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SMILEGOV

Enhancing effective implementation of sustainable energy action plans in European islands through reinforcement of smart multilevel governance

Agreement No: IEE/12/047/SI2.645923

Deliverable D4.4

Manual for Sustainable Energy Projects Implementation

Cluster of Scottish Islands

5/10/2015

Part. N°		Partner's name	Short name
CO1		Network of Sustainable Aegean Islands - Greece	DAFNI
CB2		Conference of Peripheral & Maritime Regions	CPMR
CB3		Region Gotland – Sweden	GOTLAND
CB4		Ölands Municipal Association - Sweden	ÖLAND
CB5		Hiiu Municipality - Estonia	HIIUMAA
CB6		Saare County Government – Saaremaa - Estonia	SAAREMAA
CB7		European Small Islands Federation	ESIN
CB8		Samsø Energy Academy - Denmark	SE
CB9		Canary Islands Institute of Technology - Spain	ITC
CB10		Regional Agency for Energy and Environment of the Autonomous Region of Madeira - Portugal	AREAM
CB11		Cyprus Energy Agency	CEA
CB12		Local Councils Association – Malta	LCA
CB13		Scottish Islands Federation	SIF

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1 Outline of the Projects and Barriers

The projects that participated in the Scottish islands SMILEGOV cluster were:

No.	Sub no.	Community organisation name	Project name	Description	Technology type	Barrier
1.		Arran Community Energy		Community owned renewable energy project	Hydro	Grid constraints
2.	i	Fyne Futures		Coordinated development of small scale solar PV at multiple sites to streamline development process and reduce costs through collective procurement	Solar PV	Public incentives
	ii	Fyne Futures		Community based recycling and transport fuel project	Biodiesel	Public incentives
3.		Isle of Canna Community Development Trust		Community owned renewable energy project (off grid)	Wind	Planning and grid
4.		Cumbrae Community Development Company		Community owned renewable energy project	Wind	Planning
5.		Isle of Gigha Heritage Trust		Community owned renewable energy project (repowering existing site)	Wind	Public incentives and access to data
6.		Lismore Community Trust		Community owned renewable energy project	Wind	Planning and grid
7.	i	Mull and Iona Community Trust	Garmony	Community owned renewable energy project	Hydro	Public incentives and grid
	ii	Mull and Iona Community Trust	ACCESS	Community smart grid project using electric heating for demand side management	Smart Grid	Access to data
8.		Sleat Community Trust		Community owned renewable energy project	Wind	Grid constraints and community capacity

2 Barrier A. Grid constraints

This relates to a lack of capacity on the public electricity network to accommodate a new electricity generation project. While in the UK a grid connection offer will always be made by the Distribution Network Operator (DNO) if requested, the cost may be unviable, or the timeframe too long, or both.

Grid constraints affect the majority of the geographic area of Scotland and particularly islands, the main reasons being:

- There are large amounts of renewable energy already installed in Scotland, and the network was designed primarily for one-way distribution of electricity from centralised generation, rather than two way power flows from small scale, distributed generation
- Because of the low population density of Scotland, the cost of the original network was minimised by building only sufficient capacity for existing demand, with the consequence that much of the network is single phase rather than three phase, which has inherently limited capacity for new generation connections
- The cables that run to islands are particularly expensive to replace and also cause disruption in the process
- The distribution network in the UK is regulated so that generation developers have to pay for the majority of the cost of their connection- for 'high cost' connections the proportion they have to pay is 100%.

Grid constraints typically affect projects over 50kW in size; however in exceptionally constrained areas this can be reduced to 3.7kW.

It is a key barrier because there is often no technically or financially viable alternative to a grid connection, and a large number of projects are affected.

2.1 Examples from good practices

Good practice example include the ACCESS smart grid project, which is described in detail in the 'Shining projects' factsheet. This created a technical solution by creating a collaborative partnership between a wide range of stakeholders, based on a common vision and mutual respect for the needs of individual partners.

