Lapwing Estate Reverse Coal

reverse coal

CASE STUDY

The Lapwing Estate has developed a new model for rethinking peatlands, which both sequesters and abates significant quantities of carbon, and also produces food with a measurable positive environmental and social impact.

Reverse Coal is a radical and transformative whole systems approach that transitions from traditional organic farming on degraded lowland peat towards climate-resilient, controlled-environment agriculture (CEA) with a broad array of interlinked societal, environmental and economic benefits.

The Lapwing Estate has historically been drained for agricultural activities. It is proposing to stop draining the land to raise the water table (rewetting, not flooding). This will return the Estate to the landscape it was over 400 years ago. There are positive net gains to be had in terms of biodiversity and water and flood-plain management.

Key project components are:

- Carbon capture and abatement: the premise of Reverse Coal is to use photosynthesis to remove CO2 from the atmosphere via the production of short rotation coppice willow (SRCW) on rewetted peatland. This simultaneously cleans the water of chemicals and abates landscape soil emissions from agriculturally drained lowland peat – which accounts for 3% of total UK GHG emission – and sequesters carbon from the atmosphere through the SRCW.

- Carbon processing: biomass is harvested and chipped directly from the field. The wood chip is then dried to achieve a low moisture content. Once at optimal condition, the woodchip is fed into a high-temperature pyrolysis plant which breaks down the biomass through thermal decomposition (pyrolysis is the heating of material without oxygen). This process generates biochar, electricity and heat.

- Controlled-environment agriculture: the high-grade heat and power from the pyrolysis plant will be used to power controlled-environment agriculture for more sustainable food production. This tackles the common criticism from most biomass projects, which is the displacement of food production for bioenergy.

By continuing to produce food, this land-use change does not result in offshoring food production and increasing GHG emissions. Instead, CEA can improve food security and substitute the commodity grain and arable crops which would have been grown on the land lost to biomass crops for healthy fruit and vegetables.

In addition, the power system used to produce CEA food's will be close to net zero and will substitute foods typically imported and grown under glass using fossil fuel heating systems.

To create a real impact and cut greenhouse gas emissions, this approach needs to be scaled. The ambition is to create a one megatonne contribution to net zero by 2030.