Patent queries related to SDGs

IN PATENTSCOPE

In today's global pursuit of sustainable development, patent documents offer a wealth of innovative solutions that can address pressing challenges outlined in the Sustainable Development Goals (SDGs).

These documents encapsulate groundbreaking technologies and methodologies across various sectors, from clean energy to healthcare and environmental conservation.

Introduction

01

SCOPE

To provide some examples to help users build their own queries to find patent documents related to some of the SDGs in PATENTSCOPE patentscope.wipo.int.

02

HOW SEARCHES WERE CREATED

Based on reports and studies, potential SDGs were identified and a guide was created to explain how to find patents that could contribute to achieving those SDGs.

03

LIMITATIONS

Only technologically relevant SDGs are covered. Human input inevitably introduces some subjectivity.

2 ZERO HUNGER

END HUNGER, ACHIEVE FOOD SECURITY AND IMPROVED NUTRITION AND PROMOTE SUSTAINABLE AGRICULTURE

By 2030 the area of productive and sustainable agriculture should be increased. An approach to this would be to include agriculture in cities. The main benefit of utilising vertical farming technologies is the increased crop yield that comes with a smaller unit area of land requirement which makes them suitable for cities. The increased ability to cultivate a larger variety of crops simultaneously is advantageous. Furthermore crops are protected from adverse weather conditions because of their placement indoors. Vertical farming is less disruptive to native plants and animals. However it is difficult to grow crops in soil in vertical farms, so hydroponic media are used. We can find patents covering inventions in vertical agriculture in PATENTSCOPE.

The International Patent Classification A01G covers:

HORTICULTURE; CULTIVATION OF VEGETABLES; FLOWERS RICE; FRUIT; VINES; HOPS OR SEAWEED (...)

A01G31/00 covers Soilless cultivation e.g.hydroponics

A01G31/06 covers Hydroponic culture on racks or stacked containers

We combine **A01G31/06** with suitable keywords in the abstract: vertical (farm or garden)

EN_AB:(vertical (farm OR garden)) AND IC:(A01G31/06)

https://patentscope.wipo.int/search/en/result.jsf?_qid=2cb9f1bf-ad32-4d34-befa-5c7bbf8e1505

3 GOOD HEALTH AND WELL-BEING

ENSURE HEALTHY LIVES AND PROMOTE WELL-BEING FOR ALL AT ALL AGES

As the latest and most anticipated method of cancer immunotherapy, Chimeric Antigen Receptor Natural Killer Cell (CAR-NK) therapy has received increasing attention in recent years. The associated technology has the potential to contribute to SDG 3 Health and Well-Being.

In order to find a dataset of relevant patents we can use the IPC: the relevant section is A HUMAN NECESSITIES

Going deeper into the IPC a relevant class is **A61** HEALTH; AMUSEMENT – MEDICAL OR VETERINARY SCIENCE: HYGIENE.

The appropriate sub-class is **A61P** SPECIFIC THERAPEUTIC ACTIVITY OF CHEMICAL COMPOUNDS OR MEDICINAL PREPARATIONS:
The most suitable group is **A61P 35/00 NEOPLASTIC AGENTS**

We can use this classification together with keywords to retrieve a set of corresponding patent applications.

EN_AB:(CAR OR(chimeric AND antigen AND receptor)) AND EN_AB:(NK OR (natural AND killer AND cells)) AND IC:(A61P35/00)

https://patentscope.wipo.int/search/en/result.jsf?_qid=cd8aed66-4a45-4f3d-aad8-3a429b51f489

ENSURE INCLUSIVE AND EQUITABLE QUALITY EDUCATION AND PROMOTE LIFEFLONG LEARNING OPPORTUNITIES FOR ALL

Quality education, in particular for STEM subjects,relies on practical learning experiences, These can be supported by dedicated apparatus and equipment for experiments and demonstrations.

