Restrict fossil-fuelled vehicles

1. EXECUTIVE SUMMARY

1.1. In order to restrict fossil-fuelled vehicle usage on the Island it is necessary for no new or second-hand fossil-fuelled vehicles—new to the Island—to be registered here after 2035. The inclusion of second-hand vehicles in this requirement is to ensure that the majority of the Island's fossil-fuelled vehicles have reached the end of their working life by 2050. Four fifths of vehicles registered on the Island are second-hand, and vehicles tend to be de-commissioned at 16-17 years of age.

1.2. A more ambitious timescale option is for no new or second hand fossil-fuelled vehicles—new to the Island—to be registered on the Island after 2032. A challenging programme of interventions will be required if the current electric vehicle (EV) target of 10,000 (15% of the Island's vehicle fleet) is to be achieved by 2030. A package of front-loaded monetary incentives for new and second-hand EVs would provide the initial market stimulus, supported by a combined range of policy measures. Revenue loss from hydrocarbon duties would be approximately £30m per annum.

1.3. The case for hydrogen-powered transport is likely to be insufficient for the Isle of Man, given its small size, and battery powered EVs are considered more appropriate.

1.4. Reducing the number of vehicles on the road in the first instance through reducing the number of journeys, providing greater use of more environmentally friendly forms of travel such as active travel (WP25) and public transport (WP14), then decarbonising the remaining fleet would be a more sustainable strategy to achieve reductions in the generation of direct and indirect greenhouse gas (GHG) emissions.

1.5. Curbing transport demand and a modal shift to cleaner transport modes will be important to reduce the amount of energy and other resources required to deliver zero emission mobility. However, demand reduction can only reduce emissions by a certain amount; it cannot achieve decarbonisation. Decarbonisation of the power sector will be a prerequisite for a zero emission transport system.

2. THE CONTEXT

2.1. Transport was the largest emitting sector of GHG emissions in the UK in 2017, accounting for 27% of all emissions. In the Isle of Man in 2017, although not the leading cause, transport accounted for 19% of all emissions, of which the largest emissions source in this sector is passenger cars. Passenger car emissions have increased by 30% between 1990 and 2017 and 1% between 2016 and 2017, see Figure 1 over page.

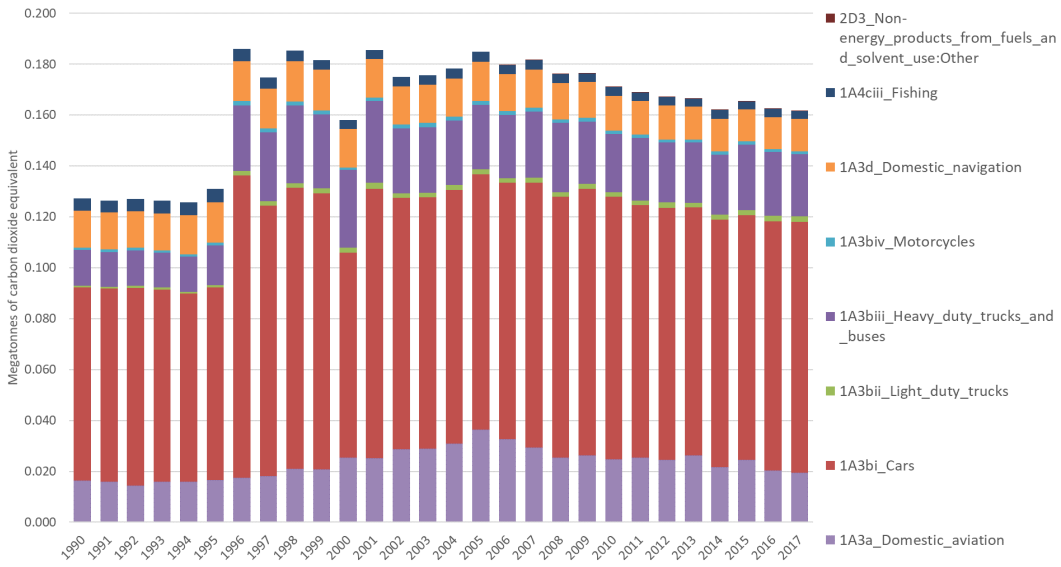

Figure 1: Emissions 1990-2017 (Aether, 2019)

2.2. Addressing emissions associated with transport will be key if the Island is to achieve net carbon emission neutrality by 2050.

3. THE CHALLENGE: FUTURE GOALS

3.1. The current position of the Isle of Man Government regarding low emission vehicles is outlined in the Department of Infrastructure policy document ***"Moving Towards Low Emission Travel: a policy for Surface Transport & Electric Vehicles"*** (GD 2019/0010) (IoM Government, 2019). The policy was approved by Tynwald in March 2019 and although not expressly stated, is linked to the Island's future fossil fuel policy.

3.2. The UK Climate Change Committee's (CCC) review of the uses of hydrogen in a low-carbon economy reported that battery electric vehicles are well placed to fully decarbonise passenger cars and vans, and 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).

3.3. The Department of Infrastructure policy document re-states the policy first approved by Tynwald in May 2015, that the Isle of Man will be powered by ultra-low GHG emission technology by 2050. To achieve this goal, the identified key performance indicator is for 10,000 EVs to be registered on the Isle of Man by 2030.

3.4. The Island's emissions policy excludes machines of cultural importance such as those used on the heritage railways and for motor racing events.

3.5. The Isle of Man 2050 target mirrors that of the UK and Eire; the aim is to have almost every car and van operate with zero emissions by 2050. To achieve this objective, the current UK policy, outlined in the UK's Committee on Climate Change document (*"Net Zero: The UK's Contribution to stopping Global Warming"*) is for no sales of new conventional petrol and diesel cars and vans by 2040 (CCC, 2019).

3.6. This recommendation was revised by the UK CCC in its July 2019 progress report to the UK Parliament (CCC, 2019), which identified as a priority for the coming year that to achieve the 2050 target it would be necessary to revise this 2040 target to 2030-2035, (with 2035 being the very latest deadline).

3.7. Scotland's target is to phase out the sale of new fossil-fuel car and van sales by 2032. The current target in Wales is for 60% of new car sales to be ultra-low emission vehicles by 2030.

3.8. The current position of Jersey is that it declared a climate emergency on 2nd May 2019, with a commitment to achieve carbon neutrality by 2030. Jersey is currently in the process of preparing a detailed programme of policy interventions, for presentation to its parliament, the States Assembly, by December 2019.

3.9. Other international target dates are as follows in Figure 2:

Target dates for banning the sale of new petrol or diesel vehicles

Year	Countries
2025	Norway
2030	Iceland, Ireland, Israel,
	Slovenia, Netherlands
2035	Denmark
2040	UK (Scotland 2032), Sri Lanka
	Spain, Portugal, France, Canada
2050	Costa Rica

Includes bans that have been announced, proposed and put into law, and excludes countries with a target of only no full petrol or diesel vehicles (eg Japan) or a partial target (eg Mexico)

Source: IAE/BBC Briefing - energy

BBC

Figure 2. Target dates for banning the sale of new petrol or diesel vehicles (BBC Website)

3.10. The UK CCC July progress report also concluded that:
"*the 'Road to Zero' ambition for a phase-out of petrol and diesel cars by 2040 is too late and plans to deliver it are too vague. To meet the need to switch the UKs entire fleet of light-duty vehicles to ultra-low emission vehicles (ULEVs) by 2050 means that a rapid ramping up of the market share of EVs, [electric vehicles] from 2.5% in 2018 will be required during the 2020s*".

Its recommendations for the coming year also include:

"Implementing policies, including fiscal instruments, to strengthen incentives to purchase cleaner vehicles. Current purchasing trends are undermining new car and van emissions targets and must be reversed."

3.11. The UK have targets for at least 50% and potentially as many as 70% of new car sales to be electric vehicles by 2030.

3.12. The Manx Utilities Authority (MUA) has modelled future EV growth scenarios in the Isle of Man—from which the Isle of Man Key Performance Indicator (KPI) of 10,000 vehicles has been extrapolated)—within their document ***"Home Generation Feed-in Tariffs, Electric Vehicles and Electric Heating for Buildings – GD 2019/0003"*** (MUA, 2019). This document was considered by Tynwald in March 2019. The future energy scenarios are based upon those produced in 2017 by the National Grid Company and are modelled along two axes: affordability, and environmental/green policies (National Grid, 2018).

3.13. The MUA scenario within GD 2019/0003, is based the most challenging of four future scenarios and was modelled to meet the United Nations Framework Convention on Climate Change target to keep the global temperature increase this century to under 2°C higher than pre-industrial levels.

3.14. The four future energy scenarios are shown in the Figure 3 over page.

3.15. The Isle of Man KPI figure of 10,000 EVs by 2030, based upon the 2°C scenario, assumes a 30% increase per year in electric vehicles through to the mid-2030s to achieve a 14% EV market penetration, with a further market penetration of 11% for plug in hybrids. The Isle of Man two degree (2°C) scenario projects a net increase of 4,000 electric vehicles per year after 2030.

3.16. The 10,000 figure was derived from normalising the UK data outlined in the 2°C scenario to match the Island's transport statistics. The other, less aggressive energy scenarios when translated to the Isle of Man forecasts 1,700 to 3,800 EVs by 2030. The progression of take up of ULEVs in the Isle of Man modelled on all four scenarios is illustrated in the table in Figure 4.

