CHOOSING AND USING A RENEWABLE WOOD BASED FUEL SUPPLY FOR TULLYNESSLE AND FORBES COMMUNITY HALL

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1. Introduction

This presentation outlines the path taken by Tullynessle and Forbes Hall Committee in selecting a wood pellet based heating system for our hall and subsequent experience in running the system. It does not claim to be based on wide experience of these systems in diverse situations but it does try to lay out the basic steps and rationale that might be useful to other hall committees. It starts from before the stage of decisions about heating systems for reasons explained.

2. Before Deciding on Anything

There are two simple points to be made here:-

2.1 What is the rationale for the Hall? This emerges as significant when it comes to applying for funding. Funders or renewable energy systems can cast their eye beyond simply heating systems and having a well argued and well founded case showing the social usefulness of a community hall can be important supporting evidence in some funding applications. The case assembled by our hall committee through considerable research is summarised in Appendix 1.

2.2 Insulation Renewable systems are not climate neutral and are expensive to run if the hall facilities are poorly insulated and basically you are just heating Aberdeenshire or the Highlands. From the start of our hall's redevelopment, we ensured very good insulation.

3. Basic Reasons for Installing a Renewable Energy Heating System

The Management Committee had five reasons for adopting a renewable energy system for the hall and two additional reasons that emerged.

3.1 Reduction in Carbon Dioxide Emissions and Contribution to Reduction in Climate Change

3.2 Reduction in Hall Running Costs –The Hall Association aims to provide an affordable, flexible, welcoming facility for all in the community, particularly disadvantaged local groups like those on below national average wage and the elderly retired. Given, in particular, the rising costs of conventional sources, a renewable energy resource helps reduce a major running costs and hence hall rental rates.

3.3 Avoidance of Warm/Cold Cycles of Internal Temperature - Conventional heating sources, switched on and off before and after usage of the hall, produce warm/cold cycles in the internal atmosphere that cause condensation onto surfaces during cooling. This causes deterioration of fabrics and surfaces, and an unpleasant musty atmosphere. A renewable energy heating system that can provide relatively continuous background heat avoids this important problem.

3.4 Educational Value – A series of initiatives are developing throughout Scotland to promote and enable community groups to adopt renewable energy systems. These

include grant aid systems (EG SCHRI and power company sources) and now initiatives to help groups select and install appropriate systems. (eg The Renewables Connection in Aberdeen City and Aberdeenshire, Aberdeenshire Sustainable Community Halls Group (See Eric Wells, Renewable Energy Development Co-ordinator at 01224-664734 or eric.wells@aberdeenshire.gov.uk) and The Highlands and Islands Community Energy). An important additional need is for a network of functioning effective installed systems in community facilities that can have the educational effect of demonstrating what is possible and effective. Tullynessle and Forbes Community Hall, sited in a wide area that has few such initiatives established, was well placed to be such a demonstration project.

3.5 Use of Local Sustainable Resources – This is discussed further under wood pellet systems below.

4. **Choosing a Suitable Heating System for a Community Hall**

A SCARF officer who dealt with the design and funding of renewable energy systems reviewed the hall and its site, along with an assessment of the energy requirements of the redeveloped hall to decide on the best option. This produced recommendations for improving the energy efficiency of the redeveloped building through insulation and other measures and these were incorporated into the final architect's design.

To select a suitable, renewable energy technology, SCARF staff and companies experienced in installing micro-renewable energy projects were consulted on site with building plans. Two companies experienced in design and installation of renewable energy systems were also consulted on site for their recommendations.

4.1 Basic Options

The full range of options should be reviewed. Our review led to these conclusions:-

4.1.2 Solar Roof Sited Panels – The hall has an extensive south-facing roof, but it is heavily shaded by mature trees that are protected and the removal of which would reduce the amenity of the hall surrounds, remove shelter that in itself reduces energy losses from the hall, and release carbon dioxide through the burning and/or decay of the wood. Further, no solar panel based heating system would be sufficient in scale to meet the requirements of the halland would need to be supplemented by a non-renewable based system.

4.1.2 Ground Source - There is not enough land area available for a pipe array and much of what is available is shaded, this reducing the available solar heat input to the soil and hence the pipes. One based on four 82m deep drillholes could be done but at great cost and into the uncertain geology of the hall's underlying geology except that it is underlain by indurated layers overlying a particularly hard granite that was quarried close by as building stone for these very reasons.

4.1.3 Air Capture Pump - Air source heat pumps are relatively cheap to buy when compared to a ground source heat pumps but:-

They tend to have a lower coefficient of performance than ground source heat pumps.

They usually require a box to be installed outside the building, which can be a problem where vandalism is rife.
Most importantly, the overall carbon saved when compared with an efficient oil fired boiler is seen by many as minimal.
These systems are insufficient in scale to meet the requirements of the hall and would have to be augmented by a non-renewable based system.

