Advice to Infrastructure Victoria on automated and zero emission vehicle infrastructure

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About VACC

The Victorian Automobile Chamber of Commerce (VACC) is Victoria's peak automotive industry association, representing the interests of more than 5,000 members in over 20 retail automotive sectors that employ over 50,000 Victorians.

VACC members range from new and used vehicle dealers (passenger, truck, commercial, motorcycles, recreational and farm machinery), repairers (mechanical, electrical, body and repair specialist, i.e. radiators and engines), vehicle servicing (service stations, vehicle washing, rental, windscreens), parts and component wholesale/retail and distribution and aftermarket manufacture (i.e. specialist vehicle, parts or component modification and/or manufacture), and automotive dismantlers and recyclers.

In addition to VACC, its sister organisations – the Motor Trade Associations, represent the automotive industry for their respective states.

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EXECUTIVE SUMMARY

The following submission provides a response to Infrastructure Victoria's inquiry Advice on automated and zero emission vehicle infrastructure. The Victorian Automobile Chamber of Commerce (VACC) welcomes the opportunity to comment on the infrastructure requirements and impacts of electric vehicles more broadly. The Inquiry is also a timely initiative given the transformation being felt across the entire automotive industry, both locally and globally.

VACC's submission focusses on the anticipated effects of both high and low levels of EV uptake in Victoria. This includes the impact on specific automotive businesses, employment, and government revenue, the skills base, end-of-life vehicle disposal and energy requirements.

Intelligence gathered by VACC, indicates there will disruption to the industry as a whole. Specifically, the number of businesses trading and levels of employment are likely to decline. Cost continues to be a significant factor in the uptake of EVs, with current models commanding around a 25 per cent price premium.

This submission considers the effect of both high and low levels of adoption. A low uptake is modelled on the assumption that there will be a one per cent adoption rate in 2021, rising to 10 per cent by 2030. Based on this, an estimated aggregate reduction of 1,064 automotive businesses in Victoria by 2030 is forecast. An estimated 3,222 people across the industry will also lose their employment.

A high up-take scenario assumes an EV uptake of two per cent in 2021, rising to 20 per cent by 2030. VACC modelling suggests this equates to projected reduction of around 2,000 automotive businesses in Victoria by 2030 and almost 6,000 job losses.

Automotive sectors likely to be affected by EV uptake have been identified as:

- Automotive repair and maintenance
- Car wholesaling
- Motor vehicle used parts wholesaling and dismantling
- Car retailing
- Motor vehicle parts retailing
- Fuel retailing.

Considering impeding changes to the industry in the wake of EV adoption, VACC believes it would be prudent to consider the implications on related public policy issues, specifically:

- Fuel excise and road user charging
- Infrastructure requirements and costs
- At home, public and wireless EV charging infrastructure.

Policy certainty, and a framework outlining the regulatory responsibilities of automotive businesses should be developed as a matter of priority.

Powering EVs is also an important consideration. Given the State's energy woes, VACC argues that more analysis be undertaken to assess the real energy requirements needed to support an increased uptake of such vehicles. This includes the energy mix required to attain environmental benefit.

Consideration should also be given to the disposal of EVs at the end of their life span. Life expectancy is closely related to the shelf life of the lithium-ion battery, which to date, is under warranty for eight years. Government must consider how such batteries will be disposed through a viable end of life vehicle policy.

The Victorian Government can also learn from international EV policies. VACC cautions the implementation of significant financial incentives (offered by many countries), as they are largely unsustainable and distort markets.

RECOMMENDATIONS

Recommendation 1:
VACC recommends that the Victorian Government provide policy clarity with respect to EVs in Victoria. A policy framework that provides a clear roadmap for business regarding their regulatory responsibilities would be beneficial, assisting automotive businesses make transitional arrangements towards the service, repair and sale of electric vehicles and facilitate appropriate investments.

