CARS
comprehensive auto-theft research system

National Motor Vehicle Theft Reduction Council

Electric, hybrid or conventional vehicles – Do thieves have a preference?

Introduction:

In November 2020, the UK government announced a ban on sales of petrol and diesel cars by 2030 as the country transitions to hybrid and, ultimately, an all-electric fleet by 2035. Norway and Denmark are also looking at similar polices and the European Union may introduce an even more ambitious target of 2025.[1] In Australia, the overall uptake of fully electric and Plug-in hybrid vehicles has been slow; however, the release of hybrid versions of some of the top selling internal combustion engine models such as Toyota Camry, Corolla and RAV4 models has seen numbers steadily increase in recent years.

Given these trends, it was considered timely to analyse theft rates of electric and hybrid vehicles in Australia compared to their non-hybrid counterparts. Are silent electric motors more attractive to thieves? Or, conversely, is their conspicuousness in the current market or battery-related range concerns of fully electric vehicles a deterrent for thieves?

In this study, CARS has examined the theft rates of electric and hybrid vehicles across Australia in 2019/20. In addition, we have also selected non-electric variants of some of these more common hybrid models for comparison.

It is important to highlight that this study was not intended to be a comprehensive study of the theft rates of all electric and hybrid vehicles in Australia. As there are a limited number of BEVs and PHEVs imported into Australia and frequently they are sold in a range of electric and non-electric variants, not all examples of BEVs, PHEVs or hybrids are readily identifiable in both police and registration datasets. Instead this study provides an indication and comparison of the theft rates of selected BEV, PHEV and Hybrid models in Australia during 2019/20.

Methodology:

The CARS database was used to determine theft and registration figures for select electric and hybrid vehicles for the 2019/20 financial year in Australia. Electric vehicles were categorised into three groups:

- BEV (Battery Electric Vehicle): An electric vehicle powered solely by a battery. This include models such asTesla's 3, Nissan Leaf and the Jaguar I-Pace.

[1] https://thedriven.io/2020/11/16/uk-and-europe-to-declare-war-on-new-petrol-and-diesel-car-sales/

- PHEV (Plug-in Hybrid Electric vehicle): A hybrid vehicle with both an internal combustion engine and an electric motor where the battery can be recharged by plugging it into an external source of electric power, as well as by its on-board engine and generator. Examples include some variants of the Mitsubishi Outlander, Hyundai Ioniq, Volvo XC90, etc.

- Hybrid: Generally, refers to a vehicle with both an internal combustion engine and an electric motor. However, rather than charging the electric motor's battery via an external electrical source, the electrical batteries are charged by regenerative braking, and /or via their internal combustion engines. Examples include some variants of the Toyota Corolla, Camry and RAV4, the Nissan Pathfinder and various Lexus models.

Findings:

BEVs

The theft rate of BEVs in 2019/20 was extremely low at 0.67 thefts per 1,000 registrations (Table 1). This may be expected and in part be due to the uniqueness of some of these vehicles making them stand out on the roads, as well as possible concern from potential thieves around the charge level of the battery and therefore the range that they will be able to drive the vehicle once they steal it. In addition, the overall number of these vehicles registered in Australia is still very low, meaning there is less demand for these vehicles or their parts. These factors possibly outweigh the fact that BEVs are quieter and therefore less likely to attract attention when being driven away.

Table 1. Theft numbers and rates of Battery Electric Vehicles, 2019/20

Make/model/series/ year range	Number of Thefts	Number of Regos	Theft rate/1,000 registrations
BMW i3 I01 MY13+	1	603	1.66
Nissan Leaf MY11_17	2	722	2.77
Nissan Leaf ZE MY19+	1	410	2.44
Nissan Leaf MY_Unknown	0	4	0.00
Hyundai Ioniq AE2 MY17_19	0	347	0.00
Jaguar I-Pace X590 MY18+	0	194	0.00
Tesla Model S MY14+	0	2699	0.00
Tesla Model X MY16+	0	870	0.00
Tesla Model 3 MY19+	2	1681	1.19
Tesla Roadster MY_Unknown	0	1	0.00
Tesla Roadster MY08_12	0	13	0.00
Tesla Unknown MY10_14	0	89	0.00
Tesla Unknown MY15_19	0	1340	0.00
TOTAL	**6**	**8973**	**0.67**

PHEVs

In 2019/20, the theft rates of the selected PHEVs included in this study was 1.2 thefts per 1,000 registrations (Table 2).

PHEVs like BEVs require connection to an external electric power source to charge their battery but are also able to be driven via their petrol or diesel combustion engine. While this may make them more attractive to thieves than BEVs, the lower overall number and popularity of PHEVs may make them less attractive, particularly if there is an intention to steal the vehicle for profit.

