Farming, Net Zero and #Pledge2040

AgriSouth: 20 May 2021

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Chief Adviser, Renewable Energy
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National Farmers' Union of England and Wales

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Energy costs / oil price
Food security
Climate Change
all are important drivers of agricultural policy

Voluntary Greenhouse Gas Action Plan since 2010, driving efficiency and productivity to reduce GHG emissions

Farmers are on the “front line”, experiencing global climate disruption

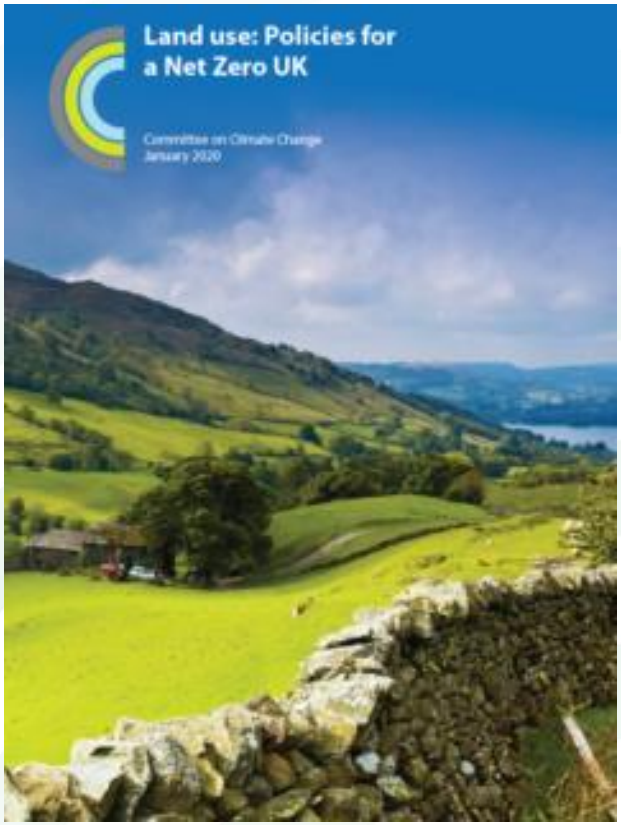
NFU climate change adviser represents our voice in international negotiations, as facilitator of the World Farmers Organisation climate change working group

Since 2015 Paris Agreement, experts have recommended limiting temperature rise to 1.5 C

UK leads worldwide trend towards **net zero** greenhouse gas emissions by 2050 or earlier – agriculture playing major role while maintaining food security in post-Brexit transition

NFU ‘raised its game’ in 2019 – ambition for **net zero climate impact** by 2040

NFU influencing the net zero transition



UN CLIMATE CHANGE CONFERENCE UK 2021

IN PARTNERSHIP WITH ITALY

An opportunity to showcase climate-friendly food production and wide range of 'public goods' delivered by agriculture

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Climate change, energy, net zero: NFU policy

The National Farmers' Union of England and Wales (NFU) represents the interests of ~55,000 members involved in commercial agriculture, horticulture and farmer controlled businesses

Given the long-term **impact of climate change on our sector**, farmers and growers have acknowledged our role in tackling it over the past 10-15 years.

Agriculture is uniquely **both a source and a sink** for greenhouse gas emissions, making good use of the 75% of UK land area under farming.

In 2019, the NFU set out its vision for agriculture to achieve a **net zero contribution to climate change** across the whole of agricultural production by 2040, focussed on three key themes or 'pillars'.

