

Finland Study Tour. 26/03/07 to 29/03/07.

1. Introduction

The tour was organised by Northern Woodheat. The tour party of 13 people was split into about half from the Highlands and half from Glasgow and North Lanarkshire. The group consisted of Local council staff, Social housing staff, members of staff from the National Trust, Cairngorm National Park and Highland Birchwoods. Elected members from Regional councils were not present due to the proximity of the local elections. Members from METLA in Joensuu led the tour.

Joensuu in Northern Karelia has adopted the title of the “Forestry Capital of Europe”. The landscape is relatively flat and forests and lakes dominate the scenery and open space appears to be a rare commodity. Finland has 72% forest cover compared with 10% in the United Kingdom. It has a *per capita* forest area two orders of magnitude greater than the United Kingdom, at over 4 ha per person compared to 0.04 ha in the UK.

The most useful aspects of the tour for woodfuel supply chains were the visits to working cooperatives, and discussions with the operators who make part of their living from supplying woodfuel and heat.

2. Political Structure

Forest cover aside, the most striking difference between Scotland and Northern Karelia was the political structure and the opportunities that existed for the establishment of Woodfuel supply chains.

Taxation in Finland is about 32%. Of this about 65% of this is given to the Municipality, and 35% to the national government. Municipalities run all of the services supplied by Regional Councils in Scotland, as well as health. The major difference is that the Municipality of Eno has 7000 people, compared with 200 000 in Highland Region. Finland has a population of about 5 million, roughly the same as Scotland. It has about 450 municipalities.

Finland has 1 million forest owners, and an integrated forest industry. Forest owners are represented on municipal councils. There is a mutual interest in municipal councils working with forest owners to generate local wealth and employment while receiving heat for municipal buildings at below the market rate for fossil fuels.

The plants visited were dedicated to municipal buildings and the co operative had the advantage of security of market. Heat prices are calculated on a basket of fuels (oil, electricity and peat in the case of Eno, as mains gas is not available), with a ‘premium’ for the interest on the bank loan for the plant. It was emphasised that wood heat was not a cheap fuel source, but that it was secure, as well as more carbon neutral and sustainable than fossil fuels. The security of supply is generated from the fact that there are sufficient forest owners with an interest in supplying the plant. The Eno cooperative is currently limiting membership as it is able to meet demand. This contrasts sharply with Scotland where forestry tends to be owned by remote

corporations or estates, and does not have a culture of cooperation between owners. (DWP Harvesting in Aboyne seem to be the exception that proves the rule).

Finland has a very different local political structure to Scotland. The impression from the tour was that this was instrumental in the establishment of local wood fuel supply chains, as the municipality and co operatives had a symbiotic relationship. In at least one case, the municipality had purchased the boiler and connected it to its buildings before contracting the co operative to supplied the fuel. This gave the cooperative a guaranteed market, and the contract to supply fuel gave the bank confidence for the bank loan. Eno cooperative owns two boilers and runs a third owned by the municipality. In one case the payback time for the boiler was projected to be 9 years, rather than the scheduled 15.

The cooperative structure of the supply chain would be difficult to emulate in Highland because of the dispersed nature of the tenure of the forest resource. Forest owners operated machines and benefited directly from their own efforts. In Highland Scotland the tendency has been for corporations to purchase land for commercial forestry, creating 'remote' landholders who are disconnected from micro scale operations, and tend to hire contractors on a basis of need. Finish forest owners appear to manage on a more sustainable level, producing annual income from managed forests. There is a general tendency for Scottish forest blocks to be managed by clearfell and restock with income on a rotation rather than continual cover basis. This observation is probably over generalised, but is one of the results of large forest blocks being managed by remote corporations rather than by owners living within them.

The heating plants in Finland are spread from the south to north of the centre of the country. There are no woodfuel boilers to the north, and the explanation given was that the forestry density is lower. This may be a partial explanation as the population density can be as low as than 0.3 per ha, and there may be cultural reasons, as the population is Sami rather than Finish. The subject was not sufficiently explored to draw any conclusions or comparison with Northern Scotland.

3. Incentives.

The Finnish state sector supplies incentives to manage forestry for bio fuel. The Scottish Forestry Grant Scheme supplied incentives for approved operations irrespective of end use. In Finland, a per ha and per megawatt payment is made to landholders in order to encourage management for woodfuel.

4. Supply Scale

One plant was within the grounds of a school/ gym / old peoples home. It was surrounded by relatively high-density housing. The obvious question was why did the co operative not supply the local houses. The answer was that there was not a consistent heat load from the houses. There is a tendency for periodic demand during the evening and early morning, with little need for heating in the late morning and afternoon.

There was an interesting comparison at one plant where the technician managed boilers on several sites. He claimed that older technology boilers required 15 hours maintenance per week, while the newer boilers required 5 hours maintenance. Woodchip boilers are 'Expert systems' requiring skilled operators. Maintenance needs to be built into the production schedule. This supplies rural employment, but requires either a skilled operator who can factor 5 – 15 hours per week into their working life, or a sufficient capacity of several boilers for a maintenance engineer to be employed on a full time basis. The former would suit the crofter culture of the Highlands, especially if other duties (processing or delivering) could be factored in.

