Nov 2022

Inventions & Innovators powering the Energy Transition

A view across the enabling technologies of Photovoltaics, Batteries, Wind Turbines, Fuel Cells, and Hydroelectric

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 provide our view of the leading innovators to watch based on recent published inventions and overall weightings to enabling technologies. The tech areas covered include Photovoltaics, Batteries, Wind Turbines, Fuel Cells and Hydroelectric.

The World's Leading Energy Transition Innovators To Watch

Cipher view of the world's leading innovators to watch based on recent publications and overall weighting of inventions to enabling energy transition technologies: batteries, fuel cells, photovoltaics, wind turbines and hydroelectric.

Cipher Sustainability Insight

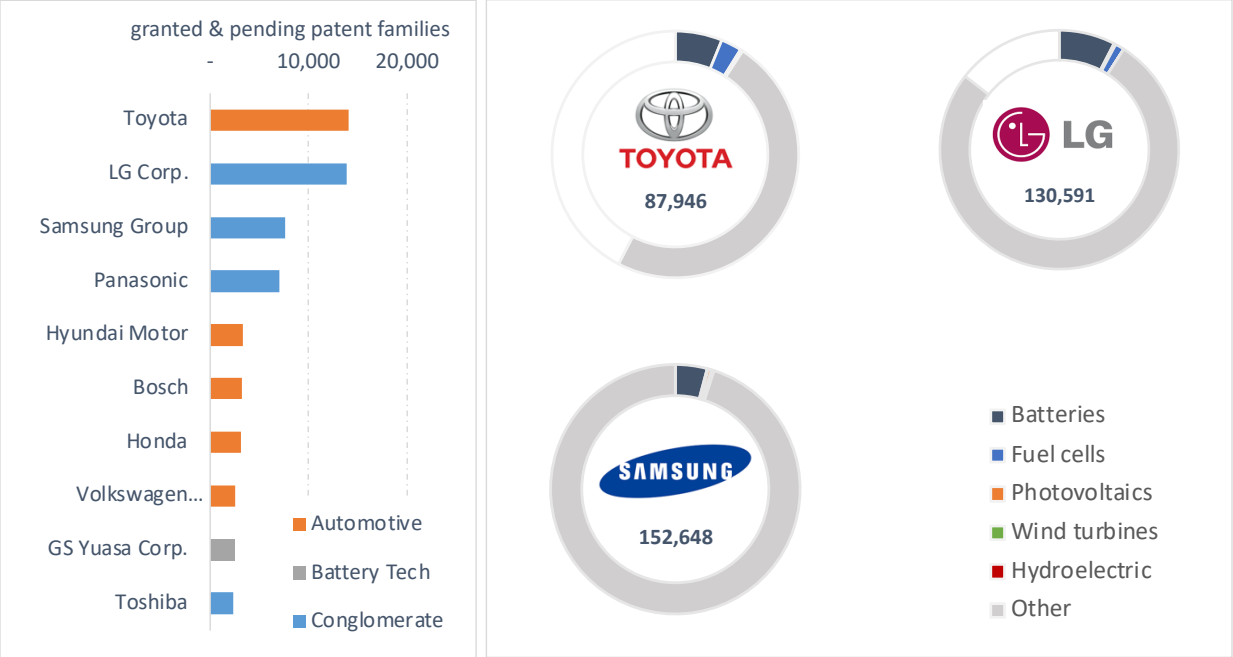
At Cipher, we support many of the world's largest organisations in scoring and benchmarking on sustainability innovation specific to the energy transition, climate change, the circular economy, clean water, health & wellbeing and more. For information on how you can access critical insight on sustainable innovation specific to your business and industry, please get in touch.

Niall McMahon
niall.mcmahon@cipher.ai

Top invention owners globally in energy transition enabling technologies include Big Auto and Korean Chaebols LG and Samsung. Batteries the dominant theme.

Energy transition tech accounts for only a small portion of the published inventions owned by the top three invention owners Toyota, LG and Samsung.

