Replace government transport fleet and all public transport vehicles with electric

1. EXECUTIVE SUMMARY

1.1. Government bodies need to lead by example in the drive to encourage the take-up of electric vehicles (EVs). The current availability of EVs suitable to replace fleet vehicles are light cars and vans, with new models being introduced to the market all the time.

1.2. The current Government policy regarding vehicle replacement is every 8 years, and an average of 78 small/light vehicles are replaced per annum.

1.3. The current additional cost of replacing a car with an EV is £10,000 for a car, and £40,000 for a van. This equates to a total additional fleet cost of £780,000 p.a. for the entire car and van fleet—based on the current cost of cars—although price parity with fossil fuelled vehicles is expected during the mid-2020s.

1.4. Both an electric bus fleet, and to a lesser extent, an electric Government fleet are modular systems, i.e. they require not just the vehicles, but also power supplies and charging points.

1.5. The installation of adequate charging facilities is essential for the roll-out of EVs across the Government fleet, as and when suitable vehicles enter the market. An additional cost per installation of charging point is in the region of £5,000.

1.6. Banks Circus is likely to be unsuitable for roll-out of the electric fleet due to infrastructure power challenges; an evaluation of the site should be completed as soon as possible.

2. THE CHALLENGE

The Context

2.1. Current government policy on low emission travel regarding large vehicles including buses is outlined in the Department of Infrastructure policy "Moving Towards Low Emission Travel: A policy for surface Transport and Electric Vehicles" (IOM Government, 2019). This document was approved by Tynwald in March 2019.

2.2. The policy document notes that for large vehicles, no one technology is dominant at this point in time, with numerous trials taking place within the UK and globally of vehicles powered by electricity, hydrogen, and alternative fuels as an alternative to diesel. The document reports that all of the above power options may offer a possible alternative to the current Euro 5 or Euro 6 standard fleet.

2.3. The policy regarding the Island's bus service is as follows: *that the Department of*

Infrastructure remains technology neutral in terms of powering the bus service of the future but commits to undertake a series of trials to ascertain which of the new technologies is best suited to the requirements of the Island's bus service."

2.4. To achieve net zero emissions in 2050, all transport vehicles, from cars to airplanes, will need to run on zero emission energy in the future. The report by European Federation for Transport and Environment (2018) as well as many other reports, concluded that the only form of zero emission energy that has the potential to power transport at scale is electricity. It could be deployed either directly (e.g. battery cars, catenary trucks) or as a secondary form of energy such as hydrogen, or electro carbons, (potential future carbon-based fuels produced from CO_2 and water using electricity as the primary source of energy).

2.5. In a zero carbon future, electricity would need to be generated from a renewable source such as wind power. Decarbonisation of the power sector is therefore a pre-requisite for a zero emission transport system.

2.6. The UK Climate Change Committee (CCC) (CCC, 2019) noted that the roll-out of electric and hydrogen buses and coaches could reach 100% market share by 2040, with accelerated take-up in the next two decades.

2.7. The CCC's review of the uses of hydrogen in a low-carbon economy reported that whilst hydrogen could play an important role as a zero emission option for long-haul heavy duty vehicles including buses, trains and lorries, it is best used selectively alongside widespread electrification (CCC, 2018). This view of hydrogen is also supported by The European Federation for Transport and Environment (Transport & Environment, 2018), which reported that electricity is the most efficient way to decarbonise vehicles, from cars to HGVs, with lower efficiency fuels such as hydrogen being used only when there are no other alternatives.

2.8. Further consideration of the case for hydrogen on the Isle of Man is covered in WP 11 – "*Urgent leasing of blocks of seabed for offshore wind farms*", WP 21 "*Maintain gas grid until future decision on potential for hydrogen generation by renewables"* and WP09 *"A date by which no fossil fuel heating can be fitted."*

2.9. Given the small size of the Isle of Man, and that hydrogen would need to be made on-Island, the case for hydrogen powered transport, is likely to be insufficient, and at best unlikely to become available until at least 2030.

