# Achieving Net Zero: farming and the bioeconomy


Novamont Matrol-Bi products

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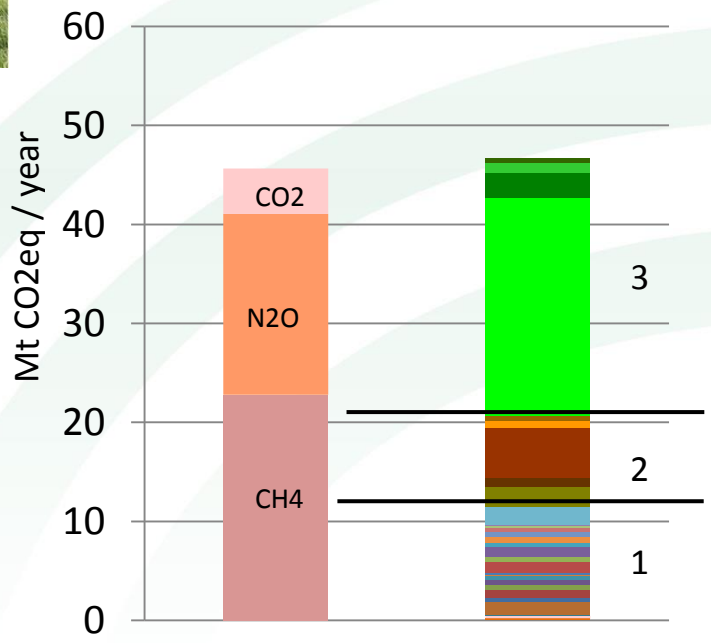
# NFU 'White Paper'

**September 2019**

- The global challenge
- Current UK inventory
- Why agriculture is part of the solution
- Our approach
- Partnership working
- Measurement and reporting

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# Pillar 1

## Boosting productivity and reducing emissions

Estimated GHG savings: **11.5 $MtCO_2e$/year**

Wide variety of measures, from controlled release fertilisers and inhibitors to feed additives, advanced breeding, energy efficiency, on-farm AD

# Pillar 2

## Farmland carbon storage

Estimated GHG savings: **9 $MtCO_2e$/year**

Enhanced hedgerows, increased tree planting, measures to boost soil organic matter

# Pillar 3

## Coupling bioenergy to carbon capture, utilisation and storage

Estimated GHG savings: **Up to 26 $MtCO_2e$/year**

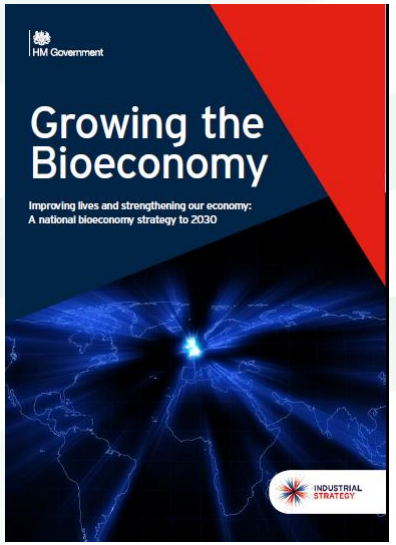
BECCS/BECCUS – notably farm-scale technologies and supply chains, plus **bio-based materials**, further displacement of fossil fuel emissions by renewables, and novel soil amendments