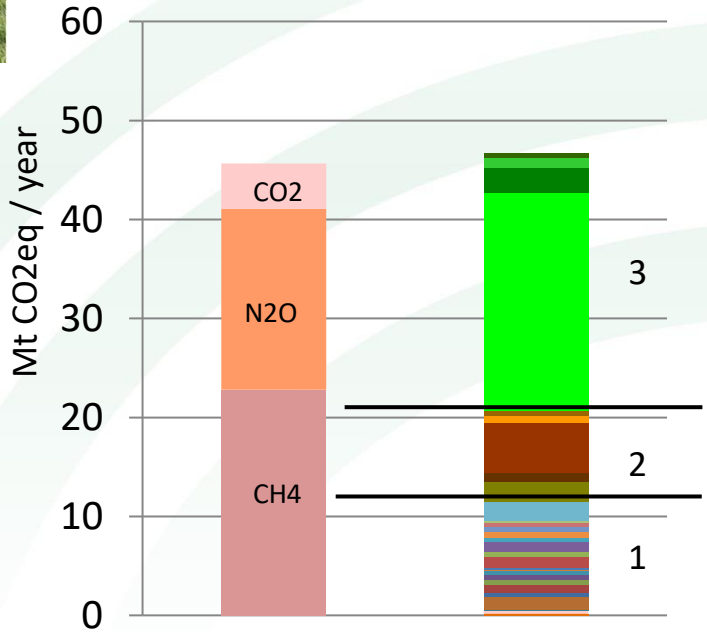
Farmers own or host over half of UK solar power and AD capacity, as well as the majority of onshore wind power, while playing a significant role in the supply or fuelling of renewable heat and thermal power generation.

Action on the twin crises of **climate change** and **biodiversity loss** requires farmers and policy decision-makers alike to move on from regarding land as having one single purpose (food, non-food, conservation)

NFU net zero strategy

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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26 ways farmers are doing their bit for net zero

The NFU has today (Friday 7 August 2020) published 26 examples of how farmers are working towards net zero on their farms, showing how other farmers can make changes to their businesses to help achieve the NFU's 2040 net zero ambition.

The booklet, titled 'Doing our bit for Net Zero', includes case studies from every sector and from farms across England and Wales, and covers each of the three pillars outlined in the NFU's net zero plan: productivity, carbon storage and renewables and bioenergy.

Some of the work outlined in the booklet includes:

- Improving genetics and animal health

Development of our Net Zero plan

August 2020

26 farmer case studies in advance of COP26 climate talks next year in Glasgow

- **Leading by example**
- **Bringing to life our ideas**
- **Finding the 'baseline'**
- **Understanding carbon calculators**

www.nfuonline.com/cross-sector/environment/climate-change

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We’re in for net zero #Pledge2040

Net zero Pledge Map

local area.

When you pledge for net zero on our map, you're join landowners who also believe that together we can ma combat climate warming.

Your pledge will show on our public-facing net zero Pl others who are joining the land force for good.

Your pledge will be anonymous and the map will only maps scale bar. Scroll down to add your details.

Send in your videos

Make sure you capture the magic and send in your vi netzero@nfu.org.uk as you try new measures – the It will help us inform other members, the wider industr

For COP26, we would like to pull together a compilati all the activity and celebrate members' achievements

We'll share with you useful sources of information an up to date with how to become more productive, store renewables and the bioeconomy.

Top 5 counties

Here's the leaderboard for pledges by county:

Devon	21
York East	20
Berks Bucks & Oxon	14
Leics Northants & Rutland	13
Norfolk	12

