



Council of the
ISLES OF SCILLY

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Isles of Scilly
Community
Venture

GO-EV SMarT Project

SPECIFICATION FOR

DESIGN SPECIALIST SERVICES FOR THE
DEPLOYMENT OF EV CHARGERS AND SOLAR
CANOPIES



Council of the
ISLES OF SCILLY

July 2019



European Union
European Regional
Development Fund



HM Government



**CORNWALL &
ISLES OF SCILLY**
LOCAL ENTERPRISE PARTNERSHIP

CONTENTS

- **Background**
- **Specification of works**
- **Variations from the Specification (Variant Bids)**
- **Appendix A**

BACKGROUND

1. The Council of the Isles of Scilly is managing a project to develop an alternative fuelling network, multi modal travel hubs and mobility platform to encourage adoption of ultra-low carbon transport. It will be trialling innovative 'vehicle-to-grid' (V2G) technology. The project is being funded by the European Regional Development Fund (ERDF) and the central government Local Growth Fund (administered by the Cornwall and Isles of Scilly Local Enterprise Partnership).

The project is managed by the Council of the Isles of Scilly and is being delivered by two project partners: the Isles of Scilly Community Venture and Hitachi Europe Ltd

The project forms part of the Smart Islands Programme. More information on the programme can be found at www.smartislands.org.uk. The [Energy Infrastructure Plan for the Isles of Scilly](#) also provides useful background information.

2. The project is being delivered in the following three work streams. WS1 is most pertinent to this tender but WS2 and WS3 have been included to provide clarity of the project as a whole:

WS1: The installation of 27 electric vehicle (EV) charge points (of which 10 will be bi-directional V2G chargers and 17 will be OLEV compliant 'smart' chargers), up to 10 solar canopies with a total of 40kW of photovoltaics (PV) across the Isles of Scilly and the initial deployment of 10 EVs. The initial funding application included provision for integrated batteries with each V2G charger although options of having a single larger battery are now being considered. Options for a community bus as part of the project are also being considered.

Subject to final survey, it is anticipated that the 10 solar canopies will provide 2 parking bays and are expected to have 4kW of PV each. Each double bay will have one V2G charger installed with the unique functionality of direct PV to EV charging. The V2G chargers and vehicles will be available for a car-share scheme while the remaining 'smart' chargers are intended to provide a network of general use charging to support the uptake of EVs where it is not possible for homeowners and business to install their own chargers.

The chargers and solar canopies will be deployed at strategic locations around the Islands that will ensure the most effective use of the car share scheme as well as to minimise grid connection costs.

Finally, the vehicles that will be deployed will be a mixture of cars, vans or other utility vehicles with 6 located on St Mary's and one on each of the four off-islands (subject to community engagement and consultation). While it is not necessary to specify the type and make of vehicle, they will have to use the CHAdeMO DC charging connector (currently the overwhelming majority in the UK) and the vehicles must be V2G enabled.

WS 2: Deploying a Car Share ICT platform and integration with Hitachi's Smart Energy Islands' Energy Resource Management Platform.

This work stream will deliver the integration of the Smart Energy Islands Energy Resource Management Platform with a car share platform deployed through this project. This solution will be uniquely innovative through optimising both the use of the vehicles and the value they can provide to the overarching management of the islands and wider UK energy system.

The car share platform will provide both the back-office functions as well as a customer facing application that will allow for the simple booking and payment system for vehicle use.

In addition to the software development and deployment the necessary hardware to track, use and manage the cars will also be installed as a part of this work package. Finally, this work package will also ensure that the user interface is designed and branded to fit with the wider Smart Islands brand design guidelines.

This work package aims to test three key energy scenarios: the optimisation of direct DC to DC solar charging of EVs, the optimisation of electricity tariff utilising multiple electricity rates and the optimisation of discharging from V2G vehicles to maximise value.

WS 3: The development of a business model for a car share scheme both for the expansion of the service on IoS and for the wider application in the UK and Europe.

Whilst this is an innovative demonstration project it is essential that it both provides the foundations to meet the ambition to transition to electric vehicles as well as demonstrates a scalable and replicable model.

