Community Renewable Energy Case Study – Solar panel water and space heating.

Introduction

This case study focuses on a family in the area who have incorporated micro generation renewable energy into their new home to provide hot water, cooking and space heating – an all in one solution.

Background

Richard and Toni Koczy have recently built their new house at Milifiach near Moniak. In their previous house, gales in 2005 had left the couple without electricity for two and half days. Despite having a full tank of oil there was no power to drive pumps etc so there was no opportunity to provide energy for room or water heating or cooking. As a result of this experience, with the desire to live a greener life and to provide a buffer from rising energy costs, the couple decided to incorporate a mix of renewable energy systems in their new home. They undertook research that identified combining a wood fired boiler with solar hot water would be the best way forward.

Purchase

Installing the integrated system involved purchasing equipment from different suppliers and integrating these in the house. Water is heated by a Rayburn stove purchased from Bonk and co Inverness. Heated water is stored in a 450 lt thermal store which was custom made by McDonald Engineers Ltd in Fife. The solar panels were purchased from AES Solar at Forres. Under floor heating on the ground floor was purchased from Begetube, Inverness

Richard and Toni choose local suppliers as they offered comparative pricing, and their systems work. The total cost for the whole renewable energy system came in at just under £11,000.

Installation

Installing the equipment as the house was being built ensured there were no installation challenges or disruption. The house was built to face south to maximise solar gain, however the site loses direct sun for two months of the year due to the surrounding hills. The system uses a thermal store to provide a supply of hot water and a specific control system had to be built to manage and integrate the equipment.

Operation

The system heats 210m^2 of living area with the total costs for heating and powering the house around £1,150 a year. This fluctuates mainly in response to whether the wood fuel has been supplied already cut and split. A key issue is managing the wood and log supply to ensure it is dry, which increases the energy released when it is burnt.

There were no problems operating the system last winter when temperatures dropped to minus 12^{o}C. The only repercussion was the work involved in loading two barrow loads of logs a day into the stove and cooker.

On an autumn or spring day, the levels of sunshine can heat water up to 80^o C. The amount of sun over the summer means the house is supplied with loads of hot water at minimal cost. Over the year, the average house temperature is 20^{o}C downstairs and 22^{o}C upstairs. This is particularly impressive over the winter months.

Perspectives/Summary

The integrated renewable energy system works extremely efficiently. There are very low maintenance costs and there is no oil boiler servicing. Managing the system becomes second nature when living with such an integrated package of renewable energy equipment. In the future, Richard and Toni hope to install solar pv and wind micro generation which will help to offset wood cost and reduce electricity bills.