4.1.4 Wood Based Options
The remaining options were woodbased – either woodchip or wood pellet. These are attractive options in our area as the hall is in the middle of a large forest area that provides a sustainable resource. Woodbased systems also had other features that seemed suited to our hall (See below).

4.2 Choosing From Wood Based Options
The chief considerations, apart from cost of the fuel type, were the suitability of the associated system for a relatively small building, the ease of running and maintenance of the system, and the reliability of fuel supplies in quality, cost, and diversity of options of suppliers.

To decide between woodchip and wood pellet system, the applicants consulted with a range of organisations with experience in installing wood fuel systems. These were staff of commercial installers, SCARF, the Highlands and Islands Renewable Energy Company (an initiative which has been installing wood pellet systems in community halls as in Allness), and Aberdeenshire Sustainable Community Halls Group (of which our group is a member). Committee members also attended a presentation by a community helper who has been successfully installing wood pellet fuelled system in community halls in Angus for several years and found the results satisfactory.

The conclusions of these consultations were:-

4.2.1 Wood chips are cheaper than wood pellets but have several disadvantages. They can be prone to variability in the quality of the chips including, critically, their moisture content, can experience difficulties in their flow properties in moving from hopper to boiler. The technology evolved in Scandinavia and, while woodchip is suitable for large installations wood pellet was more suitable for smaller buildings like community halls. Woodchip systems have boiler sizes too large to be suitable for community halls, are generally less well integrated as systems, and require frequent filling of the hopper systems. This last point is significant for a facility dependent on voluntary labour.

4.2.2 Wood pellets have advantages that outweigh their higher cost. The quality is reliable, the systems are better integrated and avoid flow problems, the hopper requires infrequent filling, and systems with the correct boiler size are available.

4.2.3 In addition, there are three local wood pellet suppliers competing with oneanother (Puffin Pellets at Boyndie, Hotstoves at Arbuthnott, and Brites (Balcas) at Invergordon.), with a fourth largescale supplier coming on stream at Invergordon.

4.2.4 It is possible to select a system that permits the boiler to function at a low cycle that sustains background temperatures in a community hall that sees intermittent use.

4.2.5 Calculations showed the woodpellet system would result in lower installation costs and running costs than any heatpump and could both heat the hall and hot water supplies.

On this basis, bids were invited from several operators listed as qualified by SCARF and the cheapest selected. The resultant project has the enthusiastic support of officers of SCARF and of the Aberdeenshire Sustainable Community Halls Group.

5. Costs and Funding

The system costs £22,524 to install including supplying, installing and commissioning of the system. A small cost for signage of £293.11 is included in this. A calculation of the tonnage of carbon dioxide emissions avoided by using a renewable system like this is part of gaining funding.

A range of sources for grant aid for renewables exist including the Energy Savings Trust and several power companies but there is little point in listing them as they change with time and place. We obtained £12,926 from the Energy Savings Trust and £10,777 from the Scottish Power Green Energy Trust.

6. Experience of Running the System

6.1 Costs Fuel has costs us £3236 this last year, that is about £270/month on average. This does not include an annual service cost of £226 including VAT and a one off repair charge for a fault that developed. This gives and average monthly cost of £304. It is interesting that a nearby, rather poorly insulated, granite built house of medium size nearby, using the same woodpellet system has costs of £200/month. It is difficult to gauge how much we would have been paying if we relied on oil but it would have been considerably more. Currently, wood pellets cost about £179/ton.

6.2 Day to Day Maintenance The rate of fuel consumption and hence maintenance demands of the system vary greatly with the outside temperatures – clearly being much greater in winter. The basic boiler system must be cleaned regularly. This takes about half an hour with a frequency ranging from once per fortnight in cold winter weather to once every 2 months in summer. In addition, the supply of pellets in the hopper must be checked regularly – not least because many suppliers take 3-4 days before delivering replacement. There is no “Huntsman” early warning system, as with oil, where you are automatically warned of declining fuel supply and a supplier may automatically top it up. The system thus requires regular attention from a volunteer or hall caretaker who understands the system.

6.3 Little Lessons We Have Learned There are a number of these.

a) The number of suppliers is limited and you may one day find the pellet supply is near depletion and a rapid re-supply needed. Keep a small stash of bagged pellets to fall back on and maintain a good relationship with your supplier in case you have to make emergency request.

b) The hoppers are bulky – our 4 ton hopper, the smallest available, is a bulky, in centimetres, 140 (lgth) x 140 brdth x 190 (hght) and has to be accommodated in a

room 312 x 250 x 230 minimum height. This takes up what was intended to be valuable storage room.

c) Blowing pellets into the hopper creates much dust, some of which is blown out of the room containing it. This makes that room unsuitable for storage of any other materials.

d) The manual for operating the system is badly written and constructed and clumsily translated, making it difficult to manage the system or correct minor faults

Much can be learned from organisations created to help promote use of renewable fuels systems such as those mentioned in paras 3.4 and 4.2 or by visiting other community halls that have installed systems. People are welcome to visit Tullynessle Hall for this purpose and details of the hall can be seen on www.tullynessleandforbeshall.co.uk.

