

## **Facilitate wider use of electric vehicles for private use including charging points in new buildings, more public charging points etc.**

### **1. EXECUTIVE SUMMARY**

- 1.1. This paper looks at how to facilitate the provision of infrastructure for electrical vehicle (EV) charging. Its central focus is on what the Isle of Man (IOM) can do in the coming years to lay the foundations for the transition to electric vehicles.
- 1.2. While it is recognised there will be a need for public charging points, there are already some works underway to facilitate this, with particular regard to visitor usage. It is likely that charging cars at home overnight using a dedicated chargepoint will be the primary way EV's are charged due to convenience for consumers, but other options must be developed. A target of at least 10,000 electric vehicles on Manx roads by 2030 has been set by Manx Utilities Authority (MUA). By setting long-term ambitions, a clear signal of the IOM's direction of travel can be set to provide certainty for industry and consumers. However, these ambitions need to be matched with actions. A fit for purpose infrastructure network will be key to this. A move to the mass adoption of ultra-low emission/electric vehicles means more infrastructure will be needed. The vision is for current and prospective electric vehicle drivers to be able to easily locate and access charging infrastructure that is affordable, efficient and reliable.
- 1.3. Other work packages have assessed potential take up of EV's, including incentives and other options to reduce emissions. This paper focuses on supporting the development the best electric vehicle infrastructure networks for the Isle of Man.
- 1.4. The transition to zero emission vehicles does not just require the vehicles to be available and affordable. An infrastructure network needs to be in place that is easy for current and prospective drivers to locate and use, and is affordable, efficient and reliable.
- 1.5. This paper proposes regulatory changes to facilitate this and ensure that both new and existing buildings are ready for such infrastructure changes. As the nature of the changes will be predominantly regulatory, a consultation is proposed to set minimum requirements for electric vehicle charging infrastructure in new and existing buildings with phased delivery.
- 1.6. There is also a need to consider how best to ensure all types of residential property owners are able to access a charge point for their EV's and are not disadvantaged on the basis of having communal facilities or not owning their own home. The level of provision around this needs to be explored in more detail.

- 1.7. It is recognised that there are works being undertaken to find the suitable sites for charging points and ways of publicising them. Some of the recommendations in this report would support this work going forward.

## 2. THE CHALLENGE

- 2.1. Moving to net zero carbon will require a shift change in the use of electric vehicles and ensuring that the infrastructure for their use is in place will be key.
- 2.2. Studies show that around 80% of electric car owners charge their car at home (Gov 2018)<sup>i</sup>. It is therefore likely that charging cars at home overnight using a dedicated charge point will be the way forward mostly due to convenience for consumers. The provisions of these will ensure that EVs can play a full part in our future smart and flexible energy system. For these reasons, it is likely that the home or home adjacent will be central to the future charging system. The main challenge will be ensuring those without dedicated off street parking are catered for.

### Existing charge points in the Isle of Man

- 2.3. There are currently in the region of 24 charge points (Figure 1), further information on these can be found on <http://www.plugshare.com> or [www.zap-map.com](http://www.zap-map.com).



Figure 1 Map of electric vehicle charging points on the Isle of Man, Extract from: <http://www.plugshare.com>

**Tariffs**

- 2.4. Currently, Manx Utilities offer an EV charging tariff to assist to customers with an EV. The electric vehicle charging tariff is available to domestic customers who wish to charge their own electric vehicle, for their personal use. The current prices per unit are shown in Figure 2.

**Electric vehicle tariff**

| Peak              | Off Peak          | Standing Charge |
|-------------------|-------------------|-----------------|
| 7am- Midnight     | Midnight-7am      |                 |
| 16.7p<br>Per Unit | 9.10p<br>Per Unit | 20p<br>Per Day  |

Figure 2 Current price per unit for Electric Vehicle tariff for on an off peak demand on the Isle of Man. Extract from <https://www.manxutilities.im/your-home/electricity/domestic-tariffs/>

- 2.5. Currently Manx Utilities Authority (MUA) provides 24 charging points, which are free to use at 10 locations, in a bid to encourage more people to switch to electric vehicles. As of the end of 2019 they are intending to charge for the electricity used. Although it is currently unclear what the charges will be.