The IoS transport electrification and EV car share business case development work will review the current situation on the Islands, develop a business case and roll out action plan to both deploy further vehicles into the car share platform (supported by the initial 10 vehicles delivered through the project) as well as encourage individuals to move to EVs. This business case will then be reviewed and verified using actual data and feedback during the first year of full deployment in 2019 and 2020. In addition to this work a small budget has also been put aside to train local engineers to service and maintain EVs on the Islands.

Aligned to this will be the business modelling work to develop the wider case for the deployment of the V2G and mobility service beyond IoS. This will be initially undertaken as a desk-based research exercise that will then be validated and refined using the technical, commercial and behavioural learning from the project. This work will be undertaken with the input from both external experts as well as key stakeholders including BEIS and OLEV to ensure the learning supports this increasingly important area of development in the UK.

SPECIFICATION OF SERVICES

3. Overview

The key output for the Design Specialist will be a full tender specification for the Supply and Install procurement of the project. The specification will need to ensure that it meets key project outputs for funders which are:

- 25 electric vehicle charging points and 2 improved multi-modal hubs (see outputs P8 and P9 in ESIF-GN-1-002_Output_Indicators_Definition_Guidance_v6) of which 10 will be V2G chargers and 17 will OLEV compliant 'smart' chargers. Note that the specification for the requirements of the chargers is not required to be produced by the Design Specialist. However, the Design Specialist will be expected to provide information relating to the physical characteristics of the chargers including their integration with the solar canopies and capability to cope with the harsh salty and sandy environment on the Isles of Scilly.
- Up to 10 solar canopies to be connected with the V2G chargers. It is envisaged that each standard solar canopy will house one V2G charger and at least one 'smart' charger. However, it is recognised that the standard configuration may not be appropriate for all sites. It may be appropriate to have more than one V2G charger or more than one 'smart' charger at a single solar canopy site.
- 40kW of solar PV. It is envisaged that the 10 solar canopies will each have 4kW PV making up the total 40kW required for the project. However, this may not be technically feasible at each site and therefore a combination of varying sizes of PV systems at each site to make up the total amount will be acceptable. It may also be possible to mount PV on an adjacent building rather than creating a solar canopy (at least one site has already been identified where this may be possible).
- Chargers and canopies should be delivered on all of the inhabited islands on the Isles of Scilly including St Mary's and each of the 'off-islands' namely St Agnes, Bryher, Tresco and St Martin's. It is envisaged that each of the off islands will have one V2G charger (subject to further community consultation) with the remaining 6 V2G chargers on St Mary's.
- Battery storage – The initial application considered the installation of integrated batteries at each of the V2G charging sites. However, an approach to using a single battery centrally located is now being considered by the project partners. The Design Specialist should consider the merits of multiple batteries at V2G sites vs. the installation of a larger single battery.
- Additional 'smart' chargers that are not incorporated within a solar canopy will be standalone charging points. For example, if there are 10 standard charging sites with a solar canopy housing one V2G charger and one 'smart' charger, this will leave seven remaining stand-alone chargers to be positioned at appropriate locations.

- Note that if budget allows, it may be possible to install more than a total 27 chargers. However, the maximum number of V2G chargers will be capped at 10, therefore any additional chargers above the 27 will be 'smart' chargers.

4. Car share and general use charging

- The legacy of the project is intended to not only be a network of EV chargers on the islands, but a car share scheme. 10 V2G compatible EVs will be procured separately to the installation services and will become part of the car share scheme.
- The 10 V2G EVs will be associated with the 10 V2G chargers. The car share will operate on a return-to-base model such that each EV will be returned to the charger that it started from. Design of the locations of the V2G chargers should therefore consider this model. It is envisaged that V2G and therefore car share locations will be close to where there are clusters of houses or businesses likely to use the car share. Generally, it is considered that the start and end point of the journey is most relevant rather than the destination. This model may be different for the off-islands where for example the quay may be a more appropriate location.
- 'Smart' chargers are to be made available to the general public to charge their own EVs where they are unable to charge an EV at their own property or building. As detailed above, these 'smart' chargers are to be located together with car share V2G chargers where appropriate. Additional standalone chargers should be designed to be located at suitable locations that make most sense for general use charging outside of the car share scheme.
- Appropriate locations for standalone chargers may be different to the car share - a destination may be an appropriate location for a standalone charger, particularly if fast charging can be achieved. For example, locations where people regularly take vehicles to go for walks, take trips to the swimming pool, visit the health centre etc. Vehicles may be at these locations for periods of time, for example an hour, which would be sufficient on fast charging to give up to an 80% charge.

