

Feeding a Green Gas Mill

In developing our Green Gas Mills, Ecotricity will work with farmers and landowners to grow feedstock suitable for the soil and climate conditions in that area. Ecological surveys will be conducted as part of the assessment to consider biodiversity enhancements and management regimes that will maintain quality of feedstock and biodiversity value of the land.

Our feedstock, Herbal Leys & their benefits

Herbal Leys will be the main feedstock for our Green Gas Mills and they have a wide range of benefits. They provide high yields of Green Gas with little or no inputs, improve the soil, sequester carbon, improve drought tolerance, and are a brilliant habitat for insects and pollinators. With lots of insects, they provide a feeding habitat for a wide range of farmland birds by day and bats by night.

Species Mix

The exact species mixtures to be used will depend on the local soil conditions, but, a typical mix will probably contain a mixture of various types of clovers, sainfoin, chicory, lucerne, birdsfoot trefoil and grasses such as Timothy, ryegrass, cocksfoot.

Species-rich herbal leys will be integrated into farming practices close to the Green Gas plant. They are likely to replace monoculture grasslands or in some areas as a break crop for a number of years in an intensive arable system that have a high level of black grass infestation. Black grass is a persistent weed of arable crops that in many areas has become resistant to virtually all herbicides. Many farmers turn black grass infected fields to ryegrass monoculture grazed by a few sheep or cattle for several years to get rid of the infestation. A herb rich species ley feedstock for a Green Gas plant does the same job but without the need for grazing.

Herbal leys include deeper rooting clovers, lucerne and sainfoin which draw up minerals from deeper in the soil important for the health of the microorganisms in the Green Gas Mills. These deeper rooting species also enhance water percolation and drainage, reducing the risk of surface water runoff and loss of topsoil.

Clovers and legumes have small nodules in their roots which contain symbiotic bacteria and cyanobacteria which can extract nitrogen from the air. The nitrogen accumulates in the nodules during the growing season, some of which is gradually released into the soil as the clovers mature. The digestate which is left over after the biomethane is extracted in the Green Gas mill is a good source of minerals and nutrients will be returned to the soil. The combination of the ability of clovers to accumulate nitrogen and the use of the digestate as soil conditioner removes the need for artificial fertilizers.

Carbon Capture

Plants capture carbon from the atmosphere and transfer it to the soil, where it is utilised by the soil biology to help unlock precious nutrients which would otherwise be unavailable to the growing plants. The greater diversity of plants in a ley, the greater the diversity of soil biology, which in turn produces greater yield and therefore more carbon captured.

Carbon is also very important for soil structure and just a small increase in soil carbon content can have a huge impact on its ability to hold moisture which is important in these times with increasingly hot dry summers.

Impacts on biodiversity

Biodiversity has declined dramatically across much of lowland UK due to the intensification of both intensive arable systems and monoculture grasslands. Arable crops such as wheat and barley, typically grown for the animal feed market, may be sprayed with ten or more different agrochemical agents during the growing season. These agrochemicals include a wide range of synthetic pesticides, fertilizers and hormones used in agriculture to prevent crop diseases, kill weeds and pests and boost plant growth. These chemical agents are toxic for wildlife as well as for humans.

In particular, agrochemicals are often associated with the reduction of the populations of birds, amphibians, and insects (bees, butterflies) by destroying their food source, contaminating soil and ground waters. Intensive bright green monoculture grasslands have also seen a dramatic decline in the number of species of birds, insects, and mammals through their lack of structure diversity, the lack of flowering species and intensive cutting or grazing.

Let's be very clear Species Rich Herbal leys won't replace a carefully managed nature reserve but because of the lack of use artificial pesticides or agrochemicals and greater species diversity including flowering plants such as clovers, sainfoin and lucerne which provide both pollen and nectar, they will support a much high density of insects, bees, and other pollinators than any an intensively managed grassland or arable field. They will provide feeding for insectivorous birds from skylarks to yellow wagtails and whitethroats to grey partridge great foraging area for bats. Bumble bees and many solitary bees have decline dramatically in intensive grasslands and the introduction of clovers and other legumes into farmed landscape will provide a significant source of pollen and nectar which may help to slow or stop the decline in bee numbers. Insects and insect larva will also provide food for voles, shrews and mice which in turn may be prey for mammalian predators such as weasels and stoats as well as birds of prey such as kestrel, buzzards, harriers and owls.

Green Gas Mills questions and answers

1. Questions have been raised about the risk to ground nest birds through harvesting the species-rich herbal leys during the spring? The cutting regimes are likely to be longer than intensive grasslands and will be considered on a site-by-site basis in partnership with farmers and landowners. If necessary, these will be modified or higher cut to avoid nest damage made during the peak breeding season. On some farms, there may be already conservation grass margins and there may be opportunities to create new grass margins on some of these sites.
2. Nature conservation bodies have asked whether the expansion of Green Gas Mill across the country will lead to ancient grassland being ploughed up? Firstly, it should be remembered that these should all be protected by a conservation designations and detailed Environmental Impact Assessments (EIA) are required by law before permanent grassland are ploughed. Ecotricity's in-house ecologist will be working in partnership with landowner and farmers to ensure that there will be biodiversity gains as a key part of each development. However, if there are any large areas of conservation grasslands managed by wildlife trusts, RSPB, forestry commission or national trust that are longer economical viable to be grazed by cattle, there may be opportunities to provide a sustainable solution for the cuttings arising from these nature reserves as an occasional feedstock for our Green Gas Mills.

References

Woodcock, B.A.; Bullock, J.M.; Nowakowski, M.; Orr, R.; Tallwin, J.R.B.; Pywell, R.F.. 2012 Enhancing floral diversity to increase the robustness of grassland beetle assemblages to environmental change. *Conservation Letters*, 5 (6). 459-469.

Clara I. Nicholls & Miguel A. Altieri *Agronomy for Sustainable Development* volume 33, pages257-274 (2013) Plant biodiversity enhances bees and other insect pollinators in agroecosystems. A review

David Goulson *Biodiversity V Intensive Farming; Has farming Lost its way*
<http://www.sussex.ac.uk/lifesci/goulsonlab/blog/biodiversity>

The Herbal Ley Framing system Cotswold Seeds <https://www.cotswoldseeds.com/downloads/cotswold%20seeds%20herbal%20ley%20guide.pdf>

Fox et al. 2014 J Appl. Ecol. 51: 949-957; Long-term changes to the frequency of occurrence of British moths are consistent with opposing and synergistic effects of climate and land-use changes

Inger et al 2015 Common European birds are declining rapidly while less abundant species numbers are rising Ecology Letters Volume 18 issue 1 28-36

https://www.researchgate.net/publication/267641428_Common_European_birds_are_declining_rapidly_while_less_abundant_species_numbers_are_rising#:~:text=Common%20European%20birds%20are%20declining%20rapidly%20while%20less%20abundant%20species%27%20numbers%20are%20rising

Vickery et al 2001 Journal of Applied Ecology Volume 38, Issue 3 The management of lowland neutral grasslands in Britain: effects of agricultural practices on birds and their food resources <https://besjournals.onlinelibrary.wiley.com/doi/10.1046/j.1365-2664.2001.00626.x>