

'TreeStations': a local supply of wood-chip from waste

Summary

The BioRegional Development Group has established a 'TreeStation' – a centre where waste wood is received from many sources, turned into wood-chip and delivered for use as a heating fuel. Until recently, their site capacity was about 2,500 tonnes per year, but a new chipper has increased this to 15,000 tonnes per year.

Legislation in the London Borough of Croydon and other boroughs requires all significant new building developments to generate 10% of their energy from on-site renewable sources. Biomass heating is one of the most cost-effective ways to do this, but requires a reliable supply of fuel. The London boroughs do have a considerable resource of fuelwood from the management of parks, gardens and woodland, but much of the waste produced is currently sent to landfill, at a cost of about £40 per tonne.

The BioRegional Development Group brokered an innovative deal between tree surgery business, City Suburban Tree Surgeons Ltd, and Croydon Council to manage and dispose of all the Council's wood waste. BioRegional established a TreeStation – a centre where waste wood is received from many sources, turned into wood-chip and delivered for use as a fuel for heating and combined heat-and-power. Until recently, the TreeStation had produced about 2,500 tonnes of wood-chip per year for a single customer, Slough Heat and Power, who supply heat and electricity to Slough Estates and use an increasing amount of wood in their fuel supply. With recent equipment, the TreeStation now has the capacity to process 15,000 tonnes per year. BioRegional is also setting up drying facilities so that the wood-chip will have lower moisture content, and so be suitable for a wide range of boilers.

The Ashden Award to Bioregional recognises the significant potential for supplying fuelwood even in cities like London, and the importance of the TreeStation approach in setting up a reliable wood supply chain.

The organisation

The BioRegional Development Group was established in 1994 and is registered as a charity. It employs 25 staff, mainly as project managers, and carries out a wide range of activities related to sustainability. These include sustainable housing development and product supply, paper recycling, charcoal production, forestry, materials reclamation, mini pulp mills, and hemp production. BioRegional won an Ashden Award in 2002 for the development of BedZed, a zero-net carbon residential development in South London which has been replicated in the UK and internationally.

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Technology and use

The TreeStation in Croydon provides a site where local woodland managers and tree surgeons can take their waste wood. It is chipped, and the wood-chip is then supplied under contract to users.

The first wood-chipper purchased by BioRegional was unable to handle short, irregular logs and had to be sold on. City Suburban helped BioRegional to find a more suitable machine second-hand from Scandinavia. This machine was processing 50 tonnes of wood per week, until March 2006, when it was replaced by a newer mobile chipper from Denmark which can process over 100 tonnes per day. City Suburban receives wood at the TreeStation, including logs of all sizes and chips from mobile chippers. The largest logs are split, then fed to the chipper which can chip logs up to 56cm diameter. Blades on a rotating drum in the chipper cut the logs into pieces which are then ejected through a screen which prevents production of over-sized chip. The chips from mobile chippers have come from branches, and have to be screened to eliminate twigs, crisp packets and fines (material like sawdust that could block the boilers' in-feed mechanism). Fines are composted on site and there is a store for wood-chips.

Air-drying facilities are currently being improved at the site, since the useful energy output from wood-chip is much greater when less energy is used in evaporating water from the chip.

How users pay

Croydon Borough Council contracts out the management of trees in its woodland, parks and gardens and the disposal of the waste to City Suburban. Croydon pays City Suburban £10 per tonne gate fee for disposing of the wood via the TreeStation, but saves about £40 per tonne on the cost of landfill. Croydon receives £25 per tonne for waste from other tree surgeons and passes on £22 of this to City Suburban for disposal via the TreeStation. In March 2006, Slough Heat and Power was the sole customer, and City Suburban made £11 per tonne over the cost of delivery costs to them.

The high capacity chipper could produce about 20,000 tonnes of wood-chip per year. The size of the Croydon TreeStation limits throughput to about 15,000 tonnes, which could bring in an annual income of £210,000. This has to cover staff salaries and operating and maintenance costs. Since the chipper is mobile, it could also be used at other sites.