**Current targets**

- 2.6. In March 2019 the Department of Infrastructure (DoI) published a policy on low-emission surface transport (DoI 2019). This document provides a policy framework and direction of travel for the support of EVs on the Island but also sets targets for how the Government fleet can assist in ensuring that the majority of surface transport will be powered by ultra-low greenhouse gas emission technology by 2050. As part of that work, a target of at least 10,000 electric vehicles on Manx roads by 2030 has been set in a policy document by MUA. The Isle of Man’s KPI figure of 10,000 EVs by 2030, based upon the two degrees 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 scenario projects a net increase of 4,000 electric vehicles per year after 2030.
- 2.7. Based on current figures the target figure represents approximately 15% of cars currently on the road.

## Required Infrastructure

- 2.8. It will be important to clarify the required infrastructure in buildings for the charging of electric vehicles, where 3 phase power is required or if existing power supply is acceptable. Understanding this must be priority as it will inform the next steps.

### UK Position

- 2.9. In July 2019, the UK's Department for Transport released a consultation paper on Electric Vehicle Charging in Residential and Non-Residential Buildings (Gov, 2019a). This proposes a comprehensive regulatory package to deliver the Road to Zero (2018) strategy, which set out a comprehensive package of support to reach their mission for all new cars and vans to be effectively zero emission by 2040. The consultation ended on 7<sup>th</sup> October 2019, the results of which will be used to gain insight on the appetite for such regulatory changes and could be used to guide any consultation on this issue in the Isle of Man.

### Targets in other Jurisdictions

- 2.10. The Isle of Man 2050 target mirrors that of the UK, and Eire, which makes more specific reference to EVs, stating that almost every car and van will be zero emission by 2050. To achieve this objective, the current UK policy, outlined in the UK's Committee on Climate Change (UK CCC) 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.
- 2.11. This figure was revised by the UK CCC in its July 2019 progress report to the UK Parliament, which identified as a priority for the coming year that to achieve the 2050 target, it would be necessary to revise this target to 2030-2035, (with 2035 being the very latest).
- 2.12. 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.
- 2.13. National Assembly for Wales Economy, Infrastructure and Skills Committee published 'Electric Vehicle Charging Infrastructure March' 2019 which seeks to establish a way forward for Wales in the next steps of delivering charging infrastructure.
- 2.14. The current position of Jersey, (with which the Island frequently compares itself), 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. THE OPPORTUNITY

#### Works already underway

- 3.1. Manx Utilities – Tynwald Question 18<sup>th</sup> June 2019<sup>ii</sup> response. Dr Alex Allinson said: ‘The number of public charging points will increase.’ It is assumed that the number of electric vehicles will increase by around 30% per year. The projections for the next five years suggest the number of electric vehicles will increase by 1,800 or 360 vehicles per year, and therefore up to 30 additional charging points will be required annually in order to maintain a 10:1 ratio of vehicles to public charging points.’ He also confirmed that work was under way to find the best sites for charging points and ways of publicising them.
- 3.2. Also at the above Tynwald the DoI stated that as part of the 2018-19 budget, capital funds were provided for the purchase of electric vehicles and infrastructure installation. The DoI has identified the suitable areas where EV and charging points are to be installed (Figure 3).

| Location                   | Number of charging points |
|----------------------------|---------------------------|
| Ellerslie Depot            | 2                         |
| St George’s Court          | 1                         |
| Sea Terminal               | 2                         |
| Government House           | 1 (currently planned for) |
| Banks Circus               | 1                         |
| Police Headquarters        | 2                         |
| Central Government Offices | 1                         |

Figure 3 Suitable sites for electric vehicle charging points. Extract from Department of Infrastructure.

- 3.3. Extract from Hansard 18 June 2019 - The DoI policy ‘Moving Towards Low Emission Travel A Policy for Surface Transport & Electric Vehicles’ (March 2019) sets out a number of action areas around the following:
- Provision of information
  - supply of viable alternatives
  - a reliable and accessible charging network
  - an appropriate taxation regime.
- 3.4. With the following deliverables:
- Introduce requirements for charging points in new parking areas and developments into the Manual for Manx Roads
  - highways legislation to regulate public parking at electric vehicle charge points
  - highways legislation to control the installation of roadside charge points

- introduction of Building Control and Planning requirements that support the development of a built environment where electric vehicles are the predominant form of powered vehicle.

### **Electricity Demand Management**

- 3.5. Longer term, charging at home is likely to be preferable in regard to managing the electricity system; as charging at home and overnight will mean less addition to peak electricity demand during the day, and allow for additional load management and other technologies (smart metering) (Gov, 2019b).
- 3.6. To future-proof the streets, new street lighting columns could potentially include charging points, where appropriately located, in residential areas with current on-street parking.
- 3.7. Summary point: Provides the opportunity for Isle of Man Government to be at the forefront in co-ordinating roll out of EV charging and establishing a clear vision for EV charging infrastructure.

