

Air Quality: Global Leaders & Innovators

A view across the enabling technologies of Air Scrubbers, Oxidation Catalysts, Biofuels, Diesel Particulate Filters & Multi-Pollutant Monitoring Devices.

The first industrial revolution supported Great Britain in becoming a commercial superpower in the mid 18th century. The long-term effects to the environment were not fully apparent until centuries later leading to the Clean Air Act of 1956, passed to preserve public health. Today the issues of pollution control and climate change are viewed as critical to moving forward as a global community. Yet, there are relatively few sources of objective and independent data available to identify the countries and companies leading in innovation of sustainable enabling technologies. There is an intrinsic bias in self-reported data from organisations, the staple for traditional ESG analysis. Our view is that this void in sustainability analysis can be plugged in part through published, classified patent data as an indicator for sustainable innovation & investment.

In this update on sustainable innovation being made in critical technologies related to air quality, we provide our view of the leading innovators to watch based on recent published inventions and overall weightings to enabling technologies. The technology areas covered include Air Scrubbers, Oxidation Catalysts, Biofuels, Diesel Particulate Filters & Multi-Pollutant Monitoring Devices.

The World's Leading Air Quality Innovators To Watch



Cipher view of the world's leading innovators to watch based on recent publications and overall weighting of inventions to enabling air quality technologies: Scrubbers, Oxidation Catalysts, Biofuels, Diesel Particulate Filters & Multi-Pollutant Monitoring Devices.

