

Tourism and Environment Forum
Go green, save money, look after the environment: Heating workshop
Inverness Youth Hostel 2 March 2006
Event Summary

The Tourism and Environment Forum (TEF) organised this day, which was open to all tourism businesses. It was advertised through VisitScotland's ebulletin to tourism businesses, through the Association of Scottish Self Caterers' (ASSC) website, and to all Green Tourism Business Scheme (GTBS) members within striking distance of Inverness. It was an opportunity for like-minded "green" businesses to both glean information on a "green" topic and also to network over a long lunch. Prior to the event GTBS members in the area were canvassed to identify topics of interest, and environmentally heating systems scored as the most popular topic. Despite very poor traveling conditions, 42 people attended, of which 34 were from the tourism industry, representing 28 businesses.

1. Introduction to the event (Caroline Eccles, Tourism and Environment Forum)

The TEF was formed about 10 years ago, and is funded by VisitScotland, Scottish Enterprise, Highlands and Islands Enterprise and Scottish Natural Heritage, to promote the link between the environment and tourism. This has evolved such that the TEF now focuses on sustainable tourism. The private sector is involved in the Forum- only so much can be achieved at a policy level and delivery on the ground by the private sector is critical, hence this event.

2. Solar panels : Gavin Taylor, Everwarm Inverness

Everwarm are part of the Corrie group of companies and part of the Tullochs Group.

Solar panels can provide 50-70% of hot water requirements over a year, rising to 60-70% in summer and dropping to 25% in winter. Water heating accounts for 27% of household energy bills, so these savings can have a significant economic impact. There are also important environmental benefits from using solar panels. Households create 29% of all carbon dioxide emitted in the UK and household energy consumption has risen 25% in the last 25 years.

The UK represents only 2% of the European market for solar panels, with uptake being much greater in other parts of Europe. The technology has been around for about 35 years now.

A typical solar panel system might comprise two panels on a south facing roof, a small pump and controls, a hot water cylinder and a digital controller linked to sensors on the panels. The pump can be run with conventional generated

electricity or a small photovoltaic cell or small roof based wind turbine.

The most important consideration is the positioning of panels. North facing is not suitable, but any other orientation is okay as direct sunlight is not needed for solar panels. The panels can be made to any size, but at least 4m² of roof is required, in addition to safe access to the roof and underlying roof space. An annual service is required to check for leaks in the pipes and to check the pump. Every three years the system should be drained to replace the antifreeze (glycol). No other maintenance is required- rain keeps the panels clean. The life expectancy of the panels is around 35 years. Everwarm systems come with a 20 year anti-corrosion guarantee, a 10 year guarantee for the panels and a 2 year guarantee for the other parts. The panels at Cawdor Castle have been running for around 25 years with no significant maintenance costs.

Typical costs for equipment and installation for a 3 to 4 bedroom house would be between £2500 and £3500, with 30% grants currently available in Scotland for domestic installations. The payback time can be expected to be on average between 7 and 10 years, although one tourism business present noted that their panels had paid for themselves within 3 years. Several businesses spoke with great enthusiasm about solar panels that they have had installed for a good number of years. Solar panels are ideal for guest houses as the water temperature recharges during the day.

It is possible to use solar panels with some types of combi boilers to preheat the water.

Panels can be integrated into a roof such that they look like velux windows. They can also be mounted on the ground or on a wall.

Photovoltaic (pv) cells cannot be combined with solar panels. Pv cells are very expensive, costs being between £10 and £20k. Although cheaper technologies are being developed for pv cells, these may not be robust enough for Scottish climates.

3. Biomass systems: Victoria Sutherland, Glencoe Cottages

Victoria has cottages in Glencoe which are heated using a wood-fired system, the key advantages being that it is cheaper than conventional fuels, is an asset for marketing the properties and is liked by customers. She includes heating costs within the cottage charges and customers like that. They particularly like the smell! She runs a mini district heating system, where one boiler heats three cottages and a central service room where customers dry out their wet climbing and walking gear. The 60kW boiler was made in Finland, and runs on wood chips or wood pellets. These are held in a 10 cubic metre hopper, and then automatically taken into the boiler when required. When it is run on wood chips

she has a delivery once a week in winter and about every three weeks in summer. There is a wood chip supplier in Fort William, also there is apparently a business at Ardesier making wood chips from waste pallets. To carry chips further than 50 miles becomes uneconomic. A lorry load of chips is about 10 cubic metres. It is important that the chips are at the right moisture level (between 18 and 25% moisture), although bigger boilers can cope with more moisture. Her boiler has an alert system to phone her if it goes out, and it will relight easily if she gets to it within the hour.

The boiler requires a fan to blow in cold air and this uses electricity, although it would be possible to link it to a renewable energy supply such as a domestic wind turbine.