5. Project timeline overview

- The project was [formally launched in mid-February 2019](#).
- During February and March community engagement events were completed on St Mary's. Events on the off-islands have also been completed with further engagement and focus groups ongoing. A report from the community engagement will be provided to the successful tenderer prior to commencement of the contract and the Design Specialist will be expected to take this into account when completing their work.
- A trial of 2 V2G chargers will be taking place during Summer 2019. One of the sites is likely to be used later as part of the main deployment but the other is not and one or

both of the chargers will be removed at the end of the trial and therefore may not form part of the final 27 chargers in scope.

- Concurrently with the trial the Design Specialist will conduct surveys on the islands to determine the final location and design of all the charger and canopy locations
- Following completion of the design phase, procurement of an installation contractor will commence. This is anticipated to be at the beginning of 2020.
- Installation will be completed during early Summer 2020
- An operational and testing phase will then commence until the end of the project in June 2021 when the car share scheme will move into a 'business as usual' phase

6. Budget

A maximum total budget of £1,033,558 is available for the supply, install, network connections, commissioning and a period of support for the above infrastructure. Ensuring the capital spend for the project is as close to this number as possible is a critical funding pre-requisite.

Note that this budget does not include the install of the trial chargers which are being funded separately. It should also be noted that this budget is separate to the budget for this tender for a Design Specialist.

7. Sites

An initial survey identifying a possible 50 sites across all islands was completed in Summer of 2018. This full list of sites will be provided if required to the successful tenderer upon signing of the contract. Since then further work has been completed to narrow the list of possible sites following public consultation and a report indicating some of the potential sites on St Mary's can be found at Appendix A. Further consultation with the off islands is being conducted to determine the best and most suitable solutions.

While this list has been provided for information, it is fully expected that the Design Specialist will visit the islands to review the information and come to their own conclusions in consultation with the project partners. In particular, the project partners expect the Design Specialist to come to the islands with a fresh pair of eyes and suggest new and improved options for charger locations and design. However, it should be noted that the final chosen sites should factor in requirements of funders as detailed above, in particular the improvement of 2 multi-modal connection points is required.

8. Community consultation

Community consultation was carried out in March 2019 with both static and mobile displays. The consultation was interactive and allowed the community to give their views on potential charger locations, the use of the car share scheme as well as provide them with information

about some of the innovation behind the V2G elements of the project. Full details of the community consultation will be provided to the successful tenderer.

The consultation included asking people for their views on the design of solar canopies and they were presented with a range of options from the very modern to the more rustic/wooden structures. There was no clear 'winner' in the chosen design and it will be part of the work of the Design Specialist to determine the final generic design. Further engagement by the Community Venture will help in determining the views of the community.

9. Planning conditions

Any required planning applications will be submitted by the Council of the Isles of Scilly as the project lead. However, it is part of the specification that the Design Specialist produces all of the documentation required for planning permission. Not all sites will require planning permission, but the Design Specialist should consider that all sites may require planning permission when pricing for the services. Many of the technical drawing and details will nevertheless be required for the installation specification, which is the main output of the services.

10. Design team

It is envisaged that the design team of the Design specialist will have skills to include (this should not be considered an exhaustive list):

- Structural Engineer
- Mechanical & Electrical Engineer
- Quantity surveyor
- Health and Safety
- A Technical Expert with a background in EV and solar PV infrastructure delivery
- GSM/broadband communications expertise

11. Expected outputs

Taking into account the information above, the Design Specialist will be expected to:

- Conduct an extensive site visit to the Isles of Scilly, visiting St Mary's and the off-islands. It will be up to the Design Specialist to determine the number of days required for the site visit although it is anticipated that this will be at least 7 days' work, including at least a day working directly with the project partners. A working base for the site visit will be provided at the Porthmellon Enterprise Centre where the Community Venture is based and where the GO-EV project office is located. However, travel (both to and from St Mary's and inter-island boating) and accommodation will need to be budgeted for and included in the tender price.
- Create a specification for the tender for a supply and install procurement summarising final recommendations for the location of each solar canopy site and each standalone general use

charger. The final design should meet the requirements of the project as detailed above as well as taking account of the needs of the community for a car share scheme and general use charging. The specification should include:

- a. an estimated overall budget broken down into the individual costs for each site
 - b. a proposal for some spare sites should any of the sites run into unforeseen technical difficulties later in the project
 - c. the most suitable locations for residents and businesses to use the car share scheme and the general use charging infrastructure
 - d. the most economically viable sites, considering infrastructure installation costs, network connections costs and GSM/broadband connectivity. It is expected that the Design Specialist will obtain network connection requests for each of the chosen sites
 - e. the most appropriate infrastructure mix at each site to deliver project requirements and local benefit within the defined budget. Consideration should be given to the benefits of having individual batteries at each site vs a single large battery located on St Mary's
- A risk register and construction plan should be created for the project.
- Create a generic design for a solar canopy site including:
 - a. Design and full specification of the solar canopy including materials, fixtures and fittings. The generic design should include the provision of cycle racks and review other possible add-ons such as bird/bat/bug boxes.
 - b. Specification of required groundworks to support the solar canopy and charging infrastructure including trenching of cables, hardstanding for EVs and any additional reinforcement of the ground to take fixing points for solar canopies and EV chargers. Some sites may already have suitable hardstanding, but this should nevertheless be included in the generic design.
 - c. Specification of PV installed on the roof of the solar canopy.
 - d. Specification of the design integration of the chargers with the solar canopy. Note that the specification of the chargers themselves is not required of the Design Specialist.
 - e. Design the incorporation of one V2G charger and one 'smart' charger into the solar canopy design including the DNO connection and associated meters and cabinet(s)
 - f. Specification of the required barriers, street furniture, road markings and signage required at each solar canopy site. The generic design should include rollaway prevention although this may not be required at all sites
- Create a generic design for a standalone 'smart' charger site including:

- a. Specification of the design of the siting of the charger. Note that the specification of the charger itself is not required by the Design Specialist.
 - b. Specification of required groundworks to support the charging infrastructure including trenching of cables, hardstanding for EVs and any additional reinforcement of the ground to take fixing points for the EV chargers. Some sites may already have suitable hardstanding, but this should nevertheless be included in the generic design.
 - c. Specification of the required barriers, street furniture, road markings and signage required at each standalone charging site. The generic design should include rollaway prevention although this may not be required at all sites
- Create a specific design for each solar canopy site and each standalone charging site
 - a. Each design should build on the generic designs but be site specific.
 - b. Each design should include a technical drawing of the specific site. Solar canopy sites should include detail of the orientation of the roof to maximise solar gain. If the PV is to go on an adjacent structure rather than a canopy this should be included in the design.
 - c. Each design should include engineering calculations and all technical specifications suitable to each site. For solar canopies this must include calculations to show the design will withstand all anticipated weather conditions at the site.
 - d. Network connection requests and cost estimates should be obtained from the DNO for each site. Consideration should be given at each site for the potential addition of more EV chargers in the future and any potential oversizing of the connection should be considered to accommodate this.
 - e. Technical drawings and any other relevant information for planning applications at each site should be produced.

12. Timescales

- It is expected that the work will be completed by the end of October 2019.
- Tenderers will be required to complete a single further visit to the Isles of Scilly to present their findings back to Members of the Council of the Isles of Scilly. This visit should be included in the tender price.

VARIATIONS FROM THE SPECIFICATION (VARIANT BIDS)

The Council will not accept variant bids relating to this procurement.

Appendix A – Report detailing potential charging sites on St Mary's

Isles of Scilly GO-EV project

Consulting visit report

9th July 2019

**Matthew Trevaskis
ecodrive Ltd.**

Visit date: Thursday 5th July - Friday 6th July

FOREWORD

The GO-EV project is aiming to deploy Electric Vehicles (EV) on several of the islands comprising the Isles of Scilly with a focus on exploring the use of Vehicle-to-Grid (V2G) and shared usage vehicles, with those vehicles being used in both private and commercial roles and potentially with a mix of vehicle types.

