

TOYOTA

Submission by
Toyota Australia
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Future Fuels Strategy Discussion Paper
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1. Introduction

Toyota Motor Corporation Australia Limited (**Toyota**) has retained a significant local presence in Australia beyond the closure of local vehicle manufacturing operations in October 2017. This includes import and distribution of vehicles, parts and accessories, the maintenance of a significant research and development division, as well as the establishment of a Centre of Excellence at our Altona manufacturing site. There are in excess of 1,500 employees throughout Australia, and Toyota also has an expansive and vast dealer network that comprises some 280 dealership sites across Australia

In 2020, Toyota was the top selling automotive company in Australia for the 18th consecutive year with a market share of 22.3 per cent. Hybrid sales have dominated the Toyota line up over recent years with hybrids accounting for 25.6 per cent of Toyota sales in 2020. Hybrid vehicles allow for immediate emissions reductions (30-40% reduction across models) whilst providing a cost of ownership and driving range superior to the current drive experience of internal combustion engines.

It has been over 20 years since the first Prius hybrid was introduced to the Australian market, and it has taken considerable time to grow market understanding and acceptance of this technology. In addition, some 15 years ago Toyota trialled plug-in-hybrid vehicles with a number of state governments and other entities including GoGet, and while there was interest in the market for electrified vehicles, this technology was often misunderstood and misused with consumer unwilling to pay a price premium.

Bringing new technologies to the market comes with a price premium to cover development costs and are often introduced to the luxury or premium end of the market first. Achieving real volume and market penetration can take several generations of the vehicle in order to lower development and manufacturing costs to make the vehicle accessible to the large, more price sensitive segment of the market.

Toyota has the capacity to introduce a range of electrified powertrains, however this requires market acceptance, fit for purpose vehicles and consumer demand to drive the introduction of this technology. It is Toyota's strong view that the entire suit of electrification options should be supported in order to deliver realistic emissions reductions as well as diversifying fuel requirements and energy security. The suit of electrified technology includes hybrid (HV), plug in hybrid (PHEV), battery (BEV) and fuel cell vehicles (FCEV).

In October 2015 Toyota Motor Corporation announced its Toyota Environmental Challenge 2050, covering its global operations which sets out to reduce the environmental burden attributed to automobiles to as close to zero as possible, while developing measures to contribute positively to the earth and its societies with the aim of achieving a sustainable society. Toyota is further enhancing focus in this space with alignment to the United Nations Global Sustainable Development Goals.

We note that the future fuels paper, and many external commentators focus heavily on PHEV and BEV within the Australian market, however Toyota believes that FCEV also have an important role to play as an alternative to petrol and diesel vehicles. One of the key advantages of FCEV is the ability to refuel in only a few minutes and the technology also offers significant opportunity for heavy vehicles (trucks, buses, trains) due to the scalability and enhanced efficiency of the system when compared to BEV. Toyota globally sees BEV and FCEV as complimentary, not competing technologies. To grow market confidence in FCEVs, Toyota has conducted a loan program with both public and private stakeholders in which participants lease a Toyota Mirai FCEV for a 3 to 6 month period. To support this trial Toyota has for several years had 13 of the first generation Mirai and two fuel cell forklifts in the country, and by mid-2021 we will have introduced a small number of the new generation Mirai, which has a 30% increase in range over the previous model resulting in approximately 650km of travel.

2. Response to questions

Charging and refuelling infrastructure

Q-1. What are the highest priority charging and refuelling blackspots that should be considered under the ARENA administered Future Fuels Fund?

There is considerable existing and growing infrastructure development on key state arterials (e.g., Hume freeway), however government support or co-investment should aim to facilitate infrastructure development in areas that have not yet reached peak demand to warrant private investment. This approach to infrastructure development will stimulate the uptake of zero emission vehicles in those areas.

Q-2. What technical issues remain for rolling out recharging and refuelling in both metropolitan and regional blackspots?

N/A

Q-3. What are the biggest commercial barriers to installing new charging or refuelling infrastructure?

Current barriers to installing new infrastructure, especially hydrogen refuelling infrastructure, is the utilisation of such assets in the early phase of FCEV roll out to market. The low uptake of vehicles and the expensive nature of the infrastructure presents a difficult business case for industry to make the required investment. Unfortunately cost recovery for this new but necessary infrastructure may take considerable time. Therefore, there is opportunity for government to help address this immediate short term need and assist industry to bring to market zero emission vehicles. This could be done by providing seed funding for initial infrastructure development as well as encouraging the take up of vehicles across government fleets and larger business fleets.

Q-4. What barriers are there to co-locating charging with existing infrastructure (for example carparks or service stations) compared to standalone charging stations?

Toyota notes that in overseas markets hydrogen infrastructure has been integrated into existing petrol stations, taking advantage of the existing location and infrastructure, and is less likely to be in car parks or residential buildings, unlike BEV infrastructure.