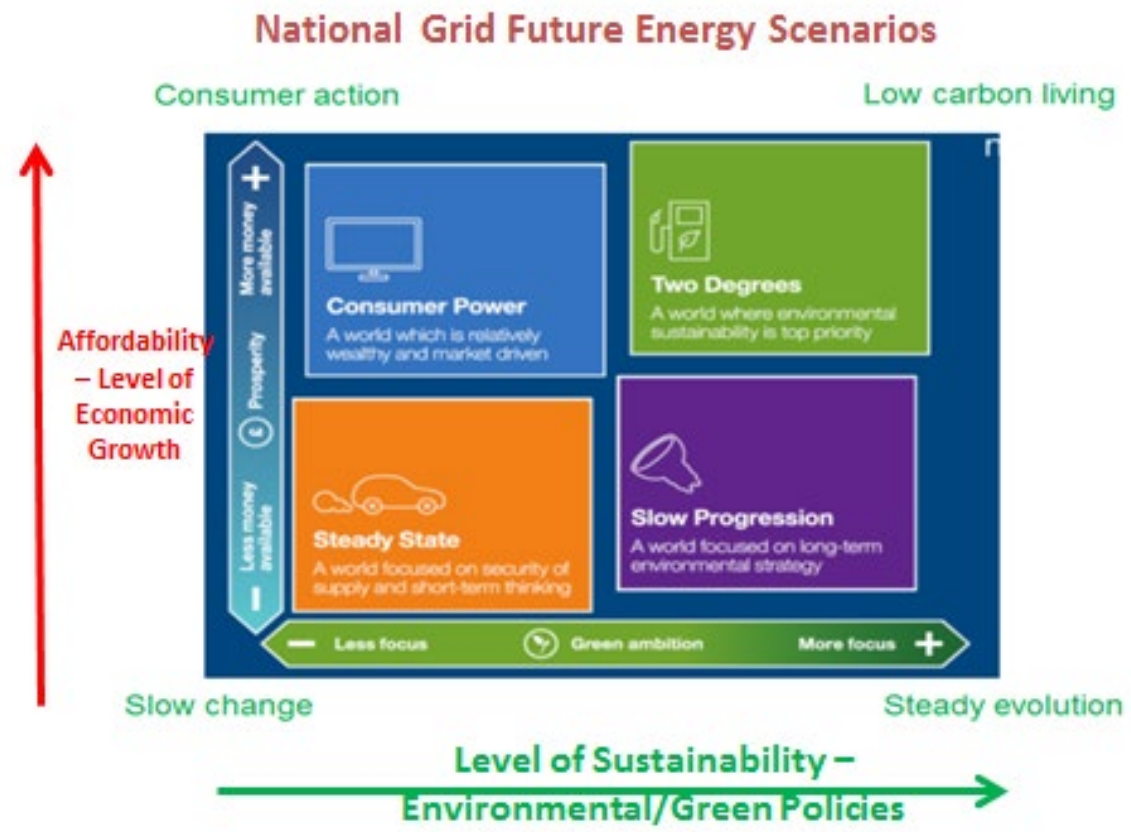

Figure 3. Figure reproduced from: National Grid Future Energy Scenarios (National Grid, 2018)

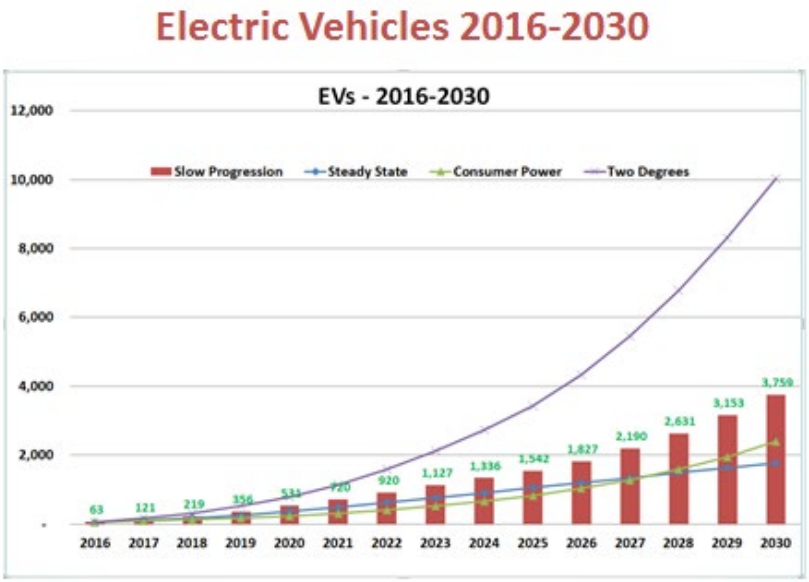

Figure 4: Electric Vehicles (Source: MUA Internal Document)

3.17. It is important to note that to achieve the 2°C scenario, a very comprehensive and challenging programme of interventions is required, in a world where environmental sustainability is top priority. The other models—slow progression, steady state, and consumer power—achieve very low levels of ULEV growth in the period to 2030.

3.18. The programme of interventions currently identified for the Isle of Man specifies that to encourage the shift to electric vehicles Government needs to instigate action in a number of areas including:

- provision of information;
- supply of viable alternatives;
- a reliable and accessible charging network;
- an appropriate taxation regime.

4. THE CHALLENGE: CURRENT ISLE OF MAN POSITION

Cars & Vans

4.1. As of August 2019, there were 64,726 cars registered on the Isle of Man, 6,514 motorcycles and 2,965 other types of vehicle. The other category includes Goods vehicles, Articulated Goods vehicles, Buses/Minibuses and agricultural or plant vehicles. Whilst there is a perception that there are more cars per capita on the Isle of Man, at 0.26 more cars per head of population when compared to the UK, the difference is marginal. Regardless of this difference, the transition to a net zero carbon future—requiring a move away from fossil fuelled vehicles—although technologically achievable, is highly emotive and will require considerable changes to individual lifestyles for many people on the Island.

4.2. Unlike the UK, where most new registrations are new vehicles, in the Isle of Man the majority of vehicles registered each month are second hand imports, mainly from the UK, with new vehicles representing only 1/5th (100 –150) of vehicles registered.

4.3. Battery operated vehicles are commonly accepted to be the most promising technology for decarbonising the light duty vehicle sector. Despite the Isle of Man being a prime location for the growth in the electric vehicle fleet, given its size and relatively small daily travel distances, as at November 2019, there were only 309 battery electric vehicles registered on the Isle of Man, which is 0.5% of the total number of cars registered. This compares to a figure of 0.6% of battery electric vehicles in the UK as at August 2019.

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

- A limited availability of electric models;

- higher cost;
- inconvenience related to charging options, and;
- consumer awareness and understanding about electric vehicles.

4.5. The inconvenience related to charging includes anxiety regarding range, charging time and charging facilities.

4.6. These barriers are addressed by the actions identified in the Department of Infrastructure policy document, " Moving Towards Low Emission Travel A Policy for Surface Transport & Electric Vehicles ".

Availability of Electric Models

4.7. Since 2009, EU legislation has been driving the increase in low emission vehicles, by increasing mandatory emission reduction targets for new cars. Stricter targets will apply from 2021 on, with a phase-in from 2020.

4.8. Regulation (EU) 2019/63110 (Council of the European Union, European Parliament, 2019) set CO_2 emission performance standards for new passenger cars and for new light commercial vehicles (vans) in the EU for the period after 2020. The new Regulation will apply from 1 January 2020.

4.9. In response to international Governments steering the electrification process, together with the economic benefit from leading the transition, the range and availability of electric vehicles is due to increase significantly during the next few years, as illustrated in the following chart. Manufacturers have announced more than $150 billion in investments to achieve collective production targets of more than 13 million electric vehicles annually by 2025 (ICCT, 2018), see Figure 5 over page.

4.10. The current production forecasts show that most carmakers are ready to embrace electrification and are leaving behind the 'technology neutrality' approach, focusing on scaling up electric car volumes instead, and there are predictions that:
"Electric vehicles are about to go mainstream in Europe, and 2020/2021 is likely to be a tipping point for the market" (E Bannon f. T., 2019).

4.11. Figure 6 on the next page shows the vehicle types and electric mileage of future EVs.

4.12. This commercial investment in electric vehicles is a good indication that the future global vehicle fleet will be substantially made up of electric vehicles powered mostly by renewable sources by 2050.

