Highlands and Islands
Community Energy Company
Companaidh Cumhachd Coimhearsnachd

Assisted by Scottish Government's *Scottish Community and Householder Renewables Initiative (SCHRI)*

The Electrification of Eigg

The Island of Eigg Electrification scheme is now commissioned and operational, with 100% take-up. All 37 households and 5 commercial properties on the island are connected and now have their very own supply of renewable electricity. The effect of the Electrification project on the Eigg community has been significant and in a number of ways is leading to greater self-sufficiency.

The composition of the Electrification Scheme makes it unique in both Scottish and UK terms. It is the first island electrical grid network in the British Islands that is being powered by an integrated mix of micro-scale renewable energy technologies. The island harnesses solar and kinetic energy by generating electricity using a mix of renewable technologies:

- a new 10kW solar photovoltaic array (see photo 1)
- a new 100kW run-of-river hydro (see photo 2);
- wind power from four new 6kW wind turbines (see photo 3); and
- the inclusion of two existing 6kW Hydro's.

The new scheme also includes control system and a battery system that can yield 24hrs of stored renewable electricity. For back-up there are also two 80kW diesel generators. Estimates are that the scheme shall be 98% renewably powered.

Background

Initially, several options to provide power for the island were examined. These included a proposal to connect Eigg to the mainland. However, estimated costs of c. £4-5 million were deemed too expensive and the proposal was dismissed. In 2004 the design for the current scheme was chosen as the best option for Eigg.

The final cost (including design & capital) for the project was c. £1,664 million. Funding was secured from a variety of sources as can be seen below.

Funding contribution	£
HICEC (SCHRI)	196,127
ERDF	764,000
Big Lottery Fund	250,000
HIE Lochaber	313,000
Energy Savings Trust	33,940
IEHT & residents	92,761
Highland Council	15,000
	1,664,828

Following a tendering process E connect Consulting and Scottish Hydro Contracting were appointed as designers and installers of the project.

Eigg Electrical Limited, a subsidiary of the Isle of Eigg Heritage Trust, are the operators of the scheme. It is vital for its long-term operation that it is able to sustain itself financially. Before any funding was secured a business plan was formed to demonstrate that the financials of the scheme were sound. The plan is based on income from electricity sales, ROC income and a standing charge for metering equipment. At the moment electricity tariffs and standing charges (15p per unit and 12p per day standing charge) are both higher than their mainland equivalents. These have been set to cover the costs of operation and maintenance of the system, with an amount accumulating over time to form a sinking fund for replacement components. The financial and cost regime structure should ensure that the system is now financially self-sufficient.

Maintenance of an island system is a significant issue and because of its isolated nature, it has been essential to employ and train Eigg residents as part-time operatives to cover day-to-day (or when otherwise required) maintenance cover.

Although the island has a continuous 24hr electricity supply for the first time, it has still been necessary to adopt a cautious approach to the allocation of electricity supply. The potential threat of inappropriate use/abuse of supply by some customers could de-stabilise the balance and smooth operation of the system. To mitigate this threat, supplies have been capped at 5kW for domestic properties and 10kW for larger properties i.e. commercial and local authority. If these limits are exceeded then meters shall "lock-out" and require to be reset, with customers incurring a penalty of £25.00.

Every property on Eigg has been supplied with smart energy meters. These meters give constantly updated digital displays of current energy consumption. The use of smart meters and the capping of supply has engendered a culture of energy prudence amongst the islanders. They realise that electricity usage in their properties must be prudent and such that they do not risk a "lock-out" and penalty charge. Thus far there have been no "lock-outs" or penalties! In many ways, therefore, the people of Eigg are piloting an approach to energy consumption that has, potentially, much wider application.

Challenges

It was inevitable that a project of this scale would provide a substantial number of challenges for all the project stakeholders. A strong Eigg based project team backed by other committed stakeholders ensured that there was a determination to overcome obstacles and address challenges. These included:

- **Timing of design**: A significant challenge for Eigg was to accurately establish capital costs early in the project. The only way to do this was to produce a costed design. At £100k the design costs were expensive, but without this, there was a risk that capital costs could return too expensive; thereby rendering the project unrealistic and unaffordable. This would have resulted in the loss of £100k of SCHRI funding. Although there was a risk, HICEC recognised that this was an important first step for the project and deemed that the need for timely project assistance outweighed the risk of loss.