Q-5. What information do businesses need to ensure an integrated charging network can be delivered across Australia?

In Europe, hydrogen refuelling infrastructure is being rolled out in a hub and spoke manner which has encouraged the uptake of FCEVs, however there are still examples of countries where the necessary infrastructure is not yet available. Infrastructure does not need to be widely available to begin with, it needs to be in strategic locations that can help drive further vehicle uptake. In Victoria, Toyota has recently opened our permanent, external facing refueller in Melbourne's west and CSIRO is scheduled to begin development of their own refuelling station shortly, in Melbourne's south east. There need only to be another refuelling station in a key location, such as Tullamarine airport, to provide enough infrastructure to facilitate the usage and the uptake of FCEVs, which in turn will drive further infrastructure development.

Early focus on commercial fleets

Q-1. What are the main barriers to adding new vehicle technology into light and heavy-duty vehicle fleets?

The biggest barrier to new vehicle technology is the supporting infrastructure that is required. Battery charging infrastructure is significantly more developed than hydrogen refuelling infrastructure and therefore Toyota encourages incentives and co-investment for the development of hydrogen refuelling infrastructure to facilitate the uptake of FCEVs.

Given the significant range an FCEV can travel on a full tank of hydrogen, the refuelling experience is similar to that of internal combustion engines, as it takes only minutes and is unlikely to be necessary daily. This makes

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FCEVs ideal for fleets, including back to base operations such as government or corporate fleets (e.g., AusPost). Toyota would encourage the development of hydrogen infrastructure for key fleet groups, rather than infrastructure for private users during the early stages of technology adoption, as it is likely that fleets will be the early adopters, after which these vehicles will flow into the private vehicle market.

Q-2. How could the Future Fuels Fund help address these barriers?

Mainstream adoption of zero emission vehicles will be dependent on infrastructure, therefore Toyota encourages the government to facilitate co-funding initiatives where infrastructure can be utilised by fleets and then shared with the public into the future. A commercial refuelling station can cost between \$1 to \$2 million, therefore public-private partnerships are essential in the initial states of infrastructure deployment to support the creation of a market pull for FCEVs, both light commercial and heavy.

Q-3. In what ways (other than direct funding) could the Government assist businesses to increase uptake of new vehicle technologies in their fleets?

Incorporating low and zero emission vehicles into government fleets would ensure a leadership position by the government in encouraging the use of these technologies by the broader public and encourage greater interest.

Q-4. What specific cost-effective vehicle technologies should be trialled under the Freight Energy Productivity Program?

N/A

Improving information for motorists and fleets

Q-1. What is the most important information to provide to motorists and fleets about new vehicle technologies and future fuels?

Electrified vehicles are not yet considered “mainstream” in the Australian market and it is likely to take many years before broad market adoption is achieved. Whilst trials have been undertaken by brands (including Toyota) over many years, there are still obstacles that need to be resolved before the volume segment of the automotive market sees a significant uptake in vehicle demand.

Based on Toyota’s internal market research, consumers generally prioritise the below criteria when buying a vehicle:

1. Up front purchase price
2. Running cost over the vehicle’s useful life, servicing, parts, refuelling cost, etc
3. Residual or resale value at end of life
4. Fit for Purpose in the Australian Market - Suitability of the vehicle to meet normalised driving requirements e.g., range and refuelling times. Vehicles need to provide drivability in the Australian market covering both metro and rural environment with road conditions that are often much more severe than European or other markets

Ultimately, consumer demand will drive the increase of low and zero emission vehicles given there are differing consumer needs across metro and rural areas, and more broadly throughout Australia. Certain technologies will be more suitable for urban environments, for example small BEVs, whereas FCEVs will likely suit rural environments due to their extended range and operability. Both BEVs and FCEVs will be required in the future market if we are to achieve a net zero position and Toyota encourages the government to take a technology neutral approach to educate consumers of the multiple technologies available.

Information needs to be easily available for consumers, and Toyota supports updating the green vehicle guide to assist in this. Consumers need to feel comfortable with new technologies, therefore again Toyota encourages the adoption of new technology into government fleets.

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Q-2. What are the highest priority knowledge sharing areas to be targeted in future fleet trials?

For fleet operators to consider electrified vehicles, different metrics and considerations are required including:

- Central infrastructure models such a hub and spoke for transport fleets such as taxi, logistics, rentals, and large corporates to enable refuelling/recharging in convenient locations
- Use cases for different drivetrain technologies for various purposes, for example BEVs being more suitable for short distances, metro, and inner-city application, whereas FCEV more suitable for rural, commercial, and long haul
- Important when considering electrification options is not only the upfront purchase price, but rather the whole of life cost proposition. This includes the purchase price, any infrastructure requirements, repair and maintenance and the resale value

Q-3. What additional guidance do businesses need on technical or taxation matters in relation to new vehicle purchases?