## **4. THE ACTIONS**

- 4.1. This weft is focused on facilitating the wider use of electric vehicles for private use including charging points in new buildings and provision of more public charging points. The availability of vehicles and taxation regime covered in other work packages.

Possible actions to facilitate wider use of electric vehicles are suggested below:

### **Necessary Ambition**

- 4.2. Communication: A communication strategy for electric vehicles should be developed (low emission travel policy), linking to knowledge and enabling choices. Provision of technical guidance for requirements for EV charging and associated enabling infrastructure, for developers, consumers and installers.
- 4.3. Knowledge Base:
  - Analysis of residential properties - assess flats/terraced houses to determine/identify required infrastructure
  - monitor the proportion of electric vehicles sold annually on the Island to feed into communal or public charging point provision
  - confirm required cabling infrastructure that is required
  - identify areas electrical capacity reinforcements may/will be needed
  - car Parking figures would need to be calculated – i.e households with off-street parking and public spaces
  - costs of charging infrastructure in the Isle of Man

- undertake an electric vehicle feasibility study focussing on what can be transferred to electric and when, and what may be required to facilitate the switch over e.g. on-road charging, private charge points, public charge points etc, adjusting the scope and detail of it to match the data you have available.

#### 4.4. Legislation:

- Introduce requirements for charging points in new parking areas and developments into the Manual for Manx Roads
- highways legislation to regulate public parking at electric vehicle charge points
- highways legislation to control the installation of roadside charge points.
- consultation on all new homes to be electric vehicle (EV) ready
- based on requirements for every new home to have a chargepoint, leading to introduction of Building Control requirements to support provision and planning requirements that support electric vehicles in development (see below with different targets for necessary and high ambition).

#### 4.5. Policy Development Opportunities:

- Ensuring new buildings are future ready

#### 4.6. New Buildings:

- New residential development with an associated car parking space to have a charge point
- car park development to have cable routes for electric vehicle chargepoints in every car parking space or provision for each space to be able to accommodate an electric car
- new Non-Residential Buildings with car parking spaces to have a certain number of chargepoints for one in five spaces and cable routes for an electric vehicle chargepoint for the remaining one in five spaces.

#### 4.7. Major renovation or Material Change of Use – Existing Buildings where building or planning legislation is relevant:

- Residential development to have cable route and charger
- non-residential development to have a one charge point for every 10 spaces and cable routes for 1 in 5 spaces.

**4.8. All Buildings:**

- Existing non-residential buildings at least one chargepoint in existing non-residential buildings with more than 20 car parking spaces.

**4.9. Current Manx Utilities Authorities work:**

- Could also include in this a feasibility study/scoping study to help quantify phasing in of public charge points, and the strategic locations for them.

**4.10. Funding interventions:**

- The domestic charging point element of this work packages is linked to work packages 10 and 27, which look into phasing out of fossil fuel vehicles and electric vehicle subsidies, respectively and as such is not covered here at this time. See them for further details.

**High Ambition Targets****4.11. Policy Development Opportunities:**

- Ensuring new buildings are ready for the future of EV infrastructure requirement
- Bring new build bring target date forward to 2025

**4.12. Major renovation or Material Change of Use – Existing Buildings where building or planning legislation is relevant:**

- Residential development to have cable route and charger
- Non-residential development to have a one charge point for every 6 spaces and cable routes for 1 in 3 spaces

**4.13. All Buildings:**

- Existing Non-Residential Buildings at least one chargepoint in existing non-residential buildings with more than 10 car parking spaces.

**5. THE IMPACTS AND MITIGATIONS FOR THEM****Costs**

- 5.1. The cost of installing ducting to route cables for residential new building and other developments including car parking spaces is expected to fall on the developer. With new build housing the same amount of parking provision is anticipated based on today's standards.



- 5.2. For existing buildings the cost is expected to be absorbed by either the owners or landlords.
- 5.3. Improved access to charging, and having plans to do so, will assist in overcoming user apprehension around buying an electric vehicle, avoiding the circular argument about uptake barriers and providing certainty.
- 5.4. Across small-medium business the impact could be greater if they are unable to absorb costs so a series of exemptions or phased provision could be considered to address this. However this is currently outside out the consideration of any funding option.
- 5.5. With new builds the costs could be passed onto purchaser, options for mitigation could be considered as part of any consultation process.