Top Invention Owners: *Energy Transition Technologies*



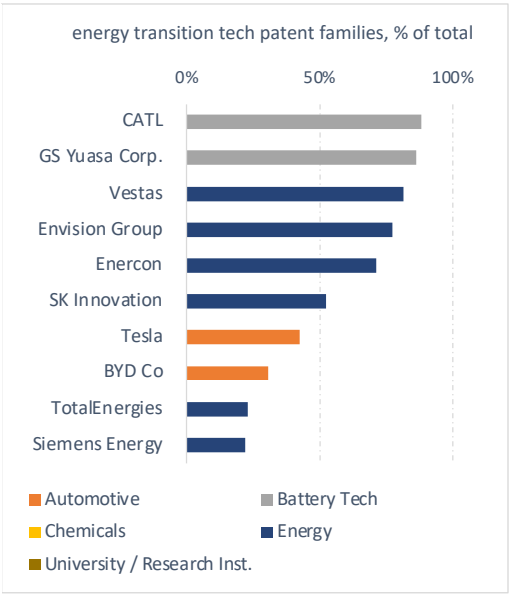
Patent families classified according to technologies using the Cipher Universal Technology Taxonomy (UTT)
Global excluding China only patent families
The extended list of 100 top owners is included on page 4.

Energy Transition Tech Weighting: *patent families owned as a percent of the total for each top owner*

Recognising that energy transition tech accounts for only a small portion of the top owners' published inventions, we rank the top 100 owners by percent exposure. This provides colour into the strategic importance and weighting given to energy transition technologies across the full top owners list.

China-based CATL (Contemporary Amperex Tech Co. Ltd.) is on top with 1,400 granted & pending patent families, 88% of which are focused on battery tech. Battery pure-play GS Yuasa Corp. comes in second and is followed by Danish Wind Energy group Vestas with 82% of its 1,700 patent families centred around wind turbine tech. Six of the top ten by energy transition tech weighting are energy companies – Vestas, Enercon, Envision, SK Innovation and Siemens Energy.

Tesla, the only Auto company in the top ten has 43% of its 723 active patent families associated with energy transition tech split between batteries and photovoltaics.



The extended list of 100 top owners by energy transition tech weighting is included on page 4.

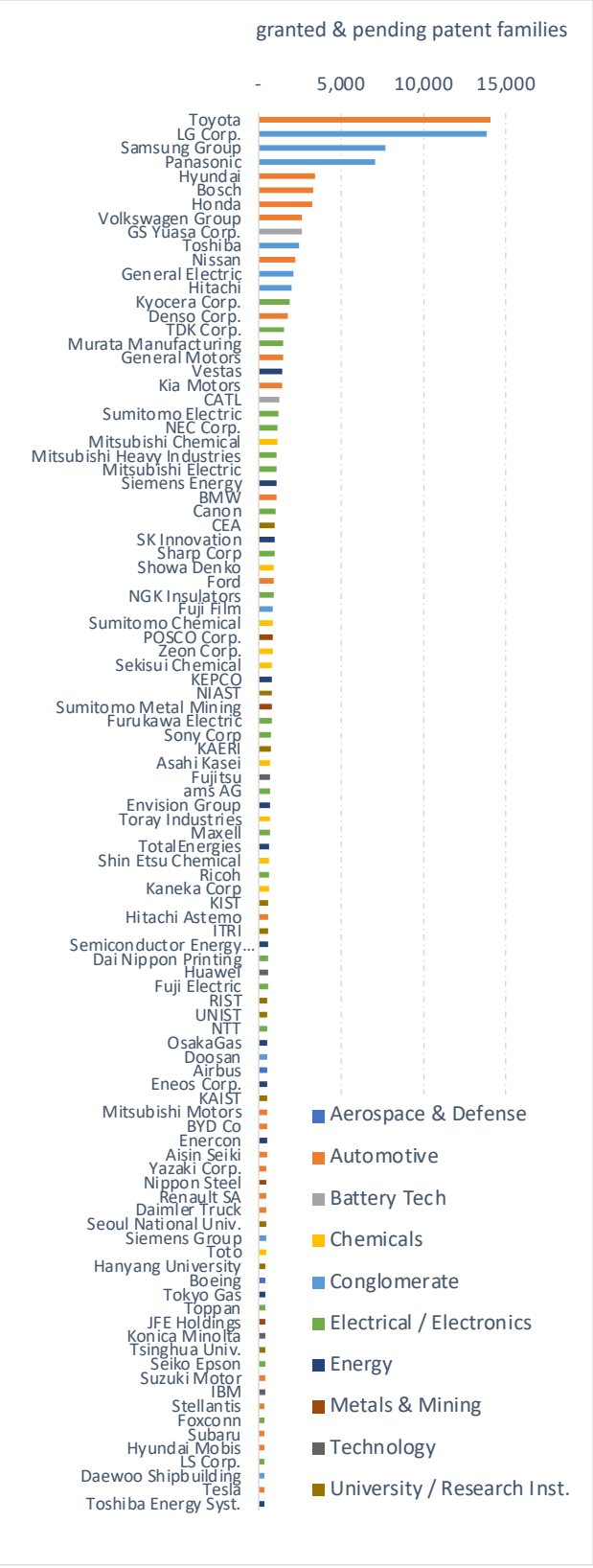
The leading energy transition weighted innovators based on recent patenting activity by scale and overall exposure; batteries and wind turbines the dominant technology enablers