Another example is the microgrid on the Island of Eigg, adjacent to the Isle of Canna. Both are off-grid communities, and on Eigg a community owned electricity network has been established that allows the output of micro wind, hydro, and solar to be combined and managed using battery storage, to create a reliable, low carbon electricity supply despite there being no connection to the national grid network.

2.2 The role of Multilevel Governance

The key challenge is that because of the regulatory framework in the UK, the interests of network operators are not usually aligned with small scale renewable energy generators. In the instance of the ACCESS project, this was addressed by developing a project concept that provided benefits to the network operator, and strong endorsement from other key national stakeholders.

With the adoption of a new regulatory policy for distribution networks in the UK from 2015-2023 (known as 'RIIO-ED1') there will be increased financial incentives for network operators to find innovative ways of reducing network costs and providing improved customer service. This could provide increased opportunities for renewable energy projects, if undertaken through an approach that involves multiple stakeholders in order to demonstrate system wide benefits.

2.3 Step-by-step methodology to overcome the barrier

1. Engage with the DNO to understand the exact nature of the grid constraint- for example, if there is a specific capacity threshold where costs/timescales increase, or where the constraint is located.
2. Use data from a SEAP to assess the scale and value of local energy needs that could potentially be met by the generation project e.g. EV charging, electric heating, woodchip processing
3. Use a financial model to assess the viability of the project if these other local uses could be met
4. Work with suitable consultants to design a system that allows the generator to be safely controlled while meeting local energy needs
5. If necessary, engage with relevant government departments or regulators to confirm that the proposed approach is viable
6. Negotiate an acceptable solution with the DNO

3 Barrier B. Access to data

In order to undertake SEAPs and assess infrastructure constraints for renewable energy projects, it is necessary to have access to good quality data. Unfortunately publicly available national statistics and building energy modelling tools are often not representative of island communities.

Similarly, infrastructure operators, such as Ferry companies or energy utilities, may either not collect suitable data, or be unable to share it for confidentiality or commercial reasons. Because many energy services on islands are not provided by public bodies or entities with obligations to disclose data, this barrier particularly affects island communities.

Where a community needs to develop an innovative solution for a renewable energy project, it is particularly important that accurate data is used for the system design. Otherwise the project may be incorrectly designed, potentially leading to an unbankable project or one that fails to deliver the intended benefits.

3.1 Examples from good practices

As part of the Energy Audits that were undertaken by the cluster members, funding from the Scottish Government was secured for the islands of Mull and Gigha to install network monitoring equipment on the public electricity network. This required significant negotiation with the network operator which was facilitated by a Scottish NGO, Community Energy Scotland. The sensors were finally installed in 2015 and are now providing accurate data which will be used to inform the design of new renewable energy systems for the islands. This was the first project of its kind in Scotland and it is hoped that it will be replicated in other communities affected by grid constraints.

An alternative or complementary approach is the installation of energy monitoring equipment within individual homes or businesses. This potentially provides the most detailed level of data, but can be expensive or labour intensive to install in sufficient properties for sufficient time to create a statistically representative sample. As part of the ACCESS project on Mull, approximately 20 data

loggers have been installed in individual homes to record electricity and temperature data that will be used to assess the impact of the project and inform other initiatives such as energy efficiency on the island.

3.2 The role of Multilevel Governance

At a national level, the Scottish Government have recognised the importance of local participation in energy planning and have attempted to help address this barrier through working with local authorities and public bodies to produce a interactive 'heat map' for showing energy demand and generation across Scotland, as well as limited information on property ownership: http://heatmap.scotland.gov.uk/. The map is free to use and provides sufficiently detailed information to identify potential opportunities for development or collaboration. This tool should help facilitate the development of SEAPs for other communities.