Recommendation 2:
VACC recommends that the Victorian Government should be explicit regarding the terms of road user charging or other measures that will be utilised to fund the declining proportion of fuel excise revenue associated with the uptake of electric vehicles.

Recommendation 3:
VACC recommends that the Victorian Government carefully evaluate the budgetary costs associated with policies surrounding the facilitation and financial support of electric vehicle charging infrastructure. Potentially, these costs could be prohibitive, and the government should be transparent in its costings and policy intentions, including the wider impacts for the community.

Recommendation 4:
VACC recommends that the Victorian Government instigate a detailed study into the impact of electric vehicles on Victoria's energy network, including emission reductions and their overall viability based on a growing mix of renewable energy sources.

Recommendation 5:
VACC recommends that an End of Life policy for EVs and their batteries is of critical environmental importance. The EU model should be considered by the Victorian Government for possible replication.

Recommendation 6:
VACC asserts that for most consumers, it is the price competitiveness of an electric vehicle that is the most important factor in the uptake and overall sustainability of the EV market. Government policies aimed at providing price support and other financial incentives to encourage EV purchases by consumers are viewed as potentially unsustainable and can distort the EV market.

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1. Introduction

VACC welcomes the opportunity to provide a response to Infrastructure Victoria's inquiry Advice on automated and zero emission vehicle infrastructure.

The emergence of electric vehicles (EVs) as a real alternative to internal combustion engines (ICEs) is fast becoming a reality. On a daily basis, new literature is produced espousing the merit of EVs, their technical components and environmental benefits.

The EV debate often centres on the environmental benefits of low or zero emissions, however, until such time that EVs can be powered entirely by renewable energy, this argument alone does not suffice.

For these reasons, the Victorian Automobile Chamber of Commerce (VACC) has focused on the very real impacts a high and low EV uptake would have on Victoria's automotive industry and economy. The following submission gives consideration to the effect on infrastructure, automotive businesses, employment, government revenues, battery disposal and energy requirements.

2. Industry background

Victoria's automotive industry encompasses a wide variety of sectors. In aggregate, the industry employs 102,810 people across 17,961 individual businesses, contributing $9.6 billion in industry value-added to the Victorian economy. Table 1 below shows Victoria's automotive industry makes a significant contribution to the state economy, representing approximately 2.6 percent of Victoria's Gross State Product (GSP).

The uptake of electric vehicles by Victorian consumers over time is anticipated to have a disruptive influence on key sectors of the automotive industry. The following submission focuses on the likely effect such adoption will have on the Victorian economy. Industry intelligence compiled by the VACC suggests there will be some negative impacts, in particular, a reduction in the number of businesses trading and in employment.

Table 1: Victorian Automotive Industry Profile – 2015/16

Automotive Sector	Employment year ending June 2016	Number of businesses as at 30 June 2016	Industry Value Added ($m)
Motor Vehicle and Parts Manufacturing	24,618	1,210	648
Motor Vehicle and Parts Wholesaling	7,054	1,537	823
Motor Vehicle Retailing	18,331	1,471	788
Motor Vehicle Parts and Tyre Retailing	6,167	974	522
Fuel Retailing	6,925	1,036	555
Automotive Repair and Maintenance	31,971	9,576	5,128
Passenger Car Rental and Hiring	2,152	437	234
Bicycle Retailing	1,280	281	150
Marine Equipment Retailing	560	138	74
Outdoor Power Equipment Retailing*	1,169	323	173
Towing Services*	751	606	325
Agricultural Machinery Retail and Repair*	1,832	372	199
Total Automotive Industry	**102,810**	**17,961**	**$9,619m**

Source: VACC - Directions in Australia's Automotive Industry: An Industry Report 2017

3. Uptake of electric vehicles

The impact of electric vehicles on Victoria's automotive industry and the state's economy will vary according to the adoption rate of electric vehicles by consumers. In this respect, two scenarios are presented and analysed in this submission:

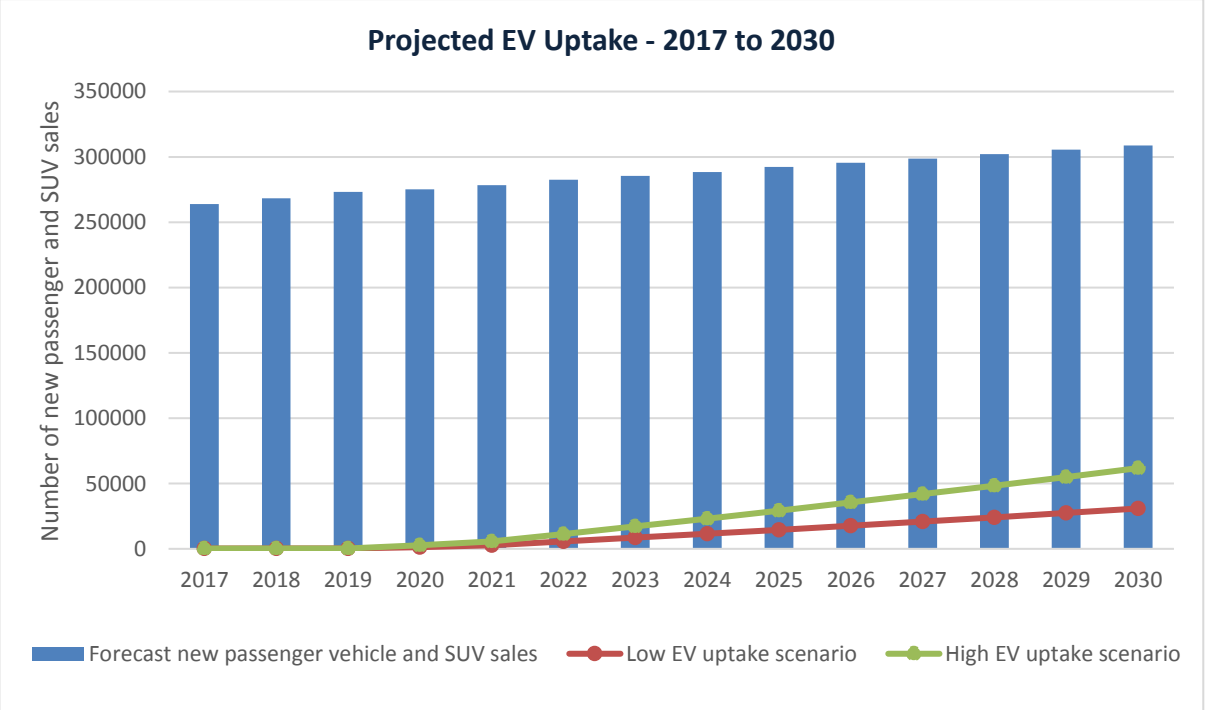
- a low electric vehicle (EV) uptake scenario over the period 2017 to 2030 for Victoria, and;
- a high EV uptake scenario over the period 2017 to 2030.

Chart 1 displays the projected annual number of new passenger vehicles and SUV sales between 2017 and 2030 for Victoria. This is based on trend new vehicle sales data supplied by the Federal Chamber of Automotive Industries (VFACTS data), along with a low and high EV uptake scenario over the same period.

The low EV uptake scenario assumes an EV uptake rate of one per cent of new passenger car and SUV sales in 2021, rising to 10 per cent by 2030. This scenario would result in 30,878 new electric vehicles sold in 2030, out of a projected total of 308,781 new passenger car and SUVs sold in Victoria.

The high EV adoption scenario assumes an EV uptake rate of two per cent in 2021 rising to 20 per cent by 2030. This translates into 61,756 new EVs sold in 2030, out of the same projected total of 308,781 new passenger car and SUVs sold in Victoria.