If we inspect the IPC section G PHYSICS (INSTRUMENTS), we find:

the group **G09** EDUCATION; CRYPTOGRAPHY; DISPLAY; ADVERTISING; SEALS;

the subgroup **G09B** EDUCATIONAL OR DEMONSTRATION APPLIANCES; APPLIANCES FOR TEACHING, OR COMMUNICATING WITH, THE BLIND, DEAF OR MUTE; MODELS; PLANETARIA; GLOBES; MAPS; DIAGRAMS and
the subgroup **G09B23/00** Models for scientific, medical, or mathematical purposes, e.g. full-sized devices for demonstration purposes.

We can then combine this classification with simple keywords in English Abstract school (stemmed) OR educa* (wildcard).

EN_AB:(school OR educa*) AND IC:(G09B23/00)

https://patentscope.wipo.int/search/en/result.jsf?_qid=a8a8147f-4312-4c46-a313-faaf73f8e538

6 CLEAN WATER AND SANITATION

ENSURE AVAILABILITY AND SUSTAINABLE MANAGEMENT OF WATER AND SANITATION FOR ALL

The treatment of wastewater to remove pathogens and pollutants so that the effluent can be safely released into the natural world, or recycled for use, supports SDG 6.

The Cooperative Patent Classification for Technologies for Waste Water Treatment is **Y02W 10/00**.

So our search statement comprises
Cooperative Patent Classification Y02W10/00
English Language Abstract (hygiene* OR safe*) – both wildcard – AND domestic

EN_AB:((hygien* OR safe*) AND domestic) AND CPC:(Y02W10/00)

https://patentscope.wipo.int/search/en/result.jsf?_qid=ed4b486f-42ce-46fd-b5f8-f2829363be76

7 AFFORDABLE AND CLEAN ENERGY

ENSURE ACCESS TO AFFORDABLE, RELIABLE, SUSTAINABLE AND MODERN ENERGY FOR ALL

Potential sources of affordable and clean energy are solar photovoltaic (PV) farms. Solar PV farms contribute to SDG 7 by delivering renewable energy at relatively low cost. These farms are large arrays of PV panels connected together and spread over large areas. However these solar farms can occupy a significant area of land which could be used for other purposes; crops, grazing or houses for example.
However this land use can be avoided if the solar PV farms are located on water such as a lake. To find relevant patents for water-located solar PV farms we can use the International Patent Classification to help.

Firstly we are looking at an electrical technology, so we would choose
Section H ELECTRICITY.
Drilling down into the classification we find Class **H02** GENERATION; CONVERSION OR DISTRIBUTION OF ELECTRIC POWER
A further refinement of the classification at sub class level is Sub class **H02S** GENERATION OF ELECTRIC POWER BY CONVERSION OF INFRARED RADIATION, VISIBLE LIGHT OR ULTRAVIOLET LIGHT E.G. USING PHOTOVOLTAIC [PV] MODULES
Lower still in the hierarchy at group level we find Group **H02S 20/00** Supporting Structures for PV Modules.

We can use this IPC Group as part of our search statement, but on its own it is too broad – too many hits. However if we combine this classification with suitable keywords like “float” and use stemming to include floating, floatable, floated etc, we can find patents associated with solar PV farms floating on a body of water such as a lake.

EN_AB:(float* water lake) AND IC:(H02S20/00)

https://patentscope.wipo.int/search/en/result.jsf?_vid=P21-LUWTJP-55433

11 SUSTAINABLE CITIES AND COMMUNITIES

MAKE CITIES AND HUMAN SETTLEMENTS INCLUSIVE, SAFE, RESILIENT AND SUSTAINABLE

Provision of safe affordable and sustainable transport systems, can be supported by hydrogen powered public transport. Especially in cities such transport systems can be supported by hydrogen-powered public transport especially buses.

In order to find a set of patent documents associated with hydrogen motive power for public road transport There are at least two technologies which use hydrogen as a fuel for motive power; internal combustion engine (ICE) and fuel cell, where hydrogen is used to make electricity to power an electric motor for example.

