

Application Guide for Aran Islands Electric Vehicle Programme

Introduction to Aran Islands Electric Vehicle Programme

SEI is supporting a project together with the Dept of Community, Rural and Gaeltacht Affairs to demonstrate how wind and ocean energy may be used to provide electricity, heat and transport requirements for the people of the Aran Islands. This would significantly reduce the need to ship fuel to the islands and make the islands more self reliant and economically sustainable for the future. By demonstrating the use of energy storage, the islands could also serve as a model for the future energy system for the whole of Ireland.



One element of this project is to assess the ability of electric vehicles to meet the transport requirements for the islands. It is therefore planned that 10 electric vehicles will be deployed and monitored on the islands starting in January 2010 and finishing in December 2012. Using performance data collected from the vehicles and the homes, the energy efficiency, reliability and maintainability of the vehicles will be examined. An assessment of the potential of locally generated wind power to supply the electricity requirement for the vehicles will be also made.

Ireland has a target of replacing 10% of its transport fuels with renewable energy fuels by 2020. Given the scale of Ireland's wind and ocean energy resources, it is considered that a significant portion of the target can be met by using this energy for transport in Electric Vehicles and Plugin Hybrid Electric Vehicles. In support of this objective, the Government have set a target of replacing 10% of our passenger and light commercial vehicles with Electric Vehicles by 2020. This project represents one of the leading efforts worldwide to demonstrate the potential for wind energy powered Electric Vehicles.

This document provides guidance for Aran Islands residents wishing to apply to participate in the Electric Vehicle programme. The document should be read in conjunction with the Application Form.

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General Terms for Electric Vehicle Programme

The target distribution of the vehicles will be 6 on Inis Mor, 2 on Inis Oirr and 2 on Inis Meain subject to sufficient numbers of applications being received from each island.

Each selected island applicant will have use of the Electric Vehicle for a period of one year. A refundable deposit will be returned to the applicant on safe return of the electric vehicle without damage and in a good, clean condition.

Each successful applicant must have a charge point installed before the electric vehicle is transferred for the trial. The owner of the dwelling must agree to have this equipment installed at their house. This can be located beside the house or on a garage/shed fitted with electrical wiring.

Each applicant must also agree to participate in the monitoring of the vehicle use including quarterly access to the vehicle for downloading mileage and electricity consumption data.

All interested participants should complete and return the application form before **Tuesday, 8th December, 2009** (please see Application Form for further details). Successful applicants will be informed by Wednesday, 9th December subject to a brief inspection of the house electrical system and parking facility. Successful applicants will then be invited to sign a formal 1 year rental agreement with Merrion Fleet Management. Merrion Fleet Management will be the owners of the vehicles and will provide full maintenance and support services and vehicle insurance for the applicants for the duration of the trial. The vehicles will be delivered on completion of installation of the charging infrastructure and the successful completion of training on EV use in January 2010.

Electric Vehicle Performance and Driver Training

The vehicles that have been selected for the programme are the Mega E-City electric cars supplied by the company Greenmachines here in Ireland (for more details on the vehicle specifications go to http://www.greenmachines.ie/downloads/pdf_docs/mega_ecar.pdf). The car is a 4 seat vehicle which includes 2 adult seats in the front and 2 small seats in the rear (most suitable for children). The rear seats can be folded forward or removed completely for increased baggage space (see picture above). The car has regenerative braking which recharges the batteries when you brake which greatly increases efficiency. Power is supplied by an electric motor which does not require a gearbox or clutch mechanism. It is expected that as the car has fewer components it should be significantly cheaper to maintain annually. The vehicle comes with central locking, electric windows and a CD/MP3 player with radio.

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Key Performance for the ECity:

- Maximum daily range = 60 km (based on a 9hr overnight charge)
- Maximum speed = 65 kph
- Estimated Fuel Efficiency = 130Wh/km [= 1.28 Litres/100km or 220 miles per gallon (note this estimate is based on the equivalent units of energy the user must purchase)]

Before passing the vehicle over, each driver will be given full instruction on its use and charging equipment operation. Drivers will also be shown how to drive the vehicle for maximum fuel efficiency savings.

Maintenance and Insurance

The operating agent will be Merrion Fleet Management who are an Irish company specialising in the operation and maintenance of many large public and private sector vehicle fleets. Merrion will be the owner of the vehicles and the trial users selected from the application process will be requested to sign a formal 1 year rental agreement with Merrion before receiving the vehicle. Merrion will be responsible for ensuring the successful operation of the vehicles for the duration of the trials. Drivers will be provided with the necessary contact points should any issues arise with the vehicles. Merrion will cover all maintenance and servicing requirements for the vehicles.

