



Hydrogen  
Highway



Hydrogen  
Society  
of Australia



INNOVATE  
AUSTRALIA

## The Hydrogen Highway

### Australia's Opportunity for Global Leadership in Clean Heavy Transport

Hydrogen Highway is a project of Innovate Australia and its interest group, Hydrogen Society of Australia. Innovate Australia is a not for profit organisation with a goal for Australia to become the global leader in innovation by 2030. To reach that ambitious goal, Innovate Australia runs a wide range of free public events around the topic of innovation and is introducing a range of new innovative initiatives. One of those initiatives is the Hydrogen Society of Australia, formed in January 2018. Although a national organisation, located in Perth, the Hydrogen Society of Australia can give a louder voice to Western Australian hydrogen-related projects and companies in this rapidly developing field.

The main initiative of the Hydrogen Society of Australia is the Hydrogen Highway. The Hydrogen Highway describes roads equipped with hydrogen refilling stations, allowing the use of hydrogen fuel cell vehicles. WA's Hydrogen Highway will focus on heavy transport, helping to introduce zero emission transport, lower cost of fuel, and eventually, a secure fuel supply, eliminating the need for importing diesel. Phase 1 will run along Highway 95 from Perth to Port Hedland, linking the state capital with the Pilbara region. The subsequent stages will lead to an expansion of the Hydrogen Highway across the State then Australia along Highway 1, the world's longest country highway.



Focusing the Hydrogen Highway on heavy transport rather than passenger vehicles allows creation of high demand for hydrogen, therefore an economy of scale and subsequently lower costs. A hydrogen car can fill

up with 4-6 kg of hydrogen, while a commercial truck can fill with about x20 times more. Earlier Hydrogen Highways in Norway or California had to rely on passenger cars to create demand, simply because heavy trucks are just now being introduced to the market.

Australia is in a unique position to profit from a once in a lifetime confluence of technological innovation and global market shifts – the beginning of hydrogen-powered heavy haulage. As batteries have become accepted as the future basis for domestic vehicles, hydrogen is seen as the ideal fuel for long haul vehicles.



Hydrogen fuel cell trucks work on the hydrogen-oxygen reaction - when hydrogen reacts with oxygen within a fuel cell, electricity is produced to power the truck. Only water is produced from the reaction, so there is no carbon dioxide or toxic by-products released into the environment.

Since heavy haulage vehicles are major emitters of CO<sub>2</sub> and fine particulate matter, a shift towards zero-emission engines is a social and economic goal for transportation companies around the world. About 1,000 heavy trucks travel daily on WA's Highway 95, with an average distance of 750km, burning up to 1l of diesel per 1 km polluting with 2.4kg of CO<sub>2</sub>. The numbers are truly staggering, especially that studies show the health of people living in the 500m radius from highways used by heavy diesel trucks is negatively impacted.

All these benefits have seen established vehicle manufacturers such as Toyota or Hyundai, and newcomers as Nikola or HV Systems, develop hydrogen truck models, however their path to market is slowed down by a lack of infrastructural support. For them to enter mass-production large-scale hydrogen demand is required. A heavy transport Hydrogen Highway can go long way towards creating the demand.

This is an opportunity for Australia to become a global leader in a new technology. That view is shared by other leading national organisations: Hydrogen Mobility Australia and Australian Association for Hydrogen Energy. Our natural reliance on long haul vehicles makes us the ideal environment to demonstrate the viability of hydrogen-powered trucks and our isolation makes us the greatest beneficiaries of sustainable, and most importantly secure, domestic fuel sources, that limit our dependency on diesel import.

The vision of the Hydrogen Highway is to help develop a supportive environment of hydrogen production and refuelling capacity, starting with Highway 95 in Western Australia, that will be used as the global pilot for long haul vehicle manufacturers. Australia can reap decades of benefits from early adoption of this world-changing technology, bringing jobs and attracting global innovators. This can be done. Denmark, with population of Sydney and size of less than 2/3 of Tasmania, spotted a unique opportunity and now leads the world in wind turbine manufacturing. Even yet smaller Holland, by embracing modern technology and innovation, managed to become an agricultural giant and leading global exporter of agricultural products.

Australia stands poised to lead the world in sustainable heavy vehicle technology and the Hydrogen Highway is a key pathway to this future.

