On-Farm AD Summit

Wednesday 9th April 2025

Askham Bryan College

Dr Tim Whitaker, Askham Bryan College

The Bioeconomy Consultants
NNFCC

Welcome to Askham Bryan College

Dr Tim Whitaker, Principal and CEO


ASKHAM BRYAN
COLLEGE
Reception


THE ELECTRIC COW
Boectric

Lucy Hopwood, NNFCC

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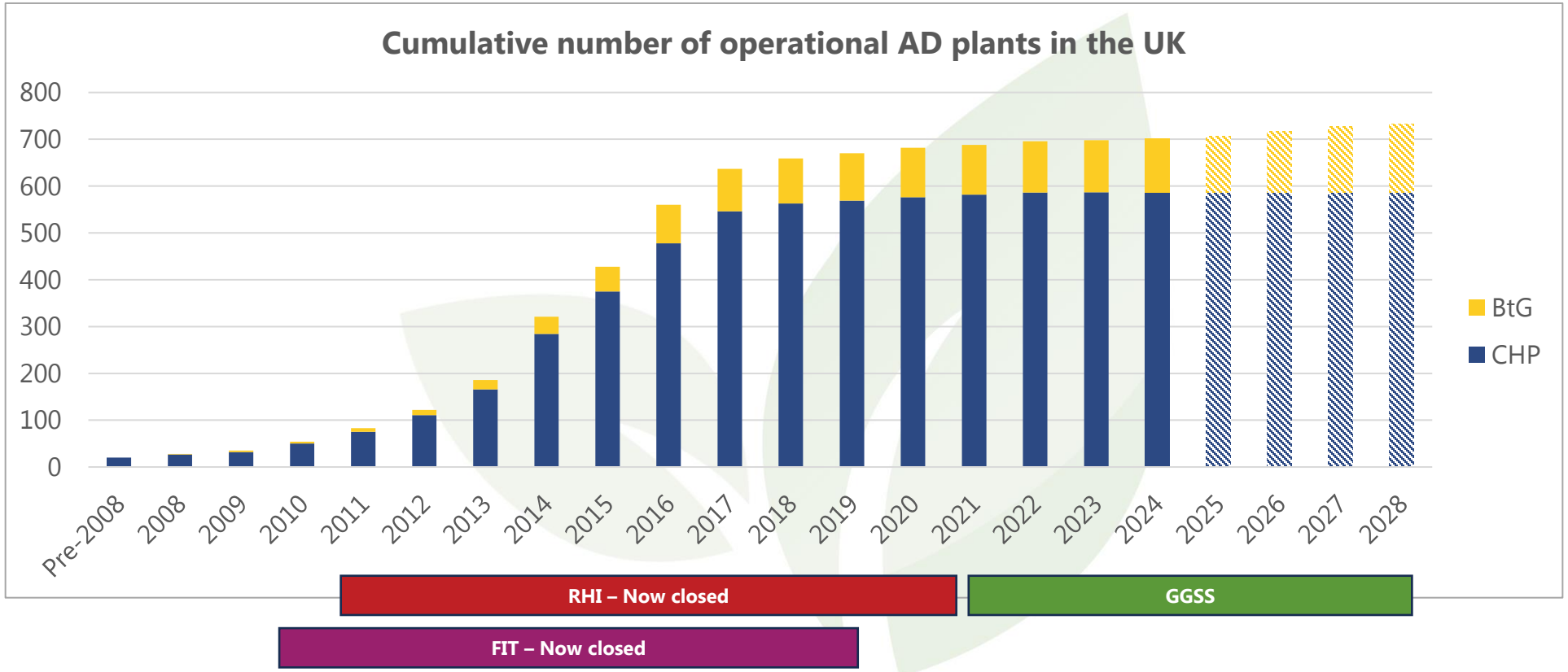
On-Farm Anaerobic Digestion: The Opportunity

Market development



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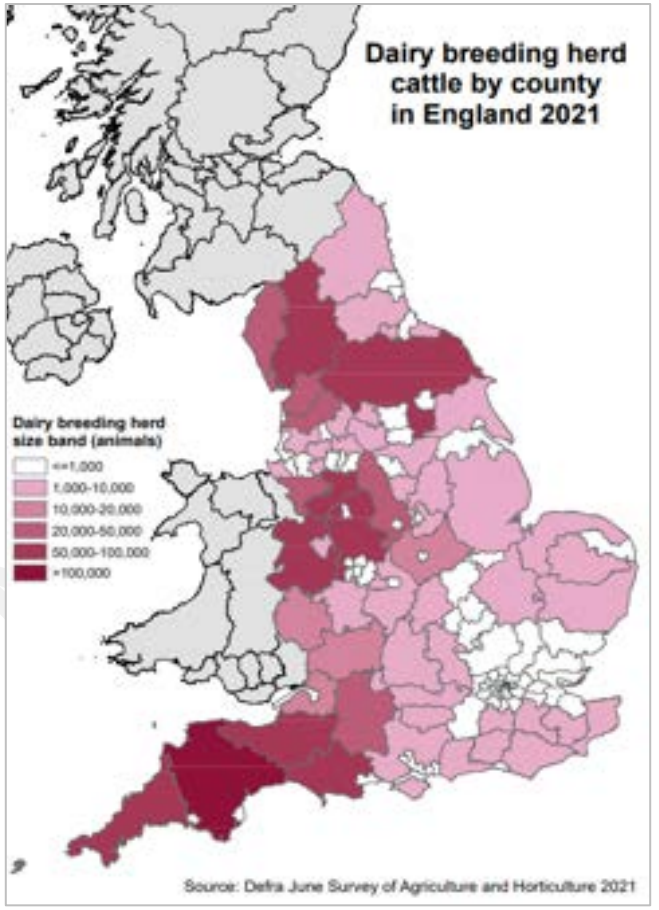
UK AD Market analysis