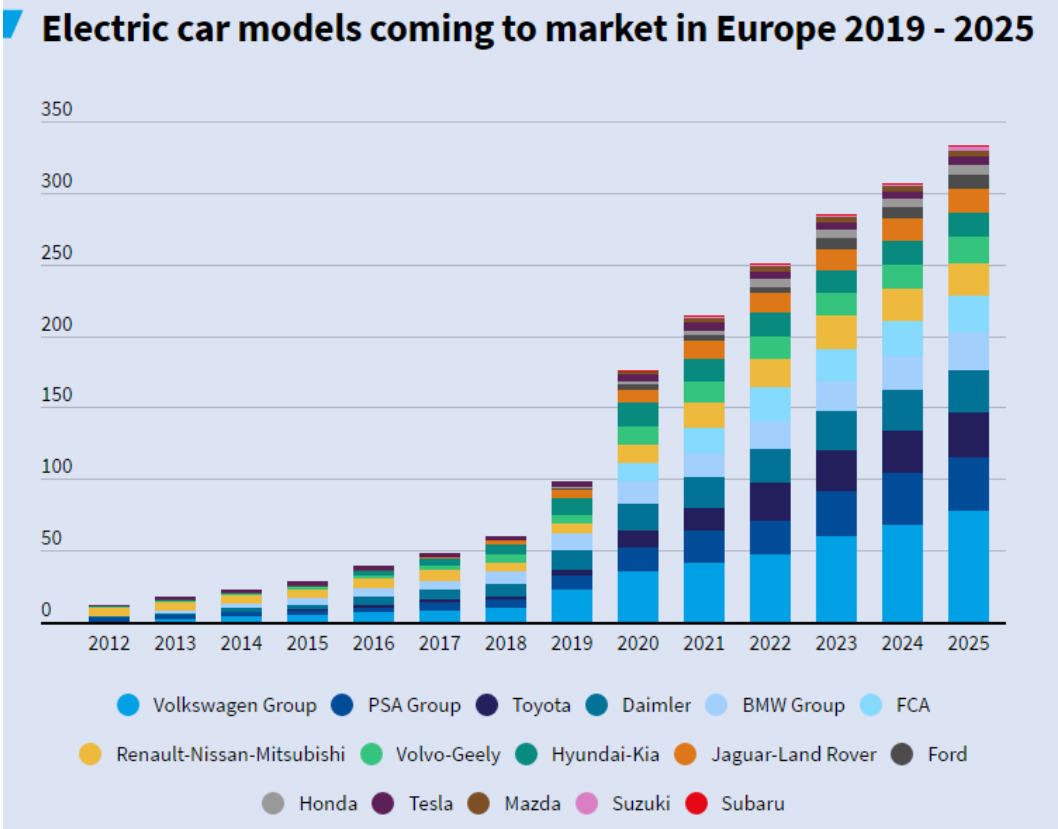

Figure 5: Electric car models coming to market in Europe 2019-2025 (Transport and Enviornment , 2019)

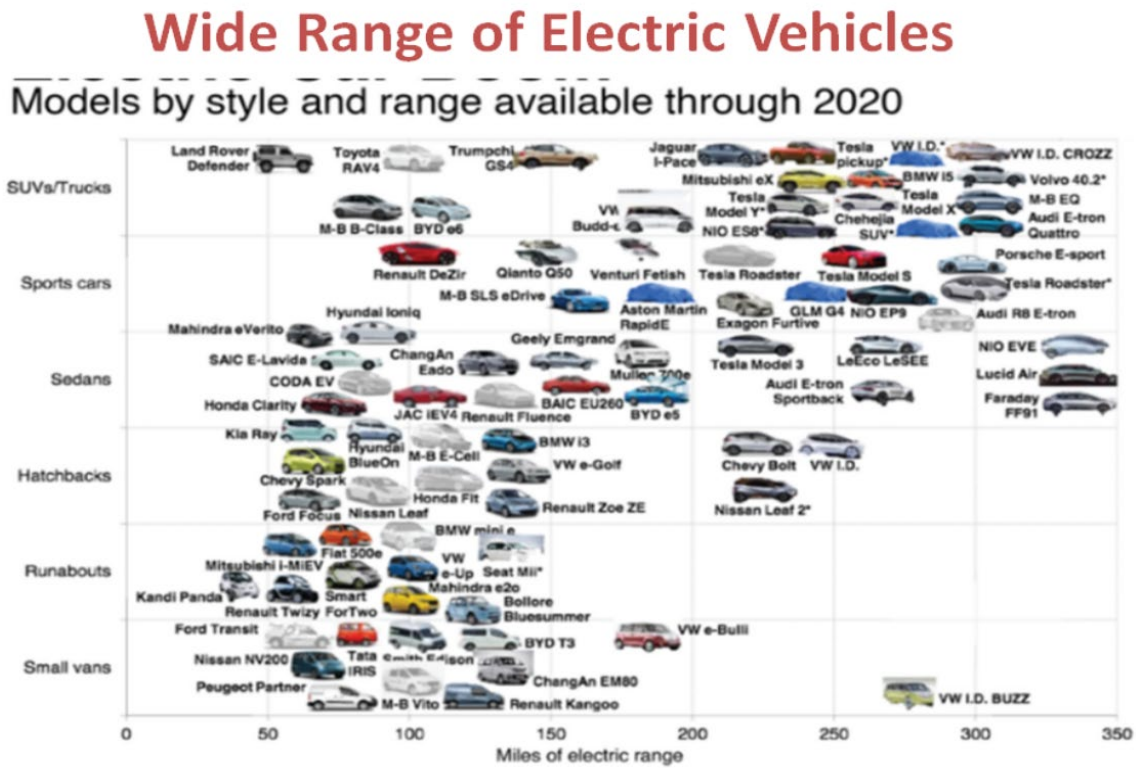

Figure 6: Electric Car Boom (Bloomberg New Energy Finance, 2019)

4.13. New and second-hand EVs are currently available from car dealerships on the Isle of Man. It has been noted that there is however a UK-wide issue of availability, with extensive waiting lists for popular new models (e.g. the Hyundai Kona), and limited availability of second-hand vehicles to meet on-Island demand. Supply issues could potentially become a significant problem given that the Isle of Man market is predominantly based on second hand UK vehicles.

Higher Costs/Financial Incentives

4.14. The key challenge slowing consumer uptake of EVs is the higher up-front cost, with lower running costs not yet balancing the up-front costs unless drivers have a high annual mileage, and there is limited evidence as to the actual whole life savings and resale value. Beyond 'early adopters', consumer choice will drive market growth (Regen, 2018).

4.15. EVs are being challenged by smaller petrol/diesel cars and a question mark over residual values, as illustrated in the Figure 7 below.

Main Challenges facing EV Ownership

Vehicle Type	Petrol/Diesel	Small Car	Hybrid	Plug-In Hybrid	Electric Vehicle
Range(miles)	300-350	300-350	550	600	100
Capital Costs	£15,000	£10,000	£23,000	£30,000	£30,000
Miles/gallon(mpg)	38	55	60	72	5 miles/kWh
Cost/mile(p/mile)	14.4	10.0	9.2	7.6	3.2
EV Tariff					1.8
Breakeven Mileage(miles)			151,018	219,865	133,365
Residual Value after 3 yrs	55%	55%	58%	58%	25%

Figure 7: Main Challenges facing EV Ownership (Source: MUA internal document, 2017)

4.16. It is predicted that once EVs are cheaper in terms of total cost of ownership (TCO), a review over a 3 - 5 year period that looks at the cost of fuel, insurance, maintenance and depreciation, many more consumers will make the investment. This tipping point is expected to occur in the mid-2020s, although higher initial capital cost could still remain a barrier (Regen, 2018). Growth in the take-up of EVs should also provide a boost to the second hand EV market.

4.17. A comparison of policy measures that promote electric vehicles across 20 countries identifies that monetary incentives in the form of subsidies or tax relief may provide an initial stimulus for consumers to consider purchasing an EV rather than a conventional combustion engine vehicle. Every major EV market across Asia, Europe and North America (with more than 1% electric share of new vehicles) has had

substantial consumer financial incentive, considerably reducing the cost difference between electric and comparable non-electric models. The markets with the highest global EV shares (e.g. China, the Netherlands and Norway), have had national incentives valued at more than $10,000 per vehicle. The greatest growth of EVs in the market took place in Norway, where a market share of approximately 3.1% in 2012 grew to 30% in 2016. This was achieved by offering purchase tax exemptions, which equalled 25% of the cost, together with reduced road tax (Rietmann N, 2019).

4.18. In the UK, grants are available for the purchase price of EVs up to a maximum of £3,500, (reduced from £4,500 in November 2018, when the grant towards hybrid vehicles was also removed) (UK Government, 2019). The UK also provides a subsidy for the installation of EV charging points, reducing the installation costs from around £1,000, to £300.

4.19. Although EVs still only achieved 2% of UK car sales in 2017, it is likely that concerns regarding range will have had an impact upon the purchase decisions of UK consumers. Continuous improvements in EV range are beginning to address these concerns. Despite the reduced grant incentives, year on year UK sales continue to increase, see Figure 8 below.

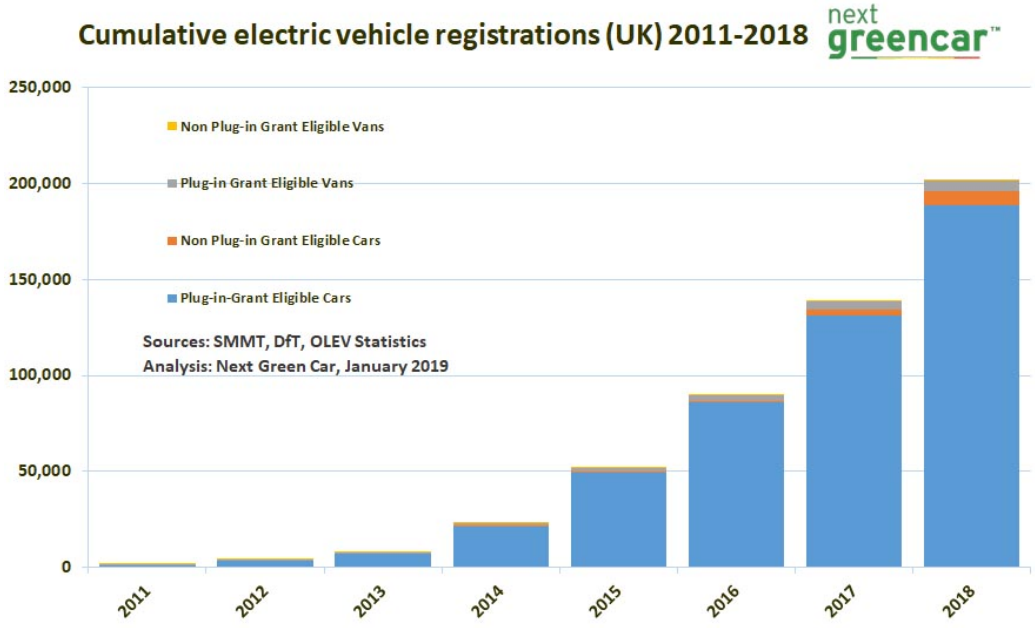

Figure 8: Cumulative electric vehicle registrations (UK) 2011- 2018 (Next Greencar, 2019)

4.20. The UK Secretary of Transport recently reported a desire to eventually end the current subsidy, even though the CCC reported in July 2019 the need to strengthen incentives to purchase cleaner vehicles, with a substantial body of evidence which suggests that addressing the cost barriers is the most effective route to increasing the take-up of EVs.