#### **Charge points become obsolete/future stranded assets**

- 5.6. There could be an issue if chargepoints are legislatively required, as technology will in all likelihood advance.
- 5.7. This could be avoided by not being prescriptive about the type of chargepoint and upgrades being an exempted or permitted development.
- 5.8. There could be an issue if an alternative power source is advanced to such a degree that the infrastructure if no longer required.

#### **Electrical System**

- 5.9. Home charging provides relatively small grid impacts if charged overnight (Denholm *et al.*, 2013).

## **6. THE COSTS AND RETURNS**

- 6.1. There are significant co-benefits in terms of air quality improvements and noise reductions. The benefits of EVs are covered in more detail in other work packages relating to electric vehicles and fossil fuels. This work packages focuses on charging points and infrastructure.
- 6.2. Costs of charging points and associated infrastructure. This is also referenced in other wefts, however it was considered prudent to refer to the work commissioned by UK Department for Transport<sup>iii</sup> to estimate the costs of elements of charging infrastructure. It looked at the four elements of charging infrastructure, 'Ducting', 'Cabling', 'Hardware' and 'Grid Connection'. It is likely that these costs will have a large degree of variation, partly to reflect the range of real world circumstances likely to be encountered, particularly with regards to grid connection costs as these are highly location specific particularly in the Isle of Man.

6.3. They considered a range of options including during construction and retrofit for four types of parking spaces, Figures 4 and 5 set out costs for residential and non-residential developments.

Annex A1: Steer - Wiring and Installation costs for single chargepoint

| Wiring and Installation costs |                      |             |               |             |               |
|-------------------------------|----------------------|-------------|---------------|-------------|---------------|
| Building type                 | Cost group           | New Build   |               | Retrofit    |               |
|                               |                      | Low         | High          | Low         | High          |
| Off-Street Private            | Cabling + Ducting    | £100        | £500          | £500        | £500          |
|                               | Electrical Equipment | £0          | £100          | £0          | £100          |
|                               | Civils               | £0          | £0            | £0          | £0            |
|                               | <b>Total</b>         | <b>£100</b> | <b>£600</b>   | <b>£500</b> | <b>£600</b>   |
| Multioccupancy surface        | Cabling + Ducting    | £500        | £1,500        | £500        | £1,500        |
|                               | Electrical Equipment | £80         | £360          | £80         | £360          |
|                               | Civils               | £300        | £1,000        | £300        | £2,000        |
|                               | <b>Total</b>         | <b>£880</b> | <b>£2,860</b> | <b>£880</b> | <b>£3,860</b> |
| Multioccupancy underground    | Cabling + Ducting    | £500        | £1,500        | £500        | £1,500        |
|                               | Electrical Equipment | £150        | £800          | £150        | £800          |
|                               | Civils               | £0          | £0            | £0          | £0            |
|                               | <b>Total</b>         | <b>£650</b> | <b>£2,300</b> | <b>£650</b> | <b>£2,300</b> |
| Multioccupancy multi-storey   | Cabling + Ducting    | £500        | £1,500        | £500        | £1,500        |
|                               | Electrical Equipment | £150        | £800          | £150        | £800          |
|                               | Civils               | £0          | £0            | £0          | £0            |
|                               | <b>Total</b>         | <b>£650</b> | <b>£2,300</b> | <b>£650</b> | <b>£2,300</b> |

Figure 4 Costs for residential development Extract from DfT consultation<sup>iv</sup>

Annex A1: Steer - Wiring and Installation costs for single chargepoint

| Wiring and Installation costs |                      |             |               |             |               |
|-------------------------------|----------------------|-------------|---------------|-------------|---------------|
| Building type                 | Cost group           | New Build   |               | Retrofit    |               |
|                               |                      | Low         | High          | Low         | High          |
| Off-Street Private            | Cabling + Ducting    | £100        | £500          | £500        | £500          |
|                               | Electrical Equipment | £0          | £100          | £0          | £100          |
|                               | Civils               | £0          | £0            | £0          | £0            |
|                               | <b>Total</b>         | <b>£100</b> | <b>£600</b>   | <b>£500</b> | <b>£600</b>   |
| Multioccupancy surface        | Cabling + Ducting    | £500        | £1,500        | £500        | £1,500        |
|                               | Electrical Equipment | £80         | £360          | £80         | £360          |
|                               | Civils               | £300        | £1,000        | £300        | £2,000        |
|                               | <b>Total</b>         | <b>£880</b> | <b>£2,860</b> | <b>£880</b> | <b>£3,860</b> |
| Multioccupancy underground    | Cabling + Ducting    | £500        | £1,500        | £500        | £1,500        |
|                               | Electrical Equipment | £150        | £800          | £150        | £800          |
|                               | Civils               | £0          | £0            | £0          | £0            |
|                               | <b>Total</b>         | <b>£650</b> | <b>£2,300</b> | <b>£650</b> | <b>£2,300</b> |
| Multioccupancy multi-storey   | Cabling + Ducting    | £500        | £1,500        | £500        | £1,500        |
|                               | Electrical Equipment | £150        | £800          | £150        | £800          |
|                               | Civils               | £0          | £0            | £0          | £0            |
|                               | <b>Total</b>         | <b>£650</b> | <b>£2,300</b> | <b>£650</b> | <b>£2,300</b> |