Insurance cover for up to 3 drivers will be included under the terms of the vehicle lease subject to the final terms of the governing vehicle insurance policy. Drivers must be aged from 25 yrs to 70 yrs of age with a full clean driving license.

Electric Vehicle Charge Point installation

As part of the scheme, each house will require the installation of an external plug to be attached to the side of a house or a garage/shed. The target building will require a modern trip switch fuse box (i.e. a box fitted with Residual Current Device (RCD) switches) to be present. The external plug will be (see Fig. 1 below) wired back to the fuse box. The key components to be fitted include:

- External water proof plug socket
- Plug activation timer switch (to ensure customer is charging over night)
- Electricity energy meter
- Associated wiring

This charge point will be installed with a timer and the system will be set up to allow the vehicle to be charged at night time, with an override switch for emergency charges if required. It will take approximately 9 hours to fully charge the vehicles or less if the battery has not been fully used during the previous days driving.

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Each trial user will be charged a total cost of €330 (inc VAT) for the installation of the infrastructure. The equipment will remain the property of the dwelling owner during and after the trial period is completed. In this way, the charge point will then be available to the home owner should he/she wish to purchase an Electric Vehicle at some point in the future.

The equipment will be installed by certified electricians (RECI approved) on behalf of Merrion Fleet Management. The installations will also be independently inspected prior to use.

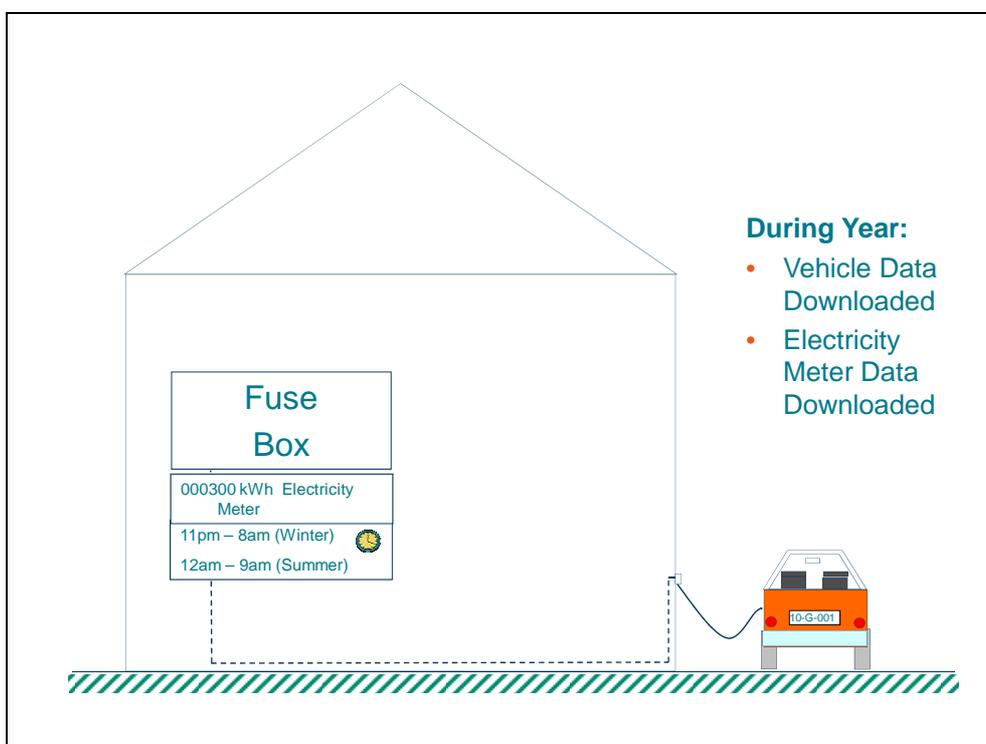


Figure 1: Schematic representation of typical charge point installation

Electricity Supply Tariff

As part of the scheme, pending approval, successful applicants will be advised to switch to a nightsaver tariff for their electricity (if they are not already on it). Typically domestic users with domestic hot water requirements using washing machines and dishwashers at night can reduce the cost of their annual energy bills.

There is no initial cost for switching over to a dual tariff meter. However, if switching from a dual tariff meter back to a single 24 hour tariff meter there is a once off cost of €192.95 (including VAT).

The use of a night rate tariff will allow the full cost benefit of electric vehicles to be realised. Based on the data provided in the Application Form, SEI will liaise with electricity supply companies to advise on a case by case basis the most beneficial tariff for the applicant to use.

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Cost Benefits of Participation in the Scheme

The costs of participating in the trial will be as follows:

- €330 for once off installation of the EV charge point (remains property of the applicant);
- Refundable deposit of €400 collected in lump sum on delivery of the vehicle;
- €12 annual vehicle rental fee for participation in the scheme;
- €64 estimated annual cost of electricity for vehicle based on current night rate tariff and a total annual travel of 5,000 km and stated vehicle efficiencies – this cost will vary on individual usage

The deposit will be returned at the end of the lease once the conditions of the lease agreement have not been breached and the vehicle is returned in a satisfactory condition for the next user.