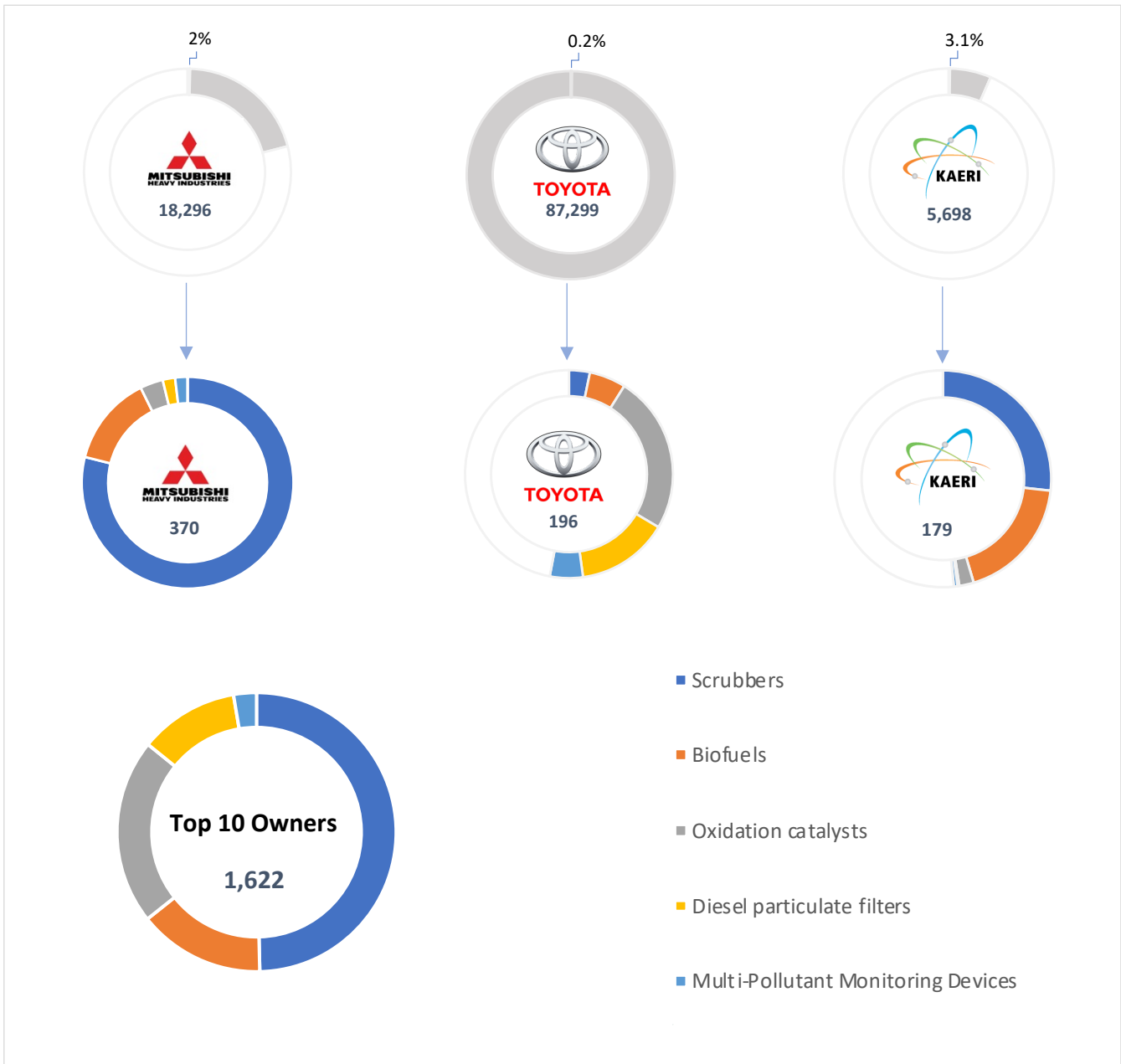
Cipher Sustainability Insight

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.

Top invention owners globally in Air Quality technologies include Korean research institutes and Japanese keiretsus Mitsubishi and Toyota. Scrubbers the dominant technology theme.

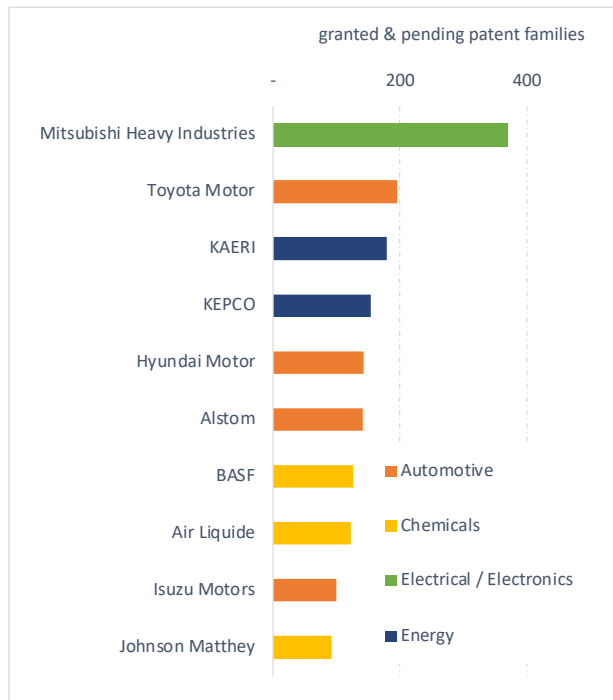
Air Quality tech accounts for only a fractional portion (0.2-3.1%) of the published inventions owned by the top three invention owners Mitsubishi Heavy, Toyota Motor & Korean Atomic Energy Research.

Top Invention Owners: Air Quality Technologies



Patent families classified according to technologies using CIPHER's internal sustainability classifiers. Global excluding China only patent families. The extended list of 50 top owners is included on page 5.

Top Invention Owners: Air Quality Technologies