Chart 1: Projected EV Uptake as a percentage of new passenger vehicle and SUV sales – Victoria



Source: ABS and VFACTS modelled data

Whilst both scenarios are plausible, a key factor influencing the uptake of electric vehicles is their cost. The latest evidence shows that electric vehicles command a price premium of around 25 per cent[1] over internal combustion engine (ICE) vehicles within the mass market segment (new vehicles costing up to $40,000). The mass market segment represents approximately 63 per cent of the total new vehicle market in Victoria. This premium relates to the cost of lithium-ion batteries, which represent around half the cost of an electric vehicle.

[1] Bloomberg, *Electric Cars to Reach Price Parity by 2025,* June 23, 2017

However, battery costs are rapidly declining, dropping by an estimated 19 per cent per cumulative doubling of manufactured capacity. Based on this trend, electric vehicles are forecast to reach price parity with ICE vehicles around the year 2025-26. At this stage, EV battery costs are expected to reach $100 per kilowatt hour. All things being equal, by 2030 it is estimated that battery electric vehicles may be up to 15 per cent cheaper than equivalent ICEs, potentially accelerating their uptake.

4. Automotive sectors affected by electric vehicles

Industry intelligence compiled by VACC suggests that the following automotive sectors will most likely to be impacted by the growing uptake of electric vehicles by consumers. These include:

- Automotive repair and maintenance
- Car wholesaling
- Motor vehicle used parts wholesaling & dismantling
- Car retailing
- Motor vehicle parts retailing
- Fuel retailing

The progressive uptake of electric vehicles is anticipated to have disruptive consequences on the above sectors to varying degrees. Experience from countries who have already experienced higher EV uptake to date, supports this assumption.

In both the United Kingdom and the United States (US), declining trends in the number of fuel station outlets have been observed relative to growing EV sales. This is despite record lows in the price of petrol. Growing numbers of EVs on-road displace conventional petrol-powered vehicles; progressively reducing the viability of many fuel retail businesses. This trend is also anticipated to occur in Victoria and Australia as the number of EVs increases.

Electric vehicles typically have around 17 moving parts or less, as opposed to around 2,000 moving parts in an ICE vehicle. This will have negative implications for the motor vehicle parts retailing, automotive repair and maintenance and car retailing/wholesaling sectors.

The greater reliability of electrical vehicles, in conjunction with fewer moving parts, will impact on vehicle parts retailing businesses, reducing current profitable income streams from the sale of catalytic converters, engine components and many other ICE vehicle parts and consumables. This will likely result in a significant contraction in investment within the sector, along with large numbers of business closures or consolidation.

These same factors will also reduce the volume of work for automotive mechanical repair businesses given the greater reliability of EVs and their need for less servicing and maintenance. The technical sophistication of electric vehicles will also require investment in upskilling within the sector. Diagnostics, programming and coding skills for vehicle technicians will be essential to remedy vehicle faults – including the customisation of EVs. Given the high voltages inherent with EVs, there will also be greater occupational health and safety compliance required to protect both staff and the general public. These cost pressures and the imminent decline in volume of repair work, is anticipated to reduce the number of operators and employment within the sector, as EVs establish a greater presence in the vehicle fleet.

It is also the case that many car dealerships will be adversely affected through the increased uptake of electric vehicles. Data from the Australian Bureau of Statistics shows that car dealerships have amongst the lowest profit margins within the automotive industry (2.6 per cent). Profit margins are typically much higher on the vehicle service and maintenance side, often subsidising the losses experienced in other areas of the business – such as the sale of new vehicles. Fewer servicing and maintenance requirements for EVs will significantly affect these key revenue streams and reduce the viability of many dealerships and employment within the sector. This has been observed in the US and other markets around the world and is likely to be an inevitable consequence for car dealerships in Victoria and across Australia.

4.1 Industry impacts of a low EV uptake scenario

According to VACC industry modelling (Chart 1), a low EV uptake is indicated by EVs representing one per cent of new passenger car and SUV sales in 2021. This is expected to rise by one per cent each year totaling 10 per cent of sales by 2030.

