



# HYDROGEN REFUELLING NETWORKS

Last year saw a record number of hydrogen refuelling stations open, crucial to the growth of the platinum-based fuel cell electric vehicle market

Infrastructure readiness, especially refuelling, is key to the scaling up of zero emission technologies that use platinum-based hydrogen fuel cells, as the European Automobile Manufacturers' Association (ACEA) has recently highlighted.

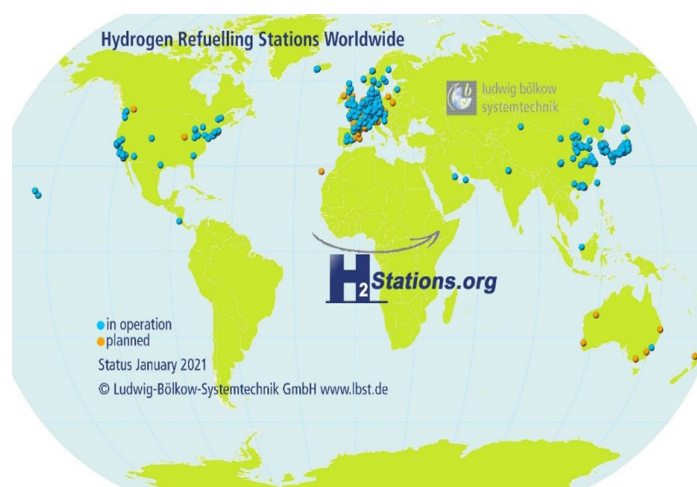
The Brussels-based trade association for the 15 major car, van, truck and bus manufacturers in the EU has called for the roll-out of some 300 hydrogen refuelling stations by the end of 2025, increasing to around 1,000 by no later than 2030, in order for the goals of the European Green Deal to be met.

Worldwide, there are currently around 600 hydrogen refuelling stations in operation. Of these, 107 hydrogen refuelling stations went into operation during 2020, more than ever before in a single year, with four countries in particular showing notable expansion: Germany extended its network by 14 hydrogen stations; China by 18; Korea by 26; and Japan by 28.

Concrete arrangements are already in place for 225 additional refuelling station locations worldwide, plans that have been further bolstered by an announcement from China's Sinopec Group. Sinopec – one of the world's largest oil refiners – plans to build 1,000 hydrogen refuelling and combined petrol-hydrogen stations over the next

five years as it reallocates some of its resources along the hydrogen chain.

In the UK, Element Two is planning to deploy a UK network of over 800 hydrogen fuel pumps in prime locations by 2027, rising to 2,000 by 2030. Meanwhile in North America, where the majority of the 75 existing hydrogen stations are located in California, Arizona-based Nikola Corporation and TravelCenters of America (TA-Petro) have agreed to collaborate on the installation of hydrogen refuelling stations for heavy-duty trucks at two existing TA-Petro sites. This collaboration is a first step for the two businesses to explore the mutual development of a nationwide network of hydrogen refuelling stations.



Also in North America, PowerTap, a leader in on-site hydrogen production and refuelling, is planning to create a minimum of 500 refuelling stations to provide hydrogen for mainly fuel cell electric vehicle (FCEV) trucks in the next three to five years.

## Platinum demand growth from FCEVs

Platinum is used as a catalyst in hydrogen fuel cell applications as it enables the reactions between hydrogen and oxygen that take place to occur at an optimal rate, while being stable enough to withstand the complex chemical environment within a fuel cell, performing efficiently over the long-term. Platinum-

based fuel cells are particularly well suited to vehicle applications, as their ability to tolerate rapid changes in load and their high electrical current density ensure they are small enough, yet able to meet the power requirements of cars and trucks.

Platinum in FCEVs is a growing demand sector for platinum, with wider adoption dependent on the availability of an accessible refuelling network. FCEV growth is coming predominantly from the heavy-duty sector, especially in the near term, with passenger vehicle growth likely to follow in the longer term.

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