Victoria has recently changed over to using pellets in her stove, and these are imported from Russia. Her hopper now only needs to be filled once a month. The pellets are made from compressed sawdust. Every tonne of pellets produces twice as much energy as a tonne of wood chips, as they are very compact. They must be kept dry. There are obviously environmental issues with importing pellets from Russia, but these need to be balanced against the benefits of not using fossil fuels. There is also a pellet manufacturer in Northern Ireland, who may be expanding into Scotland. Pellets are about a third cheaper than chips and are more reliable as the moisture content is more dependable. It currently costs about £350 a month in winter to heat four buildings.

Maintenance of the boiler is minimal and it is very easy to light. There is about a bucket load of ash to empty every week and the burner head has to be cleaned occasionally.

Hot water is piped underground from the boiler to the cottages at a depth of 1m. The heating is under floor, which has the advantages of not taking up any wall space, and ensuring that the main heat is at body level, whereas with radiators the heat often rises to the ceiling. The under floor heating was installed on top of the existing slate floor, so disruption was minimal.

The payback time for such a system would depend on the efficiency of the system being replaced, but is likely to be between five and seven years.

An alternative option is a log boiler, which is ideal if you have your own source of wood. Victoria is currently installing one in her own house. It will use between 6 and 8 tonnes of dry logs each year, and they will need to be seasoned for two to three years. Three times a week the chamber needs to be stacked with logs, and the logs drop into the stove as required. The stove heats a huge "accumulator" tank which provides hot water for heating and water. There is a back up system whereby the accumulator can be heated using electricity with an immersion heater. Another alternative system is a more domestic scale log burning stove which is filled manually as required and heats up a nearby accumulator tank via a

back boiler on the stove. The heating can then be switched on using the water in the accumulator tank without the need for the stove to be on.

Another alternative is a pellet stove. These can be domestic scale stoves which are good for social areas such as bars. They can run up to eleven radiators.

The use of biomass is growing. For example there are 37 houses in Kirkwall heated by one boiler which runs on clean joinery waste.

4. Heat pumps: Leona Coghill, Ice Energy Scotland

Ground source heat pumps have been used in Sweden for 30 years, where 7 out of 10 new buildings use this technology. Heat pumps work like a fridge, taking heat, compressing it, and then moving it elsewhere. As the pressure rises on the heated liquid, the temperature rises. Refrigerants are used but these do not contain harmful CFCs. Air source heat pumps take heat from the air and can be installed inside or out. Ground source heat pumps are the most common heat pumps and take heat from 1m below the ground where the temperature is around 10°C. Looped pipes are laid in trenches. Maintenance costs are low as there are no moving parts. A small amount of electrical energy is required. The heat pumps also incorporate immersion heaters to provide a back up system. Heat pumps can also be used to provide air conditioning.

The Ice Energy Solar Kit combines solar water heating with a ground source heat pump, with the solar heating supplementing the heat pump in the cooler months.

With a ground source heat pump the annual running costs would be as follows:

100m²: less than £400 (Oil would be around £1170)

200m² : £792 (oil £2340)

400m²: £1294 (oil £3187)

900m²: £3564 (oil £10532)

The largest heat pump project in Scotland currently is a carehome in Orkney, where 3000m² will be heated by 3 heat pumps using 24 90m bore holes. This will cost around £8296 a year to run whereas oil would be £26500. Another large scheme is currently being put in by Skye and Lochalsh Housing Association, where 41 flats will each have a borehole and a heat pump.

An average 3 bedroom house would require 200m of coils, which would fit in two 25m long trenches. The cost of the pipework and pump would be around £7k and installation would be around £1 to £3k. Where not much land is available, a borehole can be used rather than trenches, although boreholes are more expensive- an additional £2k. A large part of the drilling cost is getting the rig on sites and so the unit cost is cheaper for more bore holes. Another option would be to dig a trench 2m deep, put in one layer of loops, backfill to 1m deep and then put in another layer of coils. There are sometimes difficulties with digging to

2m however as rock can be encountered.

30% grants are available for capital and installation costs.

The ground loop system does not affect plant life as it is at a depth of 1m. The system is not noisy as the compressor and pump are on rubber mountings. There is a small amount of noise when the system starts up, a couple of times a day. The pump can be installed in a cupboard, or even a garage separate to the house, taking up the same amount of space as a kitchen unit.

Air source heat pumps are not as efficient as ground source heat pumps as the temperature is more variable. In addition the equipment does not last as long, with a lifespan of around 10 years compared with 25 years with no servicing for ground source heat pumps. Air source heat pumps are however cheaper, costing around £5k including installation.

5. Saving Energy with conventional heating systems: Ken Bamborough, Highland Energy Efficiency Advice Centre

The Highland Energy Efficiency Advice Centre provides a free telephone advice service for domestic properties, whereas the Energy Savings Trust (see below) provides advice for commercial properties.

