Cipher Classification

LexisNexis®

Inventions and Innovators Powering the Energy Transition

Oil and Gas Supermajors

Report in Partnership with **Cipher Classification**

Chevron

ExxonMobil

bp

Eni

ConocoPhillips

TotalEnergies

An obstacle in understanding the pace of progress and impact associated with companies' sustainability initiatives is separating what is being done against what is being said. Traditional ESG analysis and scoring typically starts with corporate sustainability reporting. The flaw in relying on what companies say rather than what they do is obvious, but a lack of alternative data translates to a continued reliance on company reporting, or data derived from it, in measuring sustainability performance. A whole new industry has been built up in recent years around providing sustainability research to companies and investors, but when you scratch beyond the surface a primary challenge remains a lack of independent, reliable and actionable data.

Our ambition is to contribute to plugging that gap using published patent data as an indicator to measure corporate innovation across specific technologies that enable sustainability goals.

In this update on innovation being made in critical technologies powering the energy transition, we look at the seven oil and gas supermajors. We take advantage of structured, cleansed and classified patent data as an independent indicator to evaluate the pace of innovation and top owners of invention across energy transition specific technology areas. These include Photovoltaics, Batteries, Wind Turbines, Fuel Cells and Hydroelectric.

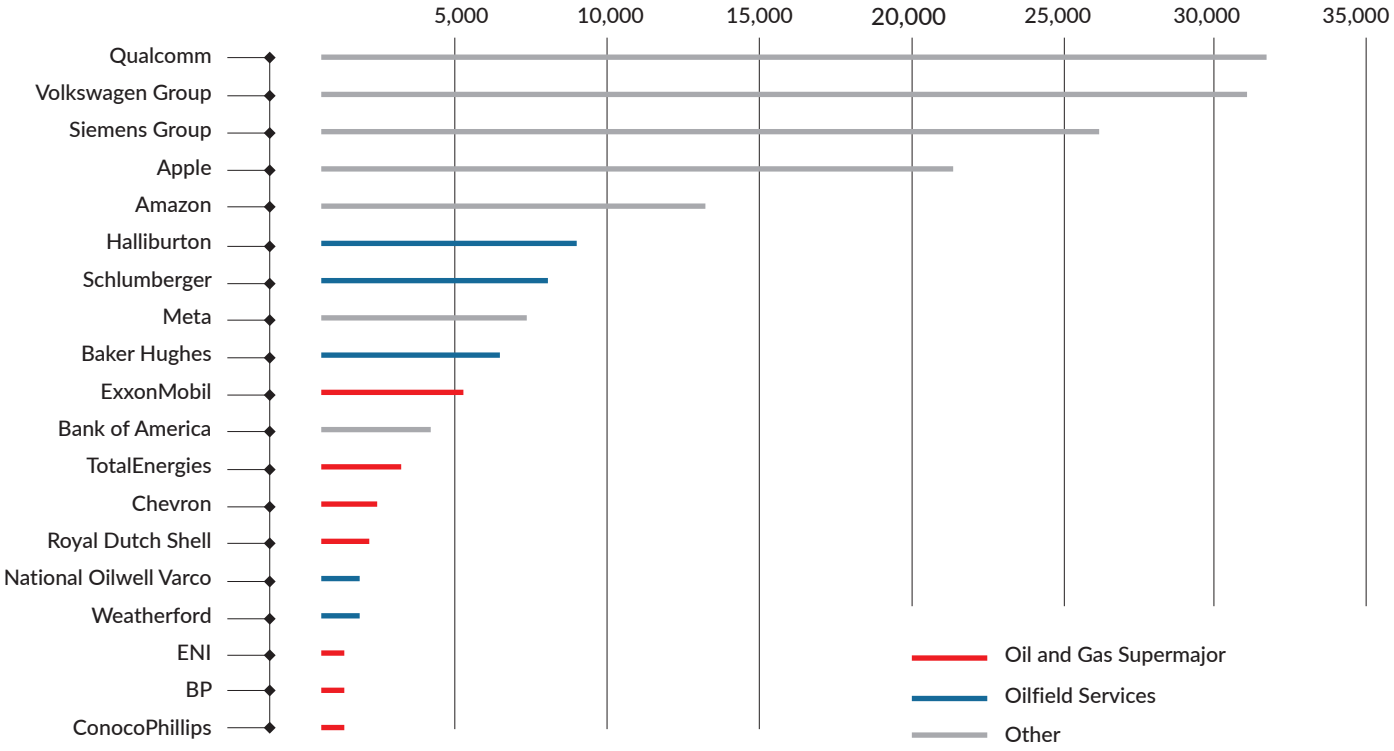
Key Messages:

- The balance of competitive advantage for energy producers is shifting from hydrocarbon resource-access to ownership of the underlying technologies that are enabling the energy transition. TotalEnergies' out-performing pace of innovation sets it apart from its supermajor peers. Its sustainable energy innovation areas of focus are batteries and photovoltaics.
- The supermajors relatively low level of patenting compared to leaders in other industries and compared to the big oilfield service providers points to a continued strategy of reliance on third-party innovation that looks set to continue with development of renewable low-carbon energy resource.
- Supermajors' innovation has been weighted towards technology areas associated with the categories of Materials, Mechanical and Sensors and Optics. This includes more downstream business focused innovation in chemicals, polymers, gases and liquid processing and some upstream focused innovation weighted to drills.

Supermajors have pursued a strategy of reliance on service provider innovation in exploitation of hydrocarbon resource

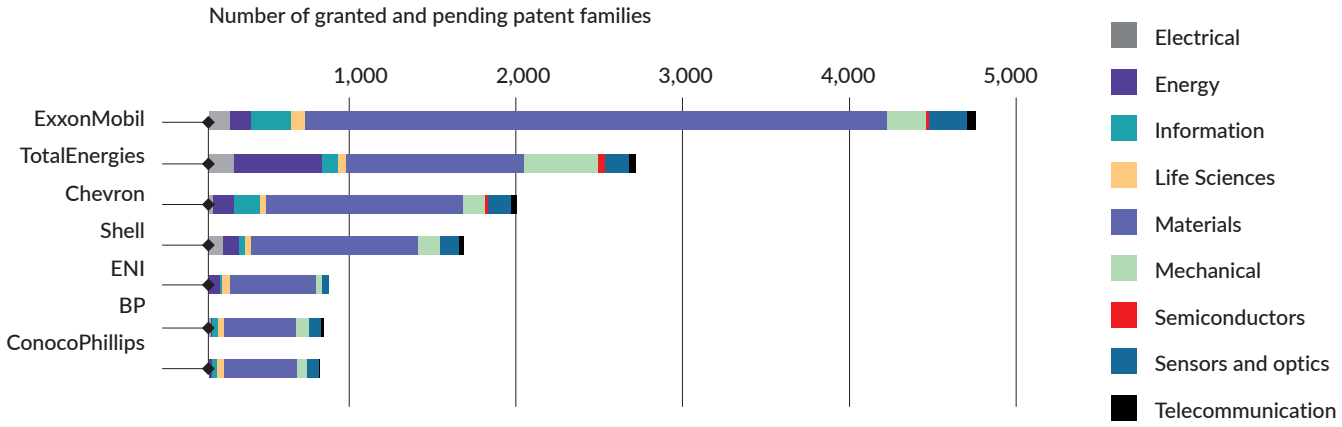
The supermajors exploitation of oil and gas has relied heavily on technical expertise and innovation by oilfield service providers including Schlumberger, Halliburton, Baker Hughes and Transocean in specialist areas such as cementing, fracking, coiled tubing, downhole tools and ultra-deepwater offshore drilling. The group lags other industry leaders in terms of inventions owned as measured by published patents. Worth recognizing here that while not all inventions are necessarily patented, the scale and growth of a patent portfolio is a widely accepted primary indicator for understanding the pace of innovation in an organization. The top invention owner among the supermajors, ExxonMobil, has 4,869 patent families compare this with leaders in other industries, Qualcomm (31,518), Amazon (13,325), Siemens (26,505) and Volkswagen Group (31,229).