We can use keywords “ICE” “internal” “combustion” “engine” “hydrogen” “bus” “passenger” “vehicle” combined with the suitable Boolean operators as follows:
EN_AB:((ICE or (internal AND combustion AND engine)) hydrogen (bus OR (passenger AND vehicle)))
https://patentscope.wipo.int/search/en/result.jsf?_qid=771d1ce5-9c52-4540-97ab-c3e252dd9623

We can use keywords “fuel” “cell” “hydrogen” “bus” “passenger” “vehicle” combined with the suitable Boolean operators as follows:
EN_AB:((fuel AND cell) AND hydrogen AND (bus OR (passenger AND vehicle)))
https://patentscope.wipo.int/search/en/result.jsf?_qid=d3eb87fc-0aae-4556-9eb9-e1d3852fc4f4

Another approach: Cooperative Patent Classification Code **Y02T**: CLIMATE CHANGE MITIGATION TECHNOLOGIES RELATED TO TRANSPORTATION and **Y02T 10/0**: Road transport of goods or passengers and **Y02T 10/30**: alternative fuels , In this case the alternative fuel of interest is hydrogen.

EN_TI:(hydrogen AND (ICE OR (internal AND combustion AND engine))) AND CPC:(y02T10/30)
https://patentscope.wipo.int/search/en/result.jsf?_qid=cd5fc6e0-6060-4dec-bade-bc6096e415dc

EN_TI:(hydrogen AND (fuel AND cell)) AND CPC:(Y02T10/30)
https://patentscope.wipo.int/search/en/result.jsf?_qid=c0d0625a-bc34-45aa-ae4c-64a42537fb92

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

ENSURE SUSTAINABLE CONSUMPTION AND PRODUCTION PATTERNS

Recycling of food packaging can contribute to SDG12 by reducing waste. In particular the recycling of food cartons. Packaging for non-frozen, liquid food, or beverages is typically made of laminated composites, comprising polymers, cardboard or paper, and aluminium foil.

However such packaging has been identified as a solid waste problem by many NGOs and environmental groups. Unlike aluminium cans, glass or plastic bottles, it cannot be recycled in municipal recycling facilities. We want to find patents covering recycling technologies for these problematic materials.

We can use the International Patent Classification for CONTAINERS FOR STORAGE OR TRANSPORT OF ARTICLES OR MATERIALS, e.g. BAGS, BARRELS, BOTTLES, BOXES, CANS, CARTONS, CRATES, DRUMS, JARS, TANKS, HOPPERS, FORWARDING CONTAINERS; ACCESSORIES, CLOSURES, OR FITTINGS THEREFOR; PACKAGING ELEMENTS; PACKAGES – **B65D** which automatically includes **B65D5/00** - Rigid or semi-rigid containers of polygonal cross-section, e.g. boxes, cartons or trays, formed by folding or erecting one or more blanks made of paper.

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We can use B65D as our classification and refine the search using additional keywords “**composite**” “**laminate**” “**food**” “**paper**” “**aluminium**” “**plastic**” “**polymer**” “**recycle**” – all with the necessary Boolean operators and wildcards as follows:

EN_AB:((composite OR laminat*) AND (paper OR aluminium OR plastic OR polymer*) AND food AND recycl*) AND IC:(B65D)

https://patentscope.wipo.int/search/en/result.jsf?_qid=a5ccee35-66f4-48a3-97ab-abe8b6b1faa4

13 CLIMATE ACTION

TAKE URGENT ACTION TO COMBAT CLIMATE CHANGE AND ITS IMPACTS

Removal from the atmosphere of greenhouse gases which cause global warmingaligns with the aims of SDG13. One of the most important greenhouse gases is carbon dioxide (CO2). Removal of CO2 from the atmosphere reduces global warming, and it is possible to capture atmospheric CO2 and use it as a useful chemical – for instance in producing sustainable aviation fuel. The process of Direct Air Capture (DAC) removes CO2 from the atmosphere, but allows the use of the captures CO2 as a feedstock for other synthetic chemical processes.

