

# Carbon balance of a short-rotation coppiced (SRC) biomass crop

More than 80% of man made carbon emissions comes from burning fossil fuels.

In Scotland, currently 91% of our total energy demand is met through fossil fuels. The Scottish Government has targets to generate 18% of electricity from renewable sources by 2010 and 40% by 2020. Bio-energy crops could help to meet these targets.

Bio-energy crops include fast growing trees, such as willow, which are harvested to provide heat and energy. These crops also capture carbon and lock it in the soils for decades without releasing into the atmosphere – a process called carbon sequestration.



## Carbon balance in willow trees

A computer model is used to estimate how much carbon is taken up by a willow crop as it grows over a period of 32 years. Carbon dioxide is captured by the trees from the atmosphere and stored in tree trunks, branches, leaves and roots. Figure 1 shows that about 83% of the tree is wood, roots make up 12% of the plant and leaves the remaining 5%.

The willow wood is harvested every three years. The average amount of wood available for fuel is around 24 tonnes per hectare when about 50% of the over ground biomass (wood) is harvested each time (Figure 2). This amount of wood can yield 86 MWh of energy on burning – enough to power 22 homes for a year.

Over time, leaves and branches fall off the trees and are incorporated in to the soil as soil organic matter (Figure 3). Soil organic matter is a huge store of relatively stable carbon.

Modifying management techniques such as time and method of fertiliser applications and wood harvesting intervals may help to increase the biomass yield as well as carbon capture by the soil.

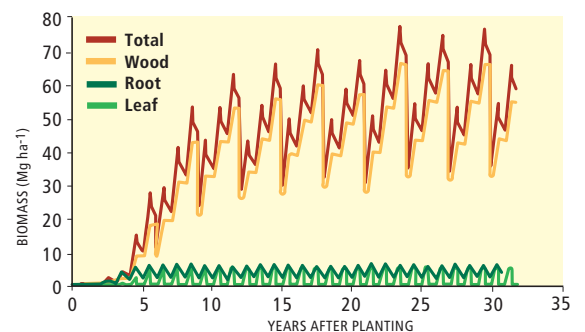


FIGURE 1 Simulated total, wood, leaf and root biomass of SRC-willow

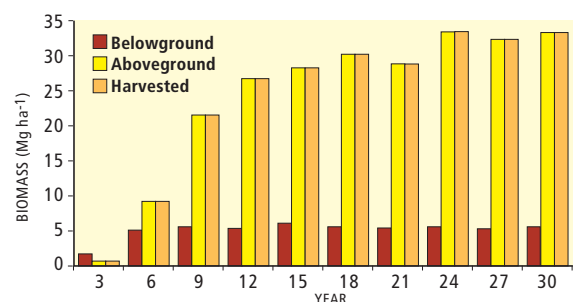


FIGURE 2 Simulated wood yield, remaining above and below ground biomass under SRC-willow.

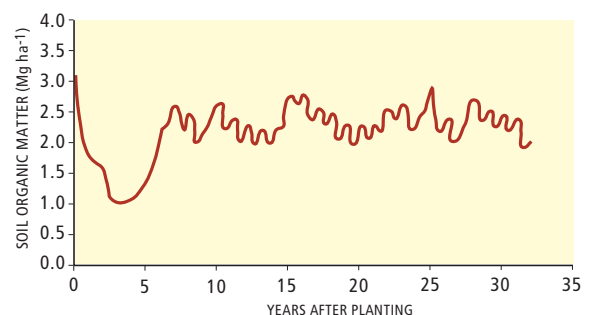


FIGURE 3 Simulated soil organic matter under SRC-willow