Table 1: Summary of Estimated Cost/Benefit for Participating in the scheme for 1 year

	Euro	Euro
Diesel Car for 1 year (Opel Astra 1.3L)		
• Insurance	400	
• Annual Service/Maintenance	200	
• Road Tax	50	
• Fuel Cost - Diesel	200	850
EV Cost for 1yr		
• Plug, Wiring, Timers, Meters	330	
• Car Rental Agreement	12	
• Fuel Cost – Electricity (Night Rate Tariff)	64	406
Typical Annual Saving		444

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CO2 Savings:

Comparing the ECity to a small petrol car, the following CO2 emissions are attributable to the vehicles estimated on 5,000 km usage in an urban environment:

- Peugeot 107 (1 litre petrol) = 600kg of CO2 emitted per annum
- ECity direct emissions = 0 kg of CO2 emitted directly
- ECity indirect emissions = 350 kg of CO2 emitted from power station (= 0 kg if 100% wind power can be used)

As can be seen, the Electric Vehicle operating on average mix grid electricity has 40% less CO2 associated with its use than a typical 1 litre petrol engine car. However, if operating the EV on 100% wind power for example, then the annual emissions associated with the vehicle would fall to 0 kg. The high efficiency and low CO2 performance of the Electric Vehicle is the main reasons for its growing importance as a transport technology in Ireland.

Application Details

Applicants must meet all the below qualifying criteria:

- **Age:** all applicants should be aged between 25 and 70 (this is restricted by insurance providers);
- **Driving Licence:** all applicants should hold a full clean driving licence for a minimum of two years;
- **Vehicle Owner:** all applicants should own an existing vehicle on the islands which will be replaced for the period of the lease with the use of the electric vehicle;
- **Charge point installation:** all applicants should agree to fit a charge point and associated metering and timing equipment for recharging the electric vehicle installed in a suitable location at their dwelling. The applicants are advised that the most economic price for charging the EVs is using a nightsaver tariff. SEI will advise on the cost effectiveness of switching over to a nightsaver tariff or other more appropriate tariffs for each applicant;
- **Monitoring:** all applicants should agree to participate in the electric vehicle monitoring programme. This will include a minimum of a quarterly reading taken from the vehicle and the return of 2 questionnaires per year on the use of the vehicles. Access to the vehicles by SEI or project representatives should be accommodated within a reasonable time frame if so requested.

Applicants who meet the above criteria will then be selected based on the requirements of the trial to include a range of representative user types for SEI's monitoring programme and based on the below selection criteria. The vehicles will be located on all three Aran Islands once sufficient suitable applications are received from each island.

The Selection Process will be based on the following primary criteria:

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- **Mileage:** the estimated daily and annual mileage (including co-applicants).
- **Vehicle use:** home, leisure, work.
- **Driver history:** clean driving license
- **Applicant occupation:** a mix of applicants with a range of occupations may be chosen.
- **Suitable charge location:** the dwelling should have a suitable location for a charging socket for recharging the vehicle.
- **Spread across the islands:** It is envisaged that the vehicles will be split across the islands with 6 on Inis Mór, and 2 each on Inis Meáin and Inis Oírr. If there are not sufficient numbers of suitable applicants, the spread of the vehicles may be different.

Selection process

All applicants to the trial will need to meet all of the application criteria. Once all these criteria have been met, the applicants will be ranked based on the selection criteria above. The following steps will then apply

- 1) Short list of most suitable applicants will be prepared;
- 2) Applicants will be contacted in order to arrange inspection of dwelling by SEI staff and its representatives to examine electrical system and layout of property for electrical charge point connection;
- 3) First 10 dwellings selected and notified for 2010 trials;
- 4) Electrical equipment fitted – Payment 330euro;
- 5) Electrical equipment independently inspected;
- 6) Rental Agreement signed – Deposit Payment 400euro;
- 7) Vehicle delivered, training provided, monitoring equipment checked.

Withdrawal process

Applicants will be allowed withdraw from the scheme should they so wish. If an applicant withdraws from the lease agreement, they will forfeit their deposit and annual lease payment as additional costs will be incurred by Merrion Fleet Management in order to transfer the EV to a new participant.

Year 2 and Year 3 Applicants

It is intended to repeat the Application Process each year in September for the following year trials. As the programme is in its early stages, details of the selection process for 2011 and 2012 will be

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outlined later in 2010 as experience is gained with regard to the operation of the scheme and feedback from existing participants.