INITIAL REVIEW

It is observed that there is already a population of EVs on St Mary's, especially Light Commercial Vehicles (LCVs), operated by utilities, such as South West Water, and smaller local businesses, such as Home Hardware. There are few genuine 'Mode 3' AC charging points on the island, with most vehicles seeming to rely upon Mode 2 charging from a standard 3-pin socket. There are no DC chargers on the islands.

There is also a significant population of electric carts (re-purposed golf buggies) operated by the Scilly Cart Company. These are available as tourist rentals, and it appears that some locals use them too.

AMBITION

The project intends to deploy 10 vehicles, with 6 on the largest island, St. Mary's, and the remaining vehicles placed on St. Agnes, Tresco, Bryher and St. Martin's. Each vehicle will primarily connect to a specific V2G charger, on a return-to-base model of operation.

V2G / Car Club Site review

ADJACENT TO GARAGE BLOCK, OLD TOWN

The area identified is adjacent to a communal garage block, with the nearest LV transformer housed in the distant garage.



Although there is a slight left-right gradient, it should be possible to accommodate two vehicles and also provide room for a cycle rack/hoop towards the right of the picture. This is also a triangular patch of land which is otherwise not useful besides housing a feeder cabinet.

A solar car port would run NW-SE so would likely best be sloped away from the view above, with the lower edge adjacent to the wall pictured above. This would have the array facing SW so would pick up afternoon sunshine.

There is also a BT telecoms cabinet adjacent, so a landline broadband connection is available.

3G coverage is poor in the area, so it may require a small repeater 'cell' to provide a 3G connection to the vehicles for the operation of the Car Club telematics system.

AIRPORT

The soft ground area at the upper end of the west parking area, adjacent to the solar farm, near the currently unused barrier to the minibus pick up / drop off area, could be suitable for a charging point installation. The gradient is across the parking area, so measures should be taken to ensure that vehicles park in that orientation to avoid rollaway issues. A hardstanding is suggested, with

some levelling of the ground and attention paid to avoiding rollaway. Power may be sourced from the connection already provided to the solar farm.



The parking opposite, with hardstanding, shown as reserved for minibuses, appears to have an unresolvable gradient issue, although bump stops could be used at the front of the parking bays to mitigate the risk of a minibus moving whilst connected. This would not help a smaller vehicle, such as that shown in the photo below.



PARSON'S FIELD

Already used extensively for car parking by nearby housing and businesses, this area has parking across the gradient, with an evident tendency for cars to reverse park which is generally preferred.



Power runs from the nearby transformer as a 95mm² Aerial Bundled Cable on overhead poles on the opposite side (left side of above picture, the shadow of the cable and the pole is visible) - an underground supply may be possible trenched across the road from pole 41-5008-6. The orientation of the parking is ENE-WSW so would be near ideal for a SSE facing solar car port.

The requisite height of the structure may be similar to the height of the trees shown in the above picture, which would mitigate any impact on the view of the adjacent housing.

It will be required to ensure that parking is across the gradient to ensure that there is no rollaway risk, including the use of barriers & obstacles.

MERMAID CAR PARK

The small car park in front of Tregarthen's Hotel, located adjacent to the Mermaid public house at the end of the quay was suggested as a potential location for a V2G charger and as a multi-modal hub, but the gradient and bounding by the sea wall suggest that it is not a suitable location, due to the potential for rollaway and swamping by storm waves.

TELEGRAPH

A grass verge has been identified as a potential location on which to install a hardstanding and one of the V2G chargers. Care should be exercised where vehicles may have to reverse into the

carriageway. This may include panel vans with poor rearward visibility but which are forced to park 'nose in' to access the Chademo connection.



SIBLEYS

The area adjacent to the Sibleys store offers good hardstanding area using block pavers, adjacent to a WPD transformer with existing LV distribution beneath.



The area should provide sufficient parking for 4 vehicles, including the desirable inter-space area for disability access and mitigating collision risk between vehicles and the charging station installations, including bollards.

There is a slight gradient away from the boundary hedge, which suggests that levelling the land and/or installing 'sleeping policemen' to mitigate the risk of a rollaway.