4.21. The October 2019 report for the CCC produced by Imperial College London on behavioural change re-confirms the conclusion that reducing the upfront purchase cost and emphasising the low running costs of EVs will be crucial to more rapid take-up (R Carmichael, 2019).

4.22. The cost of provision of a financial incentive package on the Isle of Man —in addition to the loss of revenue from hydrocarbon duties—are estimated to be in the region of £30m per year with a maximum loss of revenue over the 20 year period of £600 million.

4.23. With no grants currently available in the Isle of Man, the only financial incentive currently being offered is a significantly lower level of vehicle duty (annual road tax) payable on vehicles with up to 50gCO_2/km emissions, and no annual road tax payable for pure EVs.

4.24. A 2016 International Council on Clean Air Transportation white paper identified that the optimal design for EV incentives may be based around four principles (Z Yang et al, 2016):

- Move incentives up front to the vehicle purchase and make their value visible to dealers and prospective consumers;
- Make the value of incentives crystal clear to consumers and dealers;
- Ensure the incentives are available to the full target market;
- Commit to durable incentives that allow manufacturers, dealers, public outreach campaigns and consumers to rely on them for at least several years.

4.25. Anecdotal information from one of the car dealerships in the Isle of Man suggested that customers who have undertaken online research regarding new EV models, do not progress the purchase when they discover that the financial incentives do not apply in the Isle of Man.

4.26. Local Nissan dealership, Athol Garage, ran a highly successful promotion in the Isle of Man during 2018, when they sold in the region of 160 second-hand Nissan Leaf vehicles from the UK (Athol Garage, 2019).

4.27. When approximately 100,000 second hand contract hire Nissan Leafs came onto the UK market, Nissan provided a promotional package including a £2,000 discount incentive, free home charger, and 0% finance. Athol Garage got behind this scheme, and ran an extensive advertising campaign on many different platforms including: a number of Nissan Leafs displayed on the forecourt; and the salespeople owned and drove the vehicles themselves, which enabled them to talk knowledgeably to customers. The campaign and promotion gained such momentum, that even when the offer expired, customers continued to buy the second hand vehicles, despite the price increase. As of September 2019, Nissan Leafs account for 192 of the EVs

currently registered on the Isle of Man (accounting for 65% of EVs on Island). Athol Garage believes that the on-Island presence of the Leaf has provided market confidence in EV's, which in turn stimulates sales (Athol Garage, 2019).

4.28. The Athol Garage Nissan Leaf campaign is a real-life, on-Island example that addressed all of the key market barriers identified by the Clean Transport Committee (Athol Garage, 2019).

4.29. Athol Garage continues to have a waiting list for second hand Nissan Leafs, pre-sold in advance of arriving on the Island. Market demand for second hand EVs was also confirmed by the independent car dealers, Swift Motors.

4.30. Anecdotal evidence from Athol Garage suggests that whilst its customers appreciate the environmental impact of an EV, purchases are primarily motivated by financial savings. A limited package of financial incentives already exist which could be promoted to encourage the early uptake of EVs; these include tax relief on capital allowances and benefit in kind exemptions for electric vehicles.

4.31. Further incentives could be introduced such as free car parking for both the public and private sectors, different rates of mileage allowances for Government employees, and salary sacrifice schemes. A locally successful staff salary sacrifice scheme was provided by Mountain View Innovation Centre which has resulted in 6 staff members purchasing EVs that they charge from the Centre's 50 kWp solar panels.

4.32. Imperial College's latest research however suggests that such incentives alone will be insufficient to encourage large-scale take-up of EVs, and that up-front financial incentives will be required.

4.33. Up-front incentives are however unsustainable long term. Research on the European market undertaken by the International Council on Clean Transportation, (P Slowik et al, 2019) and the European Federation for Transport and Environment (E Bannon f. T., 2019) both recommend a review of the vehicle taxation system to facilitate the shift to zero emission solutions.

4.34. Transport and the Environment (2019) reported that taxes steeply graduated by CO_2 emissions are very effective at lowering fleet average emissions and tackling rising transport CO2 emissions (2019), in addition 'polluter-pay' policies—taxing higher-polluting vehicles—could produce steady revenue while incentivizing EVs. The development process must ensure that besides being economically smart, policies are also socially equitable, meeting the requirements of a 'Just Transition', see paragraph 6.16.

4.35. The Department of Infrastructure has proposed the 'vehicle duty collection model' as a future policy measure that could affect the composition of the vehicle fleet by aiding the transition from diesel to petrol. The new policy would introduce charges based on emissions, a £30 per vehicle diesel surcharge from April 2020, plus a £100 vehicle emissions surcharge for the worst 12% of polluting vehicles. The surcharges will progressively increase pressure on drivers to make environmentally friendly vehicle choices. As EVs reach cost parity with fossil fuelled vehicles and are more widely adopted, incentives and consumer awareness programs can evolve.

4.36. Low emission zones have been successful in reducing harmful emissions across European cities, and assisting the transition to low emission vehicles. Air quality is not currently monitored in the Isle of Man so no data is currently available In the Isle of Man, regular monitoring of air quality to 2009 showed that air quality met accepted standards, other than occasional slight elevations of nitrogen dioxide at one or two locations with heavy traffic. DEFA undertakes occasional 'snapshots' of monthly average nitrogen dioxide levels, the levels found generally slightly lower than in the period to 2009, and with none having found levels above the UK/EU target maximum. Air quality testing around congested areas such as schools would be useful to inform future policy.

4.37. Consideration should also be given as to how private sector businesses could be encouraged to transition to low emission fleets; company car taxes could provide the opportunity to shift the new car sales to a zero emission models. Commercial fleet and company cars move quickly into the private market, so could be strategically important for growing the local second-hand EV market. More company and fleet EVs would also increase visibility and help normalise the technology, leading to more rapid adoption.

4.38. Incentives could also include dedicated fleet reviews, support and case studies, such as those offered by the Energy Saving Trust on behalf of the UK Department of Transport (Energy Saving Trust, 2019).

4.39. The age profile of vehicles currently registered on the Isle of Man is illustrated in Figure 9 below.

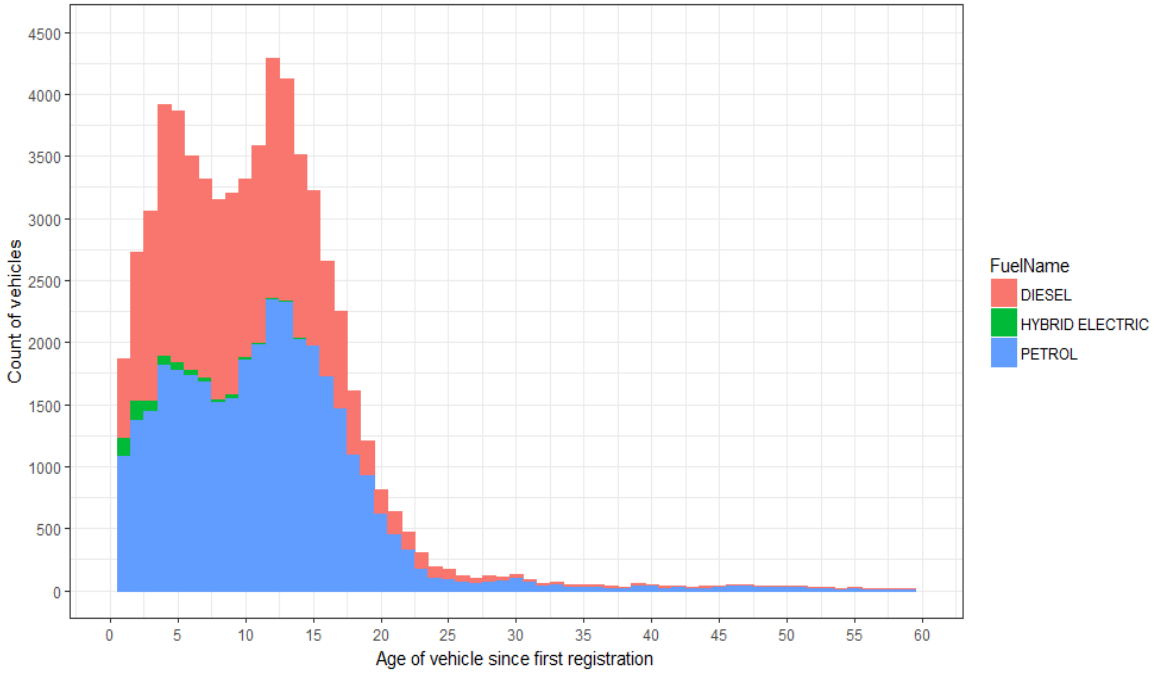

Figure 9: Analysis produced by Jack Emmerson, Climate Change Analytical Team

4.40. This diagram illustrates that the modal average age of vehicles on the Isle of Man is 13 years old, and suggests that vehicles tend to be de-commissioned at 16-17 years of age. For an incentive policy to have the most significant and timely effect in terms of encouraging the uptake of EVs, it could be developed and rolled out in the next 4 or 5 years, to coincide with the decommissioning pattern of the spike shown in the graph above of vehicles of around 14 years of age. As this period would also be around the time when there is expected to be market parity between electric and conventional combustion engine vehicles, a policy which incentivised the purchase of 2nd hand electric vehicles on the Isle of Man, could have a significant impact in the growth of the Manx EV fleet.