Number of Inventions: Supermajors / Service Providers / Others

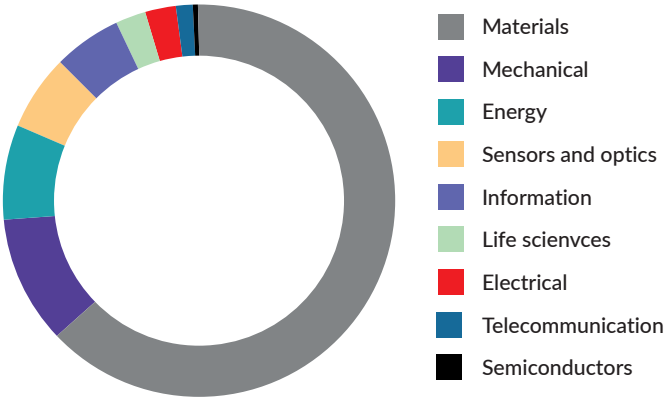


This is not symptomatic of the oil and gas industry being significantly less sophisticated, requiring less innovation or materially lower R&D spend than say the semiconductor, consumer electronics or automotive industries. Look at the scale of inventions owned by the big three oilfield service companies compared to the supermajors. We believe that the lower invention ownership of the group reflects a reliance on third party innovation with the supermajors having positioned themselves as well capitalized, expert project managers of mega-scale projects in exploitation of their licensed acreage and hydrocarbon resource.

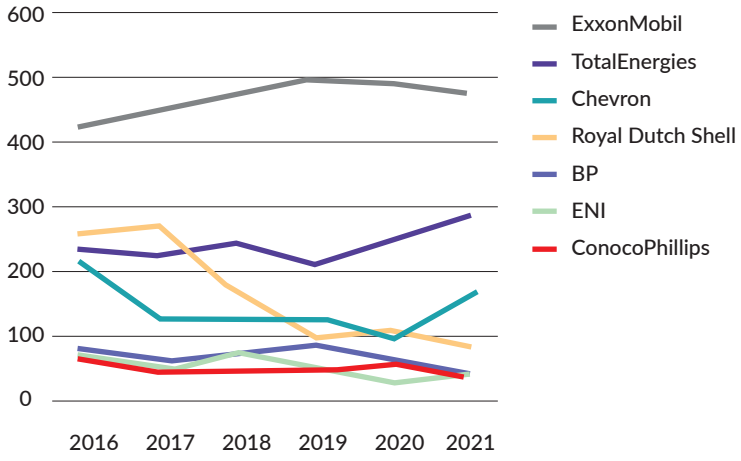
Supermajors' innovation is weighted towards technology areas associated with the categories of Materials, Mechanical, and Energy.



Number of Inventions: by UTT Superclasses



Invention Breakdown: Supermajors



Invention Breakdown: Supermajors

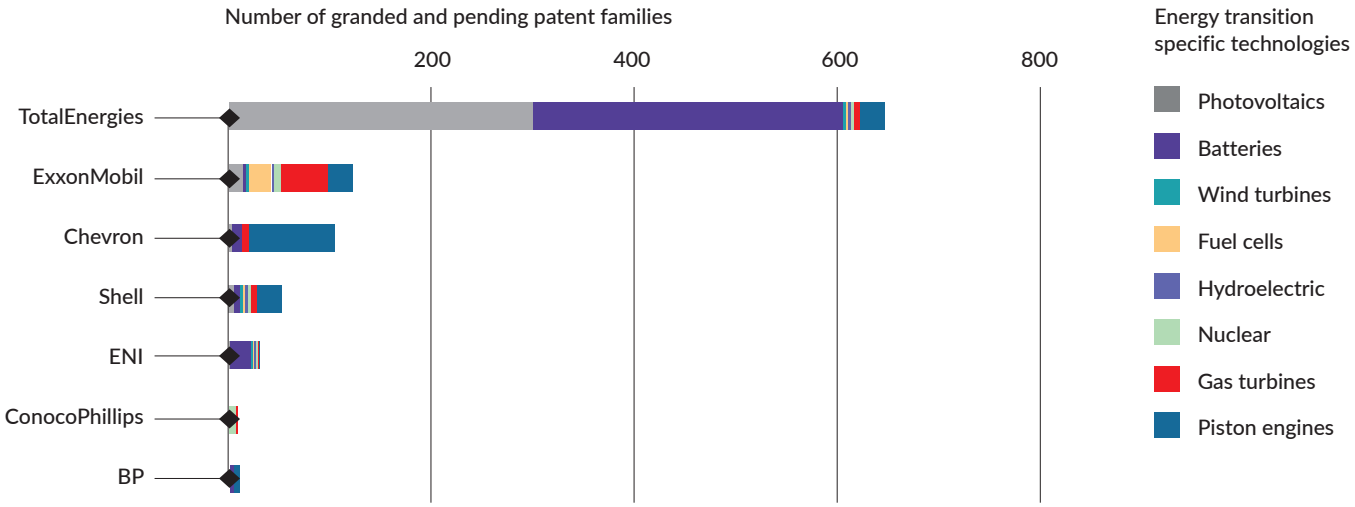
Over two thirds of ExxonMobil's inventions are associated with Materials, with the main technology area constituents within weighted to chemicals, polymers, gases, and liquid processing. These are most likely linked to R&D associated with the downstream refining and chemicals business. The Mechanical category is primarily connected to inventions associated with drills, directly benefitting the upstream businesses.