3. BUS VANNIN: CHALLENGES

Bus Vannin: Fleet Vehicles

3.1. In 2017 the number of electric bus orders more than doubled from 400 in 2016 to more than 1,000; the next years are projected to follow the same tendency. In 2018, the electric bus market share was estimated to be around 9%, marking the transition

from niche to mainstream and the beginning of a steep uptake curve. Major manufacturers Daimler, Scania, MAN, Volvo and Iveco are actively promoting their full electric buses which are already in series production or will be in 2019/20 (Transport & Environment, 2018).

3.2. Bus Vannin, the trading name of the Island's public transport system, currently has 72 buses in operation providing the Island's public transport service. Bus Vannin recently trialled a second hybrid bus on the Island's roads, and has included some hybrid buses in the 2020 bus fleet capital bid. Should the bid be accepted, and the likely technical issues addressed, it is anticipated that they would be added to the fleet in 2022.

3.3. Whilst hybrid buses could contribute to a reduction in emissions in the short-term, they require fossil fuels and will not enable the Island to achieve its 2050 net zero carbon target.

Bus Vannin: Charging Infrastructure

3.4. Electrical supply capacity will likely pose one of the most significant barriers to an electric bus fleet.

3.5. The Chief Engineer at Bus Vannin (a former MUA employee), has advised that Bank's Circus, is "*certainly not suitable for a major EV fleet upgrade at the moment, as it does not have electrical supply capacity or infrastructure to install charging points".*

3.6. He further advised that Bus Vannin could probably upgrade to support a couple of electric buses short term, although that would require some work and investment. The estimated infrastructure costs for a basic EV bus set-up, would be £290k plus contingency, made up as follows:

- Substation £150,000
- Cabling and Excavation £ 80,000
- Charging Station £ 60,000

4. BUS VANNIN: OPPORTUNITY

Bus Vannin: E-Transportation System

4.1. The future electric bus procurement process should take into consideration that electric buses are part of a modular system with many different options and possibilities. These systems are adaptable to find the right configuration of battery size, technology, charging system and power supply.

4.2. As every bus fleet has specific needs, Bus Vannin will need to carefully choose the product and adapt operations to avoid oversizing the fleet or the battery. Such considerations should include smart charging systems, which have the potential to

provide a viable charging infrastructure and reduce the cost of the grid infrastructure upgrades, whilst also ensuring that the electricity grid is not overloaded.

4.3. Mercedes-Benz, the manufacturer of the majority of the current Bus Vannin fleet, is undergoing its final tests for the new fully electric Citaro (Mercedes-Benx, 2019) . It aims to provide a comprehensive and holistic e-mobility transportation system, from power supply and complete operating procedure through to servicing including the garage equipment, to ensure provision of the necessary energy to meet the timetabling requirements.

4.4. Bus Vannin intends to trial a fully electric bus during 2020, to evaluate its suitability for the Island. The Director of Public Transport has advised of hopes to have several fully electric buses by 2025, should the trial demonstrate suitability for the Island. When selecting a demonstrator for the Island, Bus Vannin may wish to consider the number of trials into low- and zero- emissions bus technologies taking place as part of the 'Low Emissions Bus Scheme (LEBS)' and Ultra-low emissions bus scheme (ULEBS) in the UK (Low Carbon Vehicle Partnership, 2019). The LEBS project involves the testing of electric and gas bus technologies in a range of different operational scenarios, including urban, regional and rural locations.

4.5. Bus Vannin has advised that running costs experienced by operators so far indicate that the operational costs of an electric bus are approximately half the running cost of an equivalent diesel, and a rough estimate is that it could save £216k over an 8 year life cycle. This would currently place an electric bus at £86k greater whole life cost vs a current Euro 6 diesel bus. However, the study included in the 2018 report by Transport & Environment clean transport campaign group (Transport & Environment, 2018) identified that when the total cost of ownership calculation includes external costs on health and climate, electric buses are cheaper than diesel buses. This is illustrated in figure 1.