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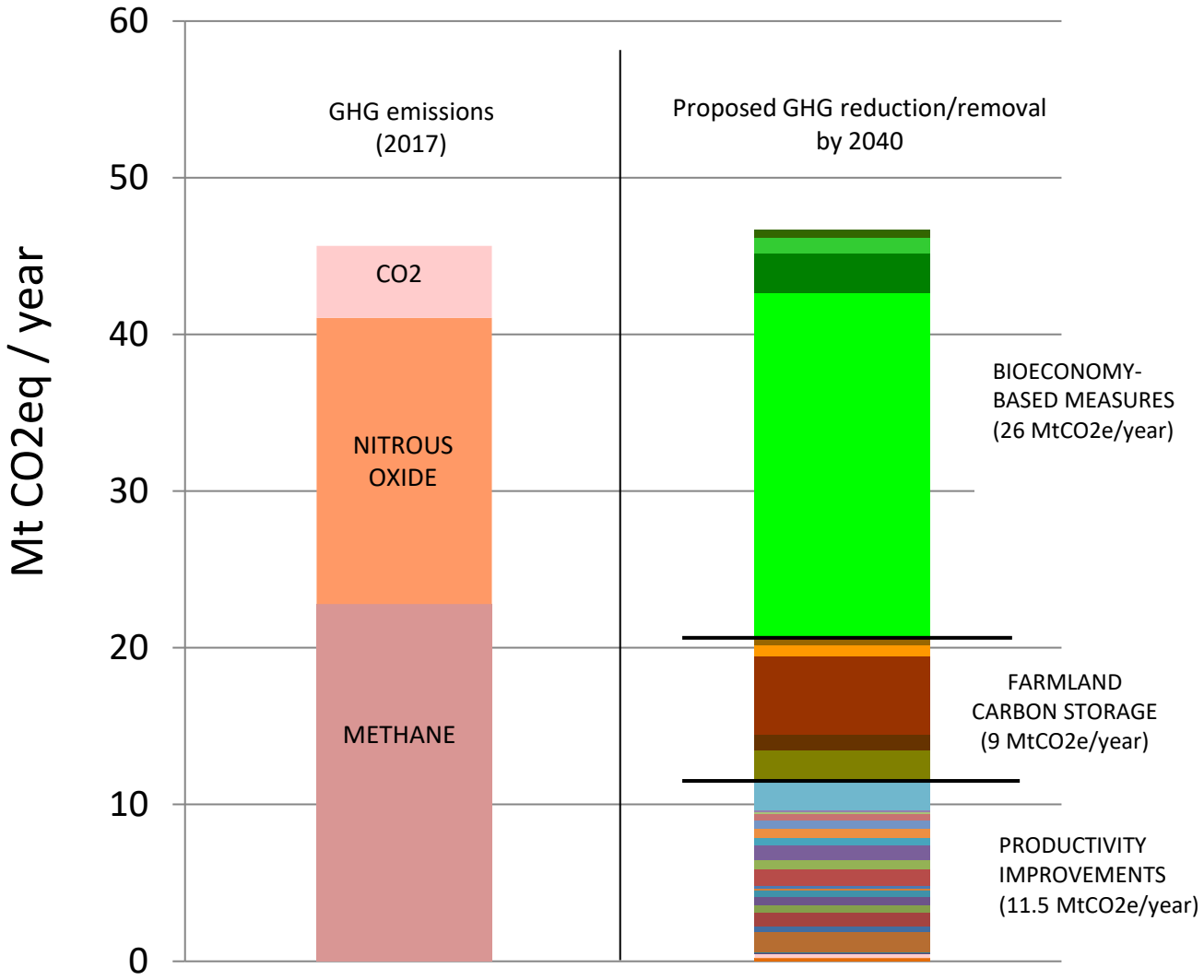


Current (2017) agricultural emissions balanced against potential GHG reduction through productivity measures and GHG removals by various methods

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

Enhanced hedgerows – early action on climate change

Total UK hedgerow area = 120,000 hectares or about 800,000 km

Crude average above+below ground carbon density = 40 tC/ha

Total UK hedgerow C = 4.8 MtC

Increase volume by 20% over 10 years (e.g. double size of 20% of hedgerows) = **0.4 Mt CO_2/year**

New hedges +2% per year for 10 years = **0.07 Mt CO_2/year**

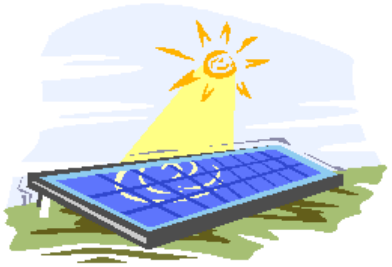
Further opportunities in hedgerow restoration / gapping-up / shelter belts / hedgerow trees; possible use of wood fuel

Hedgerow stakeholder community needs to help Defra make case with HM Treasury: highly cost-effective 0.5 MtCO2/year @ only £40-50 / tCO2