Total Energies has more inventions than any other supermajor in the category of Energy which includes the sustainable energy transition specific technology areas of photovoltaics, batteries, wind turbines, fuel cells and hydroelectric.

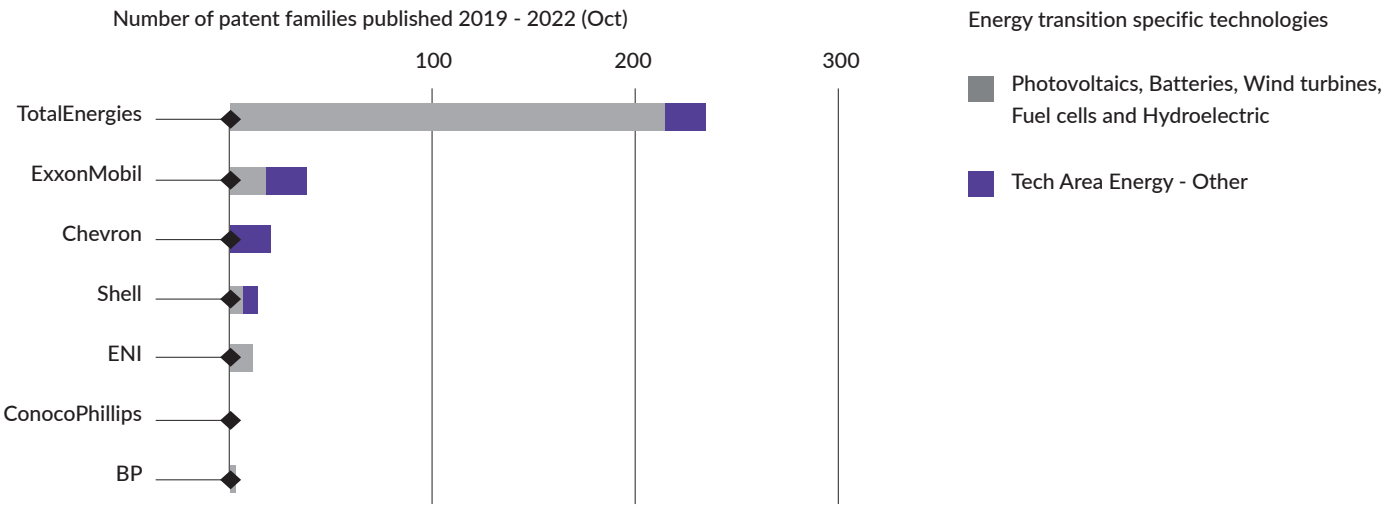
The energy transition is shifting the balance of competitive advantage from ownership of resource to ownership of technology. TotalEnergies' pace of energy transition related innovation sets it apart from its supermajor peers.

British Supermajor BP's Beyond Petroleum rebrand 20 years ago is often cited by greenwashing theorists. It was part of an ambitious pledge under the leadership of John Browne to reinvent the energy business and push a more sustainable agenda. Forward thinking at the time, progress appears limited. BP's oil and gas dollars sourced from the upstream and downstream business segments accounted for 99% of the total reported 2020 revenue. This combined with environmental catastrophes on multiple projects, including the 2006 Prudhoe Bay Oil Spill and 2010 Macondo well blowout, reinforced for many the direction of Big Oil. However, the primary goal behind the Beyond Petroleum pledge was to avoid further emissions increases. It was not about exiting oil and gas, instead targeting a reduced environmental impact associated with its exploitation and use. New commitments that BP has in place under the leadership of Bernard Looney and ex-Statoil boss Helge Lund appear more robust. And these commitments do provide a firm foundation to the company's global PR spin on its energy transition and its transformation from an International Oil Company to an Integrated Energy Company.

