3. Security of fuel supply

There is an abundant supply of wood based material available in the South East which could be used as fuel.

3.1 Forestry

A Forest Research study was carried out to establish the current resource of wood fuel from traditional forest products, arboricultural thinnings, sawmill residues and energy crops. This study estimates a total resource of over 550,000 oven dry tonnes (ODT) per annum in the South East region and London. 550,000 ODT is the equivalent to 2,750 million kWh of input energy. If you assume 80% efficiency which is easily achievable, 2,200 million kWh could be produced when burnt. This is enough to heat 100,000 homes . It is important to note that a proportion of this material will be diverted from alternative markets and that it may be uneconomical to extract some of the material.

3.2 Waste wood

Further to the supply identified above, the post consumer wood resource is substantial in the South East region. Wood from construction and demolition, packaging and civic amenity sites account for 850,000 tonnes. If used in appropriate energy from waste systems, this could generate 3,400 million kWh and heat 150,000 homes in the South East.

3.3 Supply chain and processing

There are a number of wood chip supply companies in existence or currently being formed to meet the increasing demand, see www.biomassenergycentre.org.uk for a list of national suppliers

Wood chip advantages:

- Chip is cheaper than pellet (p/kWh)
- Chip is more readily available
- Chip is more robust when being handled
- Many chip boilers can run on pellets
- Chip requires less energy to produce

Wood pellet advantages:

- Pellet has a higher energy density than chip
- Pellet is uniform in size
- Pellet has a uniform moisture content
- Simplified delivery
- Pellet boilers tend to be smaller and cheaper

Forestry Commission
England

Wood fuel resources

A number of suitable fuel options are outlined below.

1. Wood Chip

Wood chips are produced from a wide range of sources such as forestry timber, forest co-products, arboricultural arisings, short rotation coppice, reclaimed timber and sawmill residues. They can be more cost effective than fossil fuels and are most economical if sourced locally. Wood chips are suited to automatically-fed larger systems of at least 30 kW. Wood chips stored dry can be held for several years with little degradation of quality or loss of energy value. However, in order to prevent contamination of the chips with stones and clods of earth it is important to ensure that all storage prior to delivery to end user is on a solid concrete or tarmac surface.

The most important considerations when buying wood chip are the moisture content (MC) and the chip size. Moisture content can vary from 60% in freshly felled timber to 10-12% in kiln dried wood. There are boilers available that will burn a wide range of moisture contents, but most boilers work best within specific limits. Ideally timber will have been seasoned in the round for at least 12 months in order to reduce the moisture content and to maintain an even moisture throughout the material. Drying woodchip often creates pockets and/or layers of moisture which some boilers are unable to burn.

Chip size is less important than the consistency of size within the chip. As with moisture there are a range of boilers that will burn different types of fuel. A consistent chip size will feed into the boiler freely and burn in a predictable way. If there is any significant variations in the size of chip (as with moisture), the efficiency of the boiler will suffer.

The other potential issue connected with chip size is longer, larger slivers within the mixture. These oversize slivers can cause blockages in the fuel feed by jamming the auger or bridging in the fuel store. Larger systems tend to have more robust feed mechanisms so this may be less of an issue.

Things to look for when choosing wood chip fuel:

- moisture content
- calorific value
- size of the chip and
- consistency of chip

These will affect the efficiency of the boiler system. The boiler installer or manufacturer will provide a chip specification which best suits the boiler. You must ensure your fuel supplier can meet this specification.

Forestry Commission England

1.1 Forestry material

Forestry and woodland management activities produce a large amount of material suitable for fuel use. This includes all parts of trees which can't be used in other ways or which have no alternative higher value market nearby. The production of woodfuel from undermanaged woods can help enhance local biodiversity and increase the productivity and quality of the woodland as a whole.