These are the companies that we view as leaders to watch in energy transition innovation. The full list is generated by screening those organisations with the most inventions published across the enabling technologies from start of 2021 to date and where recent innovation is relatively more weighted to those technologies over others.

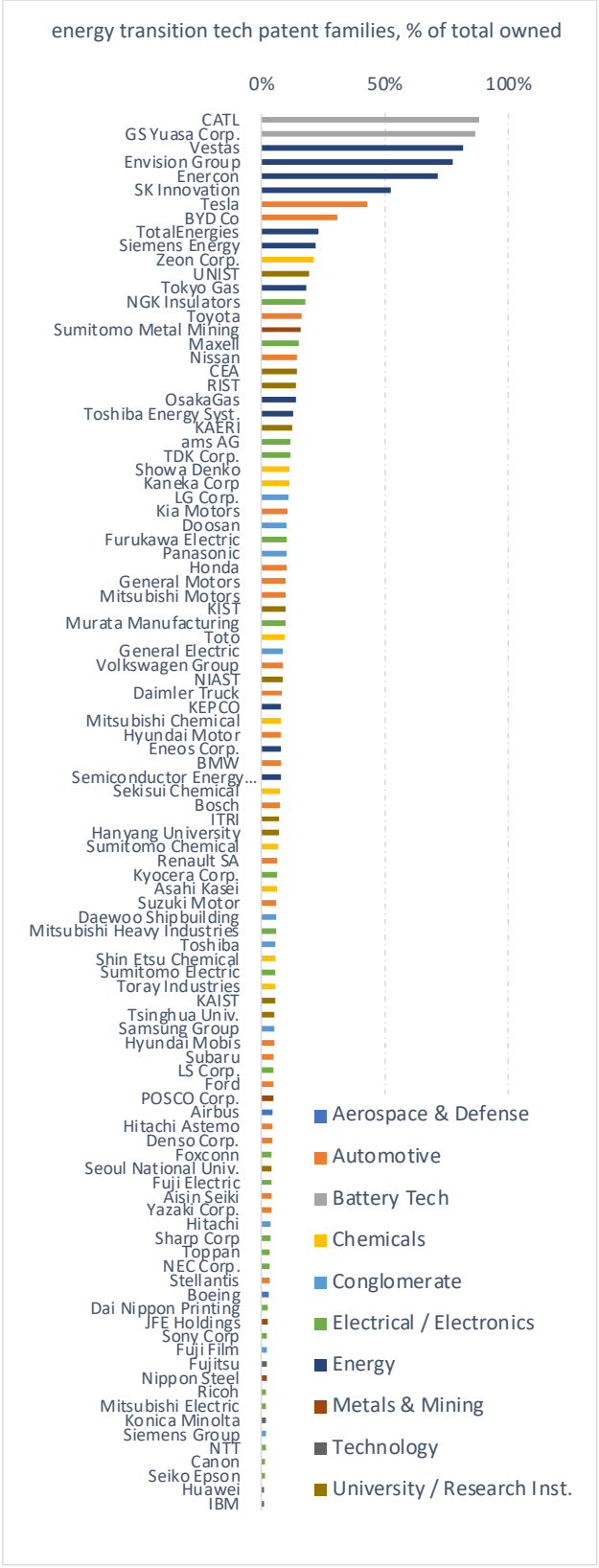
The World's Leading Energy Transition Weighted Innovators To Watch
Technology breakdown of published inventions 2021 – 2022 (Oct)