Mitsubishi Heavy Industries ranks 1st in Air Quality technologies patent count with 376 granting & pending families in the outlined technologies, followed by Toyota & KAERI.

Automotive sector leads in this technology area, including both big players (Toyota, Hyundai) and emerging companies such as Alstom, a French rolling stock manufacturer and Isuzu, a Japanese multinational commercial vehicle manufacturer. Alstom focuses solely on scrubbers, while Isuzu’s portfolio is based on oxidation catalysts and diesel particulate filter technologies.

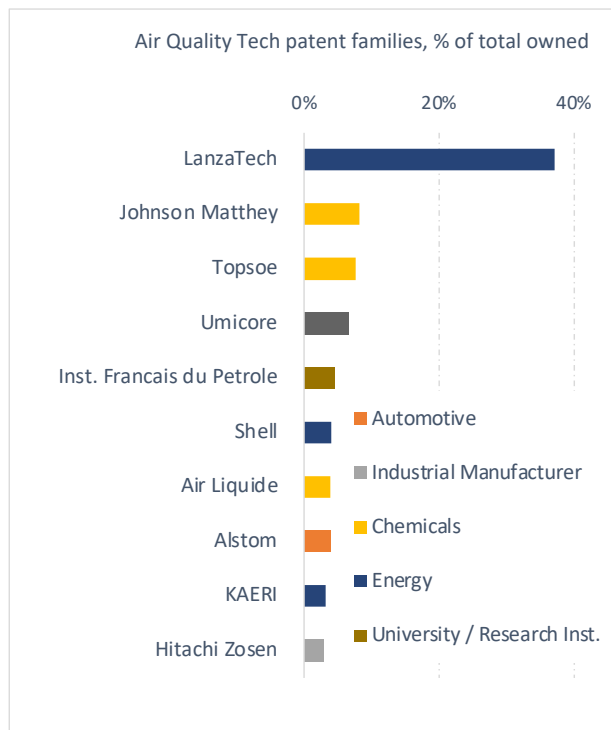
Other companies of note include Korean research & energy companies KAERI (Korean Atomic Energy Research Institute) and KEPCO (Korean Electric Power Corporation), where the primary focus is scrubbers, followed 2nd by biofuels technologies.