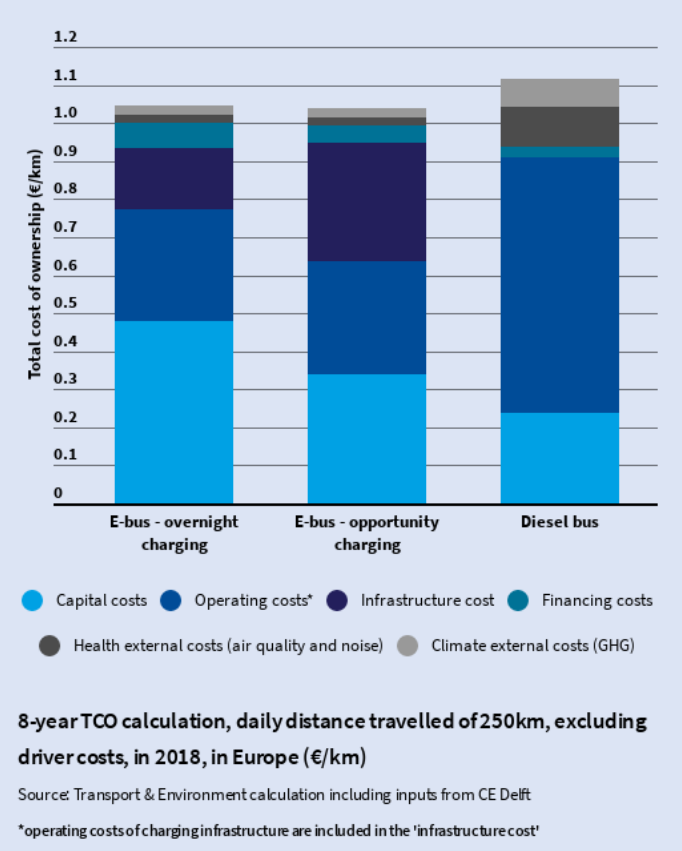

Figure 1 Compared total cost of diesel and electric buses, extract from: Transport & Environment clean transport campaign group (Transport & Environment, 2018)

4.6. It was noted at the public Climate Change stakeholder workshop on 19th September 2019 that there is a demand for Government to provide free buses, although this is not the funding model currently employed by Bus Vannin. Any re-evaluation of the current model would also need to consider the greater whole life costs of an electric fleet.

4.7. Should the electric bus prove suitable for the Island, the calculations required to specify and evaluate a comprehensive e-mobility system should enable the identification of the operational power and fleet infrastructure requirements. This in turn would inform identification of the suitability, or otherwise, of the current bus depot at Banks Circus, although anecdotal evidence would suggest that Banks Circus would likely be found to be unsuitable to accommodate an electric bus fleet.

5. BUS VANNIN: CONCLUSION

Necessary Ambition

5.1. Bus Vannin could continue with its planned trajectory of trialling hybrid and electric buses, with the aim to have a number of electric buses in operation by 2025. Early evaluation of the infrastructure requirements to identify challenges and opportunities of locating an electric fleet at the current bus depots is required.

High Ambition

5.2. Bus Vannin could accelerate its planned programme for the acquisition of electric buses, immediately commencing the evaluation of the e-mobility system with the intention to complete the forthcoming potential purchase of hybrid buses, but commence the purchase of electric buses within the early 2020s.

6. GOVERNMENT FLEET: CHALLENGE

Government Fleet: Vehicles

6.1. The current Government fleet comprises approximately 1,200 road vehicles, including excavators and trucks.

6.2. There are currently only 10 EV cars, and 15 EV vans in use across Government, as follows (Table 1 and 2).

Table 1 Electric cars in the Government fleet

Cars	
1 x Renault Zoe	Cabinet Office - Government House
1 x Nissan Leaf	Department Environment, Food and Agriculture
1 x Renault Zoe	Department for Enterprise
1 x Renault Zoe	Department of Infrastructure – Public Transport
1 x Renault Zoe	Department of Infrastructure – Public Transport (on loan)
2 x Renault Zoe	Department of Infrastructure – Public Estates & Housing (awaiting installation of charging point)
3 x Peugeot Eon	Manx Utilities Authority
A further 2 or 3 EVs are due to be ordered once site inspections have been completed for charging points.	

