

What are energy crops?

Energy crops are specifically grown to produce energy and can be readily harvested with farm machinery. Energy crops can consist of short rotation coppice or short rotation forestry. This factsheet focuses on woody based energy crops, produced for the purpose of combustion. Other energy crops can be grown and utilised to produce liquid and gaseous fuels. These are not covered in this factsheet.

Uses of Energy Crops

Energy crops can be used for both the generation of electricity and the provision of heat through combustion in the form of woodchip, wood pellets or wood briquettes. Aside from utilisation as an energy source, the sector is successfully developing new products including wood fibre, novel chemicals, biofuels, and biomaterials. These are contributing to a growing bioeconomy sector.

Species chosen for growing are those that are quick to amass biomass and that can be grown in a variety of field(soil) and climatic conditions. Energy crops can offer viable alternatives to existing land uses and to traditional biomass-based fuels from forestry and timber production residues.



Energy Crop Production Systems

Short Rotation Coppice (SRC)

Short Rotation Coppice (SRC) is a long-established management practice of woody biomass of certain species that allows for semi continuous harvesting from a plantation on a rotation-based system. This means that the crop can grow for several years before being cut/harvested, at which point the plant will grow again from the root system and the cycle can be repeated. These cycles typically operate between 2-5 years.

Short Rotation Forestry (SRF)

Short Rotation Forestry (SRF) is the practice of growing single stemmed fast growing tree species in dense stands that enable harvesting as soon as suitable levels of biomass are present.

The harvesting cycles are longer than that of SRC, typically between 8 -20 years, and usually occurs when the trees have reached a diameter of between 10-20 cm at chest height.

Types of Energy Crops

Willow

Willow is one of the main energy crops most suitable for short rotation coppice in Ireland. There are several willow species that are planted for this purpose and typically they grow well in a wide range of different soil and land types. Willow slips (hard wood cuttings from year old plants) are planted in spring at approximately 10,000 - 15,000 per hectare. They are spaced out in rows that allow for ease of access by machinery when it is time to harvest.

The crop tends to be harvested on a 3-year cycle, with multiple harvests meaning a plantation can have a life span of up to 25 years. The material will need to be further processed once harvested to attain the right moisture content and size depending on its destination. It is estimated that 1 hectare of SRC willow at a moisture content of 20% has a heating value equivalent to 4500 litres of home heating oil.

Poplar

Poplar is a suitable native species that lends itself to both SRC & SRF. It is a tree from the same family as willow. Depending on the length of the harvesting rotation (often between 6-8 years or 9 to 12 years), poplar can be planted at a density of 1,300 to 4,000 trees per hectare.

Species like poplar may offer advantages over willow in sites that are prone to machinery access issues during winter. Planting poplar involves placing planting rods of between 25cm - 35cm into the ground. Poplar, once harvested, will regrow from the tree stump left behind. The material will be chipped for combustion in biomass appliances.

Miscanthus

Miscanthus is a species of perennial grass that originates from Asia and one which has very high rates of growth, has lignified stems like bamboo and is a species that presents benefits to the harvester in that it can be harvested annually once established. All planting, propagation and harvesting can be carried out using conventional farm machinery.

Miscanthus plantations have an expected lifetime of 20 years, and the crop can reach a height of 3.5m each year. It is estimated that 1 hectare of miscanthus chipped has a heating value equivalent to 4,100 litres of home heating oil. Due to typically higher levels of chlorine within the biomass, miscanthus should only really be combusted in appliances that are designed to handle the material.

Non-native species

Other non-native species including Eucalyptus have been shown to provide good yielding high quality fuel and fibre and may become more commonly grown as an energy crop in Ireland in the future.

Energy Crops - Benefits



Energy crops are a renewable resource, supplying continuous biomass that can be considered carbon neutral and which can also sequester carbon in root systems.



Be produced locally, creating economic value and offsetting costly fossil fuel imports and can help ensure security of energy supply.



Assist with farm diversification, alternative land use and emissions reduction opportunities for the agricultural sector.



Aid in the protection of watercourses and reduce risks associated with flooding and nutrient loss.



Provide important habitats for wildlife, aiding in protecting biodiversity.



Offer other alternative side streams (fibre, novel biochemicals/materials, composting)

IrBEA's work in this area

IrBEA is calling for the Government to reinstate the Energy Crops Establishment Scheme as a matter of urgency to assist in meeting demand associated with the Support Scheme for Renewable Heat (SSRH), to promote diversification of agricultural enterprises and to provide alternative income streams for farmers.

IrBEA administers, manages, and promotes the Wood Fuel Quality Assurance Scheme (WFQA) with financial assistance from the Department of Agriculture, Food and Marine (DAFM).