Examples of multifunctional farm landscapes

- solar farms with sheep grazing and agri-environmental features around margins (e.g. enhanced hedgerows with occasional hedgerow trees)
- wind farms or single turbines surrounded by arable crops and/or grazing
- perennial energy crops providing wildlife refuges, plus flood mitigation, early-season pollen (willow catkins) and public amenity (where footpaths cross or border such land)

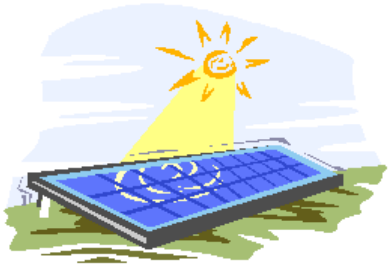
NFU is concerned that Net Zero must also benefit tenant farmers as well as freeholders and landowners



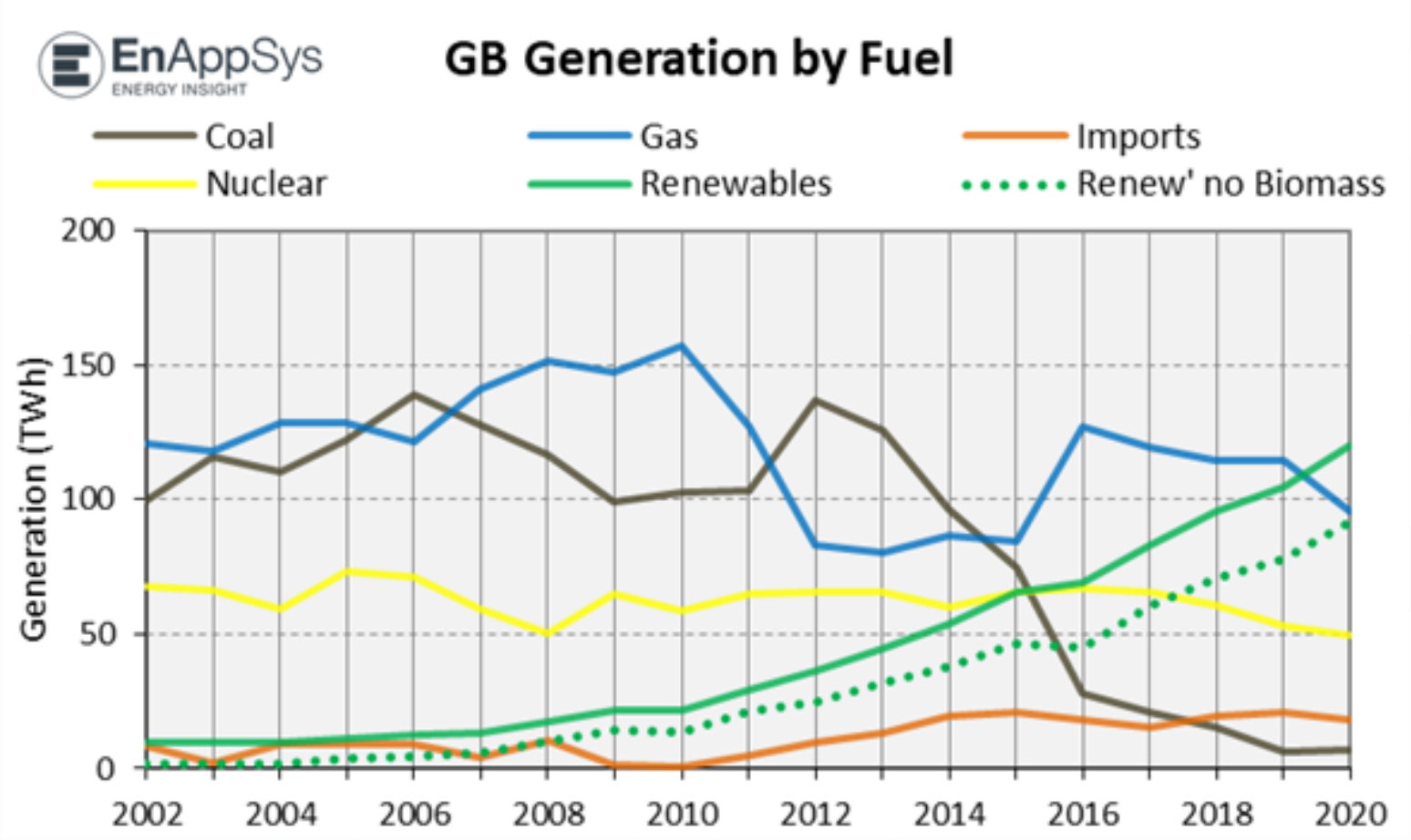
Renewable energy facts

- Wind power & solar power capacity worldwide both exceeded 700 MW during 2020: each 2x world nuclear capacity (about 330-370 GW): both projected to be 1600-2100 GW by mid-2030
- Renewables supply a quarter of world electricity (twice the contribution of nuclear) – IEA predicts one-third before 2030 (more than coal) and at least half by 2050. Solar will overtake oil as #1 in the wo