The energy transition journey for the supermajors is not at all about abandoning oil and gas, but broadly speaking it's about working towards a reduced carbon future through increasing investment in more sustainable energy sources. The competitive edge in oil and gas and where the supermajors have exploited their scale to great success is in getting access to resource. The dynamics of energy transition solutions such as solar, wind and hydrogen are fundamentally different and having ownership over the technologies needed to exploit them can be viewed the key competitive advantage over resource-access. In this new energy world, the balance of value is shifting from ownership of the hydrocarbon resource to ownership of the energy transition enabling inventions.



Number of Inventions: UTT Category Energy

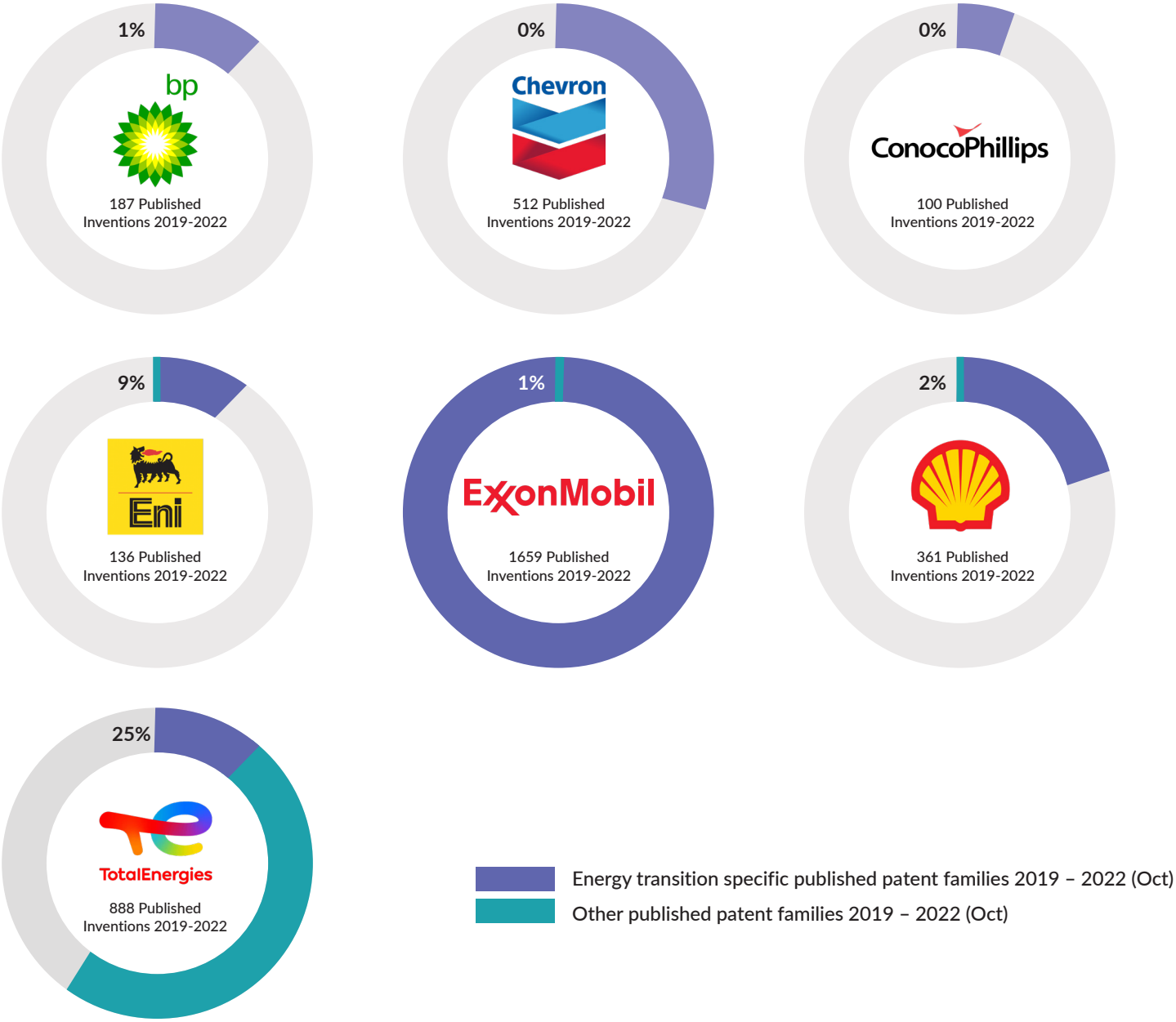


Top Innovators: Published 2019 -2022 (Oct)

In the case of BP, the data points directly to a relatively, very low level of innovation in the energy transition specific technologies. Does this support the theory of continued greenwashing by BP? Definitely not. It looks like a continuation of the strategy – reliance on service providers over in-house innovation, but working with new names such as Siemens Gamesa, Vestas and GE in wind energy. This is being supplemented by targeted acquisitions and partnerships. The story is similar across the group.