The industry and economic impacts forecast with this scenario are:

- an estimated aggregate reduction of 1,064 automotive businesses in Victoria by 2030
- an estimated decline of 3,222 people employed in Victoria's automotive industry by 2030.

To place these results this into perspective, this outcome is similar to the employment downturn observed through the closure of a major vehicle manufacturing plant locally, such as Ford.

These outcomes highlight a moderate disruption to Victoria's automotive industry if a 'low and slow' uptake of EVs takes place. Table 2 shows that these overall impacts are concentrated within the retail and repair sectors of the industry. However, the results do not incorporate other trends affecting automotive industry sectors. They also assume an EV policy status quo by the Victorian government, i.e. that there are no significant policy interventions to incentivise the uptake of EVs for consumers over the period.

This scenario does not suggest the need for urgent action by the automotive industry over the short to medium term. This adoption rate provides sufficient time for automotive businesses to plan for and transition towards the new EV environment. Nevertheless, it would be prudent for businesses to increase their awareness of impending changes and receive appropriate training and/or advice to make appropriate transitional arrangements.

Table 2: Low EV Uptake - Impacts by Automotive Sector, Victoria

BUSINESS POPULATION				
Automotive Sector	**Yr 2022**	**Yr 2025**	**Yr 2030**	**Cumulative Total**
Car Wholesaling	No change	-10	-30	**-40**
Motor Vehicle used parts wholesaling & dismantling	-11	-15	-52	**-78**
Car Retailing	No change	-74	-80	**-154**
Motor Vehicle Parts Retailing	-12	-40	-100	**-152**
Fuel Retailing	-40	-100	-120	**-240**
Automotive Repair and Maintenance	-80	-120	-200	**-400**
TOTAL – ALL SECTORS	**-143**	**-339**	**-582**	**-1,064**
EMPLOYMENT				
Car Wholesaling	No change	-54	-120	**-174**
Motor Vehicle used parts wholesaling & dismantling	-36	-70	-162	**-268**
Car Retailing	No change	-200	-220	**-420**
Motor Vehicle Parts Retailing	-40	-220	-480	**-740**
Fuel Retailing	-100	-180	-250	**-530**
Automotive Repair and Maintenance	-90	-400	-600	**1,090**
TOTAL – ALL SECTORS	**-266**	**-1,124**	**-1,832**	**-3,222**

Source: ABS data and VACC industry modelling

4.2 Economic impacts of a high EV uptake scenario

Table 3 describes the economic impact of a high EV uptake scenario (as shown in Chart 1) on Victoria's automotive industry. This scenario assumes an EV uptake rate of two per cent of new passenger car and SUV sales in 2021, rising incrementally by two per cent per annum to 20 per cent of new passenger and SUV sales in 2030.

The industry and economic impacts forecast with this scenario are:

- a projected loss of around 2,000 automotive businesses for Victoria by 2030
- a loss of almost 6,000 people employed within Victoria automotive industry by 2030.

These results are broadly equivalent to the employment reduction observed through the closure of two major vehicle manufacturing plants, such as Ford and Holden.

These results indicate a more aggressive impact on Victoria's automotive industry, with Table 3 showing the main reductions affecting the retail and repair sectors of the industry. These results do not incorporate other trends affecting automotive industry sectors and assume the current government EV policy status quo remains over the period.

Whilst these economic impacts are manageable, changes in government policy that incentivise electric vehicle purchases can accelerate their uptake. Such a phenomenon has been observed in Norway, Denmark and Sweden. It is important to note that such policy actions could expedite the number of business exits and employment losses within the Victorian economy.

Therefore, it is critical that the government provides policy clarity with respect to EVs for the benefit of both automotive businesses and the broader community. Such certainty would signal the government's commitment to an electric vehicle future to automotive businesses and provide the certainty needed for businesses to prepare for a new operating environment.

It should also be noted that concise and clearly communicated policy statements in relation to EVs, as witnessed in countries such as the UK, the EU and China, assist considerably in manufacturers' plans for automotive investments in design, plant and machinery.