To find the relevant patents we can use the Cooperative Patent Classification:

Y02C CAPTURE; STORAGE; SEQUESTRATION OR DISPOSAL OF GREENHOUSE GASES [GHG]

Y02C 20/00 Capture of disposal of greenhouse gases

Y02C 20/40 .....of CO2

We can use this classification Y02C 20/40 and refine the search to include keywords DAC direct air capture.

EN_AB:(DAC OR (direct AND air AND capture)) AND CPC:(y02c20/40)

https://patentscope.wipo.int/search/en/result.jsf?_qid=a5b62efc-7cec-4684-9ede-526432593 0f2

14 LIFE BELOW WATER

CONSERVE AND SUSTAINABLY USE THE OCEANS, SEAS AND MARINE RESOURCES FOR SUSTAINABLE DEVELOPMENT

by 2025 marine pollution of all kinds should be reduced, in particular from land-based activities including marine debris. Ideally such debris should be prevented from reaching the seas and oceans in the first place. We can find patents for catching rubbish in terrestrial waterways in PATENTSCOPE.

The Cooperative Patent Classification **E02B 15/00** covers Cleaning or keeping clear the surface of open water; Apparatus therefor (...) **E02B 15/04** Devices for cleaning or keeping clear the surface of open water from oil or like floating materials by separating or removing these materials (stopping water-borne material in artificial water canals **E02B 5/085**; stopping water-borne material at barrages or weirs **E02B8/023**.

We can use the generic keyword “debris” in conjunction with these latter two classifications:

EN_AB:debris AND CPC:(E02B5/085 OR E02B8/023)

https://patentscope.wipo.int/search/en/result.jsf?_qid=f9cfc2e8-4e75-438b-bcd2-89f680a1b0a7

PROTECT, RESTORE AND PROMOTE SUSTAINABLE USE OF TERRESTRIAL ECOSYSTEMS, SUSTAINABLY MANAGE FORESTS, COMBAT DESERTIFICATION, AND HALT AND REVERSE LAND DEGRADATION AND HALT BIODIVERSITY LOSS

Sustainable management of forests is an indicator of progress towards SDG 15. This includes sustainably management of forestry products such as wood pulp. Instead of wood pulp going to waste, or making low value materials, pulp can be used to make valuable chemicals and non-fossil fuels.

The Cooperative Patent Classification for Production of liquid hydrocarbon mixtures from (...) materials e.g.wood, coal **C10G1/00**.

Another approach: **Y02E** is the Cooperative Patent Classification for REDUCTION OF GREENHOUSE GAS [GHG] EMISSIONS; RELATED TO ENERGY GENERATION TRANSMISSION OR DIDTRIBUTION
Y02E50/00 is the classification for Technologies for the production of fuel of non-fossil origin
Y02E50/10 is the classification for Biofuels e.g. bio-diesel
Y02E50/30 is the classification for Fuel from waste e.g. synthetic alcohol or diesel.

To find patents associated with the production of fuel, for example, from wood pulp we can combine the classification with suitable keywords “wood” “pulp” “lignocellulose” (the scientific term) and “fuel”.

EN_AB:(((wood AND pulp) OR ligno*) AND fuel) AND CPC:(C10G1/00)
https://patentscope.wipo.int/search/en/result.jsf?_qid=f2db75ae-4ab6-42d9-bf4e-e6892ca2951d

or
EN_AB:(((Wood AND pulp) or Ligno*) and forest*) AND CPC:(Y02E50/10 OR Y02E50/30)

Links

01

PATENTSCOPE

WIPO's free global patent database patentscope.wipo.int.

02

INTERNATIONAL PATENT CLASSIFICATION (IPC)

Administered by WIPO, provides for a hierarchical system of language independent symbols for the classification of patents and utility models according to the different areas of technology to which they pertain.
https://ipcpub.wipo.int/

03

COOPERATIVE PATENT CLASSIFICATION (CPC)

The Cooperative Patent Classification (CPC) arises from collaboration between the EPO and the USPTO, as part of their shared endeavor to establish a unified, globally applicable classification framework for technical documents, particularly patent publications.
https://www.cooperativepatentclassification.org/home