

SCHRI CASE STUDY – Technical Assistance

Eas Mor Ecology Hydro Feasibility Study (South West Scotland)



Introduction

Eas Mor Ecology Ltd is a charitable company established in January 2004 by Michael Holmes. He and his partner Mirayne have been grafting for years, with the help of a dedicated band of occasional volunteers, and considerable in-kind assistance from local businesses, to make the beautiful glen at Eas Mor (pronounced like 'ease more') accessible to people with mobility problems who would otherwise never be able to appreciate the therapeutic benefits of being out in a relatively wild forest.

The centrepiece is a 100-foot waterfall dropping into a ravine. They have built a log cabin in a clearing above the waterfall using wind-blown timber and this is now a library with an ecology theme. It is currently off the electricity grid. They have built paths which can be used by 'shopmobility'-type battery-powered scooters and are expecting a grant for these and to build 'disabled toilets', for which they have recently obtained planning permission. There are also plans for an 'Earthship-style' ecology centre with visitor accommodation and education facilities. A planning application is being prepared. They already receive in excess of 10,000 visits to Eas Mor each year, the company's only revenue being voluntary donations from these visitors.

They contacted the Energy Agency with a request for advice as to how they might use renewable energy to produce electrical power to the centre and to provide another ecological strand to the Eas Mor 'experience'. The Agency's in-house Scottish Community & Householder Renewables Initiative Development Officer helped them to create a tender brief for a feasibility study into the potential options for small-scale hydro systems.

Following the tender process, the group received approval for a grant of £2,015, 85% of the total quoted study cost of £2,375.

Aims & Objectives

The main aims of the project were to:

- Calculate how much energy might be available from both high and low head turbines, ie. with their inlets either above the waterfall or in a dam built below it.
- Identify the relative merits and feasibility of these two options
- Compare the likely costs of developing the two alternatives
- Identify what practical issues they would have to tackle to execute the project.

Who was involved?

The lead organisation was Eas Mor Ecology Ltd which also provided in-kind assistance with the site survey. Other organisations involved were:

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|-----------------------|------------------|
| ➤ Energy Agency | Advisers |
| ➤ Energy Saving Trust | Funders (£2,015) |

The approach

With the assistance of their SCHRI Development Officer the group sent tender briefs to three small-scale hydro consultants in April 2004, giving them an indicative upper price of £3,000. Only one of the three, SEARCH For Renewable Energy, made a proposal, which was accepted. They were able to combine their site survey with another already scheduled to take place on the Island.

Grant approval was given and the site survey took place on 5th May 2004 with Michael Holmes of Eas Mor Ecology acting as field assistant. They assessed the practical feasibility of installing schemes at the site, identified potential intake and powerhouse positions and pipe routes, measured the relative height differences and the area flooded by the proposed dam in order to calculate storage volumes, and considered the access requirements.

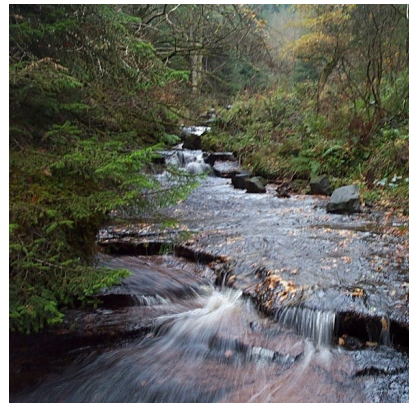
The consultant then researched the hydrology of the area, calculated flow duration curves, the storage capacity of the dam built to various heights and assessed the likely costs of the obvious options for high and low head systems, both stand-alone DC battery-charging and grid-connected options.

Results

The main findings were as follows:

Various high head run-of-river schemes are feasible with rated capacities up to 25kW at the following estimated costs:

25kW grid-connected	£110,000
12.5kW AC battery-charging	£76,000
6kW AC battery-charging	£49,000
6kW DC battery-charging	£32,000



View to the dam site from the powerhouse site

A low head scheme with an intake in a newly-constructed dam could produce around 3kW but at the relatively high cost of c.£25-30,000, or £65-70,000 including the dam. However the amenity value of the reservoir may allow this option to become feasible and the group plan to build the dam regardless.

Michael Holmes has proved himself extremely effective at soliciting in-kind assistance in the form of materials supply and plant provision from contractors and other businesses operating on Arran and he expects that the costs could be substantially reduced from those quoted.

The Next Stage

The next stage in the project is to employ a hydro specialist as project manager and for them to draw up the specifications for the chosen options and identify and cost those aspects which can be carried out by the group themselves with in-kind assistance, so that the rest of the work can be put out to tender.

Eas Mor Ecology are extremely keen to build both a high and a low head system, partly for demonstration and educational purposes, but also for the practical benefit of extending the capability of the combined system to provide charging power from the reservoir during periods of low flow from the high head system which will have minimal storage capacity.

Whether or not they will be able to have either depends heavily on the amount of grant funding available for equipment and professional services. Bids are being made to a variety of bodies including Leader+ (ERDF, via WHELK), ScottishPower Green Energy Trust, Heritage Lottery Fund, etc, as well as the Scottish Community & Householder Renewables Initiative.

Further information

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The view Southwards from the 'all-abilities' path near the waterfall