3.3 Step-by-step methodology to overcome the barrier

1. Use the SMILEGOV SEAP template to identify the data you will require
2. Use publically available databases to initially complete and identify gaps (e.g. Scottish Government heat map)
3. Engage with local stakeholders to collect additional or missing data
4. If more detailed data is required, consider the installation of monitoring equipment on energy infrastructure or within homes and businesses
5. Make sure the specification of the equipment is suitable for the purpose required (e.g. data collection interval) and that you have written permission to collect and share data from any individuals or companies.
6. Where affordable, data loggers that can upload data to the internet ensure that a more consistent record can be collected, with less disruption to tenants, and allow ongoing performance monitoring.

4 Barrier C. Public incentives for RES development

In the UK, the benefits of renewable energy systems (RES) are not fully reflected in the market value of the electricity they produce. Therefore support mechanisms such as the Feed in Tariff have been adopted to encourage the development of technically viable schemes. However this requires a prospective developer to have sufficient financial resources to cover the 'at risk' costs of initial feasibility work, planning applications, and deposits for hardware. The larger the project, the larger the potential outlay, which in the UK is typically £100,000 per MW of RES generating capacity. This is a particular barrier for community energy projects, as these often do not have their own funds to take this risk.

A related barrier is that the underlying support mechanism, such as the Feed in Tariff, may itself be unstable as a result of a change of government or EU policy. This can be very disruptive as it creates uncertainty among investors and requires revised financial modelling which may no longer make the project viable. This in turn discourages other RES developers from initiating projects.

4.1 Examples from good practices

The Garmony hydro scheme on Mull used funding from the Scottish Government's 'Community and Renewable Energy Scheme (CARES)' to undertake feasibility studies, community consultation and planning applications. Having identified the most suitable site, they secured planning permission and a grid connection offer. This then allowed them to approach investors and undertake a community share offer, using the future FiT income as security for the investment provided. This model enabled them to raise nearly £500,000 in share capital, with the balance of the project costs through a combination of commercial and social loans. The project is now operational and generating as intended.

4.2 The role of Multilevel Governance

The CARES approach effectively creates a partnership between a community group and central government. Start up finance is provided in the form of small grants or for larger costs loans that can be written off if the project fails. If the project proceeds, the loans are repaid with a high rate of interest which helps ensure the sustainability of the scheme. In Scotland there has been consistent support from central government for over ten years, and community energy is a focus of their energy policy as confirmed publicly in their policy publications.

However at the UK level, government support for the FiT for RES has been quite variable, with a high level of uncertainty and rapid changes in support levels without full consultation processes. This is the opposite of effective multilevel governance, and at this time, the efforts of local stakeholders have not been able to produce a solution at a national level. Potentially at an EU level, a greater focus on the importance of community owned energy in enabling RES could help national governments to undertake more focused incentive mechanisms for supporting the most vulnerable but valuable renewable energy developers.

4.3 Step-by-step methodology to overcome the barrier

1. Use low risk funding such as grants to support the development of the high risk stage of a RES project. Only proceed if the project is technically and financially robust, and ensure you are conservative in your financial modelling, with a high level of contingency.
2. Use community finance and crowdfunding where possible to raise the required capital when the project is at a more advanced stage- these investors are also more likely to be more flexible than commercial lenders.
3. Engage with local and national policy makers and RES networks to support the case for stable public incentives for RES development, and particularly for CE and coop development.

5 Summary table

Barrier	Examples	Role of MLG	Key steps of the methodology
Grid constraints	ACCESS project	Enabling collaboration between a **community** and **electricity network operator**	Engage consistently and early with the network operator; use accurate data to create innovative but practical solutions
Access to data	Scottish Government Heap Maps	Enabling collaboration between **central government**, **Local Authorities** and other **public bodies**	Maximise the data that may be helpfully gathered through community engagement; use free and public data sources where possible; collect your own data using monitoring equipment
Public incentives	Garmony hydro project	Enabling collaboration between **communities** and **central government**	Use government, local authorities or EU funding to fund 'at risk' feasibility work on RES projects; use the Feed in Tariff to raise commercial finance through share offers or loans to build the RES project if it is 'bankable'