4.41. The distribution of the vehicle age profile also shows a bi-modal pattern, with a large number of vehicles being 5 years old. Assuming the same de-commissioning pattern of 16-17 years, policy to encourage renewal of this group with EVs should be in place by 2030.

Charging Infrastructure

4.42. There is a recognised strong link between public charging points and EV take-up, with the two key barriers being the charging availability and time required to charge.

4.43. There are currently 12 public charging stations on the Isle of Man, each comprising twin sockets providing 7 kw of power per hour, free of charge. There are another 12 plus private and commercial units with 3.6kW, 7kW and dedicated Tesla outlets, including private domestic EV owners offering their home charging units. There is

one twin 22kW 3 phase point on the mountain, at the Bungalow.

4.44. The MUA policy is to provide a ratio of one charging point for every 10 vehicles, with the assumption that 60% of EV charging will take place in the home. The MUA policy aim is that most EV owners will opt for home charging. This will allow them to utilise the EV tariff cheap overnight charging units, which are applied to the whole house usage, potentially representing a 15% discount on annual electricity costs.

4.45. The MUA expects commercial organisations to install EV stations in their car parks for staff usage, and possibly community usage overnight, which can then also cater for those EV owners without off-street car parking facilities. On this basis, the MUA estimates that only 10% of all charging stations are required for destination centres and other EV owners without off-street parking. Further research regarding the mechanics to encourage commercial organisations to provide EV charging facilities and the provision of facilities for those without of-street parking is required.

4.46. The MUA has committed funding to supporting the installation of additional charging points to ensure the ratio of EVs to charging points remains within European Union targets.

4.47. As the projected 30% exponential increase in EVs is not based on linear growth, annual monitoring of the number of EVs will be required in order to ensure that the MUA is able to achieve the 10:1 ratio of Electric Vehicles to public charging points.

4.48. The MUA is seeking to out-source the provision of public charging points, and in August 2019 advertised for expressions of interest for the provision of electric vehicle charge points, back office and payment platforms. It is intended that the formal tender process will commence in October 2019, with the service starting to be rolled out by Spring 2020. It is hoped that this will meet the needs of residents as the take-up of EVs on the Isle of Man expands. The Department of Infrastructure policy includes an action for retro-fitting Government properties with appropriate charging facilities where practical. Further information on this issue is provided within WP 28 *"Replace Government transport fleet and all public transport vehicles with electric".*

4.49. Whilst the Isle of Man has been recognised as a prime location for the growth in the electric vehicle fleet, it is important to recognise that residents do regularly travel to the UK. The UK charging network is therefore likely to be a consideration in any decision to purchase an EV.

4.50. The number of UK public charging points is extended daily. As of 29th October 2019, the total number of locations which have a public charging point installed was 9935, the number of devices at those locations was 15908 and the total number of

connectors within those devices was 27522. There were 439 new devices added to the Zap-Map database over the previous 30 days which equated to 862 new connectors (Zap-Map, 2019). This trend is only set to continue, and is illustrated in Figure 10 below.

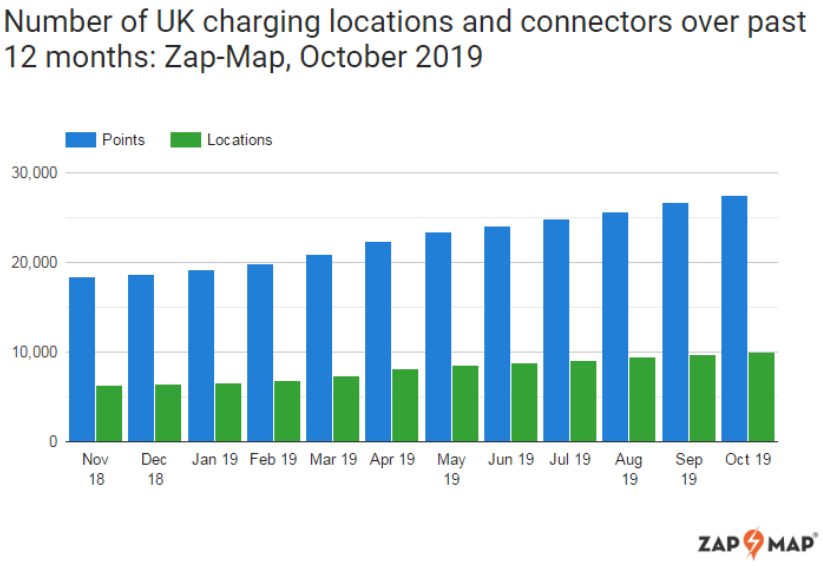

Figure 10: Number of UK charging locations and connectors over past 12 months (Zap-Map, 2019)

4.51. In September 2019, the UK Government launched a £400 million fund to increase Britain's electric vehicle charging infrastructure, with the first £70 million allocated for 3000 charge points.

4.52. Rapid charge points can recharge a family car in as little as 20 minutes, compared to existing technology which can take 40 minutes, making the reality of driving electric vehicles easier and more accessible across the country.

4.53. EV owners travelling in the UK are able to identify availability of charging points using on-line sites such as Zap-Map and Plug-In, in addition to EV charging locations identified on satellite navigation systems.

5. REVENUE IMPACT

Fuel Duty

5.1. In 2018/2019 road fuel duty totalled £29.24m. Treasury currently raises £15.24mm per annum through hydrocarbon oil duties; this equates to c. 8.15% of all Customs & Excise income to Treasury in that period. The financial balancing of Treasury's annual budgeting process will require that the loss of revenue from hydrocarbons be sourced elsewhere as this income diminishes over time through the introduction of EVs and changes to domestic heating from oil-fired boilers. It could be that the cost

of electricity for EV users is increased to meet a portion of this revenue shortfall. Full details of the hydrocarbon position are attached at Appendix 1.

5.2. It could cost in the region of £8m per annum for the additional costs resulting from the introduction of fiscal incentives to a level equal to that of the UK. As is the case with the loss of revenue from hydrocarbons, any costs incurred will need to be balanced from funds elsewhere as part of the annual budget process and long term tax strategy.

Power Sources

5.3. 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 the European clean transport campaign group, Transport & Environment (E Bannon f. T., 2018), as well as many others, 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 in the form of other energy carriers (hydrogen or electrofuels i.e. potential future carbon-based fuels produced from CO_2 and water using electricity as the primary source of energy). Decarbonisation of the Island's power sector will therefore be a pre-requisite for a zero emission transport system.

5.4. The Isle of Man Combined Cycle Gas Turbine (CCGT) power station emissions when charging a first generation Nissan Leaf are approximately 67g/km, significantly lower than conventional petrol and diesel vehicles, which are on average approximately 140g/km.

5.5. Most transport modes can be decarbonised following different pathways, but have very different implications for the overall energy system. Unless ways are found to produce significant amounts of zero emission electricity at low cost, it will remain important to minimise the need for additional clean electricity. This will mean that an approach focussed on using the most efficient pathways (i.e. direct charging 95% round trip efficiency) wherever possible is recommended. Given the much lower efficiencies of hydrogen and electrofuels (approximately 70% and 25% respectively), these are best used only where no other alternatives exists. The most efficient way to decarbonise all vehicles (from cars to HGVs,) and achieve net zero emissions from road transport by 2050, is by electricity.

Hydrogen Fuel Cell Vehicles

5.6. An alternative technology is also being progressed by the car industry alongside the development of EV's; vehicles powered by hydrogen fuel cells. Although primarily available in Asia, they are now available in the UK; Toyota and Hyundai both sell hydrogen fuel cell models. There are currently 13 hydrogen refilling stations operational in the UK. Hydrogen could be the future fuel source for HGV vehicles,

tractors, plant and machinery. Hydrogen fuel cells can also address the lengthy charging times required by EVs: Toyota claim that in less than 5 minutes of refuelling, it is possible to drive 300 miles and Hyundai claim their 400 mile Nexo can also be refuelled in 5 minutes.

5.7. Hydrogen is an energy carrier that can be produced through the electrolysis of water. If the electricity used in this process were to come from renewables, the hydrogen could be regarded as zero carbon.

5.8. 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 WP 09 *"A date by which no fossil fuel heating can be fitted."*

5.9. The development of a full hydrogen refuelling infrastructure, whereby the gas is produced and then transported to stations, would take billions of pounds and many years to develop in the UK.