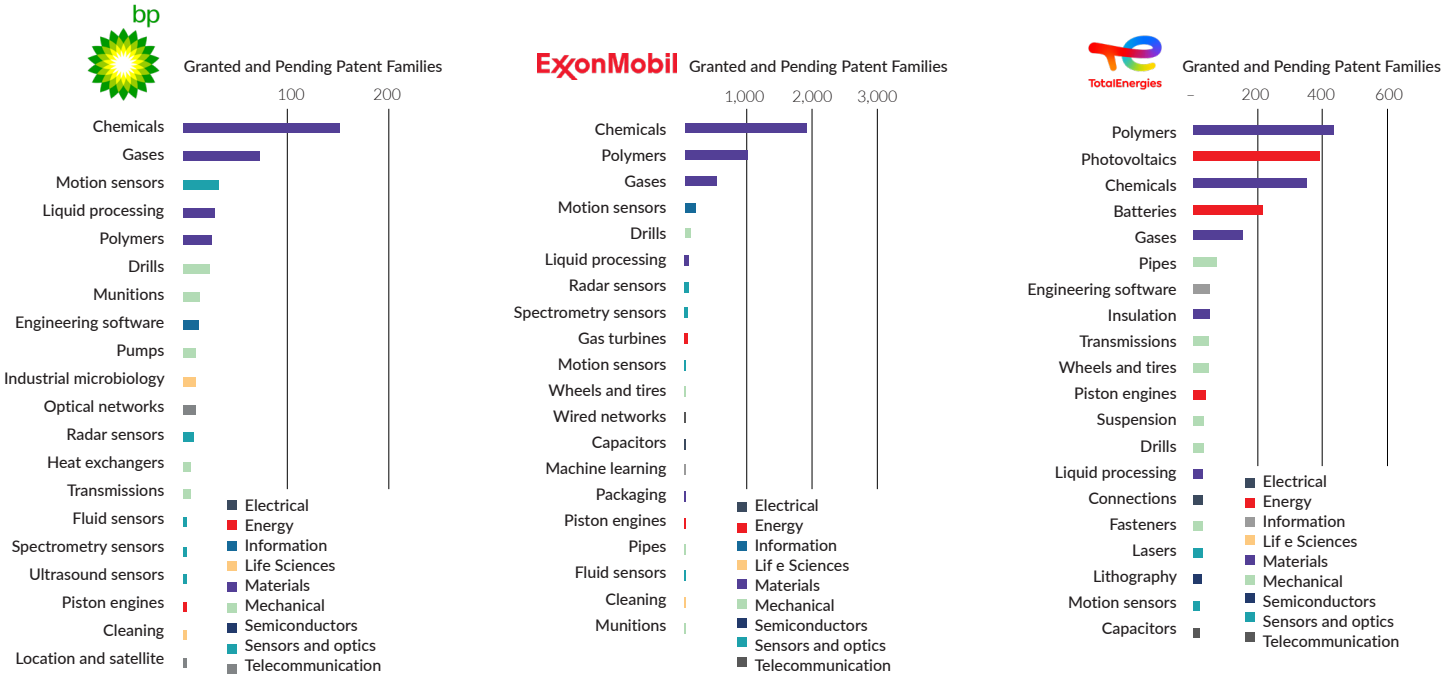
TotalEnergies stands apart in terms of its pace of innovation in sustainable energy with 25% of its published inventions from start of 2019 to date directly linked to the energy transition technologies; photovoltaic and battery innovation being its primary focus. The clear outlier and best-positioned from a technology ownership perspective.

Supermajors: weighting of published inventions since start of 2019 to the energy transition specific technologies: Photovoltaics, Batteries, Wind Turbines, Fuel Cells and Hydroelectric.