Table 2 Electric vans in the Government fleet

Vans	
4 x Renault Kangoo	Manx Utilities Authority
2 x Renault Kangoo	Department of Home Affairs
2 x Nissan Env 200	Manx Utilities Authority
1 x Renault Kangoo	Awaiting installation of charging point
6 x Nissan Leaf EV200	Isle of Man Post

6.3. The majority of Government's fleet is managed centrally by the Fleet Services Section of the Transport Services Division of the Department of Infrastructure.

6.4. Isle of Man Post bought its first EV van in 2007, and currently has 6 EV vans within its fleet. A Statutory Board of Government, Isle of Man Post vehicles, like local authority vehicles, can be purchased via Fleet Services, but are not within their direct remit.

6.5. Government's vehicle replacement programme looks to replace vehicles approaching their 8th anniversary, although certain vehicles may be replaced earlier, or later, due to their level of use. In the financial year, 2018/19, 65 fleet cars and vans were replaced. The average number of cars and vans replaced per year is 78.

6.6. The premium for EV's during the 2018/2019 financial year was in the region of twice the price of a conventional small vehicle, and three times the price of a tradesman's vehicle.

6.7. For the past two financial years 2018/19 and 2019/20, a budget of £200,000 has been provided for the provision of EVs and associated infrastructure costs.

Government Fleet: Charging Infrastructure

6.8. Transition to an electric Government fleet is dependent upon the availability of an adequate charging infrastructure to enable timely charging at the Government building where they are to be used. There are currently 1 charging point at Thie Slieu Whallian, 6 charging points at Isle of Man Post, and 7 charging points at the head office of the Manx Utilities Authority. An additional 6 more double charging points are due to be installed at the following locations: the Sea Terminal, St Georges Court, Ellerslie Depot, Banks Circus and the Power Station.

6.9. The cost quoted by the MUA for the installation of EV charging points at Government Office was recently quoted as between £4,000 - £6,000.

7. GOVERNMENT FLEET: OPPORTUNITY

Government Fleet: Vehicles

7.1. The vehicle replacement programme for the Government Fleet could be revised to reflect a requirement that, wherever practicable, all new vehicles are replaced with an alternative, electric model. Not only would the transition of the Government fleet reduce the Island's annual carbon emissions, it would also provide Government with the opportunity to role model the transition to EVs.

7.2. Whilst Island-based EVs are charged with electricity produced by the Isle of Man Combined Cycle Gas Turbine (CCGT) power station, emissions produced by charging an EV are significantly lower than those produced by conventional fossil fuelled vehicles. For example, emissions produced from charging a first generation Nissan

Leaf are approximately 67g/km, compared with the emissions produced by an average conventional vehicle, which is an average of approximately 140g/km.

7.3. The International Council on Clean Air Transportation (ICCT) identified that to develop the electric vehicles market, four key market barriers need to be overcome (Lutsey N Et al, 2018). These are typically summed up as:

- Limited availability of electric models;
- Higher cost;
- Inconvenience related to charging options and;
- Consumer awareness and understanding about electric vehicles.

7.4. These financial and technical barriers are addressed in Work Package 10: *the Future Policy on Fossil Fuels.* Electrification of the Government fleet specifically addresses some of the social and psychological issues of the fourth barrier; consumer awareness and understanding.

7.5. The following model "The Leadership Communication Grid" highlights the influential effect of role models on influencing patterns of behaviour (Figure 2).