- **Keeping within budgets**: Following the design and early indications of funding it was imperative that the project costs were not allowed to escalate outwith acceptable funding limits. The project team on Eigg took a strong hand with this challenge and worked very closely with the contractors to ensure cost overruns were avoided.

- **Funding**: As can be seen from the earlier table and project costs there was a considerable challenge to raise the finance required. The Eigg project team, assisted by HICEC and HIE Lochaber worked hard making applications and lobbying other stakeholders for funding. This was no easy feat and demanded a great deal of time and effort. However, persistence paid off in the end.

- **Permissions**: As with all projects, gaining permissions can be a problematic and difficult area to overcome. Consents were necessary from: SNH, SEPA, Historic Scotland, Highland Council planning, Highland Council roads dept, way leaves from local land holders and organisations. The Eigg project team took a practical and pragmatic approach to gaining these permissions. They engaged personally with agencies, inviting them to visit the various sites, to spend time exploring and discussing difficult areas of contention and showing a willingness to find practical and mutually acceptable solutions. This approach was successful and personal engagement and a willingness to co-operate and find solutions enabled all permissions to be gained without stalemate and lost time.

The above examples illustrate a sample of some of the many challenges that the Electrification Project encountered. These were overcome through a diplomatic, prudent and pragmatic approach to project development, with skills and experience that can be transferred to other community renewable developments.

Overall, benefits this scheme will include:

- A reduction in the importation of polluting hydrocarbon fuels and resultant leakage of energy costs to the mainland. Much of the energy pound now stays on Eigg and is playing an important part in feeding back into the island and increasing sustainability and self-sufficiency;
- A reduction in the Carbon/Ecological footprint of Eigg and its inhabitants;
- An increase in living standards and quality of life for the Islanders;
- Increased self-sufficiency;
- Increased economic opportunity;
- Increased skills and capacity of the Eigg workforce;
- Increased capacity and expertise in project development;
- Electrical energy security;
- Potential to capitalise on and export expertise;

In terms of achieving overall energy self-sufficiency, Eigg has made giant leaps and is more advanced than most of the rural communities in Scotland. However, the demand for heat energy still remains a challenge for Eigg and other similar communities. That said, this model for development and the type of scheme now operating successfully on Eigg offers great scope for replication in other off-grid communities worldwide. The Highlands and Islands Community Energy Company has worked closely with the community of Eigg on this project from the early stages and is now planning how to ensure that other communities can benefit from Eigg's experience.