Source: NNFCC (2022) AD deployment in the UK, annual report (https://www.nnfcc.co.uk/publications/report-anaerobic-digestion-deployment-in-the-uk)

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Feedstock Availability vs. Use

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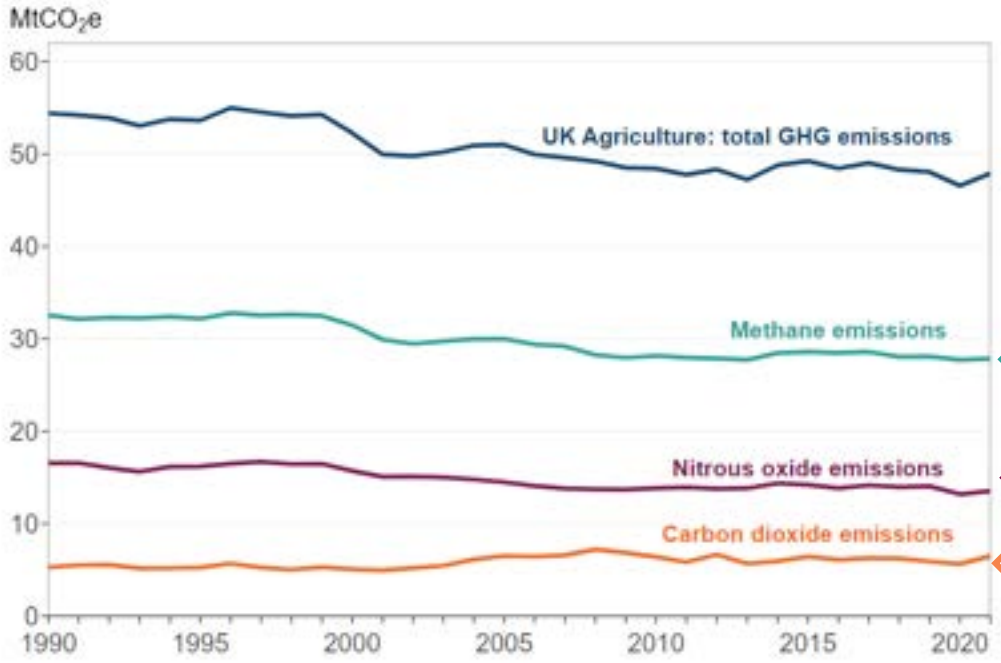
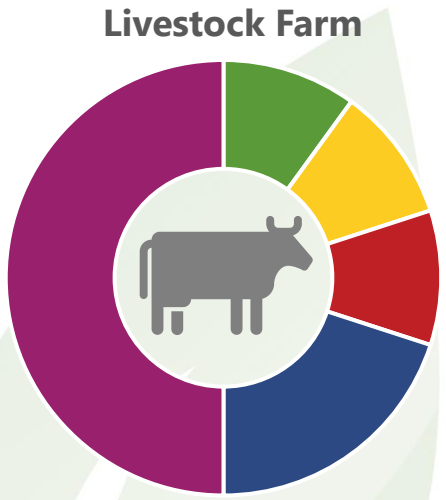
Emissions from Agriculture

- 11% of total GHG emissions in the UK
- 71% of total nitrous oxide emissions
- 49% of total methane emissions
- 1.9% of total carbon dioxide emissions

Figure 1.2 GHG emissions from UK agriculture ($MtCO_2e$)





Grazing livestock & manure

Soil, fertiliser & manure

Fuel, energy & fertiliser

- Fuel & energy
- Feed (imported)
- Fertiliser
- Manure
- Fugitive methane

Source: UK greenhouse gas emissions, Department for Energy, Security and Net Zero