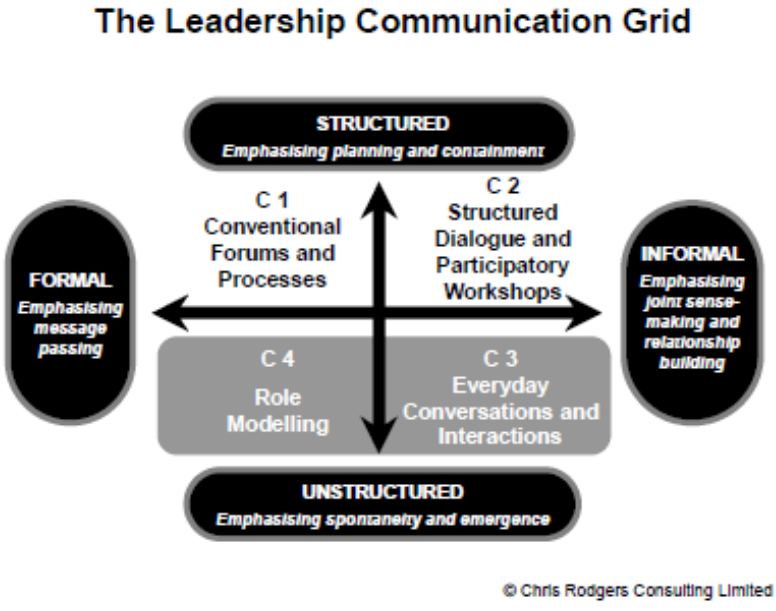

Figure 2 the leadership communication grid, extract from (Chris Rodgers Consulting Ltd, 2019)

7.6. Whilst it is not possible to quantify the impact of highly identifiable Government branding on electric vehicles on the Island's roads, their presence will undoubtedly raise consumer awareness of electric vehicles, and provide a positive demonstration of confidence in and commitment to EVs by the Isle of Man Government, an organisation which clearly plays a key role in Island life.

7.7. Anecdotal evidence from local Nissan dealership Athol Garage regarding its 2018 promotion of the Nissan Leaf, suggested that the increase in the number of Nissan Leafs on the roads created consumer confidence in both the model, and EVs, which in itself further generated sales. Sixty one percent of all EVs currently on the Isle of Man are Nissan Leafs.

7.8. If the Government fleet EV transition was introduced on the basis of 78 vehicles per annum, at an additional fleet replacement cost of approximately £10,000 per vehicle, this would require an additional current cost in the region of £780,000 pa, plus £195,000 pa for the installation of 39 double electric charging points @ circa £5,000 each; an additional total cost of £975,000 p.a., based on current costs. Should such a policy be progressed with effect from 2020, and the decommissioning date remain circa 8 years, the entire light vehicle fleet could be replaced with EVs, where possible, by 2028.

7.9. Whilst there would be an initial additional cost for EVs in the first 5 years, it is anticipated that price parity between EV's and conventional combustion engines will be reached in the mid-2020s, with the projected annual and overall costs reducing as time progresses.

7.10. In reality, it is likely that not all locations or services would be able to accommodate an electric vehicle, for reasons of suitability of either the service use (e.g. police), or suitability of the building – whether that be the Government building, or the home of the vehicle user (there is currently in place a policy whereby users of vehicles who are on call, or district nurses and health visitors, take their vehicles home). A more likely scenario could be for half the car and vans on the programme being replaced with EVs – at a total additional cost of approximately £472,500 p.a., and a more gradual programme of EV replacement progressed. Clearly, the current level of funding provided to support the transition to EVs of £200,000 p.a. is insufficient to fund half the vehicle replacement programme, even at the lower financial level of light car replacement only.

7.11. A feasibility study based on an analysis of the daily cumulative mileage for each vehicle would create an understanding of the scope for transition to electric vehicles. A more sophisticated assessment based on vehicle use patterns could identify greater opportunities available for switch over.

Government Fleet: Charging Infrastructure

7.12. It is important to note that electrification of the Government fleet involves far more than replacing one vehicle with another. In a similar way to the transition to an electric bus fleet, but to a lesser extent, an electric government fleet is also a modular system, in that it requires not just the vehicles, but also power supplies and charging points.

7.13. The Manx Utilities Authority (MUA) has confirmed that the cost of installation can be

generalised as approximately, £5,000 for a double charging point, which will include any necessary trenching and cabling required to deliver power to the required charging location. This is in addition to the purchase and installation of the charging point itself. The cost of this essential infrastructure could also be considerably in excess of this figure, particularly if extensive cabling is needed, or a new sub-station required to charge a number of vehicles.