- Bioenergy remains the 4th largest form of primary energy and natural gas – and provides 2% of world electricity
- Solar PV meets 7-9% of electricity needs in Italy, Germany and Greece
- China installing >20 GW wind power and 30-40 GW solar each year Germany now 52 GW solar (half the entire UK power sector)
- Bioenergy provides nearly 13% of British electricity, wind about 24%, solar >4% and hydro ~2% at present – coal just 1.7% in 2020

Solar PV = 7.6% of UK in 2020Q2



UK renewable power in 2020 = 43%



Solar roofs are a ‘no-brainer’ – economic for farmers and supposedly preferred by government policy makers

50-250 kW PV systems for intensive livestock sheds, grain stores, dairy barns: examples from around Britain (all now Permitted Development from Apr 2015)

NFU Conference Centre, Stoneleigh Park

‘Walking the Walk’: NFU following its own advice to farmers and growers

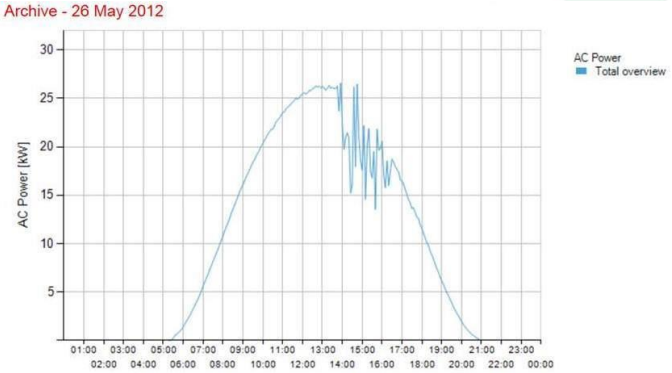
Installed Feb 2012 on new HQ conference building in Warwickshire

