



Fact sheet – Hydrogen fuel cell technology in cars and buses

Number 20, 2017

Part of the [Tranzinfo Hot Topics](#) series, this Hot Topic offers a selection of recent material on hydrogen fuel cell technology in cars and buses. In the transport sector hydrogen fuel cells, which convert hydrogen and oxygen directly into electricity, have potential benefits for the environment, the economy, and energy security.

Glossary

A list of terms and acronyms used to describe different types of hydrogen fuel cell technology can be found [here](#).

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Hydrogen Car Technology

[SimpleFuel home hydrogen fuel dispenser wins \\$1 million DoE prize](#)

Voelcker, J. Green Car Reports, 23 January 2017

The U.S. Department of Energy has awarded a \$1 million prize to little-known team SimpleFuel for its hydrogen home-fuelling station, which aims to enable drivers of hydrogen fuel cell vehicles to generate fuel at home rather than having to visit possibly scarce public hydrogen fuelling sites.

[Hyundai's hydrogen fuel-cell vehicle coming to Aus](#)

Inside Waste, 11 January 2017

Hyundai announced recently that its all-new dedicated hydrogen-powered fuel cell electric vehicle (FCEV) will be sold in Australia when it is released within two years. The Korean carmaker announced that it would be supplying the ACT government's Hornsdale Windfarm Project with 20 FCEVs in 2018, replacing the existing ix35 FCEV with a dedicated new model.

[Toyota Australia launches new mobile hydrogen refueller](#)

Vagus, S. Hydrogen fuel news, 7 December 2016

Toyota Australia recently unveiled its first mobile hydrogen refueller. The new refueller is meant to ensure that the Mirai can travel anywhere a conventional car can go, even if those areas lack a hydrogen infrastructure. The mobile fuel station has been developed by local engineers and hydrogen suppliers and represents a significant breakthrough for fuel cell vehicles in Australia.

[Move over Evs, hydrogen fuel cell vehicles may soon pass you by](#)

Mearian, L. Computerworld, 12 September 2016

Hydrogen fuel cell vehicles (FCVs) will catch up to electric vehicle (EV) sales because of the advantage of shorter refuel times and greater drive distances, according to a new report by Information Trends, a Washington-based market research firm.

[ACT Government orders 20 Hyundai fuel-cell vehicles](#)

Motoring, 30 August 2016

Hyundai will supply the ACT government with 20 hydrogen-fuelled vehicles for the Renewable Transport Fuels Test Berth in Canberra from 2018. The project aims to create the capacity to provide fuel-grade hydrogen for more than 1000 fuel cell EVs travelling an average of 14,000km a year.

[Toyota Mirai hydrogen cars land in Australia for landmark three-year trial](#)

Dowling, J. News Corp Australia Network, 11 July 2016

A trio of Toyota hydrogen vehicles - which emit only water vapour from their tailpipes - are presently being trialled in Australia. Toyota has imported a special mobile hydrogen refueller which enables the hi-tech cars to be driven across the country. Hydrogen cars are seen as the solution to future mobility - beyond electric cars - because they can be refuelled in the same time as petrol-powered cars and can travel the same distance between refills, more than 500km.

[New molecular design to get hydrogen-powered cars motoring](#)

Australian Research Council, Research Highlights, 6 July 2016

A radical new process developed by researchers at The University of Melbourne, supported by ARC funding, allows hydrogen to be efficiently sourced from liquid formic acid, and could be one step forward in making the dream of hydrogen-powered cars an economic reality. The report, Global Market for Hydrogen Fuel Cell Vehicles, argues that by 2020, sufficient hydrogen filling infrastructure will be in place in several regions of the world, giving a boost to the market for hydrogen fuel cell vehicles.

[Australia's first hydrogen-powered car reviewed](#)

Hall, S. Drive, 1 April 2015

Hyundai has invested an estimated \$1 million in getting a fuel cell prototype and its associated hydrogen re-fuelling station into Australia. Hyundai has invested the money primarily as a "conversation starter" with governments for prospective funding and incentives, with the hope of producing production right-hand-drive models in the next couple of years.