5.10. Hydrogen fuel cells could be the powertrain of choice for future vehicles, but for now, the technology and infrastructure gaps ensure that unless an abundance of green power becomes available, the small size of the Isle of Man makes the case for hydrogen powered transport insufficient. Battery electric vehicles are therefore more appropriate. Any forthcoming opportunity for hydrogen- powered transport is also, in practical terms, at least a decade away. It is recommended however, that a watching brief is kept on the development of this technology.

HGVs/HDVs

5.11. 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"***.

5.12. The UK CCC have advised that ***"to reach net-zero emissions by 2050 it will be necessary for HGVs to move away from combustion of fossil fuels and biofuels to a zero-emissions solution (e.g. hydrogen, battery vehicles). Given the current evidence on lead-times for infrastructure and the time taken to turn over vehicle stocks, the government will need to make decisions on how HGVs will be decarbonised in the second half of the 2020s"*** (CCC, 2019).

5.13. The European Federation for Transport and Environment roadmap to decarbonise European transport (Bannon, 2018) reports that the drawbacks to hydrogen as a truck fuel are: *"the very high vehicle/technology costs, the high cost of the refuelling*

infrastructure and the inefficiency of the hydrogen system. The hydrogen pathway is less efficient than its full electric counterpart, and therefore requires more electricity."

5.14. There are already a number of viable electric heavy-duty vehicles (HDV) under 28 tonnes gross vehicle weight which are currently in operation in the UK. These are proving to be operationally practical for specific use cases. Given the relatively small mileage an HDV is likely to accrue on the Isle of Man, electrification of the fleet is highly plausible, and it would be highly unlikely that HDVs operating on the Island would need to consider the longer range zero- and low- emissions vehicle technologies such as hydrogen and dynamic power transfer systems. It is expected that rapid uptake of battery HDVs could be possible in the 2020s, once they reach total cost of ownership (TCO) parity with diesel.

5.15. An analysis of off-the-shelf technologies and strategies 'low hanging fruits' in Transport & the Environment (E Bannon f. T., 2018) found fuel efficiency standards for trucks to be the single most effective measure towards decarbonisation. The Isle of Man emissions inventory for 2017 reported that the second highest emissions within the transport sector, at 15% of the transport total, are attributed to heavy duty trucks and buses.

5.16. Binding standards for new trucks and buses would deliver the 30-50% fuel efficiency improvements and CO_2 reductions. This could be achieved with conventional (diesel) technology and would be cost-effective for truck users (lower fuel bills).

5.17. Vehicle and fuel taxation from the 2020s onwards should be designed to incentivise commercial operators to purchase and operate zero-emission HDVs.

5.18. In line with the current policy, there should be full engagement with the sector to identify and agree a clear route for reductions. This however will need to be considered in the context of the over-arching engagement plan.

6. OTHER ISSUES

Alternative Fuels - Bioethanol

6.1. To support the UK Government policy to reduce greenhouse emissions, petrol and diesel sold in the UK already contains a proportion of sustainable, renewable fuel. The requirements of the UK Renewable Transport Fuel Obligation Order requires a percentage of fuel sold by companies which supply 450,000 litres or more to come from sustainable sources (Department for Transport, 2019). There is no similar Order in place on the Island, but it could be worth investigating whether a requirement for inclusion of sustainable biofuels within the Island's fuel supply could be introduced to reduce the Island's emissions in the short to medium term. However, there would be

additional infrastructure requirements to transport pre-mixed fuel to the Island.

6.2. According to the All Party Parliamentary Group on Bioethanol 27, the contribution of biofuels in the UK could be further improved. E10, a biofuel made of 90% regular unleaded petrol and 10% ethanol would assist the UK in achieving its GHG reduction targets, saving the equivalent emissions of taking 700,000 cars off the road, while also being delivered at a low carbon cost relative to other options (APPG for British Bioethanol, 2019).

6.3. However, the Group also recognise that whilst E10 represents a big advance that could be achieved right now, EVs are the long-term solution to emissions from transport. E10 has not, to date, been rolled out in the UK – but should this be the case in the future, it could potentially provide a further short-term reduction in the Island's carbon emissions.

6.4. Unfortunately there are sustainability issues to consider with biofuels related to land and feed stock. Some of these issues are explored in WP 9: ***"Establish a date by which no new fossil fuel heating can be fitted."***

Alternative Fuels - HVO (Hydrotreated Vegetable Oil)/GTL (Gas to Liquid)

6.5. A local fuel supplier has advised that it is able to supply two alternative products for use in diesel engines, which although produce lower emissions, do not provide any carbon reduction benefit.

6.6. These alternative products are: GTL (Gas to liquid), a fossil fuel product that burns cleaner (fewer particulates and NOx) than conventional diesel and therefore has a lower impact on local ambient air quality, and HVO (Hydrotreated Vegetable Oil), a renewable, non-fossil fuel product. The industry is awaiting a decision on a standard for the sustainability of the feedstock.

6.7. Both GTL and HVO are products that are compatible with diesel and carry the full rate of duty. As both products require dedicated storage tanks, neither product is currently being brought to the Island, although the current storage tanks could accommodate them.

6.8. An academic evaluation of HVO compared to the effects on emissions of a passenger car diesel engine identified that the use of HVO resulted in a significant reduction of all regulated emissions. Suitable adjustment of a number of engine parameters, would reduce the emissions further (A Dimitriadis *et al,* 2018).

6.9. However, as both GTL and HVO are fossil fuel products, they could at best, provide an interim measure to reduce carbon emissions, but would not meet the requirements of the Island's net zero carbon emissions by 2050.

New Ownership Models

6.10. To offset the initially high cost of purchase, there may be a growth in Personal Contract Purchase (PCP), which secures a loan against the car. The value of the car at the end of the finance agreement is calculated at the start of the agreement, and deducted from the monthly repayments. PCP schemes both address perceived technology risks, ensuring the ability to upgrade to the latest model, and addresses concerns regarding battery performance and disposal.

6.11. Whilst this is a relatively immature market on the Island, a local firm has recently started to push its leasing product.

Mobility as a Service

6.12. With private cars lying idle for 90% of the time (Regen, 2018), fixed subscription 'Mobility as a Service' models that maximise the utility of vehicles, rather than leaving them parked. These schemes are growing in global popularity, e.g. the "Boris Bike" scheme in London which is now replicated in many other areas.

6.13. 'Mobility as a Service' subscriptions provide an on-demand, real-time platform to access a combination of transport methods such as car and bike sharing, taxis and car rentals/leases could be one way in which the Island's future transport needs are met. Although not a current feature of Island life, there is the potential that 'Mobility as a Service' schemes could become popular in the future should there be a commercial demand. It is worth noting that dramatic change can happen relatively quickly; the first Uber ride was in July 2010, with 10 billion rides having been taken by June 2018.

6.14. Whilst 'Mobility as a Service' could increase the use of low- and zero- emission vehicles, its real potential value is that it could be used to encourage modal shift to mass transit solutions which are inherently more sustainable. 'Mobility as a Service' could then become one element in a range of personal transport options which replace individual car ownership, along with active travel and public transport. If people could be encouraged to travel using active and public transport options the reduction in vehicles on the road would have a direct and immediate impact on emissions, whilst also reducing congestion. This would have the added benefit of reducing highway maintenance, which in turn protects natural capital and avoids the embedded emissions accrued in the maintenance processes. (G Bailey, Eunomia, 2019, pers. comm).

6.15. The issue regarding modal shift in transportation is covered in WP 14 ***"Promote use of public transport in place of private vehicles."***

Just Transition

6.16. 'Just Transition' is an effort to plan and invest in a shift to environmentally and socially sustainable jobs, sectors and economies.

6.17. The growth in EV's will have a direct impact upon local garages and mechanics that currently provide buy, sell, maintain and service conventional vehicles. The Economic Affairs Division of Treasury has advised that this sector employs in the region of 380 local residents.

6.18. In order to ensure that the transition to low emission vehicles complies with the principles of Just Transition, the social impact on individuals employed in the relevant sectors could be mitigated in part by the provision of financial or other support (such as re-training in the skills necessary to service EVs). Further consideration of this issue is required.

Motorsports/Heritage Transport

6.19. Although the Island's emissions policy excludes machines of cultural importance such as those used on the heritage railways and for motoring events, in 2019 the amount of carbon produced by TT qualifying and racing was estimated by climate change organisation Poseidon and offset by the Department of Enterprise. This process should be continued for future years and expanded to include the other emissions created by running the event, such as the travelling marshals and the helicopters.

6.20. The analysis undertaken by Poseidon also identified the impact of the far more significant level of emissions as a result of the travel to the Isle of Man by the 45,000 TT visitors. A voluntary carbon offsetting scheme could be made available to visitors, who could then choose to offset their emissions should they wished to do so. Further consideration of carbon offsetting is within WP 03, *"Establish easy mechanisms for donations, offsetting to fund Isle of Man schemes"*.

6.21. Emissions offsetting could also be adopted by the Heritage Railways.

6.22. Further consideration will be required regarding the approach to be taken for the many privately owned vintage vehicles on the Isle of Man.

Battery Production

6.23. 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).

6.24. 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).

6.25. 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

6.26. Off-Island battery disposal is a service has not yet been required, as there have been no vehicles on the Isle of Man that have reached their end-of-life. There is also some evidence to suggest that the batteries are out-living the vehicles themselves (InsideEVs, 2019).