Table 3: High EV Uptake - Impacts by Automotive Sector, Victoria

BUSINESS POPULATION				
Automotive Sector	**Yr 2022**	**Yr 2025**	**Yr 2030**	**Cumulative Total**
Car Wholesaling	-9	-30	-60	**-99**
Motor Vehicle used parts wholesaling & dismantling	-13	-52	-104	**-169**
Car Retailing	-70	-80	-150	**-300**
Motor Vehicle Parts Retailing	-35	-100	-170	**-305**
Fuel Retailing	-80	-120	-250	**-450**
Automotive Repair and Maintenance	-100	-200	-380	**-680**
TOTAL – ALL SECTORS	**-307**	**-582**	**-1,084**	**-2,003**
EMPLOYMENT				
Car Wholesaling	-50	-120	-210	**-380**
Motor Vehicle used parts wholesaling & dismantling	-58	-162	-302	**-522**
Car Retailing	-200	-220	-400	**-820**
Motor Vehicle Parts Retailing	-190	-480	-700	**-1,370**
Fuel Retailing	-160	-250	-500	**-910**
Automotive Repair and Maintenance	-300	-600	-1,000	**-1,900**
TOTAL – ALL SECTORS	**-958**	**-1,832**	**-2,987**	**-5,902**

Source: ABS data and VACC industry modelling

5. Government Policy implications

As previously stated, VACC argues it would be advantageous for the Victorian Government to provide policy certainty and a framework outlining the regulatory responsibilities of automotive businesses as soon as possible.

The mass uptake of electric vehicles, however, has much wider implications for society and the role of government at a state and federal level. Key considerations include:

- diminishing fuel excise revenues over time
- the possibility of new taxes and charges on road users to balance the decline in fuel excise revenues
- the cost of infrastructure provision associated with electric vehicles
- implications for Victoria's energy network associated with the charging of electric vehicles
- an end of life vehicle policy for old-fleet and electric vehicles

Recommendation 1:

VACC recommends that the Victorian Government provide policy clarity with respect to EVs in Victoria. A policy framework that provides a clear roadmap for business regarding their regulatory responsibilities would be beneficial, assisting automotive businesses make transitional arrangements towards the service and sale of electric vehicles and facilitate appropriate investments.

5.1 Fuel excise and road user charging

The progressive and cumulative uptake of EVs over the next decade, even under a low EV uptake scenario, will substantially effect fuel excise revenues and significantly more according to a higher uptake scenario.

A key consideration for government and the broader community is what measures will be taken by government to offset declining fuel excise revenues as electric vehicles displace ICE vehicles on the road over the next decade?

In this respect, VACC believes the Victorian Government should be transparent on this issue. Should the Victorian Government intend to encourage the uptake of electric vehicles, then it is necessary to make explicit, that additional road taxes or charges may be levied as a consequence. VACC argues that the uptake of electric vehicles should not be viewed as an opportunity to gouge road users with extra taxes and charges. Such policy may act as a major disincentive to the purchase of electric vehicles.

Recommendation 2:

VACC recommends that the Victorian Government should be explicit regarding the terms of road user charging or other measures that will be utilised to fund the declining proportion of fuel excise revenue associated with the uptake of electric vehicles.

5.2 Infrastructure requirements and costs

The growth of electric vehicles on the road over the next decade will be commensurate with a growth in home, workplace and public EV charging infrastructure to support this shift. The cost of this infrastructure remains a key consideration for households, businesses and governments alike. The processes and costings associated with EV infrastructure are described below.

5.2.1 At home EV charging infrastructure

It is anticipated that most EV drivers will charge their vehicles at home, overnight, during off peak times, when electricity prices and demand on the grid is at its lowest. Therefore, drivers will likely to be starting journeys each day with a full charge.