A canopy would run almost exactly N-S, so it may be desirable to decide upon an east or west facing array relating to when most energy may be consumed - or the value to the grid. To limit the height, a west facing array would have its lowest edge adjacent to the hedge. There is a footpath currently between the hedge and the parking area which needs to be considered with respect to potential trip hazards and height clearance.

MUSEUM

The on-street area outside the Museum on Church Street has a narrow pavement so there is not enough clearance for the installation of charging points at the kerbside.

At the time of the visit there was significant scaffolding in place and it was unclear what future works were to be carried out in this area.

TOURIST INFORMATION CENTRE (TIC)

There is a small area to the rear of the Tourist Information Centre with room for 2 vehicles.



It is unlikely that a car port is possible here due to the negative impact on the sea views from the neighbouring residential property over Porthcressa beach. (The stone/white rendered building in the photo above.)

This area is highly subjected to wind blown sand from Porthcressa beach and this should be factored into the design of the car port (if permitted) or another enclosure or protection for the charging point(s)

The WPD LV connection runs underground past the site and there is a landline telephone pole adjacent for data.

WELL CROSS

The short road connecting Strand and Church Street, running from a wide area outside the church, offers a couple of charging/parking options: immediately in front of the church, with vehicles parking orientated towards the building, or on the west side, parking parallel to the neighbouring property's boundary wall.



Neither option really offers a solar car port opportunity due to view restrictions, adjacency to historic buildings and, in the latter case, shading from adjacent trees.



There appears to be a 95mm² 4-core cable running underneath this area, suggesting good power availability. However there is a gradient concern outside the church, which is more acute towards Church Street compared to the area to the left of the front of the building as viewed straight ahead. Planning Permission may consider the historic nature of the building.

PARADE GARDENS

A similar situation is found on the short road connecting Lower Strand and Church Street, where it may be suitable for a charging point for 2 vehicles but is unlikely suitable for a solar car port due to shading and affecting adjacent buildings.



MEDICAL CENTRE

In addition to some unmade ground, which appears to be overflow parking, there are two areas of block paved parking: one area of a generous area for two vehicles and another for 4-5 vehicles.



SMART CHARGING SITES

To complement the deployment of V2G sites for use with the Car Club vehicles, 17 'Smart Charging' sites are intended to provide a network of charging points for other vehicles, such as those already present on the island and additional private use and commercial vehicles.

It should be considered whether the Car Club vehicles should be granted access to the Smart Chargers and whether this adds learning to the management of V2G charging.

It is suggested that the capacity of Smart Charging points be a nominal 22kW (32A three-phase) in order to provide a minimum of 7.4kW (32A, 230V) or 11kW (16A, 230V/400V three-phase) although 22kW may also be available.

It may not be necessary to offer a full 22kW on every charging point in a cluster simultaneously, although this may be possible. Where the capacity is not available, the charging points can be load managed, by networking charging points together, either physically and/or via the 'backend' cloud system used to monitor and control them remotely as well as provide a public payment system.

Although there is no paid parking on the islands, and seemingly no restriction on the length of time that residents may park in any area, it is worth considering how to maximise the benefit of the charging facilities by encouraging high turnover and 'throughput'.

Experience from other island markets, such as Jersey, show that encouraging a culture of 2 hour parking can give very good turnover of charging sessions and allow a high ratio of vehicles per charging point. This may require local regulation and signage and may require a certain kind of charging tariff that penalises overstaying - although this may only be introduced later, once the market begins to grow.

STRAND

Although not originally included in the scope, we suggest that the on-street parking on Strand in Hugh Town may be very well suited for EV charging. The pavement is very wide, allowing a great deal of room for pedestrians to pass unencumbered. WPD plans shows that the LV supply runs down the opposite pavement. Subject to survey, it is suggested that a new supply is brought across the road near to the junction with Wellcross, to a feeder cabinet from which several dual outlet charging columns may be connected. Marked parking spaces would be required to ensure EVs park in the correct area, and that other vehicles are discouraged from parking.

The choice of charging point should be considered for the exposure to salt spray, although the relatively sheltered harbour should afford the units some protection.

