Short Rotation Coppice Willow (SRC)

Crop Fact Sheet

Short Rotation Coppice (SRC) willow is grown as a high biomass energy crop across the UK. SRC is a woody perennial crop, the rootstock remaining in the ground after harvest with new shoots emerging the following spring. SRC willow plantations can remain viable for 25-30 years; harvested every 2-3 years.

What is SRC grown for?

SRC willow is a high biomass energy crop grown across the UK. The crop is grown to generate heat in biomass based heating systems or for power generation, as a co-fired product in power stations.

SRC is generally available in chip, pellet or billet form; suited to a range of heat and power generation systems from domestic to industrial-scale.

SRC willow has an energy value of 16-18 GJ/oven dry tonne (odt).

Where can SRC be grown?

SRC willow is suited to a wide range of soil types, from heavy clay to sand; the crop can also be grown on reclaimed land. The crop is most productive on well aerated soils that retain moisture. Soil pH should be in the range of 5.5-7.

More information on site selection and potential growing areas can be obtained from Defra; maps illustrating opportunistic growing areas were published in 2007 and are available from the Defra website.

How is SRC grown?

SRC is planted in the spring. Complete eradication of all invasive perennial weeds is essential prior to planting; a glyphosate-based herbicide should be applied in the summer/autumn prior to spring planting; an additional application just before planting may be necessary on some sites. Sludge or manure with low nitrogen content can be incorporated into the soil prior to planting, to help improve moisture retention.

harvesting SRC - image courtesy New Holland

wood pelleting unit

SRC fuel pellets

'supplied by ecolivingsolutions.co.uk'

Planting

Willow can be planted as rods or cuttings using specialist planting equipment.

Planting should take place as soon as possible after the last frosts in spring; delaying planting until late-spring is possible, but this is unfavourable as a longer initial growing season makes the plants stronger before winter and subsequent cutback.

Willows are planted in twin rows 0.75 metres apart, with 1.5 metres between each set of twin rows, to allow machinery to pass through the crop after planting and at harvest.

1-3 shoots will emerge from each cutting and they will reach up to 4 metres in height after the first growing season.

Key points

- Harvested every 2-3 years
- Planting grants available for 50% of establishment costs
- Low inputs required once established
- Long-term costs & returns can be predicted for lifetime of crop
- Existing and increasing markets in heat, power & fuel sectors

Inputs

Sewage sludge or manure can be applied pre-planting and after subsequent harvests to help improve moisture retention and maintain yields. Use of synthetic fertiliser is discouraged to maximise environmental benefit. A residual herbicide should be applied pre-emergence. In nitrate vulnerable zones, the Nitrates Pollution Prevention Regulations 2008 apply.

The crop will be cut back to within 10 cm of ground level during the first winter to encourage coppicing; this will usually take place during February, before bud-break. A contact herbicide should be applied after cutback to control the weeds that have established in the first year.

Chrysomelids (willow beetles) are the most common insect pest of willow; they feed on the leaves and can cause significant damage to the crop; local applications of insecticide may be necessary to control beetle populations in the early stages.

Rabbits and deer can be problematic in the crop in the first two years of growth; rabbit fencing may be necessary to prevent damage, costs incurred are eligible for support under the Energy Crops Scheme.

Harvesting

Harvesting of SRC takes place on a 2-3 year cycle depending on productivity, with the first harvest taking place 2-3 years after cutback. Harvest takes place during the winter, after leaf-fall and before bud-break; usually mid-October to early March.

SRC can be harvested as rods, chips or billets. Rod harvesting is uncommon; the stems are cut and stored in heaps around the edge of the field. Material is then collected and chipped as required. Chip harvesting is carried out using modified forage harvesters, with a specially designed header; chip is collected by trailers and stored on farm. Storage and drying of chip can be a problem, to prevent decomposition of the material before use.

Billet harvesting is intermediate between rod and chip harvesting; the stems are cut whole and then chopped into 5-15 cm lengths and collected in a trailer. Storage and drying is easier as air flow between the billets is less restricted. Harvesting to billets requires specialist equipment.

Crop productivity

Yield varies depending on the site, soil type, moisture availability and pest or weed control. Generally the first harvest will yield 25-30 odt/ha; subsequent harvests will yield 30-35 odt/ha.

Prices for SRC chip or billets currently range from £50 per odt ex-farm through to £70 per odt delivered. Long-term contracts secured with the grower will be index-linked to inflation, so an annual price increase can be expected for the lifetime of the crop.

Higher prices can often be attracted for supplying small-scale heat installations, however logistics, deliveries and labour requirements must be considered.

A gross margin comparison tool is available on the NNFCC website to allow potential or existing growers to understand how the economics of SRC production would compare to annual arable crops.

Support

Planting costs of SRC are high; however 50% of the planting and establishment costs can be funded under the Energy Crops Scheme, administered by Natural England. The current Scheme runs from 2007-2013.

Future outlook

The outlook for perennial energy crops looks positive. The development of advanced biofuel technologies, which will use biomass as a feedstock, are likely to see further increases in demand in the power sector. Dedicated energy crops attract higher financial incentives for end users than general biomass. The Renewables Obligation (RO) provides the maximum level of support for energy crops and this is more than general biomass receives. The RO will be operational until at least 2027 with a possible extension to 2037. Further details about the RO can be found on the BERR website.

Further Information

SRC Growers Guide & Site Selection Maps: *www.naturalengland.org.uk/ourwork/farming/funding/ecs/default.aspx*

NNFCC Gross Margin Calculator: *www.powerplants2020.co.uk*

Biomass Energy Centre: *www.biomassenergycentre.org.uk*

Coppice Resources Ltd: *www.coppiceresources.co.uk*

Renewable Energy Growers Ltd: *www.energycrop.co.uk*

Renewable Fuels Ltd: *www.renewablefuels.co.uk*

Strawsons Energy: www.strawsonsenergy.co.uk

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