The South East is England's most wooded region with more than 270,000 hectares of existing woodland, which represents 25% of England's woodlands. Historically, these woods were actively managed to supply local markets for fuel and building materials, but over the last 100 years these markets have declined and many of the woods are no longer actively managed. The Forestry Commission estimates that these woods could supply a further 500,000 fresh tonnes (at 55% moisture content).

1.2 Short rotation forestry

There is considerable interest in using fast growing native or exotic tree species in purpose grown plantations to produce woodfuel. Trees in these plantations would be planted at very high densities and managed as conventional single stem plantations rather than coppice. The trees would be harvested after 8 - 15 years using conventional forestry equipment. This system is known as 'short rotation forestry'. Advocates of this system point to potentially high yields, a well established forestry industry able to harvest and transport forest products and the high 'wood to bark' ratio in logs and chips produced using this system. It's detractors raise concerns over the effects this system could have on local biodiversity and the potentially high water use of the system. Providing it is managed in a sustainable way, SRF may become a useful addition to the woodfuel supply chain in the future.

1.3 Energy crops

Energy crops can be grown to meet the needs of the market and provide a secure long-term resource. The most commonly grown energy crops are miscanthus, a fast growing grass, and willow.

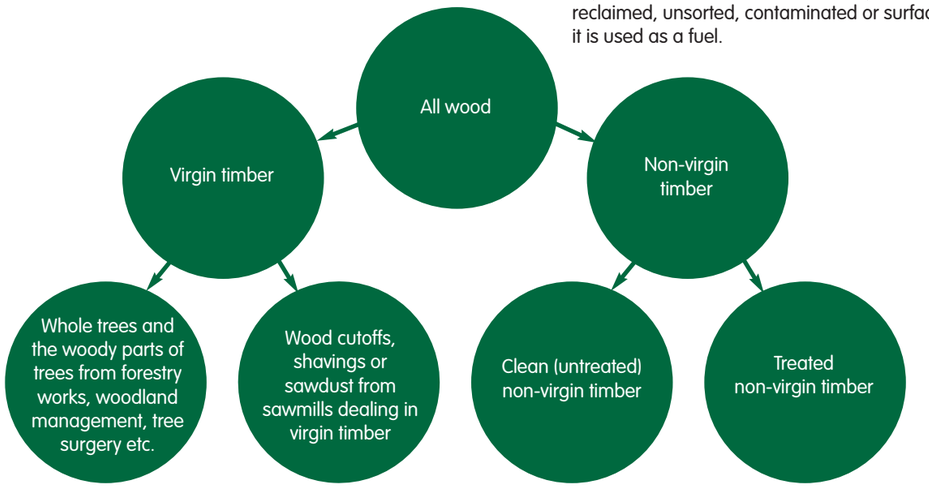
Willow is commonly grown under short rotation coppice (SRC) management. Harvesting is typically carried out in the fourth year after planting and every subsequent third year. An SRC plantation can often remain viable for up to 30 years although the introduction of higher yielding varieties can warrant replanting. Material is chipped during harvest and can be stored and handled relatively easily. SRC can provide wildlife habitats for birds and invertebrates, consequently improving on-farm biodiversity. Energy crops are widely planted to support power stations, many of which co-firing biomass with coal.

1.4 Arboricultural thinnings or arisings

Local Authorities and tree surgeons produce many thousands of tonnes of chip and other arisings from garden, amenity and street trees each year. Much of this is currently landfilled, stored in anticipation of a demand from the landscaping industry or burnt on site. With correct processing handling, grading and storing this is a fuel source that could be used to provide energy. In the South East many tree surgeons and Local Authorities are already utilising their arboricultural arisings to supply Slough Heat and Power's wood fuelled combined heat and power plant. Sites are being established around the South East to enable the aggregation of material that cannot currently feed into the power station in order to process it into a suitable fuel.