APPENDIX 1

THE ROLE AND POTENTIAL OF TULLYNESSLE AND FORBES COMMUNITY HALL IN MEETING THE CHANGING NEEDS OF THE COMMUNITY

SUMMARY

The parish of Tullynessle and Forbes lies in the heart of rural Aberdeenshire in the catchment of the River Don in one of the strongholds of the Broad Scots culture of language, song and dance. The population is widely scattered with no clear social or economic centre save the Community Hall. The traditional economy based on agriculture and, to a lesser extent, foresty, have been in long term decline in terms of income and number employed, while the oil industry has brought a large influx of a mainly commuting population to the area. Despite this, income levels remain below average. Employment from the oil industry is in long term decline and the wider Alford area of which the parish is part contains a high proportion of elderly retired people. Parallel to this, there has been a longterm severe decline in the traditional social structures and supports from churches to shops.

These trends have placed rural communities under considerable strain, with pressure on the local culture increasing, a large retired population to cater for, a new commuting population to integrate, and a sizeable new population of young people in need of social facilities, and a general local population of whom many are still on lower wages.

These challenges place a greater importance on remaining local facilities such as the Community Hall. It needs to cater for an increasing demand and range of activities and people. It must support the local culture while helping provide for a large incoming population, provide affordable facilities for people in lower as well as higher wage bands, for specific groups of particular local importance such as retired people and younger people, and provide flexible facilities that can be used for this wider range of uses.

At present, the Community Hall, which has been a source of pride to the community, makes a significant and increasing contribution to meeting all these community needs both for the local people and many from a far wider area. However, the hall was built at a time of lower building standards, is structurally deteriorating in many ways, and needs to expand to meet increased demand on its use. The Hall Committee therefore decided there was a pressing need to upgrade the facilities.

The Committee reviewed the local social, economic and planning situation, and the situation of the hall. After drawing general conclusions from this, it carried out a thorough consultation with hall user groups, the wider community, and special groups within the community such as young people. It also researched the design of local halls that had been redeveloped and the resultant demand for their facilities, and conducted consultations with a series of experts on the design of various aspects of the Hall.

The results of the consultations demonstrated the value the people of the parish and wider community placed on the Hall facilities due to their central location, scale, flexibility and generous parking space. It also drew out peoples' preferences for how the hall should be redeveloped, a range of ideas for increased use of the Hall by groups within the community, and demonstrated scope for increased usage of it.

From its general review of the situation and the consultations, the committee concluded that there was not other option other than the community hall for meeting the identified social and cultural needs. ***If the hall, with a generous allotment of land around it, was lost through degeneration and underuse resulting from deteriorating facilities, the cost of acquiring land and rebuilding at present day land and building prices would be very large and beyond the reach of the community. The hall should therefore be redeveloped!***

It was clear that the Tullynessle and Forbes Community Hall already provided a valued facility for a broad range of people and groups within the immediate parish *and a much wider population*, but it needed to cater for an increasing demand and range of activities and people. There was adequate vacant time in the usage of the hall to provide this. In future, the hall must support the local culture while helping provide for a large incoming population, provide affordable facilities for people in lower as well as higher wage bands, for specific groups of particular local importance such as retired people and younger people, and provide flexible facilities that can be used for this wider range of uses.

The general aim of the redevelopment had to be to maximise the use of the Community Hall by the greatest diversity of local people and groups and thus sustain local social, cultural and recreational life, and increasing community cohesion.

A range of other investigations provided valuable practical guidance in the design of a redeveloped hall in matters ranging from improved insulation to stage facilities for drama groups. Research into the design of and experience with other redeveloped halls provided practical adviceon such things as the design of catering facilities, extent of storage facilities to provide, and suitable design of any other extensions.

The finalised proposals were then defines as:-
1. Extension of the hall down both sides to clear the main floor for activities, provide seating areas, and improve lighting.
2. Redecoration of the interior and exterior of the hall.
3. Insulate the facilities to a high standard
4. Provision of a separate Kitchen that would be adequate for outside caterers to use but not designed for full catering within the premises.
5. Upgrading of the small hall at the rear to provide a good small meeting space.
6. Upgrading of toilets
7. Increased storage space.
8. Improved stage facilities.
9. Tarmacing of the carpark if the budget permitted.
10. Provision of an additional small servery.
11. Provision of a pitched roof over the extension at front of the hall.

From this basis, an architects' brief, a redevelopment plan and a grant application were prepared.