36kW – 288 Inventux thin-film modules, each 125 watts

Output around 26-27 MWh/year, meeting 34-45% of needs for all-electric building

Saving about £1400/year electricity costs

About 10% return on investment



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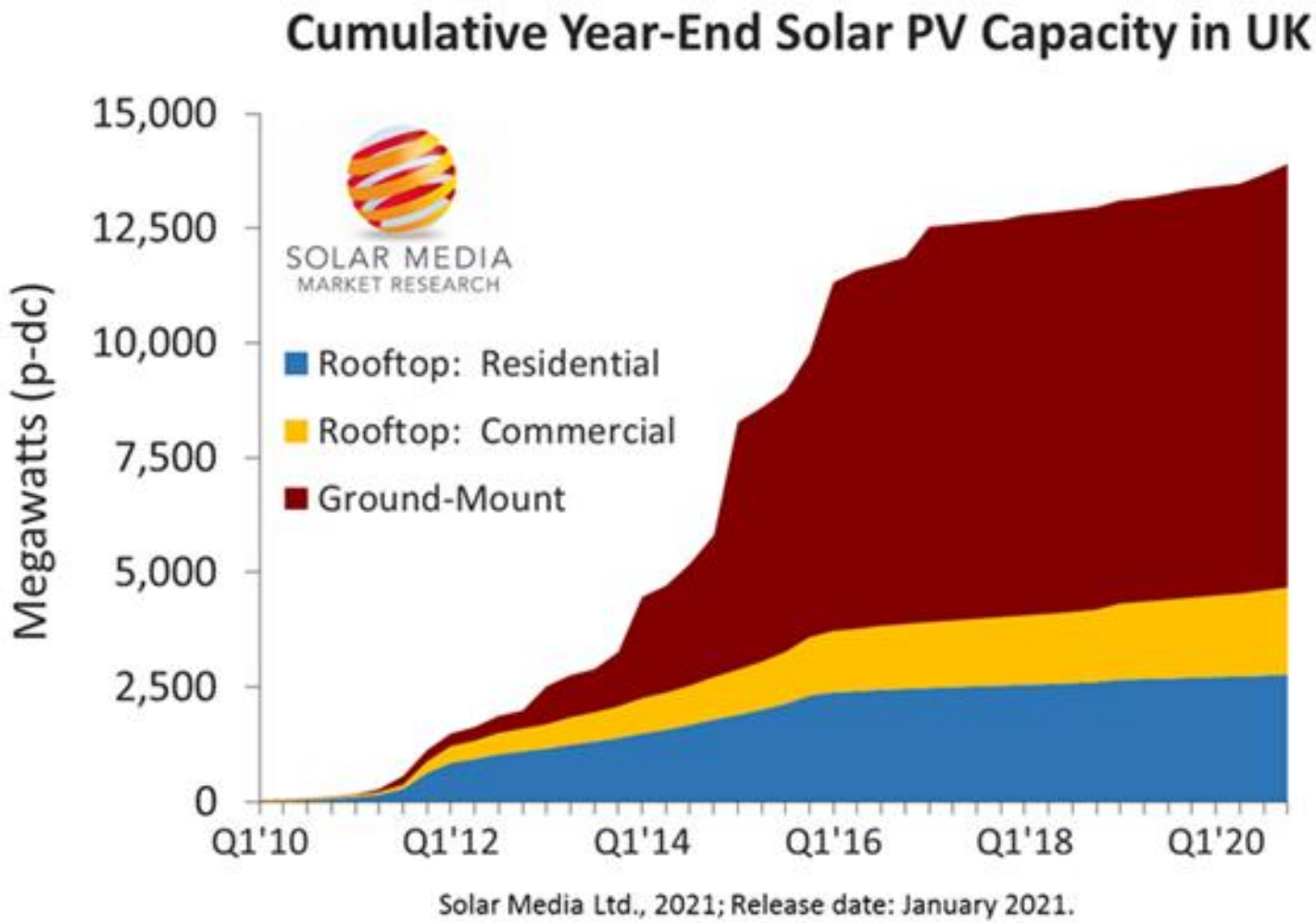
Good impressions count

Demonstrating multi-purpose land use and upholding high standards in Operations and Maintenance is most important for the investment value of Britain's 9 GW of large-scale solar power – **perhaps a unique export opportunity for the UK?**

"Sheep may safely graze" (J.S. Bach) – and the farmer gets paid for it!

Rapid past growth in British solar PV capacity



BEIS/Solar Media data: latest = 13.5-14 GW, farmers own/host 70%

Rooftops mostly Feed-in Tariff; solar farms mostly Renewables Obligation.

