.espacenet.com.

esp@cenet is a free internet patent database provided by the EPO. It contains approximately 70 million patent documents from all over the world.

You can retrieve patent documents relating to climate change mitigation technologies by entering the Y02 code in the ECLA search field of *esp@cenet*'s Advanced Search screen.



The screenshot shows the 'Advanced Search' interface of the esp@cenet database. It features several input fields for search criteria, each with a label and a value. The fields are: 'Keyword(s) in title:' with the value 'plastic and bicycle'; 'Keyword(s) in title or abstract:' with the value 'hair'; 'Publication number:' with the value 'WO2008014520'; 'Application number:' with the value 'DE19971031696'; 'Priority number:' with the value 'WO1998US19925'; 'Publication date:' with the value 'yyyyymmdd'; 'Applicant(s):' with the value 'Institut Pasteur'; 'Inventor(s):' with the value 'Smith'; 'European Classification (ECLA):' with the value 'F03G7/10'; and 'International Patent Classification (IPC):' with the value 'H03M1/12'. At the bottom of the form, there are two buttons: 'SEARCH' and 'CLEAR'. A blue arrow points from the left towards the form.

This will produce more than 100 000 results.

You can narrow down your search by entering a more specific Y02 code in the ECLA search field and/or by combining the Y02 code with other search terms, for example a keyword in the title or abstract field.

Specific example: capturing carbon dioxide (CO₂) by adsorption

Capture of greenhouse gases, and especially CO₂, is a very relevant technology when it comes to reducing greenhouse gas emissions where use of non-fossil fuels is (still) not an option. Yet no IPC classes or “conventional” ECLA classes deal with the capture of specific greenhouse gases such as CO₂.

The closest IPC and ECLA entry is B01D53/62 :

In practice, this classification entry is not very helpful in retrieving documents on CO₂ capture. Firstly because it relates only to chemical and biological purification, and does not include other commonly used separation techniques such as sorption or condensation. Secondly because it relates to carbon oxides in general, which also include carbon monoxide. Carbon monoxide (CO) is a very useful product in the chemical industry, yet it is highly poisonous. Good separation/removal technologies for carbon monoxides are therefore important in many industrial sectors. As a result, the B01D53/62 entry contains many documents relating to CO capture, rather than CO₂ capture.

Y02C (Capture, storage, sequestration or disposal of greenhouse gases) however contains a number of entries directly relating to CO₂ capture:

Y02C10/10	CO ₂ capture or storage (empty, covered by subgroups)
Y02C10/02	Capture by biological separation
Y02C10/04	Capture by chemical separation
Y02C10/06	Capture by absorption
Y02C10/08	Capture by adsorption
Y02C10/10	Capture by membranes of diffusion
Y02C10/12	Capture by rectification or condensation
Y02C10/14	Subterranean or submarine CO ₂ storage

If you are looking for documents on the capture of CO₂ by means of adsorption, you can enter the relevant code in *esp@cenet*'s Advanced Search:



This will produce a results list with a few thousand documents, which can be further refined by combining the Y02C10/08 code with other classes or keywords.

Further reading

Online information

Patents and clean energy

www.epo.org/clean-energy

Inventors' handbook

www.epo.org/inventors-handbook

An introduction to European patents

www.epo.org/guide

Searching patent documents

www.epo.org/pi-tour

www.espacenet.com

Filing applications online

www.epoline.org

Guidelines for Examination in the EPO

www.epo.org/guidelines

Paper publications

European patents and the grant procedure

esp@cenet – searching using classifications

All paper publications can be ordered from info@epo.org.

Published and edited by

European Patent Office

Munich

Germany

© EPO 2010

Responsible for the content

Victor Veefkind

Javier Hurtado-Albir

European Patent Office

Photo

Grandtuillot/REA/laif

Design

ANZINGER | WUESCHNER | RASP

Munich

Printing

J. Gotteswinter GmbH