Table 2. Theft numbers and rates of selected Plug-in Hybrid vehicles, 2019/20

Make/model/series/ year range	Number of Thefts	Number of Regos	Theft rate/1,000 registrations
Hyundai Ioniq AE2 MY17_19	0	119	0.0
Hyundai Ioniq AE3 MY19+	0	1	0.0
Mercedes-Benz C350e W205 MY16_19	0	515	0.0
Mercedes-Benz E350e W213 MY16_19	0	32	0.0
Mercedes-Benz GLE500e W166 MY16_19	1	125	8.0
Mitsubishi Outlander ZJ MY12_15	1	1608	0.6
Mitsubishi Outlander ZK MY15_17	1	101	9.9
Volvo XC90 MY15+	1	722	1.4
TOTAL PHEV	4	3223	1.2

Hybrid vehicles

In 2019/20, the theft rate of the selected hybrid vehicles was 1.8 thefts per 1,000 registrations (Table 3). Hybrid vehicles are by far the most popular category of electric vehicles (EVs) in Australia with manufacturers such as Toyota having sold over 100,000 hybrid vehicles. This increase in numbers within the vehicle fleet not only makes it easier for offenders to find these vehicles but also demonstrates a demand by the buying public. Combined with the fact that hybrid vehicles do not pose the same battery-related range concerns as BEVs, it is not surprising that hybrid theft rates are 1.7 times higher than BEVs and 50 per cent higher than PHEVs.

Table 3. Theft numbers and rates of select Hybrid vehicles, 2019/20

Make/model/series/ year range	Number of Thefts	Number of Regos	Theft rate/1,000 registrations
Lexus CT200h ZWA10R MY10+	2	7,468	0.3
Lexus ES300h AVV60R MY13_18	1	1,110	0.9
Lexus ES300h AXZH10R MY18+	3	647	4.6
Lexus GS300h AWL10R MY13+	0	98	0.0
Lexus GS450h GWL10R MY12+	2	353	5.7
Lexus GS450h GWS191R MY06_12	0	629	0.0
Lexus IS300h AVE30R MY13+	4	2,391	1.7
Lexus LC500h GWZ100R MY17+	0	26	0.0
Lexus LS500h GVF50R MY17+	0	34	0.0
Lexus LS600h UVF45R MY13_18	0	48	0.0
Lexus NX300h AYZ10R MY14+	4	1,178	3.4
Lexus NX300h AYZ15R MY14+	4	9,787	0.4
Lexus RX450h GYL15R MY09_15	1	4,228	0.2
Lexus RX450h GYL25R MY15+	2	2,024	1.0
Lexus UX250h MZAH10R MY18+	0	416	0.0
Lexus UX250h MZAH15R MY18+	0	101	0.0
Nissan Pathfinder MY14_19	0	851	0.0
Nissan Pathfinder MY19+	0	39	0.0
Toyota Camry AHV40R MY10_12	27	10,309	2.6
Toyota Camry AVV50R MY12_17	96	31,099	3.1
Toyota Camry AXVH71R MY17_20	35	13,779	2.5
Toyota Corolla ZWE186R MY16_18	5	4,923	1.0
Toyota Corolla ZWE211R MY18+	34	9,059	3.8
Toyota Prius C NHP10R MY12_20	10	9,201	1.1
Toyota Prius MY Unknown	0	115	0.0
Toyota Prius NHW10R MY97_00	0	16	0.0
Toyota Prius NHW11R MY01_03	0	225	0.0
Toyota Prius NHW20R MY03_09	0	10,061	0.0
Toyota Prius V MY Unknown	0	1	0.0
Toyota Prius V ZVW40R MY12+	10	4,642	2.2
Toyota Prius ZVW30R MY09_16	2	5,808	0.3
Toyota Prius ZVW50R MY16+	2	1,001	2.0
Toyota RAV4 MY19+	7	5,160	1.4
Total	**251**	**136,827**	**1.8**

Note: The Toyota RAV4 MY 15-19 was sold as both hybrid and non-hybrid variations, however they have been excluded from this study as the hybrid variants were unable to be separately identified from non-hybrid variants in our reference data.

The Toyota Camry, Corolla and Prius are the three highest selling hybrid models in the dataset. Of these, the two models that are also sold as non-hybrid versions, i.e. Camry and Corolla, had higher theft rates (2.9 and 2.8/1,000 registrations, respectively) compared to the Toyota Prius which is only available as a Hybrid (0.8 thefts/1,000 registrations).

Table 4. Theft numbers and rates of the three top selling Hybrid vehicles, 2019/20

Make/model/series/ year range	Number of thefts	Number of regos	Theft rate/1,000 registrations
Toyota Camry	158	55,187	2.9
Toyota Corolla	39	13,982	2.8
Toyota Prius	24	31,070	0.8

Non-Hybrid vehicle comparisons

To provide an accurate assessment of the theft rates of electric and hybrid vehicles a comparison should be made with the theft rates of their equivalent non-hybrid models. As can be seen in table 5 below, the overall rate of the selected non-hybrid comparison models was 3.2 thefts per 1,000 registration. This is approximately 78 per cent higher than equivalent hybrid models.