2018/19 hiatus; industry now subsidy-free, grew 660 MW in year to Mar 2021

Electricity storage: a new kid on the block

Fast-growing energy service opportunity

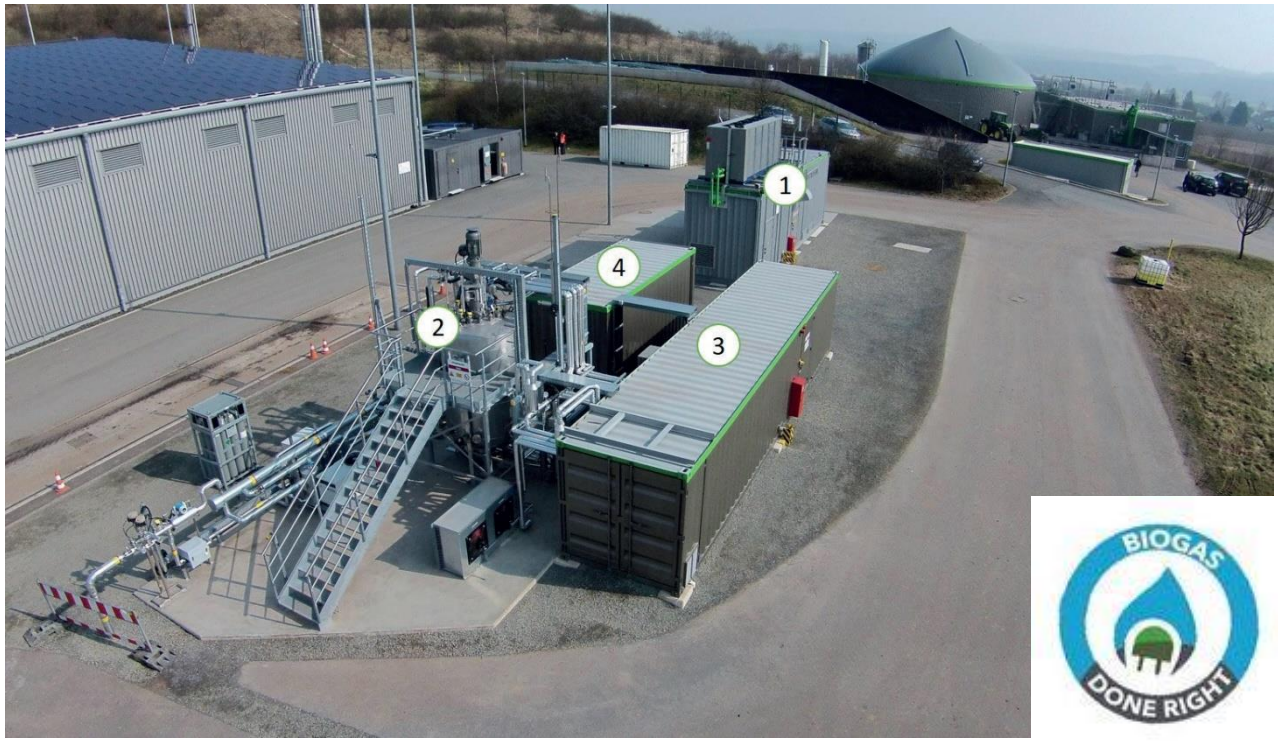
Multiple AD products including bio-CO_2

gas / electric / CO_2 / digestate

JV ENERGEN

RENEWABLE ENERGY

Power-to-Gas, making ‘green molecules’, etc.



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

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

adding value to CO_2

Solar PV power (or wind) to $H_2 + CO_2 = CH_4$ (synthetic fuel or chemical feedstock)

- **In future, bio-CO_2 will be a feedstock for BECCUS, too valuable to vent to atmosphere**
- **BiogasDoneRight (Italy) demonstrates optimum C storage using digestate**

Some recent NFU policy work

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NFU responds to consultation on petrol/diesel vehicle phase out

The NFU has responded to the government's consultation on bringing forward the end of the sale of new petrol, diesel and hybrid vehicles from 2040 to 2035, or earlier 'if feasible'.