Toyota is aware that certain states are intending to introduce a road user charge (RUC) on low and zero emission vehicles. Toyota is also aware that consideration of a fuel excise replacement is an important policy area for the Commonwealth to consider, and that this replacement is mostly likely a RUC. However, Toyota encourages the government to do so in a way that does not disincentivise the take up and market acceptance of low and zero emission vehicles. As mentioned earlier, in order to achieve reasonable market penetration in the volume segments of the market, vehicle pricing and associated costs are critical considerations. Implementing a RUC that potentially disadvantages those that take up new technologies, could potentially alienate lower socio-economic groups who are more conscious about the total cost of ownership of their vehicles. The Federal Chamber of Automotive Industries (FCAI) has been studying the impact of RUC for some time and Toyota would encourage the government to engage with the FCAI to gain significant industry insight into the matter.

Integrating battery electric vehicles into the grid**Q-1. What are the highest priority issues to consider when integrating large numbers of battery electric vehicles into the electricity grid?**

The Australian market has always had a variety of energy sources for vehicles such as unleaded petrol, diesel, and LPG and therefore a shift to only BEV may not be practical or realistic. Toyota's position is that both BEVs and FCEVs are complementary and that both products are required for meaningful transport sector emission reductions. Diversifying vehicle fleets with FCEVs, BEVs and hybrids will help prevent overburdening of existing systems, as FCEVs are not reliant on the energy network. One of the advantages of hydrogen more broadly is that it can enable "sector coupling" by linking electricity, gas, and the mobility sector. Hydrogen has multiple applications including power to power, whereby excess renewable energy is converted to hydrogen, stored, and then repowered to electricity via a fuel cell system in times of high demand (or to stabilise the grid).

Hybrid vehicles will also support the decarbonisation of the Australian transport sector, without placing excess burden on existing infrastructure. One of the main benefits of a hybrid vehicle is that it is self-charges the battery as it runs. The proliferation of hybrid provides immediate CO₂ emission reductions within the Australian fleet, during which infrastructure upgrades and market adjustment can be gradually completed in order to support the increasing number of electric vehicles into the future.

Meaningful CO₂ reduction via the uptake of EVs will be dependent on the source of the energy used in charging. As much of the electricity generation is from coal, increasing reliance on the grid is transferring CO₂ emission generation from on road, to the upstream power source (e.g., brown coal). Therefore, until electricity generation moves towards a higher mix of renewables, hybrid technology can offer a pathway to emission reductions.

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Q-2. What further action is needed to ensure consumers and the electricity grid can benefit from bidirectional charging technology?

N/A

Q-3. What are the opportunities for tariff innovation or reform to support the rollout of public charging infrastructure?

Australia should leverage experiences from overseas markets to understand how best to drive the uptake of electrified vehicles in Australia. While there is significant focus on battery recharging, hydrogen refuelling for FCEVs must also be considered and the Japanese market provides significant lessons that can be utilised in the Australian context. Currently a key barrier to market uptake is the price of hydrogen, however, to reduce this barrier and encourage growth of the technology, hydrogen in Japan is priced competitively with other fuels to incentivise take up.

Q-4. How could motorists be incentivised to charge their battery electric vehicles outside periods of high electricity demand to help keep prices low?

N/A

Supporting Australian innovation and manufacturing

Q-1. What are Australia's market niches in future fuels to maximise high-value domestic and export outcomes?

Australia has a unique opportunity to become a major exporter of hydrogen to the world, however there should also be significant development of the domestic market. A domestic market would diversify the risks associated with international export markets and maximise Australia's efforts to decarbonise. Australia's domestic market would include utilising hydrogen to decarbonise the energy market as well as the mobility sector, with the growth of hydrogen mobility reducing our reliance on imported petroleum, while securing ongoing demand for hydrogen.

3. Conclusion

As outlined above, electrified vehicles have an important role to play in reducing economy-wide emissions, however as evidenced by overseas markets, government support is an essential element across a range of vehicle technologies to support the successful proliferation of these products, from both a supply and demand perspective. Toyota encourages the Commonwealth to co-invest in infrastructure development, both recharging but more specifically hydrogen refuelling infrastructure, to encourage fleets and the broader market to take up these vehicles. Toyota urges the Commonwealth to continue including FCEVs in any future transport mix and to treat this technology as complementary to BEVs.

Prior to widespread infrastructure development, hybrid vehicles play an important role in the short to medium term to reduce vehicle emissions and Toyota encourages the Commonwealth to continue including hybrids in any policy aimed at increasing electrification in Australia.

Toyota has a global challenge to radically reduce new vehicle CO₂ emissions, but we cannot achieve this if not aligned to other stakeholders. We look forward to working collaboratively with the Commonwealth to achieve an environmentally friendly vehicle fleet through an integrated approach to emissions reduction.