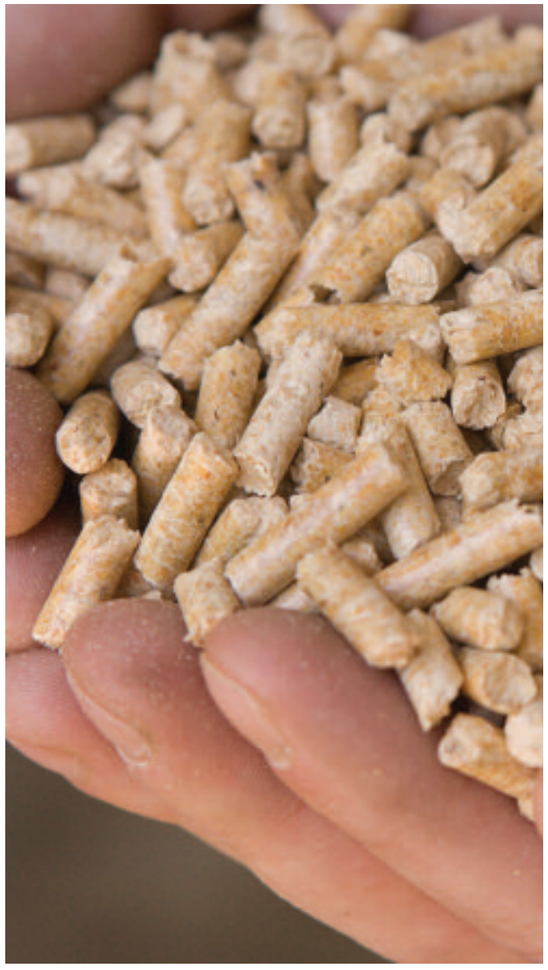
1.5 Clean waste wood and timber processing co-products

Many categories of clean (untreated), used wood can be readily used as fuel, including tree surgery arisings and offcuts and sawdust from sawmills processing virgin wood. There is greater regulation of waste wood or non-virgin timber, which includes reclaimed, unsorted, contaminated or surface treated wood when it is used as a fuel.



2. Wood pellets and Logs

Two alternative forms of wood fuel commonly used for heating are pellets and logs. Wood pellets are mainly produced from untreated material such as sawdust, pulverised pallets or reclaimed timber of a low moisture content. The wood is compressed through a die to form the pellets. Wood pellets range in size but are typically in the region of 6mm in diameter and 20mm in length. Wood pellets are suitable for small scale systems that do not have the fuel flexibility of some larger systems, but also where fuel storage space is limited as they have a higher energy density than wood chips. Due to the consistency in size of the pellets they can also be used in specially designed domestic stoves and boilers. Wood pellets are more expensive than woodchips, but pellet suppliers are beginning to import pellets into the region from other areas of the UK and local production is starting to become established.



Logs are the most well known wood fuel and historically have been the most popular source of woodfuel. Logs can be used on open fires or more efficiently in log stoves to provide space heating to individual rooms however they are used most efficiently in domestic closed log boilers, to provide space heating and hot water. Wood briquettes are a similar, less common alternative, which can be used in place of logs in traditional manual feed stoves, modern log boilers and larger plant. As with pellets, they are produced from clean waste wood, such as joinery off-cuts and sawdust.

Closing the Cycle

By utilising wood either grown or produced on site to generate heat it is possible to increase the comparative value of the product, to solve disposal issues and to offset existing fuel costs. Local Authorities can achieve this 'closed cycle' by utilising clean wood waste that would otherwise go to landfill and their arboricultural arisings to generate heat for their own portfolio of buildings. Farmers, foresters, and estate owners also have the opportunity to close the cycle by utilising wood that has been grown on site in their boilers. Secondary wood processors such as furniture manufacturers can use timber off-cuts, dust and shavings to heat warehouses, timber drying systems and workshop space.

Key considerations

- Identifying local woodfuel suppliers
- Can you produce your own fuel and close the cycle?
- Are you able to take a variety of fuel sources/sizes or does fuel need to meet certain specifications?