# GHG removal through bio-based materials

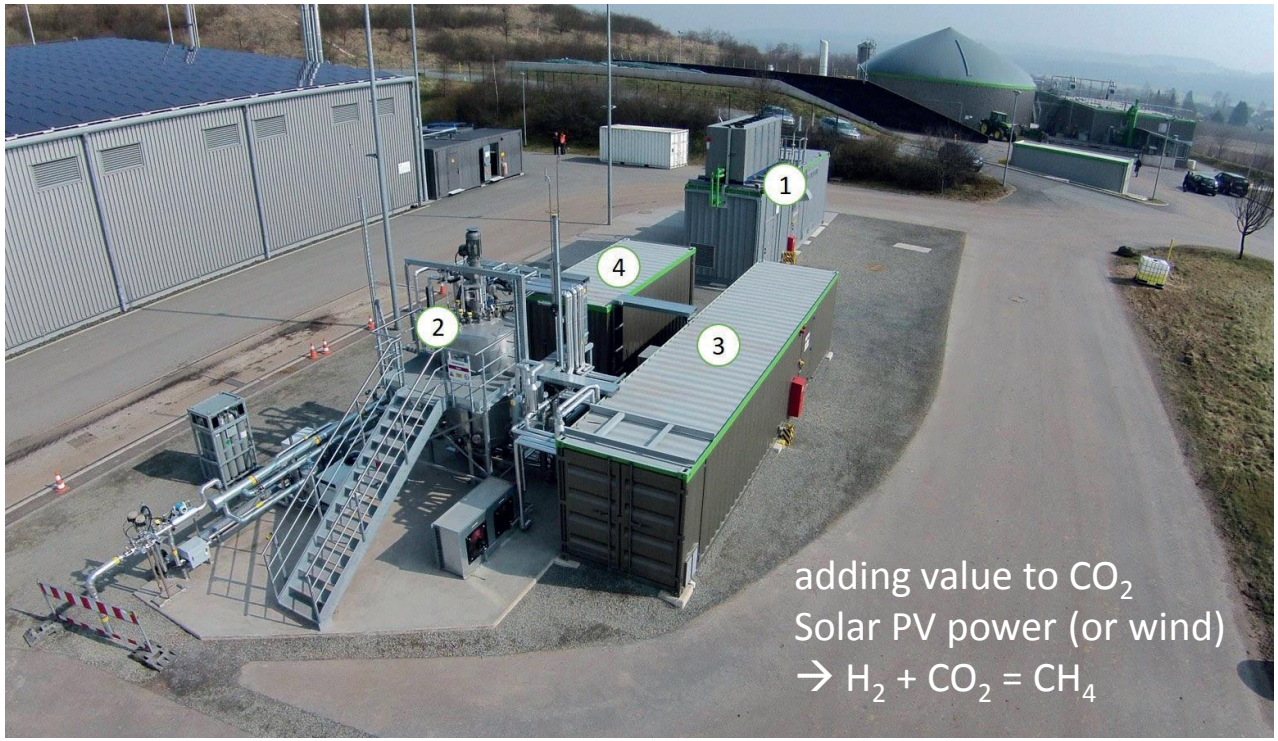
- Not a new subject – NFU has worked previously on EU Bioeconomy Strategy, Bioeconomy Manifesto, etc. – other initiatives include International BioFuture Platform, announced at COP23 in Bonn 2017
- Bioeconomy includes all renewable biological resources (crops, forests, fish, animals, micro-organisms), i.e. primary agricultural biomass and energy crops (ABEC) plus forest and woodland resources, AND secondary co-products, residues and wastes from both food and non-food production
- Key stakeholders:

  **paper+pulp/timber industry** - timber/fibre based biorefinery, added value from CLT, gluelam, acetylated wood, potentially net energy positive and C negative

  **petrochemicals sector** - carbohydrate biorefinery replacing fossil-fuel inputs (paint, lubricants, fine chemicals, carbon fibre, resins)



# Synthetic fuels and materials: Power-to-Gas




Allendorf, Germany - Schmack + MicrobEnergy case study from IEA Task 37 (since 2016)

small 5m3 high-temp, pressurised bioreactor processing 30 m3/hour raw biogas, equivalent to about 72 kWe CHP

Audi – P2G plant at Werlte since 2014

**In coming years, bio-CO2 will be a feedstock for BECCUS, too valuable to vent to atmosphere**
**e.g. Econic CO2-based polyols for PU**

Both German and UK aviation sector keen on synthetic fuels from CO2

# Take-home messages

- A strong domestic bioenergy supply chain is needed to realise GHG removals through the bioeconomy, avoiding venting bio-CO2, etc.
- Bio-based methane, ethanol/ethylene, isobutene, acrylonitrile (C-fibre); all likely to be important platform chemicals
- Important distinction between environmental credentials of (1) short-life biodegradeable products, replacing single-use plastics; (2) long-lived bio-based products, creating GHG removal for decades

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