[Hydrogen: Energy for the ideal world? Iain Staffell at TEDxBedfordSchool](#)

Staffell, I. TEDxBedfordSchool, 2013 (YouTube video)

UK sustainable energy expert Iain Staffell debates whether hydrogen powered cars and homes are a revolutionary miracle, or hydrogen power is just a pipe dream.

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Hydrogen Bus Technology

[Europe's largest hydrogen bus project moves into action](#)

Cork, L. Transport Engineer, 27 January 2017

Europe's largest zero-emission hydrogen bus project has been launched in Cologne, Germany, with the €125m scheme set to deliver 144 hydrogen fuel cell buses and 7 large hydrogen refuelling stations across Europe.

[New bus fuel: Workshop B: Hydrogen infrastructure](#)

Hope-Morley, A. Fuel Cell Bus 10th edition Workshop December 1, London, 2016 (PowerPoint slides)

In this presentation panelists debate if infrastructure can be made 100% reliable and if diesel parity can be reached and if there are affordable pathways to carbon free hydrogen bus technology.

[Daimler to launch electric and fuel cell buses by 2018](#)

Tyler, L NGT News, 9 March 2016

Daimler Buses says it will debut two alternative fuel buses, the all-electric Citaro E-CELL and the hydrogen fuel-cell-powered Citaro F-Cell, by 2018. The two buses will join Daimler's offerings of efficient diesel and compressed natural gas transit buses. Both buses are based on a joint E-Mobility platform. Daimler Buses will bring both powertrain concepts to production standard and on the roads by 2018.

[Fuel cell electric buses – potential for sustainable public transport in Europe: a study for the fuel cells and hydrogen joint undertaking](#)

Berger, R. FCH JU, 2015

The report documents the first phase in the EU's initiative to develop a broad stakeholder coalition to commercialise fuel cell buses. The coalition currently plans to implement large-scale demonstration projects with a total of approximately 300 to 400 FC buses in Europe by 2020. Currently, 45 public transport authorities and bus operators representing 35 cities and regions from 12 European countries are participating in the commercialisation initiative.

[Hydrogen fuel-cells could be boon for WA](#)

Payne, R. Science Network Western Australia, 24 July 2015

Jamie Ally, whose [PhD thesis](#) investigated hydrogen fuel cell bus technology, says Australia's long-distance driving needs, transport energy trade deficit and geographical attributes make it a prime location for both hydrogen production and fuel-cell technology. And Perth already has industry connections, having participated in a global trial of bus fuel cell technology from 2004 to 2007. "The Perth hydrogen bus trials focused on testing reliability, and since then we've seen a huge increase in efficiency, durability, availability and affordability in second-generation technology," Mr Ally says. "What could really give it a push here is the big uptake of hydrogen research in Asia, particularly with the automotive companies - Hyundai, Toyota and Honda are all developing fuel cell cars."

[Bus technologies in Australia to 2020 and beyond: a discussion of the opportunity for new technology adoption for the Australian bus industry](#)

Rare Consulting, 2010

Hydrogen and fuel cell vehicles are still very much in the prototype stage and the advancement of this technology for transport is complicated by major challenges relating to the cost, complexity, fuel handling and absence of low carbon production sources. The majority consensus within the transport industry, including that of the authors, is that hydrogen will not be available as a transport fuel in the next 25–30 years, if at all.

[Hydrogen fuel cell buses: An economic assessment](#)

Cockroft, C. Division of Science and Engineering, Murdoch University, Perth, 2008

This paper presents the results of a cost benefit analysis comparing diesel, compressed natural gas and hydrogen fuel cell buses in the Perth bus fleet based upon life cycle societal costs and benefits of each technology. Despite its significant environmental benefits in operation, the high initial cost of the prototype hydrogen fuel cell bus meant that it could not compete financially with the fossil fuel technologies. Therefore the study was undertaken assuming that the buses, including fuel cells, were produced under conditions of economies of scale and that a fully developed fuel infrastructure for the provision of hydrogen existed.

[H2 Aberdeen: hydrogen bus project](#)

Aberdeen City Council, website, no date

The project aims to provide its partners with experience in using hydrogen as an energy storage medium, addressing a number of inter-related policy objectives, such as evaluating the commercial realisation of hydrogen technologies; using hydrogen energy storage as a means of managing electrical grid constraints; making progress towards Scotland's green transport targets; and improving air quality and noise levels in congested city centres.

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