5. Plant.

The cost of plant in Finland appears to be relatively cheap compared to that in Scotland. This is a general feeling amongst the group rather than a 'like for like' study. (Investment costs for the Eno cooperative plant vary between 6.3 and 10.3 euros per M³ volume heated). Although there is no direct comparison, the Albyn plant at Avimore cost about 10 000 euros per house including the pipe network. There was some discussion about whether there are enough boiler suppliers in the United Kingdom, whether they could supply a suitable range of appliances, and if they were abusing a monopoly position. It appears that the lack of experience in Scotland means that purchasers of plant are reliant on the judgement and supply contacts of very few UK suppliers or agents. It may be in the interest of a potential boiler purchaser to contact the manufacturers directly and to compare like for like prices between Finland and Scotland.

Some plant manufacturers can supply self-contained plant in a container that acts as the building for the boiler. This apparently reduces brick and mortar costs and acts as a 'Plug and Play' module. A heating pipe network can be connected to the container. This may raise some planning issues in Highland Scotland, and the tour did not see any examples.

6. Supply chains.

A plot was being cleared for housing and the forest cover was being removed, chipped and transported. Normally the material would have been left to dry, but needed to be removed from the site. The operator of the chipper was also driving the lorry to plant, and the material was being used wet. It could be mixed with dry material at the plant, and was suitable for burning in a 750 kw boiler. Normally the chipper would have been operated by one person and the transport provided by another. This was an opportunistic operation, and the cooperative had sufficient experience and knowledge to take advantage of the situation. The flexibility of operation allowed the cooperative to use "windfall" material.

At the plant where the material was delivered it was explained that higher Moisture content was preferred in the summer months because demand was less, and dry material is more difficult to regulate when burned in the summer. The 'knack' that the operators possessed was impressive, and left the impression that there was more to operating plant than supplying sufficient quantities of fuel at the right time. If woodfuel supply chains are established in the Highlands, it may be a good investment

to send potential Highland operators to work with the practitioners in another country where the 'knack' has been acquired through experience.

7. Other visits

The tour also visited a house heated by pellets, a business selling pellet boilers and a soapstone stove manufacturer.

With sufficient development of the pellet market, pellet stoves may become popular in Scotland, and may be a practical alternative to oil heating in the Highlands. The business selling pellet burning plant classified pellet boilers as Ladas, Skodas and Audis. The aim of the business was to promote the 'Audi' end of the market, where owners had the convenience of electric supply, with minimum need to 'operate' the boiler. The business was expanding in Finland. This is an interesting development for a country where rural properties take pride in having at least one years supply of firewood harvested and stacked.

The owner of the business claimed that house builders in Finland tended to put electric heating into buildings because the infrastructure costs for boilers (about 12 000 euros) was too high. This made fitting wet systems more difficult and expensive as well. There was some discussion of a change in legislation in the next two years which would mean new houses would be required to be more energy efficient, and would boost the business.

The tour visited a house with a boiler which required a relatively high level of input from the owners, and was more in the Lada / Skoda range. The owners were happy with the boiler, although development limits on the house site meant that the storage capacity for pellets and operation of the stove was sub optimal. This year was a mild winter in Finland, only reaching -30° C. 'Normal' winters reach -42° C in Northern Karelia. Open fires also heated the house, but the technology of the boiler was obviously sufficiently proven for the owners to rely on it.

The soapstone fireplace factory made some interesting stoves that are designed to be burned for 2 hours per day. They store and release heat their over 24 hours. It was difficult to see how they could be adapted for Scotland, as they require 0.3 m lengths of wood, dried to about 15% moisture content. This would require a dedicated supply chain and the introduction of a different attitude to heating homes. The problems of establishing the supply chain are similar to those of woodchip, but would not supply whole house heating or hot water.

8. Conclusions.

There is more that is different to Highland Scotland in Northern Karelia than is similar. The differences have allowed Finland to forge ahead with woodfuel. Scotland can benefit from the lessons learned, but will need to adapt many of the Finnish models to its social political and geographic conditions.

The technology is developed rather than primitive. This works to Scotland's advantage, as many of the inefficiencies have been overcome. Finland enjoys advantages that have allowed it to be in the vanguard of woodchip technology. It is unlikely that the technology would have evolved in the United Kingdom but the confidence shown by the operators makes it easy to believe that the technology would be easily exported to Highland Scotland. The material needed for fuel is probably available but the culture is not. Culture can be changed faster than the material can be grown.

9. Appendix Programme:

Monday 26th of March	
Evening	Arrival to Joensuu Transportation from Airport to Sokos Hotel Kimmel Brief check of programme and arrangements Accommodation in Sokos Hotel Kimmel ****
Tuesday 27th of March	
09.00 - 11.30	"Forest Energy in Finland" Orientation to Finnish Forest Energy culture and business Lunch
13.00 – 15.00	Urban private house heated by pellets School and community centre with pellet heating
16.00 – 17.30	Lämpötalo ltd. Leading edge pellet boiler technology by Windhager boilers and plumbing
Wednesday 28th of March	
08.30 – 11.00	Eno Energy Cooperative, forest energy entrepreneurship fuel supply, heating plant, business
12.00 - 12.30	Lunch at NunnaUuni ltd.
13.00 – 15.00	Log burning: NunnaUuni soap stone fireplaces, factory visit and exhibition
16.00 – 16.45	Kylmäoja school, small chip boiler run by Kontio-Energia cooperative
17.30 – 20.30	Dinner and professional discussions with sauna Presentation: City of Joensuu, arboriculture and woodfuels Presentation: Public sector organisations and decision making in renewable energy utilisation
Thursday 29th of March	
9.00 – 11.00	Concluding remarks and farewell discussion
11.00 =>	Home sweet home, here we come ...