Cipher view of the world's leading innovators to watch based on recent publications and overall weighting of inventions to enabling energy transition technologies: batteries, fuel cells, photovoltaics, wind turbines and hydroelectric. The extended list of 100 top innovators and their energy transition tech weighting is included on page 5.

Top Invention Owners: Energy Transition Tech *patent families owned*

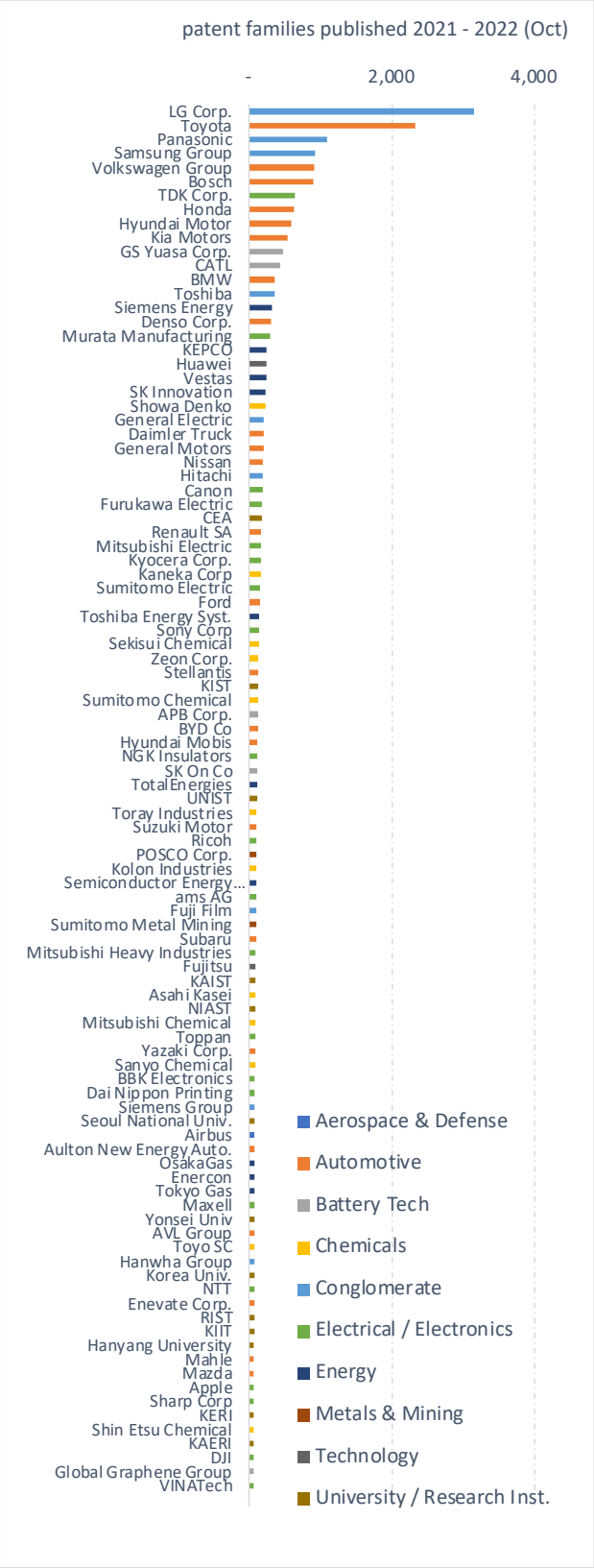


Top Invention Owners, Energy Transition Tech Weighting: *patent families owned as a percent of the total number of patent families for each organisation*