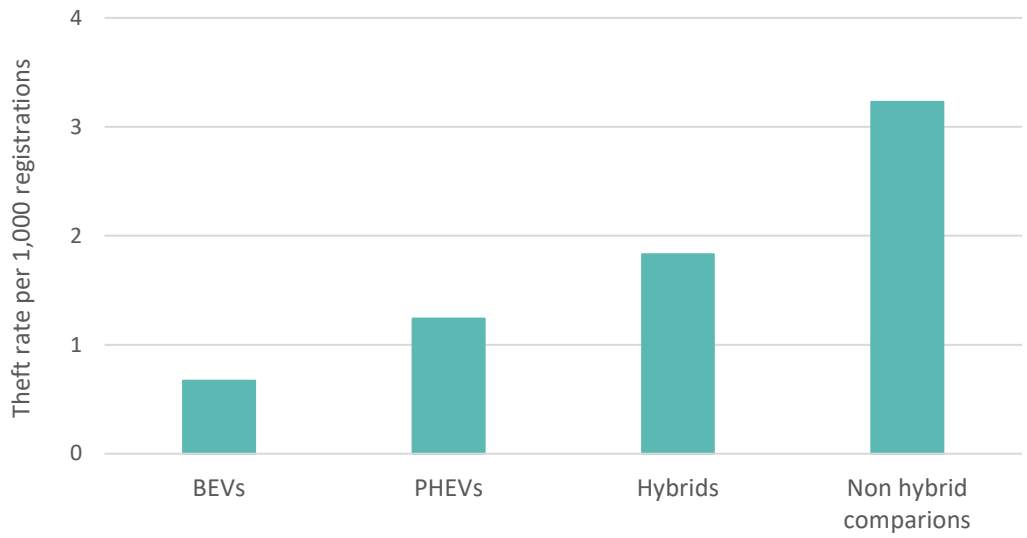
Table 5. Theft numbers and rates of selected non-hybrid comparison models, 2019/20

Make/model/series/ year range	Number of thefts	Number of regos	Theft rate/1,000 registrations
Lexus NX300 AGZ15R MY17+	4	14	285.7
Mitsubishi Outlander ZJ MY12_15	38	21,015	1.8
Mitsubishi Outlander ZK MY15_17	61	34,854	1.8
Mitsubishi Outlander ZL MY17+	124	31,511	3.9
Nissan Pathfinder MY14_19	65	23,590	2.8
Nissan Pathfinder MY19+	4	2,034	2.0
Toyota Camry ACV40R MY10_12	101	28,022	3.6
Toyota Camry ASV50R MY11_17	432	113,366	3.8
Toyota Camry ASV70R MY17+	78	13,954	5.6
Toyota Camry GSV70R MY17+	4	2,164	1.8
Toyota Corolla MZEA12R MY18+	96	18,891	5.1
Toyota Corolla ZRE172R MY14_19	132	46,257	2.9
Toyota Corolla ZRE182R MY12_18	538	178,156	3.0
Toyota RAV4 MY19+	10	8,440	1.2
Volvo XC90 MY15+	13	4,394	3.0
Total	**1,700**	**526,662**	**3.2**

Overall, hybrid versions of the Toyota Camry had theft rates of 2.9 compared to 3.9 for non-hybrid equivalents. One explanation for the lower theft rate of hybrid Toyota Camrys may be that they are often purchased for taxi-use, which may make them less likely to be targeted by thieves due to higher levels of usage and the fitment of tracking devices and cameras.

On the other hand, a comparison of other popular models found little difference between the hybrid and the non-hybrid models. For example, the theft rate of the hybrid versions of the Toyota Corolla (2.8 thefts/1,000 registrations) was similar to the non-hybrid version (3.1 thefts/1,000 registrations). Also, the hybrid variant of the current model Toyota RAV4 recorded a theft rate of 1.4 thefts/1,000 registrations compared to 1.2 for non-hybrid versions.

Figure 1. Theft rates of the selected categories of vehicles compared, 2019/20



Conclusions:

In Australia, the take up rate of BEVs and PHEVs remains very low, although there has been increasing adoption of hybrid versions of some of Australia's most popular combustion engine models. Whether it is due to battery-related range concerns associated with BEVs, their scarcity in the registered fleet, or the fact that there is a smaller market to fence stolen vehicles or parts, BEVs currently have a theft rate which is almost half of PHEVs and nearly 63 per cent lower than other hybrid vehicles.

PHEVs have a theft rate somewhere between BEVs and other types of hybrids, again with fewer registered vehicles potentially making them less attractive options, particularly if there is an intention to steal the vehicle for profit.

While hybrid vehicles had the highest theft rates of the three electric vehicle classes, the theft rates are generally lower than their non–hybrid variants. However, for some of the top selling models, such as the Toyota Corolla and RAV4, there appears to be little difference between the theft rates of Hybrid and non-hybrid variants.

National Motor Vehicle Theft Reduction Council

The National Motor Vehicle Theft Reduction Council (NMVTRC) acknowledges all police services, registration authorities, participating insurers, the Federal Chamber of Automotive Industries and Glass's Information Services for the supply of the data on which this report is compiled. Theft incident data may be subject to later revision by the data providers.