All manufacturers recommend the installation of a Level 2 charging station for home and business charging. This involves the vehicle being connected directly to the electrical network via a specific socket and plug and a dedicated circuit. Level 2 charging is conducted at higher voltage and at higher amperage. The cost of hardware for a Level 2 home EV charging station can range between $1000 up to $2500. Installation is also necessary through a licensed electrician and depending on charger location, upgrades to circuits and breakers can cost from $800 to $1800.There is also the possibility of further ancillary costs such as increased home insurance costs. A further issue is that OEM charging plugs are not standardised and may require appropriate adapters for charging.

5.2.2 Public charging infrastructure

DC Level 3 charging infrastructure is recommended for petrol stations, motorways, street side charging, fleet vehicles and for commercial users. Level 3 DC EV charging provides rapid recharge of an electric vehicle to around 80 per cent of battery capacity in 30 minutes. DC Level 3 charging infrastructure requires significant panel and service upgrades, and consequently, is the most expensive to deploy. DC 3 charge stations range in price from $25,000 for a stand-alone (not networked with other stations), to up to $60,000 for a smart, networked charge station.

5.2.3 Wireless charging infrastructure

Wireless charging of electric vehicles via electromagnetic induction has gained interest across the sector. This involves burying conductors, such as copper wires coiled around ferrite in a flat case pad beneath the ground. This generates and amplifies a magnetic field, so that when a vehicle equipped with a suitable “pickup” coil stops or parks above this pad, an alternating direct current is induced by the pickup and is used to top up the vehicle’s battery. For induction to work, the vehicle does not need to be stationary. Preliminary trials are underway globally for charging vehicles on the move. Such a process is involved and expensive, with the installation requiring cutting trenches into roads, placing the relevant electric infrastructure inside and re-asphalting the trench.

The key benefit of this technology is that it eliminates the need for plugs, cables and charging points. Electrifying roadways however, remains an unduly expensive and impractical proposition at this point in time. The need for plugs in EVs is unlikely to diminish in the foreseeable future.

Overall, both home and public EV charging infrastructures are expensive requirements and must be factored into the overall cost of owning and operating an EV. For government, policies designed to subsidise the cost of EV charging infrastructure can potentially translate into billions of dollars in expenditures, necessitating careful consideration.

Recommendation 3:

VACC recommends that the Victorian Government carefully evaluates the budgetary costs associated with policies surrounding the facilitation and financial support of electric vehicle charging infrastructure. Potentially, these costs could be prohibitive, and the government should be transparent in its costings and policy intentions, including the wider impacts for the community.

5.3 The energy network and electric vehicles

VACC believes that insufficient analysis has been undertaken concerning the energy requirements of a mass uptake of electric vehicles, including the mix of energy sources that will effectively deliver the expected benefits in terms of emissions reductions for the community.

Primarily, substantial reductions in emissions through the greater uptake of electric vehicles can only realistically be achieved through the use of renewable energy sources. The capacity of renewable energy sources to meet the added power requirements of millions of electric vehicles in future, is yet to be proven. VACC advises that this represents an area of business and public concern, and further analysis of these issues is necessary.

Recommendation 4:

VACC recommends that the Victorian Government instigate a detailed study into the impact of electric vehicles on Victoria's energy network, including emission reductions and their overall viability based on a growing mix of renewable energy sources.

5.4 End of life EV policy

The lifespan of electric vehicles is closely associated with the life expectancy of their component lithium-ion batteries. Most manufacturers warrant the lithium-ion batteries contained in EVs for eight years and generally, this is considered to be their life expectancy. An unanswered environmental question, however, is what happens to the half-tonne of lithium-ion batteries in each vehicle when they wear out?

EV batteries carry a risk of giving off toxic gases if damaged, and the core ingredients such as lithium and cobalt are finite, with their extraction possibly leading to water pollution and other negative environmental consequences. Furthermore, given their sheer size, EV batteries cannot be stored at home and landfilling is not an option. This necessitates the introduction of a suitable End of Life EV policy.