7.14. In similarity with the e-bus system, some of these costs could be reduced by considering the opportunities that could be provided through the installation of a smart charging infrastructure to meet the energy demand from vehicles and ensure that the grid was not overloaded.

7.15. A cost-benefit analysis of extending the electric fleet recently undertaken by Isle of Man Post Office concluded that total costs, including infrastructure upgrades, were prohibitive at this point in time. The organisation therefore instead placed an order for diesel vans.

7.16. Amongst the local authorities, Douglas Borough Council and Onchan Commissioners considered buying EVs but found the costs to be prohibitive. As an alternative, Douglas Borough Council has started to purchase vehicles fuelled by LPG. Braddan Commissioners has however confirmed its intention to purchase 3 EVs.

7.17. The 1st April 2019 version of the Government Financial Regulations includes guidance on buying EVs, including in the evaluation of prices the need to identify and compare the whole life costs (Figure 3) (IOM Government, 2019). A worked comparison of delivery vehicles is provided at FPN C.03: Vehicle and Plant Procurement.

Example comparison with Electric Vehicles

Example comparison of Electric Vehicle whole life costs over 5 years – Delivery Vehicles (as at 2017)

Manufacturer & Model	Purchase Price (ex VAT)	Servicing, Repairs & Tyres (1,2,3,4)	Road Fund Licence (5)	Fuel (6)	Estimated Residual Value (7)	Total Life Cost (Over 5 years)
Ford Transit Connect	£11,470	£5,960	£720	£5,462	(£2,000)	£21,612
Vauxhall Combovan	£13,814	£5,174	£720	£4,580	(£2,000)	£22,288
Mercedes Citan	£14,228	£5,935	£330	£4,498	(£3,000)	£21,991
Nissan eNV200	£17,550	£4,460	£75	£2,690	(£3,500)	£21,275

Figure 3 Electric vehicles costs over a 5 year period, extract from IOM Government (2019).

7.18. Unfortunately, this example does not necessarily reflect all costs currently incurred in the vehicle purchase, as installation of charging points are an essential, but missing, component of the costs involved.

7.19. One option for the early stages of EV fleet roll-out could be that the programme be aligned to properties where the installation of charging points could be completed relatively easily and cheaply, with vehicles being re-assigned to drivers where

necessary. A joint assessment of Government properties could be undertaken by the MUA and the Department of Infrastructure, to evaluate both the electricity network supply and charging infrastructure requirements and identify those properties where charging points could be installed relatively easily. This process reversal could facilitate a faster speed of transition than by focussing on vehicle replacement, and then assessing the infrastructure. This process should also consider the installation of smart charging infrastructure.

7.20. An alternative could be for charge points to be installed at the homes of drivers, with a policy framework developed to provide such facilities. Such an approach was considered in a feasibility study undertaken on behalf of Southampton City Council (University of Southampton, 2017).

7.21. At the time of writing, a number of electric vehicles purchased by Fleet Services in November 2018 are still awaiting installation of charging points. Discussions have been taking place between the parties concerned: Fleet Services and the Properties Maintenance Divisions of the Department of Infrastructure, the MUA and the receiving Departments. The MUA is currently engaged in a procurement process to provide charging points and payment options for the public charging network.

7.22. A white paper produced by UPS (UPS, 2018) recommends establishing an internal cross-functional electrification task force, aligning procurement, fleet operations, engineering, maintenance and facilities teams, considering the inclusion of members from senior leadership, and finance. The paper also recommends that the electrification journey is not taken alone, but taken in collaboration with manufacturers, suppliers, utilities and other government agencies, and joining or forming a coalition that can help make a public commitment and share resources.

7.23. A cross-Departmental working party, comprising representatives from the Department of Infrastructure Properties Division, Fleet Services and Highways, together with representatives from Manx Utilities has now been established, to discuss the current and forthcoming EV progress/requirements.

7.24. A pragmatic framework for the installation of EV charging stations across the Island involving both MU and Isle of Man Government needs to be agreed, to encompass both public and public sector EV sites in the near future. The framework should outline the correct processes and procedures that need to be followed to allow collaborative working, with the overarching environmental aim of working towards achieving net zero emission targets for the Island's transportation sector.