A key issue is that we are often paying for energy we do not actually need, so we should all be looking firstly at our current fuel usage.

Everyone should regularly consider switching energy supplier as this can save money.

The first step is to understand your heating system and then you know whether it is working efficiently and providing energy when and where you need it. Then the next step is to identify what you can do to change your system. Monitoring and understanding your system may save more energy than actually changing the system of heating.

Heating systems are generally overspecified, and it is likely that in replacing a system the new system will not need to be so highly specified. Radiator pipes should be insulated and boxed in.

There are significant building design issues that can reduce energy requirements. For example in the winter low sun angles can cause glare, which in turn means blinds are needed and lights are switched on- this can be tackled as part of building design. With correct siting and good use of materials, energy costs can be minimal.

The location of the heating system control items (thermostats and radiators) is a

key issue. All too often thermostats are sited in a location which is not typical of a room as a whole (for example over a coffee maker) and then the heating output is not appropriate. It is important to consider which part of a room you want to heat and then position equipment accordingly- radiators heat the upper part of a room.

A wide range of guidance is available on the Energy Saving Trust website (see below), including Best Practice guide no. 302 "Controls for domestic heating and hot water."

6. Funding sources: Stephen Cribb, Energy Saving Trust

There are currently no grants for businesses other than for biomass systems.

There are interest free loans under the "Loan Action Scotland" scheme. The Carbon Trust has a similar scheme in England, Wales and Northern Ireland, but this is not applicable in Scotland. Loans are for from £5 to £50k repayable over 5 years, for refurbishment and renewal costs. The amount that can be applied for is five times the estimated annual cost savings you would make. Where no heating is in place, the costs can be approximated. To be eligible to apply for a loan the business must have been trading for a year and must present business accounts. The loan could form part of a package made up of various grants and loans.

Where the business premises is also used as the owners home, then it may be possible to apply for funding under the Scottish Community and Household Renewable Initiative grant (SCHRI). This grant covers 30% of costs up to a grant of £4k for various technologies, including solar panels.

The DTI gives grants for photovoltaic cells.

The Enhanced Capital Allowance scheme may also be relevant. This enables businesses to reclaim tax earlier than you would normally, to assist with cash flow. Items that can be covered include boilers and heat pumps. More information is available at www.eca.gov.uk.

More information on the community element of the SCHRI grants is available in the Highlands and Islands Enterprise (HIE) area from HIE's Community Energy Company.

The Local Enterprise Companies can provide funding advice.

The Highlands and Islands Woodfuel Development Programme is a grant scheme to support wood fuel clusters comprising suppliers, e.g. sawmills, and users, e.g. forest owners, management companies, contractors or community-owned woodlands. Funds are available to help building owners with the costs of installing boilers, boiler houses, and hoppers which automatically feed wood

chips into the boilers; help wood chip suppliers to buy and install the equipment, such as chippers, grading equipment, drying sheds and to supply customers with a good quality of chips.

SOURCES OF FURTHER INFORMATION

Energy Saving Trust. The business adviser for the Highlands is Dr Stephen Cribb 01463 703505. Provides free advice. <http://www.energy-efficiency.org/index.jsp>

Highland Energy Efficiency Advice Centre. Provides free guidance to households, both through its website and through a free phone line 0800 512012. <http://www.highland.gov.uk/property/energy-advice/>

Hospitable Climates. A government funded initiative providing free information to the hospitality industry, including fact files and telephone advice. www.hospitableclimates.org.uk

Green Tourism Business Scheme. An initiative funded by VisitScotland to provide information and support to tourism operators who wish to ensure that their activities have minimal impact on the environment. Businesses are graded according to and audit of the impact of their activities. www.green-business.co.uk

Tourism and Environment Forum. A partnership of public, private and voluntary organisations that work together to develop sustainable tourism in Scotland. www.greentourism.org.uk

Highlands and Islands Community Energy Company. Provides free advice, grant funding and finance for community groups who want to develop renewable energy projects to benefit their community. Details of local advisers on website. <http://www.hie.co.uk/community-energy.html>

Highlands and Islands Woodfuel Development Programme. A grant scheme to support wood fuel clusters comprising suppliers, e.g. sawmills, and users, e.g. forest owners, management companies, contractors or community-owned woodlands. Funds are available to help building owners with the costs of installing boilers, boiler houses, and hoppers which automatically feed wood chips into the boilers; help wood chip suppliers to buy and install the equipment, such as chippers, grading equipment, drying sheds and to supply customers with a good quality of chips. Contact Rebecca Carr at the Forestry Commission Scotland on 01349 866004.

Installers list. The Clear skies website gives renewable technology installers who are accredited to be used with SCHRI grants. <http://www.clear-skies.org/households/AccreditedInstallers.aspx>

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