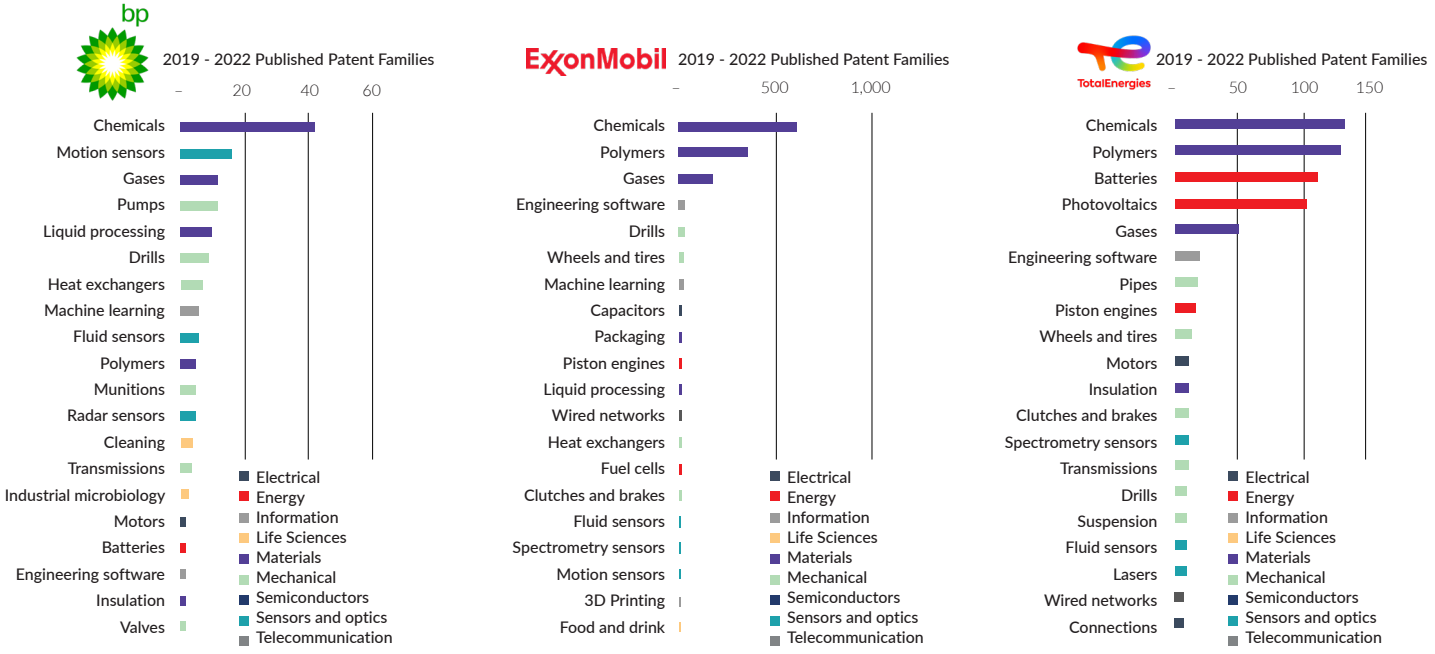
Innovation Snapshots: BP, ExxonMobil, TotalEnergies,

Top Inventions Owned: UTT Subclasses



Showing the top 20 UTT Subclasses by number of inventions for each company.

Top Inventions Published 2019 – 2022: UTT Subclasses



Showing the top 20 UTT Subclasses by number of inventions published 2019 – 2022 (Oct) for each company.

About Cipher Classification

With 44+m active patents, how can you zone in on the patents that are relevant to the technology areas you operate in? By building a classifier that is defined you allows you to do this.

LexisNexis® PatentSight® uses Cipher Classification system, which uses AI to read all the 44m+ patents globally and pull the relevant patents into your classifier. The classifier is defined by you and the machine does all the hard work of going and finding the right patents. The machine can read more than 60 million patents an hour and looks at 200,000 data points in the patent.

About LexisNexis® Intellectual Property Solutions

LexisNexis® Intellectual Property Solutions bring clarity to innovation for businesses worldwide. We enable innovators to accomplish more by helping them make informed decisions, be more productive, comply with regulations, and ultimately achieve competitive advantage for their business. Our broad suite of workflow and analytics solutions (LexisNexis® PatentSight®, LexisNexis® Cipher, LexisNexis® IPlytics, LexisNexis PatentOptimizer®, LexisNexis PatentAdvisor®, and LexisNexis TotalPatent One®, LexisNexis® IP DataDirect), enables companies to be more efficient and effective at bringing meaningful innovations to our world. We are proud to directly support and serve these innovators in their endeavors to better humankind.

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