In its consultation, the Department for Transport asked about:

- The suggested phase-out date
- The definition of which vehicles should be phased out
- Barriers to achieving the above proposals
- The impact of these ambitions on different sectors of industry and society

The NFU responded in July/August 2020 to Government consultations on:

- Future of Low Carbon Heat
- Phasing-out Petrol/diesel Vehicles
- Higher ambition needed for green gas and other low-C heat measures
- EVs offer exciting new opportunities, but rural areas must be prioritised, and we cannot yet phase out diesel tractors

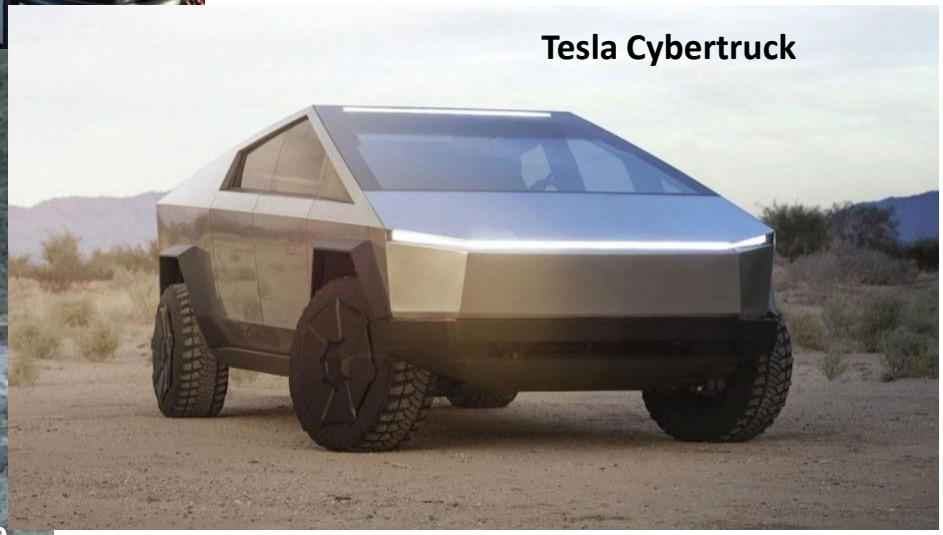
And in Feb/March 2021 on:

- Greenhouse gas removals
- BECCS/biochar/weathering

Electric vehicles – for farmers

NFU Vice President Stuart Roberts now travels around England and Wales in a Nissan Leaf, and NFU headquarters has installed 22kW charge points

Land Rover prototype



Tesla Cybertruck

Farm technology of the near future?

SES

- 1

- be

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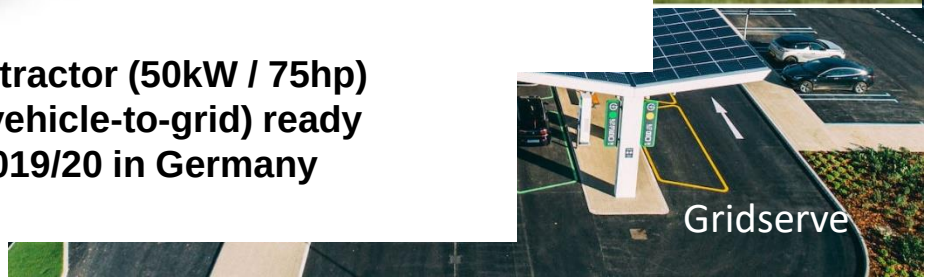
- Like
sheds v
income
mainter

Fendt e100 Vario electric tractor (50kW / 75hp)
100 kWh battery – V2G (vehicle-to-grid) ready
Extended field trials 2019/20 in Germany



Media reports of progress by manufacturers around the world

Cascading announcements in trade press show future direction of travel

Manitou/Deutz – demonstrated prototype telehandlers with electric and hybrid drive trains in September 2018

JCB (UK) – 525-60E electric telehandler, announced November 2020

NFU policy asks

- Support for investment in new technology, and improved infrastructure, to drive increased productivity
- Farmers need access to a robust carbon price to enable on-farm C storage in vegetation and soils – climate change must be an ELMS priority
- A strong domestic bioenergy supply chain is essential to realise GHG removals through the bioeconomy, avoiding venting bio-CO2 – plus continued non-tariff support for renewables, batteries, EV charging, etc.

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