Heavy Duty Vehicles (HDV)

7.25. The current policy outlined in the Department of Infrastructure policy document, is "*to remain technology neutral but continue to work with the sector to determine how best to power vehicles such as these in the future*".

7.26. Although companies are developing heavy duty prototypes, such as the 26 tonne excavator with a 300 kWh battery produced by Caterpillar, it is clear that the market is not sufficiently developed at this point in time (Electrek, 2019). It is expected that electric HDV vehicles will reach upfront cost parity with conventional HDV vehicles in the second half of the 2020s. However, several other studies have suggested this date could be much earlier (CCC, 2019).

7.27. Due to the global nature of the product development, governments will need to make a decision on the required infrastructure for zero emission HDVs, with international coordination, in the mid-2020s ready for deployment in the late 2020s and throughout the 2030s, to ensure the ability to transport freight across Europe.

7.28. It is important to recognise that there would be challenging issues to overcome regarding infrastructure requirements in the Isle of Man should hydrogen become the technology of choice for HDVs. In particular, hydrogen would need to be produced and stored on the Island, created using energy from a renewable source. Given the small size of the Isle of Man, the case for hydrogen powered transport is likely to be insufficient and battery electric vehicles are likely to be more appropriate. It is recommended however, that a watching brief is kept on the development of this technology.

7.29. Given that the technology is insufficiently advanced at this point in time to make any recommendations regarding the Government HDV fleet, it is recommended that a watching brief regarding this area is maintained. However, due to the size of the Island, and that the current method of freight shipment to the Isle of Man is delivery by trailer, there is no absolute necessity for the Island to adopt the same powertrain as Europe for its heavy duty fleet.

8. OTHER ISSUES

Vehicle Leasing

8.1. One suggested alternative for direct vehicle ownership is leasing. The value of the vehicle at the end of the finance agreement would be calculated at the start of the agreement, and deducted from the monthly repayments. Furthermore, the battery would then be returned to the vehicle owner, ensuring ease of disposal. A study conducted by European Federation for Transport and Environment (Transport & Environment, 2018) recommends focusing on a TCO (Total cost of ownership) focused approach by shifting from upfront payments to lease or loan payments, while including external costs in the tendering process when comparing different options.

8.2. Treasury has advised that leasing is unlikely to provide value for money, and that therefore as a model it is unlikely to be supported. However, it is suggested that the opportunities for leasing the future EV fleet be further explored.

Battery Production

8.3. Most recently, in an article published by the Institute of Engineering and Technology (IET) on 21st August 2019, Ben Heubl reported that he believes that EVs may not provide the hoped for solution to climate change due to the CO_2 footprint associated with the production of EV lithium ion batteries (Heubl, 2019).

8.4. The mining of lithium, copper and myriad other materials in South America subtracts huge amounts of water and lowers the natural water table that would otherwise be used by local communities for irrigation and agriculture (Heubl 2019). Heubl suggests that these developments will cause water shortages in the future. Furthermore, the alternative method of extraction i.e. lithium mining from solid rock, also involves considerable carbon dioxide emissions. Domestic extraction of lithium from sea water has been posited and if commercially viable would be less damaging to the environment (Martin, 2015).

8.5. Research conducted by Elsa Olivetti at Massachusetts Institute of Technology and colleagues at the University of California in Berkeley and the Golisano Institute of Sustainability in New York, suggests that the supply of most materials contained within lithium-ion batteries will likely meet the demand for the near future (Olivetti et al, 2017). However, there are potential risks associated with the supply of cobalt and conflicting suggestions that if there is rapid adoption of EVs (incentivised by policy interventions) demand could outpace supply for some battery-grade materials—including lithium—in the very near term.

Battery Disposal

8.6. Off-Island battery disposal is a service which has yet to be required, as there have been no EVs on the Isle of Man which have reached end-of-life. There is also some evidence to suggest that the batteries are out-living the vehicles themselves.