6.27. The current model is for old batteries to be returned to the manufacturers; manufacturers are keen to look at schemes to re-purpose those batteries outside the use of the car, for example, storage systems like Nissan's three-megawatt storage system using the equivalent of 148 Leaf batteries, both new and used, which opened at Amsterdam's ArenA soccer stadium.

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

Future Policy on Fossil Fuelled Vehicles

6.29. The average car on the road in the UK is 8 years, and is likely to be scrapped at 14 years. The UK average vehicle age data makes it easier to understand the UK Committee on Climate Change recommendation that 2040 is too late for the phase-out of petrol and diesel cars and vans, and the recommendation that all new sales should be pure battery or electric by 2030-35 at the latest.

6.30. In the Isle of Man, the data suggests that vehicles are likely to be scrapped at 16-17 years. On this basis, most (although not all), new vehicles in the UK registered in

2035 will be scrapped by 2050. The long life of vehicles on the Island will however become academic if, due to greater global awareness of climate change, and the growth in clean sources of energy and alternatively powered vehicles, fossil fuels become unavailable.

6.31. As the vast majority of the Island's vehicles arrive via the UK and the UK has the same net zero target date of 2050, it is recommended that the Isle of Man should follow the same proposed trajectory for its future policy on fossil fuels, and that the registration of new vehicles be ultra-low emission by 2030-2035. The Island could choose to follow the Scottish model, and determine that all new cars and vans registered in Scotland be ultra-low emission by 2032. This earlier date would be more appropriate given the age of vehicle decommissioning in the Isle of Man, and would better ensure that most of these vehicles have reached the end of their useful working life by 2050.

Costs and Returns

6.32. The costs and returns of an incentive scheme based upon that offered in the UK for the high and low ambition targets, is shown in the following table over page.

Analysis Results Table - High Ambition 20,000 reduced cars						
	2010	2017	2020	2025	2030	% change
Emissions inventory (annual total for the year)						
CO_2 Emissions	103,000	99,000			71,308	-31%
CO_2 Captured						
CO_2e Reduction (from 2010)	0	4,000			-71,308	
Investment						
Public Investment in the preceding 10 years (£)					£50,000,000	
Cost per tonne of CO_2e					£485.44	
Analysis Results Table - Low Ambition 10,000 reduced cars						
	2010	2017	2020	2025	2030	% change
Emissions inventory (annual total for the year)						
CO_2 Emissions	103,000	99,000			87,154	-15%
CO_2 Captured						
CO_2e Reduction (from 2010)	0	4,000			- 87,154	
Investment						
Public Investment in the preceding 10 years (£)					£25,000,000	
Cost per tonne of CO_2e					£242.72	

7. CONCLUSION

7.1. A very challenging policy regarding the adoption of EVs has already been agreed, and DOI has already identified some key deliverables. The Climate Change Emergency work has however effectively halted the development of a detailed implementation plan, until the outcome of the project is known.

7.2. Seeking to reduce the number of vehicles on the road in the first instance and then decarbonising/electrifying the remaining fleet may be a more sustainable strategy. This would achieve reductions in the direct and indirect emissions that are generated. This would also help to increase the longevity of the road network and cut congestion.

7.3. There is also a concern that whilst EV implementation addresses tailpipe emissions, brake, tyre and road wear will continue to be an issue that represents a more significant health issue re: particulate matter emissions. By reducing the traffic on the roads the volumes of emissions from such sources will be reduced.

7.4. The development of a range of combined policy measures which incentivise growth in EVs in the Isle of Man will be required if their widespread adoption is to be achieved. The timing of the introduction of policy measures should take into consideration the de-commissioning age of the Island's existing fleet, to ensure the optimum timing for introduction to provide the greatest chance of success.

7.5. Whilst it would appear on the surface that the issue regarding sufficient charging networks is being addressed, close monitoring of public charging facilities will be required to ensure delivery, with further consideration regarding how commercial organisations could be encouraged to install charging facilities for employees.

7.6. As the bar for the ambition has already been set extremely high, considerable effort across a number of different Departments will be required to achieve the required modal shift to alternative forms of transport, and the take-up of low emission vehicles to enable the required cessation of fossil fuelled vehicles.

7.7. To ensure the successful outcome of the policy development and implementation process, key stakeholders from the relevant central Government Departments including the Department of Infrastructure, Treasury, and the Manx Utilities Authority, together with the private sector, need to work together to maximise the policy effectiveness. Although there is already in existence a cross-government working group "The Energy Future Group", consisting of representatives from the Department of Infrastructure, Environment, Food and Agriculture, this group last met in June 2018. It is recommended that this working group be reformed, and its remit and membership expanded, to include public sector vehicles, and Treasury representation.

7.8. To ensure effective and timely development and delivery—and cohesiveness with other—developing Climate Change policy options and actions, it would be appropriate for the EV acceleration programme to be progressed within the remit of the Climate Change Emergency transformation programme.

8. RECOMMENDATIONS

8.1. The two options regarding the future policy on fossil fuelled vehicles are:

- Necessary timescale: no fossil fuelled vehicles new to the Island to be registered after 2035, or;
- Ambitious timescale: no fossil fuelled vehicles new to the Island to be registered after 2032.

Action
A new or re-invigorated multi-disciplinary working group be established to identify and develop an inclusive portfolio of policies to overcome the market barriers and deliver and monitor the required growth in the EV market, particularly during the periods when current ageing vehicles are due to be decommissioned around 2023/24/25 and 2030.
Review of taxation system with the objective of dis-incentivising high emission vehicles and consideration of commercial and company car fleet EV incentives.
Consider and agree offsetting for TT race event and heritage railways.
Consider voluntary offsetting scheme for TT visitors.
Investigate mechanics to encourage organisations to provide EV charging facilities.
Investigate options to provide off-street EV charging facilities.
Engage with the Transport Sector to identify and agree route for emissions reductions.
Investigation and consideration of the introduction of legislation to require inclusion of sustainably sourced biofuels in fuels imported to the Isle of Man.
Consider implications for privately-owned "vintage" vehicles.
Public communications regarding the date from which no new petrol or diesel vehicles will be registered on the Isle of Man.
Consideration of the 'Just Transition' issues of the impact of removing internal combustion engines on mechanics and individuals employed within that sector on the Isle of Man.
Multi-disciplinary group to monitor the rate of EV growth on the Island, and the provision of charging points.

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APPENDIX I

What are the fuel duty barriers/opportunities, including current value to Isle of Man Government of fuel duty?

Background information

When is HCO duty payable and who pays it?

The liability to pay Hydrocarbon Oil (HCO) duty falls due when a dutiable oil product is removed from bond; on the Isle of Man this means the point at which either Manx Petroleum (MP) Ltd. or Ellan Vannin Fuels (EVF) Ltd. remove any type of dutiable fuel from their bulk storage facilities in Douglas or Peel. The two importers must declare and pay the duty due on these 'removals' directly to Isle of Man Customs and Excise (C&E) every month using duty deferment arrangements.

There are also a couple of other small HCO traders on the Island but the duty paid by EVF Ltd. and MP Ltd. accounts for 98% of the Island's annual collection of HCO duty.

So whilst EVF Ltd. and MP Ltd. 'pay' the duty to Isle of Man C&E upfront both companies recover it by adding it on to the cost of the HCO products they sell at the forecourt etc. For instance, a litre of petrol costing 117.06 pence at the forecourt can be broken down in to the following components:

Component	Pence per litre
Product	32.00
HCO Duty	57.95
Distribution cost	1.90
Retailer	5.70
VAT @ 20%	19.51
Cost to consumer	117.06

The duty represents almost 50% of the retail cost of a litre of fuel and the VAT a further 16% in the above example, making the amount payable to the Isle of Man Government 77.46p for every litre of petrol consumed.

Duty Rates

The full table of HCO duties and rates is reported below, but in reality the Island only generates income through the consumption of Ultra Low Sulphur Diesel, Derv, Marine Gas Oil (marked) and a small amount of aviation fuel.

Kerosene, which is used for domestic heating purposes, is also liable to duty but this is fully rebated so effectively the importer (and the consumer) pay zero duty.

VAT

The sale of most HCO products is treated as a taxable supply for VAT purposes; this means that every £1 of fuel sold on the Island generally results in the collection of a further £0.20 in VAT.

However, kerosene and gas oil used for domestic heating are liable to VAT at the reduced rate of 5%. Any significant reduction in the sale of either product would also result in a lower VAT collection on the Island.

Current value to Isle of Man Government of fuel duty

Since 2009/10 the average collection of Hydrocarbon Oil (HCO) Duty on the Island has been £30m per year. The highest collection was in 2009/10 (£30.69m); the lowest was in 2014/15 (£29.97m); and the last two financial years have been static at c. £30.3m each.

The stability in HCO receipts might seem surprising if you consider the improvements that have been made in fuel consumption/engine efficiencies throughout the last 10 years; however, the following points also need to be taken in to consideration:

(a) Vehicle replacement
There is a probability that most drivers only change their car once every 10 years on average and many will buy a second-hand rather than a brand new car. This being the case then the Treasury will only experience a significant decrease in HCO duty receipts once all of the older and less efficient vehicles have been replaced through this cycle.
On this basis the Treasury is forecasting HCO duty receipts to remain around £30m in the years 20/21 and 20/22 and this has been factored into financial forecasts.