The European Union (EU) enforces regulation that require the makers of batteries to finance the costs of collecting, treating and recycling of all collected batteries. This has encouraged partnerships between carmakers and recyclers. For example, Umicore, who has invested €25m into an industrial pilot plant in Antwerp to recycle lithium-ion batteries, has deals in Europe with Tesla and Toyota to use smelting, to recover precious metals such as cobalt and nickel.

Recommendation 5:

VACC recommends that an End of Life policy for EV batteries is of critical environmental importance.
The EU model should be considered by the Victorian Government for possible replication.

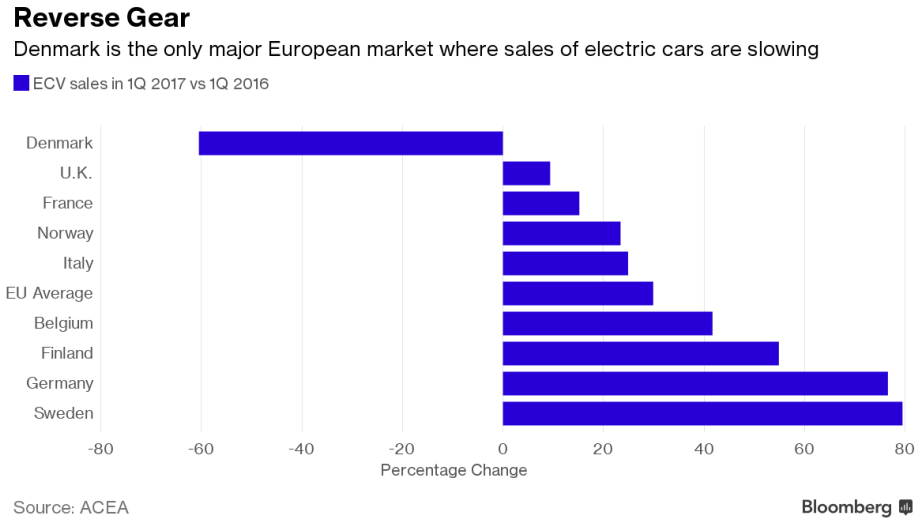
6. International EV policy practices

In an attempt to meet CO2 emission targets, many countries have adopted policies designed to incentivise consumer uptake of electric vehicles. These incentives include tax credits, rebates and price subsidies for electric vehicles, often amounting to many thousands of dollars per driver. This is evidenced in the United States, the UK, Germany, Denmark, Norway, Sweden and many other countries. Further initiatives include exemptions from registration and road taxes, parking fees and other motor vehicle charges. Such policies have contributed to an early surge in the global uptake of EVs. However, few countries have focused explicitly on facilitating growth in charging infrastructure.

VACC asserts that significant financial incentives of the magnitude offered by many countries, are largely unsustainable and distort the market for EVs respectively. There is also the risk that once such price supports and financial incentives are removed, sales of EVs could stall or go backwards. This is evidenced by the dramatic fall of EV sales in Denmark, dropping 60.5 percent in the first

quarter of 2017 following the phasing out of its tax incentives on EVs in 2016 (as shown in Chart 2). This dramatic reduction suggests clean-energy vehicles are not currently attractive enough to compete against ICEs, without some form of subsidy.

Chart 2: Decline of Denmark's Electric Vehicle sales



The international experience suggests, that whilst financial incentives towards the purchase of EVs have helped motivate the EV market in many countries, fundamentally, it is the cost competitiveness of EVs versus conventional ICE vehicles that will ultimately sway consumers in the mass vehicle market over the longer term. Based on the analysis presented in this submission, this price competitiveness is expected to occur between 2025 and 2030.

Recommendation 6:

VACC asserts that for most consumers, it is the price competitiveness of an electric vehicle that is the most important factor in the uptake and overall sustainability of the EV market. Government policies aimed at providing price support and other financial incentives to encourage EV purchases by consumers are viewed to be unsustainable and can distort the EV market.