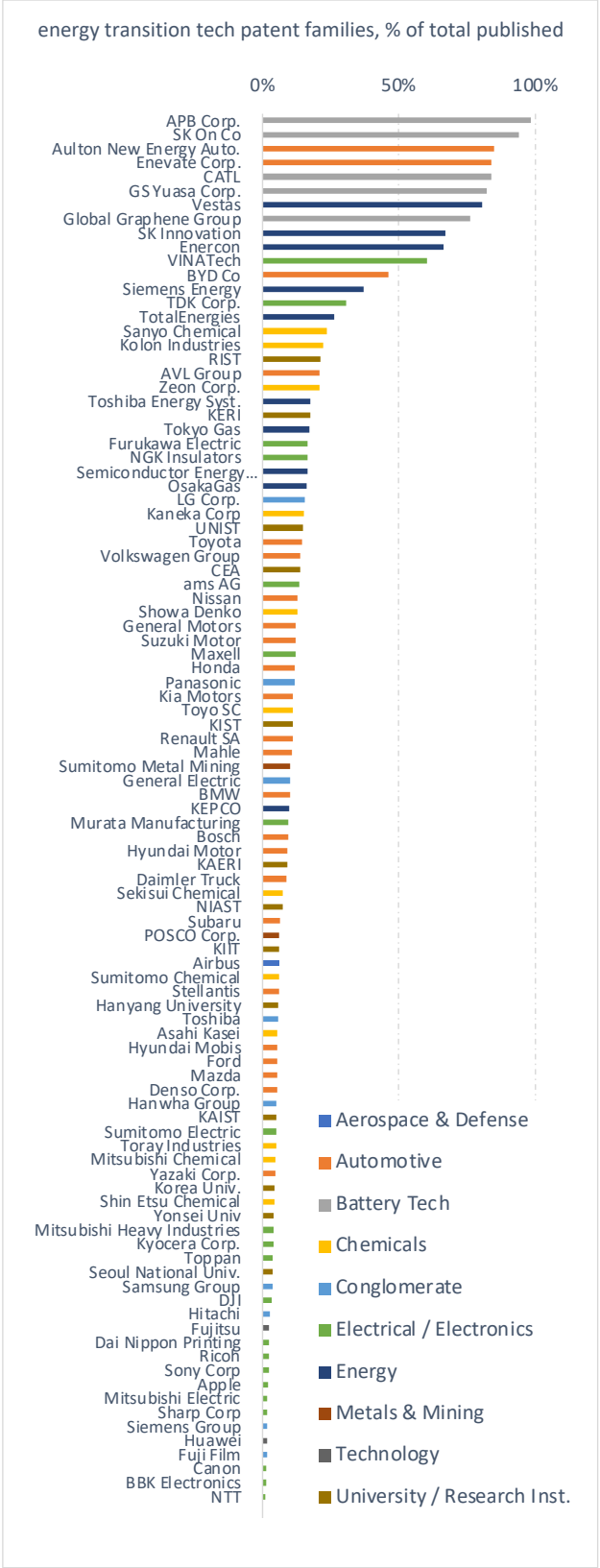


Global excluding China only patent families

Top Innovators: Energy Transition Tech
patent families published 2021 – 2022 (Oct)



Top Innovators, Energy Transition Tech Weighting: *patent families published as a percent of the total published 2021 – 2022 (Oct) for each organisation*



Global excluding China only patent families