Training, support and quality control

The development of the TreeStation involved on-the-job learning for staff from both BioRegional and City Suburban. The procedures are now fairly well-established, and the TreeStation is now operated with a single full-time person to receive deliveries and operate the equipment supported as required at busy times.

Slough Heat and Power, which is the sole customer at present, will accept wood-chip with moisture content up to 50% whereas smaller biomass boilers generally require wood-chip with no more than 35% moisture content. This is the next market which the TreeStation plans to serve, by providing on-site facilities for air-drying the wood-chip.

Benefits and replicability

The Bioregional TreeStation has set up a market for waste wood in Croydon. The management of woodland, parks and urban trees, produces large volumes of poor quality logs (short and irregular in size) and small off-cuts. Areas of Croydon had become overgrown but are now being actively managed, since there is now a market for this wood. The managed woodland now supports greater biodiversity. Waste wood no longer has to be sent to landfill, and both the Council and local tree surgeons save on landfill costs.

BioRegional carried out a survey in January 2006 which indicated that there is a potential annual supply of about 502,000 fresh tonnes (331,000 dry tonnes) of wood in the London area. Of this dry

wood, about 120,000 dry tonnes is tree surgery arisings and 200,000 is waste timber, both of which could be a lower cost source of wood-chip. As fuel prices rise, it will become viable to obtain wood from forestry and short rotation coppice.

The use of wood-chip replaces fossil fuels and saves carbon emissions. Until recently, the TreeStation supplied 2,500 tonnes of wood-chip per year to Slough Heat and Power. This replaced coal and saved about 2,100 tonnes of CO₂ emissions per year.

With the high capacity chipper, an estimated 15,000 tonnes of wood-chip will be processed by the BioRegional TreeStation each year, and be used in a wide variety of biomass heating schemes. This will save an estimated 5,100 tonnes of CO₂ emissions per year if used in place of gas. Having a local wood-chip supply coupled with the London 10% renewable energy requirement has led to early adoption of wood heating schemes in Croydon. A number of significant projects have had the confidence to choose wood fuel for heating. These range from residential developments and care homes to a supermarket and mixed use developments. Croydon Council goes further than London's Mayor and now requires all developments with more than 10 housing units or over 1000 square feet to generate 10% of their energy from on-site renewables. The Croydon TreeStation makes it easy to use biomass, which is often the cheapest option. A number of the larger commercial building projects across London are now including biomass heating.

The Croydon TreeStation has directly created the equivalent of two full-time jobs.

Management, finance and partnerships

BioRegional established the concept of a TreeStation, negotiated the supply of wood from Croydon and created the links with City Suburban, which operates the TreeStation. BioRegional helped City Suburban to secure three-year contracts for park management and waste disposal. City Suburban employs two people at the Croydon site and 80 in total. Andrew Tolfts, Forestry Project Manager, has managed the project at BioRegional.

BioRegional received grants of £150,000 - from Landfill Tax Credit, the Carbon Trust and Scottish Power Green Energy Trust - to set up the TreeStation and buildings, and purchase the first chipper. City Suburban has financed the capital investment in other technology, which cost approximately £250,000. They estimate the payback period will be about 2.5 years. Croydon Council have made the site available rent-free.

Use of the Ashden Award

BioRegional intend to use the Ashden Award to facilitate the creation of three new TreeStations around London. They will use training workshops to promote biomass heating to construction, procurement and planning professionals. A drying facility for wood-chip will be installed at each of the proposed new TreeStations and added to the Croydon site. This will improve the product quality, making it more suitable for smaller scale biomass boilers.

This report is based on information from the application submitted to the Ashden Awards by the BioRegional Development Group, findings from a visit by one of the judges to see their work in and around Croydon, discussions between Andrew Tolfts and the Ashden judges at interview, and presentations by Andrew Tolfts at Ashden Awards seminars.

Dr Anne Wheldon, Technical Director of the Ashden Awards Jeremy Rawlings, Technical Assistant July 2006.

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