Figure 5 Costs for non-residential development Extract from DfT consultation<sup>y</sup>

**6.4. Summary points:**

- Cost savings from installation during construction of new build could also extend to avoiding disruption and costs on public assets and building occupants in the future from retrofitting.
- There could be significant cost and logistical difficulties involved with retrofitting chargepoints into existing properties.
- Installation in new build properties at the point of construction is in most circumstances both cheaper and easier. By setting a legislative requirement for full installation in new build properties with off-street parking, it would assist in moving towards widespread access to home charging, in a significantly more cost-effective way than retrofitting.

**7. RISKS OR BARRIERS**

7.1. In relation to the actions set out under section 6 above some risks have been identified and have been ascribed a risk level as set out below. The associated risks are considered to be as follows:

**7.2. Coordination Failure:**

- Without addressing supply, the circular relationship between the take up of EV's is likely to continue to affect take up.

**7.3. Lack of take up of EV's:**

- Charge points are underutilised
- Occupants may not drive, or plans such as active travel significantly reduce individuals' car use leading an oversupply of charge points.

**7.4. Negative impact on new build supply due to costs:**

- Could affect supply of housing and/or increase cost to purchaser which may lead to a reduction in demand for those properties.

**7.5. Electrical capacity reinforcements don't happen:**

- Wider reinforcements of the electrical infrastructure may be required to support the charging infrastructure and usage could result in power outages or being unable to charge the vehicle.

**7.6. Costs of Fitting are under estimated:**

- Cost differential between new build and retrofit may be lower.

7.7. Rural/urban divide: It is vital that the needs of rural communities in the Isle of Man are not overlooked as EVs become more commonplace. Consideration should be given to how best to provide the right charging infrastructure in the right place to meet local needs. Consideration should also be given as to how to identify and support rural communities that are interested in trialling new transport solutions such as car clubs, as part of a wider transport solution.

Table 1 Risk Matrix for Proposed Actions

|  |   |   |  |
|--|---|---|--|
| <b>Costs not known</b>                 | <b>Funding Schemes</b>  | <b>Electrical capacity reinforcement</b>                              |  |
| <b>Costs known better than to 100%</b> |   | <b>Legislation to facilitate infrastructure into new developments</b> | <b>Legislation to facilitate infrastructure into existing developments</b> |
| <b>Costs known better than to 50%</b>  | <b>Communication Strategy</b><br><br><b>Data Capture – Knowledge Base</b> |   |  |
|  | <b>Little chance of failure</b>   | <b>Less than 30% chance of failure</b>                                | <b>May fail</b>  |

| <b>Risk</b>     | <b>Action</b>                       |
|-----------------|-------------------------------------|
| High Risk (H)   | High risk, enumerated as 6 or 9     |
| Medium Risk (M) | Moderate risk, enumerated as 3 or 4 |
| Low Risk (L)    | Low risk, enumerated as 1 or 2      |

## 8. THE CO-BENEFITS (THE POSITIVE BENEFITS ASSOCIATED WITH THE CLIMATE ACTION)

- 8.1. Encouragement of 'green delivery businesses', such as installers, maintenance and advisors.

## 9. CONCLUSION

- 9.1. There are opportunities for the Isle of Man Government to be leaders in setting standards and being clear about what is required to facilitate wider use of electric vehicles for private use including charging points in new buildings, retrofitting and public charging points.

## 10. REFERENCES

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## **ANNEX WITH IMPORTANT ADDITIONAL INFORMATION**

[www.plugshare.co.uk](http://www.plugshare.co.uk)

<http://www.iomtoday.co.im/article.cfm?id=49336&headline=There%20will%20be%20a%20charge%20to%20charge%20your%20electric%20car&sectionIs=news&searchyear=2019>

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