8.7. The current model is for old batteries to be returned to the manufacturers, who are also looking at schemes to re-purpose those batteries outside the use of the car, for storage systems. An example is Nissan's a three-megawatt storage system using the equivalent of 148 Leaf batteries, both new and used, which opened at Amsterdam's ArenA soccer stadium (Loveday, 2019).

8.8. It is likely that commercial markets will develop for used car batteries, which will in turn address the issue of off-Island battery disposal.

9. GOVERNMENT FLEET: CONCLUSION

9.1. As identified above, transition to a full EV fleet will require far more than purchasing vehicles, and will need to be progressed in conjunction with development of the essential infrastructure requirements.

9.2. To ensure effective and timely development and delivery, and cohesiveness with the EV acceleration programme outlined in WP 10, *the future policy on fossil fuelled vehicles,* it is suggested that the transition to a government EV car and van fleet is progressed by the same cross-Government working party and incorporated within the remit of the Climate Change Emergency transformation programme to ensure cohesion with other developing Climate Change policy options and action plans.

10. GOVERNMENT FLEET: THE ACTIONS

Necessary Ambition

10.1. Government's EV fleet could continue its more gradual growth as it has in the past few years, with priority given to ensuring that the charging infrastructure is in place at Government properties to enable the fleet growth, with new EVs being assigned to locations where the infrastructure requirements can be relatively easily and cheaply be met, to provide a number of highly visible "quick wins", and provide the role modelling essential for the growth in EVs amongst the local population.

10.2. An intensive programme to replace its light vehicle fleet could begin in earnest in 2024, to provide an all-electric light vehicle fleet by 2032, the proposed date in WP 10: *State the Island's future policy on fossil fuelled vehicles* for cessation of registration of internal combustion engines. This timescale for complete light vehicle fleet replacement could be achieved at a lower total cost than the high ambition option, as it would enable the cost of EVs to achieve market parity with internal combustion engines, predicted to take place in the mid-2020s, whilst also ensuring that an adequate charging infrastructure is also in place.

High Ambition

10.3. Government could commence a programme of replacement of its light vehicle fleet over the next 8 years, at an additional total estimated cost of £945,000 p.a., although these costs will reduce as the 2020s progress.

10.4. RISKS

GOVERNMENT FLEET	
Necessary Ambition	**High Ambition**
Failure to immediately implement a programme of vehicle replacement with EVs sends a message that Government is not serious about climate change, and misses the opportunity to send a very positive message to the Manx Public about Government's commitment to addressing climate change.	Considerable additional costs would be incurred in the cost of vehicles during the early 2020s, prior to the market achieving price parity with internal combustion engines.
	Adequate infrastructure not in place
BUS VANNIN	
The transition to an electric bus service involves far more than merely the replacement of one type of engine with the other: it will involve the purchase of an entire transportation scheme, comprising a number of different components. Such a complete change in the operational model will involve significant risks regardless of the timing of the transition.	
	Full transition to an electric fleet at such an early stage, will bring a risk that any "snagging" with the different elements of the transportation system have not been fully identified and resolved.
	Despite considerable investment in the electric bus system by manufacturers, it may ultimately be the case that an alternative form of power for buses e.g. hydrogen, becomes the long term preference at some point in the future.

10.5. The co-benefits (the positive benefits associated with the climate action)

10.6. In addition to reducing Government vehicle emissions, adopting a policy of vehicle replacement with EVs sends a highly visible and immediate message to the Manx public that Government is committed to addressing climate change.

10.7. As identified above, Government's commitment to electrifying its fleet would provide consumer awareness and confidence in electric vehicles, and help facilitate growth in the Island's fleet of EVs.

10.8. The health benefits from the transition to electric buses as a result in the reduction in air pollution that will in turn provide benefits to health and reduce Health Service expenditure.

10.9. Electric buses would improve the customer experience, with less noise, and fewer vibrations, all creating a more comfortable journey. This in turn will attract more customers.

10.10. Increasing demand for e-buses in the European market could bring e-bus battery prices down much faster. In this scenario, electric buses with the bigger battery packs would reach upfront cost parity with diesel buses sooner, around 2025-27 instead of 2030.

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