(b) Duty rate
Historically the HCO duty rates were adjusted every year by HM Treasury as part of its Spring Budget process (now the Autumn Budget); however, due to ongoing economic uncertainties HM Treasury has not adjusted the HCO duty rates since March 2011.
This means that for the past 8+ years the Island's motorists have paid duty at £0.5795 per litre: this is an artificial situation as no inflationary or other economic measures have been adjusted for but all other excise duties e.g. alcohol, tobacco etc. have been subject to annual rate adjustments during this time.

(c) Fuel Prices
Throughout most of the last 8 years the average cost of petrol and diesel at the forecourt has been lower than it was before the last duty rate adjustment was applied in March 2011. This is demonstrated in the graph in Figure A1-a.
In the past, increases in the duty rate (which increase the overall cost of fuel) may have incentivised motorists to change their habits with a view to lowering the cost of motoring. However, the combination of (i) a static duty rate; and (ii) the reduction in the cost of oil, may mean that motorists have reduced their motoring costs or have not noticed any significant increase motoring costs (excl. maintenance and insurance costs). Motorists, might therefore, not have been as motivated as normal to seek out cost efficiencies.

For instance a vehicle is likely to become less fuel efficient as it ages making it more expensive to run; but the reduction in the cost of fuel at the pumps might have enabled motorists keep their fuel costs relatively stable even if they have actually been consuming more fuel than previously.

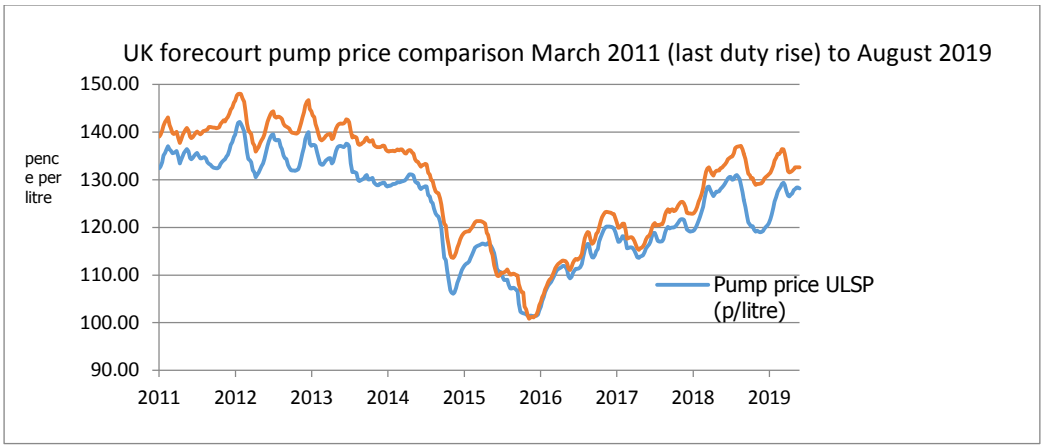

Figure A1-a. Based on UK stats – (UK Government, 2019)

(d) Distance travelled

A high proportion of vehicle journeys on the Island are only likely to cover short distances; depending on the vehicle used short journeys are likely to be fuel inefficient leading to increased consumption and higher than average HCO duty receipts on the Island.

(e) Inflation

Since March 2011 inflation has increased by 14.43%; based on this the public could have expected to spend £1.14 today to purchase what have cost £1.00 in March 2011.

As the duty rate has not changed since March 2011 inflation has not been fully captured within the Islands HCO duty receipts; the value of the £30.69m collected in 2009/10 should equate after adding inflation to HCO receipts of £34.98m in 2018/19; however inflationary increases in the duty rate have not been introduced by HM Treasury and high fluctuation in forecourt prices driven by oil prices has meant that overall receipts are similar to 2009/10 levels.

HCO consumption rates in 18/19 by type

In 2018/19 the £30.3m collection was made up of:

Category	**Litres (m)**	**£m Duty**
Derv/Diesel	26.2	15.2
Petrol	23.8	13.8
Gas Oil	9.6	1.0
Other trader income	-	0.3
Total	59.6	30.3

Barriers

The Revenue Sharing Agreement with the UK

The HCO duty rates are set by HM Treasury in the UK and under the 1979 C&E Agreement the Isle of Man adopts the same rates.

Paragraph 6 (2) (a) of the C&E Agreement allows the Isle of Man to apply a supplementary rebate not exceeding 10p per gallon or 2.2p per litre on any hydrocarbon oil used in the Isle of Man:

"so long as the Isle of Man Government advises the United Kingdom of any proposed variation in the supplementary rebate".

The Isle of Man Government must give the UK Government 3 months' notice of any proposed change in the HCO duty rate.

Unfortunately the C&E Agreement (which is an Act of Parliament and not an Isle of Man Act) does not include any provision to apply a 'surcharge' in respect of excise (incl. HCO) duties consumed on the Island.

This means that the Island can only reduce the cost of hydrocarbon oil duty by up to 2.2 pence per litre and it cannot influence consumer behaviour through the application of a fuel surcharge. For instance if we had the vires to apply a surcharge rather than a rebate then the Island would have more scope to influence consumer behaviour by (for example) decreasing petrol duty by 2.2p per litre and increasing diesel duty by a similar amount. Such measures might assist in a gradual reduction in the number of diesel vehicles on the Island. However simply switching from diesel to petrol wouldn't reduce the reliance on fossil fuels; although there *should* be some health benefits gained through improved air quality/reduction in nitrogen oxide (NOx) gases in the atmosphere.

Impact on VAT of introducing a new 'tax' for HCOs

On December 14 2010 a question was raised in Tynwald under the following heading: "*New tax on road fuel. Avoiding sharing proceeds with the UK".* A copy is attached at Appendix II of this document.

The reasons cited in the response, although it was made 9 years ago, remain extant.

Ability to recover the loss of revenue from HCOs per year

The Treasury currently raises £30m per annum through HCO duties; this equates to c. 9% of all C&E income to Treasury in 2018/19. For comparative purposes £30m is not far short of the amount needed to fund the Department of Home Affairs for a year.

Any reduction in revenue to Treasury will have to be offset by the following type of measures:

- Increasing the revenue raised through:
    (i) another indirect taxation income stream—however the existence of the C&E Agreement limits the Island's ability to increase the agreed 'shared duties' which are collected under that agreement.
    (ii) Introduction of new 'non-shared' environmental duties.

Currently on-line gaming duty, lottery duty, air passenger duty and the revenue raised through the application of VAT penalties sit outside of the C&E Agreement. These are referred to as 'non-shared' duties; the revenue raised on the Island through these duties is not shared with the UK in the same way that VAT, Excise or Customs duties are. The Island could seek to introduce its own 'environmental taxes' as non-shared duties but would have to go through the full consultation and legislative process in order to do so. The UK already has a range of environmental taxes including Aggregates Levy, Climate Change Levy, Landfill Tax that could be considered on the Isle of Man however aggregates and landfill charges are already in place on the Island and are administered by the Department of Infrastructure and the Department of the Environment, Food & Agriculture. They do not form part of the indirect tax system administered by the Isle of Man Treasury Department.

Opportunities

A new duty/environmental duty could be introduced as long as it sat outside of the C&E Agreement. However, there is still a possibility that any new 'duty' could be subject to some conditions and the biggest consideration would be the point at which the 'duty' would become due; anything that would create a border would (almost certainly) contravene the 1979 C&E Agreement with the UK. Equally we cannot adopt any mechanism that would create an additional layer of tax on an item that is already subject to tax/taxes.

For instance any additional 'duty' on fossil fuels could be difficult to introduce because a form of duty is already applied under the C&E Agreement and VAT is also charged on the supply so the introduction of a third layer of duty could be considered overly punitive.

The switch to cleaner fuels for transport and domestic heating purposes should still generate a reasonable amount of income for the Isle of Man Treasury as these products, which are already available, are dutiable at the same duty rates currently used for Petrol and Diesel. In the short term, only a significant uptake of e-vehicles would put a 'dent' in the income gained from HCO duty on the Island.

Also if transport continues to be powered by liquid fuels it will, in all probability, still be subject to duty charges. Therefore a significant loss of duty revenue may not be as big, or as immediate, an issue as originally anticipated.

Funding for initiatives

Treasury currently has a General Reserve Fund of £338m. Not all of the fund is available for use but there is a possibility that the Treasury could provide some incentive funding out of the General Reserve Fund.

Appendix II

Light oils

Fuel Duty—pound per litre (unless stated)	**From 6 pm on 23 March 2011**
Unleaded petrol	0.5795
Light oil (other than unleaded petrol or aviation gasoline)	0.6767
Aviation gasoline (Avgas)	0.3770
Light oil delivered to an approved person for use as furnace fuel	0.1070

Heavy oils

Fuel Duty—pound per litre (unless stated)	**From 6 pm on 23 March 2011**
Heavy oil (diesel)	0.5795
Marked gas oil	0.1114
Fuel oil	0.1070
Heavy oil other than fuel oil, gas oil or kerosene used as fuel	0.1070
Kerosene to be used as fuel in an engine, other than in a road vehicle or for heating	0.1114

Biofuels

Fuel Duty—pound per litre (unless stated)	**From 6pm on 23 March 2011**
Bio-ethanol	0.5795
Biodiesel	0.5795
Biodiesel for non-road use	0.1114
Biodiesel blended with gas oil not for road fuel use	0.1114

Road fuel gases **Fuel Duty—pound per litre (unless stated)**	**From 6pm on 23 March 2011**
Liquefied Petroleum Gas (LPG)	0.3161£/kg
Road fuel natural gas including biogas	0.2470 £/kg