HICEC
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Photo 1

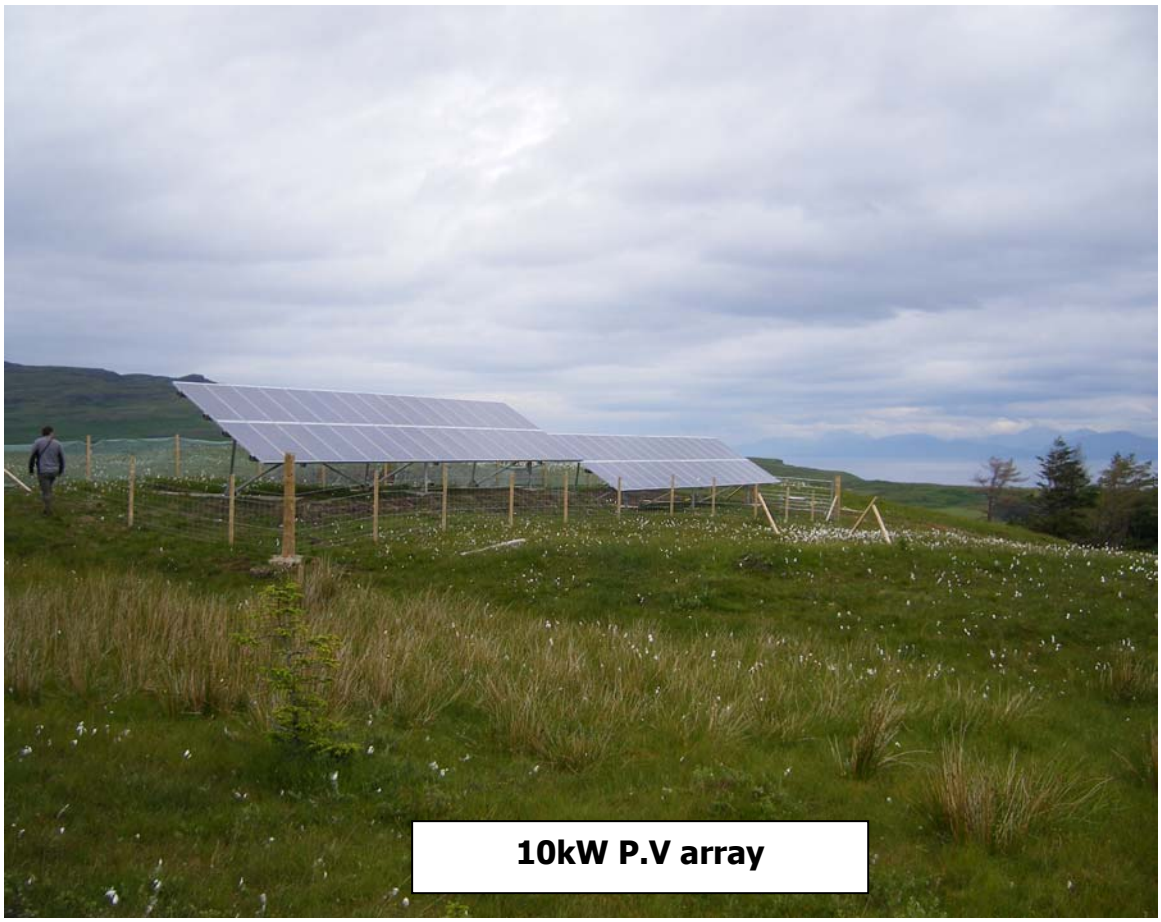

Photo 2

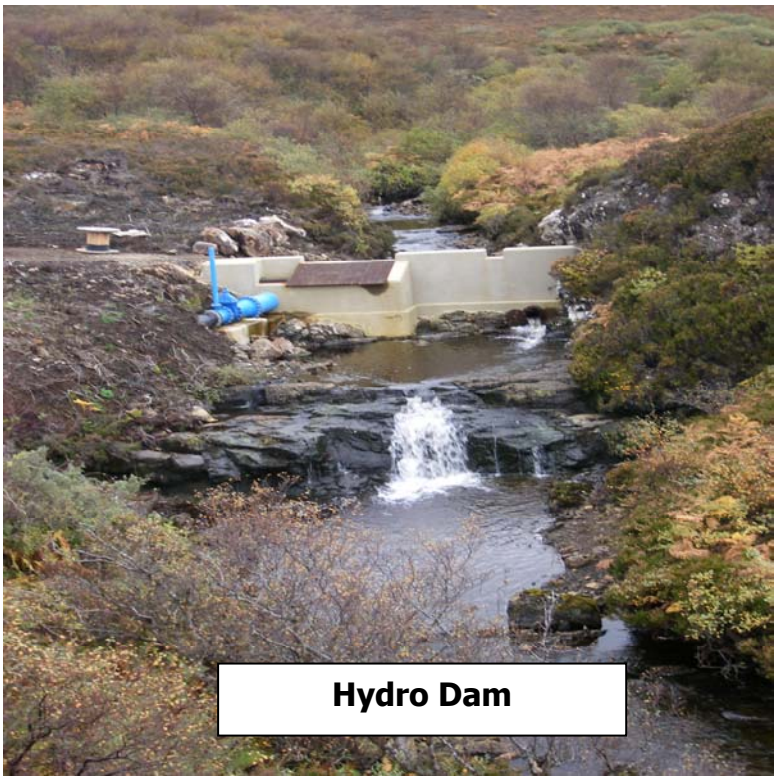

Photo 3

Four 6kW Proven Turbines