Air Quality Tech Weighting: patent families owned as a percent of the total for each top owner

Recognising that air quality tech accounts for only a small fraction of the top owners’ published inventions, we rank the top 50 owners by percent exposure. This provides colour into the strategic importance and weighting given to air quality technologies across the full top owners list.

Chicago-based LanzaTech leads the charge with the most targeted portfolio, with a size of 124 granted & pending families, 37% of which are targeted towards Air Quality technologies. British multinational company Johnson Matthey follows in 2nd place, with a particular focus on oxidation catalysts; followed in turn by Topsoe at 3rd place, a Danish catalysis company

Hitachi Zosen, a Japanese industrial powerhouse focusing on waste treatment & industrial plants, is the only industrial manufacturer in the top 10, with 41 granted & pending families, focusing on scrubbers and biofuels.



The extended list of 50 top owners by air quality tech weighting is included on page 5.

The leading air quality weighted innovators based on recent patenting activity by scale and overall exposure; biofuels and scrubbers the dominant technology enablers

These are the companies that we view as the leaders to watch in air quality 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.

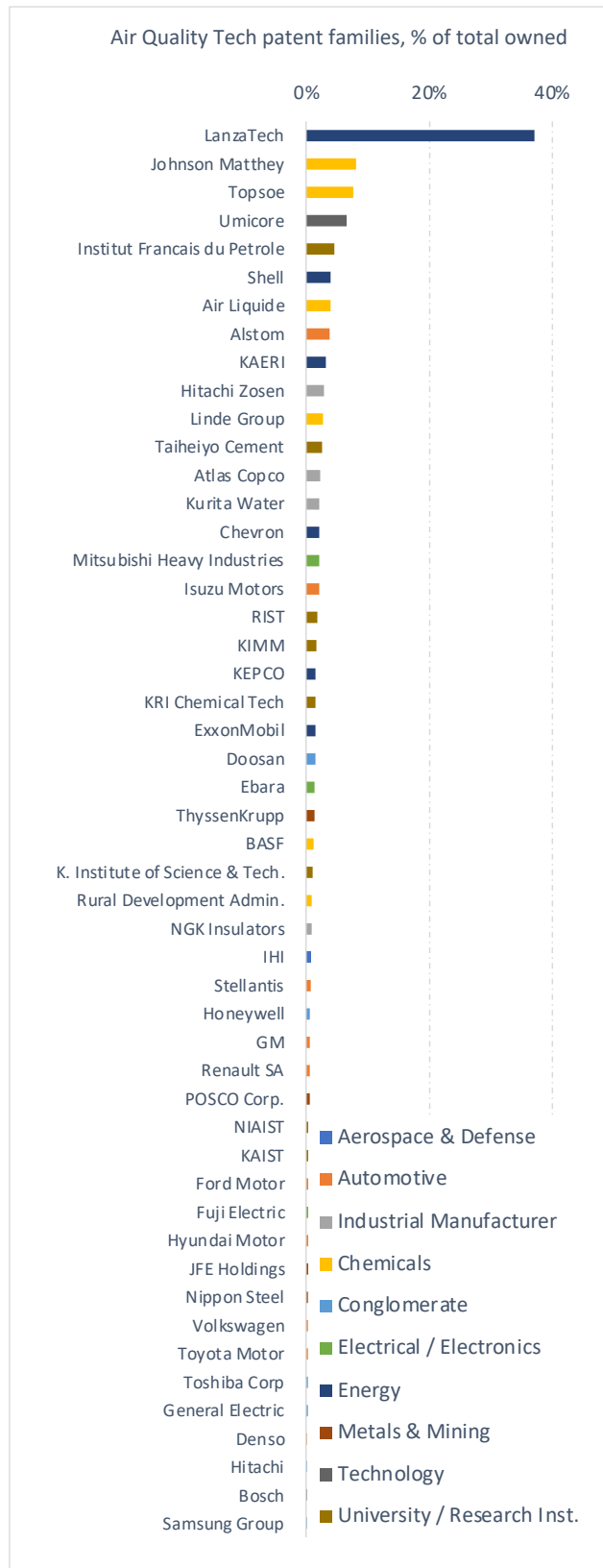
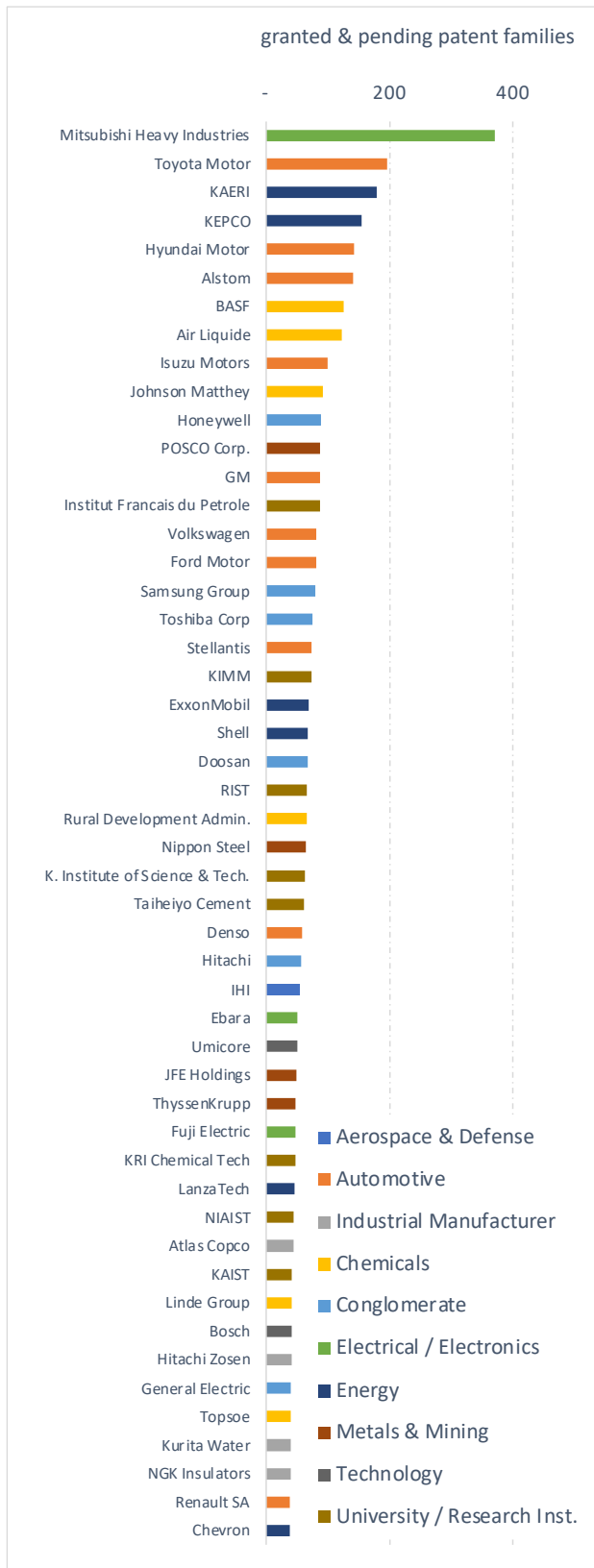
The World's Leading Air Quality Weighted Innovators To Watch
 Technology breakdown of published inventions 2021 – 2022 (Nov)



Cipher view of the world's leading innovators to watch based on recent publications and overall weighting of inventions to enabling air quality technologies: Air Scrubbers, Oxidation Catalysts, Biofuels, Diesel Particulate Filters & Multi-Pollutant Monitoring Devices. The extended list of 50 top innovators and their energy transition tech weighting is included on page 6.

Top Invention Owners: Air Quality Tech
patent families owned

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



Top Innovators: Air Quality Tech
patent families published 2021 – 2022 (Nov)

Top Innovators, Air Quality Tech Weighting:
patent families published as a percent of the total published 2021 – 2022 (Nov) for each organisation

