ETIP Bioenergy

European Technology and Innovation Platform

HOW TO SEARCH FOR BIOENERGY RELEVANT PATENTS

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This HOW TO shall support bioenergy stakeholders with little or no experience, who want to find patents in a specific field.
It has been generated with the intention to assist you in overcoming the discrepancy between countless or towards zero results when carrying out a patent search.
E.g. searching with the term "bioenergy" you get more than 2,800 results. In general you have to be aware that patent search can be a rather time consuming task, because you might have to go through many patents, classes or subclasses to find out which are relevant for you.

With **Espacenet** the European Patent Office offers a free platform for patent search with 110 million patent documents from over 100 patent authorities all over the world. On Espacenet you can search in 3 different ways:

1. **Smart search:** With this search you can type up to 20 words separated by a space or operator (e.g. AND, OR, NOT) in one field to find certain patents. You can enter inventor or applicant names, numbers, dates, keywords and classes in any order without having to specify the search field for each search term.
2. **Advanced search:** The advanced search allows you to search with more specific terms, e.g. publication date, applicant, inventor or classification symbol in separated fields.
3. **Classification search:** Here you can find which class the patent you are looking for belongs to according to the International Patent Classification (IPC) . Once you know the classification respectively the subclass you continue within the advanced search. When you have too many results with the class you are searching with you should go through the sub classes and identify the most relevant one(s) to narrow your search.

Tips from experienced patent searchers:

1. If you have **known patents** you find references in them, which can be a very good base for your search. You can check which patents were cited and in which other patents was the one you have, cited. In espacenet this can be found in "Bibliographic data" box on the left under cited and citing documents.
2. If you already find patents when searching **from a high level of detail** (class, keywords, date) the chance is high that these are close to what you are looking for. If you did not find any patents when searching with a high level of detail you can reduce that level of detail to increase your hit rate. However starting with a very narrow search bears the problem of missing important results. In other words: if you start the search broad on a low level of details and then narrow with a high level of details you will avoid missing important results.
3. For the **classification search within the field of bioenergy** it is useful to work with product names as key words, for patents the conversion process will lead to more results. The conversion process is in the focus of a patent, thus it is better to use terms reflecting conversion technologies than to use terms reflecting the products. Note that the patent concept you are looking for could have also been used for something else – so you might want to check other classes as well.
4. The choice of **key words** is very important. For the field of bioenergy/biofuels we have listed a choice in the table.
5. Be aware of **synonyms** (e.g. e-fuels, efuels, electro fuels, electrofuels,) and make sure to search for all of them. On the other hand, the specification of general terms, e.g. biofuels to transport biofuels can increase the accuracy of your hits.
6. Take advantage of **wild cards** like * or ? to represent any character or range of characters, e.g. if your search should include the plural form, different endings or alternative spellings.
7. It is crucial to **document your search very well.** You should not only keep track of the results but also record how you carried out each step of your search. This will make your future search much more efficient and you will avoid to search in e.g. same class or patent more than once. The documentation can be done via tables and/or screenshots, depending on the platform/software you work with these records can be saved in various ways.
8. **RSS feeds** help you to stay automatically

1. *https://www.wipo.int/classifications/ipc/en/preface.htmls*

updated within certain topics. E.g. when running an advanced search in espacenet you can, click on the RSS icon next to the words "Result list" when it appears. That way you will be notified when new documents appear in the database that match your search criteria.

9. **Fee-based Software** can be very helpful for your patent search. The advantages of fee-based software can be the search adapted to individual needs concerning structure or key words defined by the user. This can simplify and accelerate your search. Note that when you search with freely available patent search tools, there is the risk that someone else will be able to watch what you are doing. If you use a fee-based software instead, you do not expose yourself to that risk.

   Examples for fee based software:
   - IP7 – Compass
   - PatMan®
   - PatOrg
   - uptoIP®
   - XPat
   - Eidopat
   - SIP

10. Other **online platforms** to search for patents:
    - Google Patents
    - Thomson-Reuters Patent Web
    - PatentMax.com
    - PatBase.com

11. Other **helpful links:**
    - https://worldwide.espacenet.com/?locale=en_EP&view=seven
    - https://www.youtube.com/results?search_query=how+to+search+for+patents+online
    - https://www.epo.org/learning-events/materials/inventors-handbook/novelty/professional.html

If you need **more specific information** or support when searching for patents, please check the **numerous help files** belonging to the platform or software applied.

Key words according to the topics along the bioenergy value chain

Topic	Keyword
Feedstock	
	Oil crops
	Sugar crops
	Starch crops
	Lignocellulosic crops
	Lignocellulose
	Agricultural residues
	Log wood
	Wood chips
	Pellets
	Forestry residues
	Municipal solid waste (MSW)
	Waste oil
	Waste fat
	Tall oil
	Waste gas
	Organic residues
	Algae
	Aquatic biomass
	Cyanobacteria
Conversion technology	
	Pretreatment
	Mechanical processing
	Energy densification
	Pelletisation
	Fractionation
	Steam explosion
	Alkaline hydrolysis
	Liquid hot water (LHW)
	Use of ionic liquids (ILs)
	Plantrose process (supercritical hydrolysis)
	Low Temperature Steep Delignification (LTSD)
	Co-solvent Enhanced Lignocellulosic Fractionation (CELF)
	Organosolv process
	Ozonolysis
	Pyrolysis
	Torrefaction
	Biomass to liquids (BTL)
	Biomass to gas (BTG)
	Gasification
	Intermediate production
	Cellulose hydrolysis
	Hydrolysis
	Synthesis
	Fermentation
	Digestion
	Combustion
	Transesterification
	Hydrotreatment
	Anaerobic digestion
	Co-firing
Product	
	Bio-oil
	Raw biogas
	Biobutanol
	BioDME
	Biogas
	Biohydrogen
	Bio-synthetic Natural Gas (Bio SNG)
	Cellulosic ethanol
	Conventional ethanol
	ETBE
	FAME/Biodiesel
	FT-liquids
	Bioelectricity
	HFO/HEVA
	Methanol
	PPO/SVO
	Synthetic paraffinic fuel
End use market	
	Transport
	Aviation
	Road transport
	Rail transport
	Water transport
	Engine biofuels
	Space heating
	Combined heat and power/electricity