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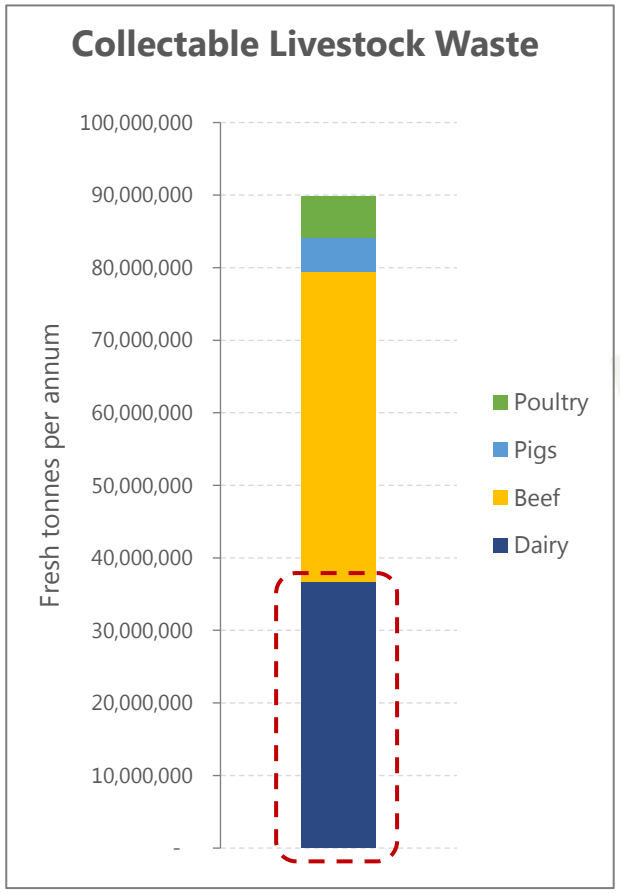
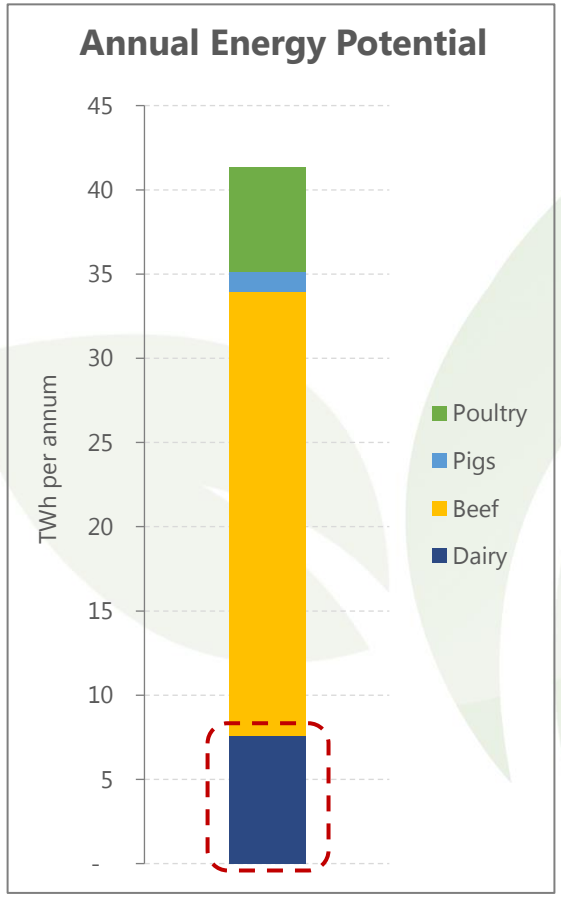
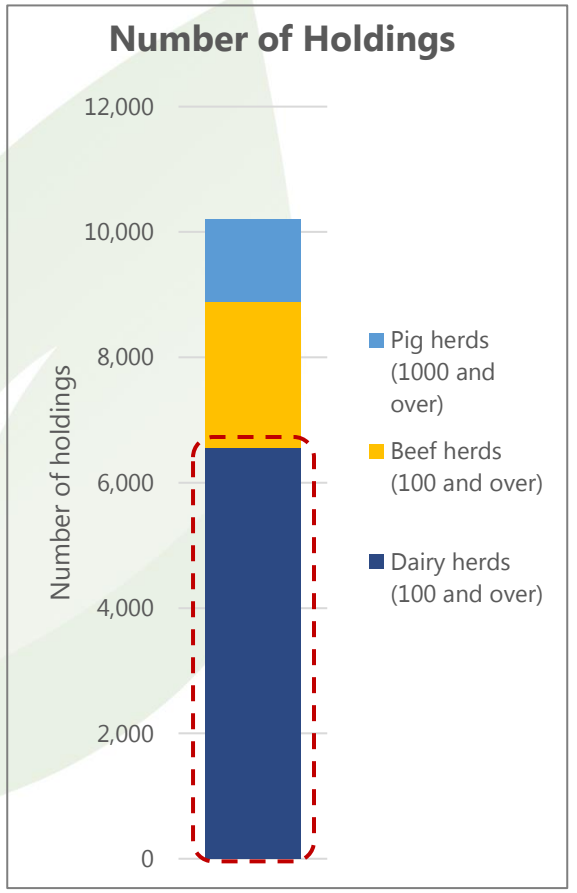
Scale of the Opportunity







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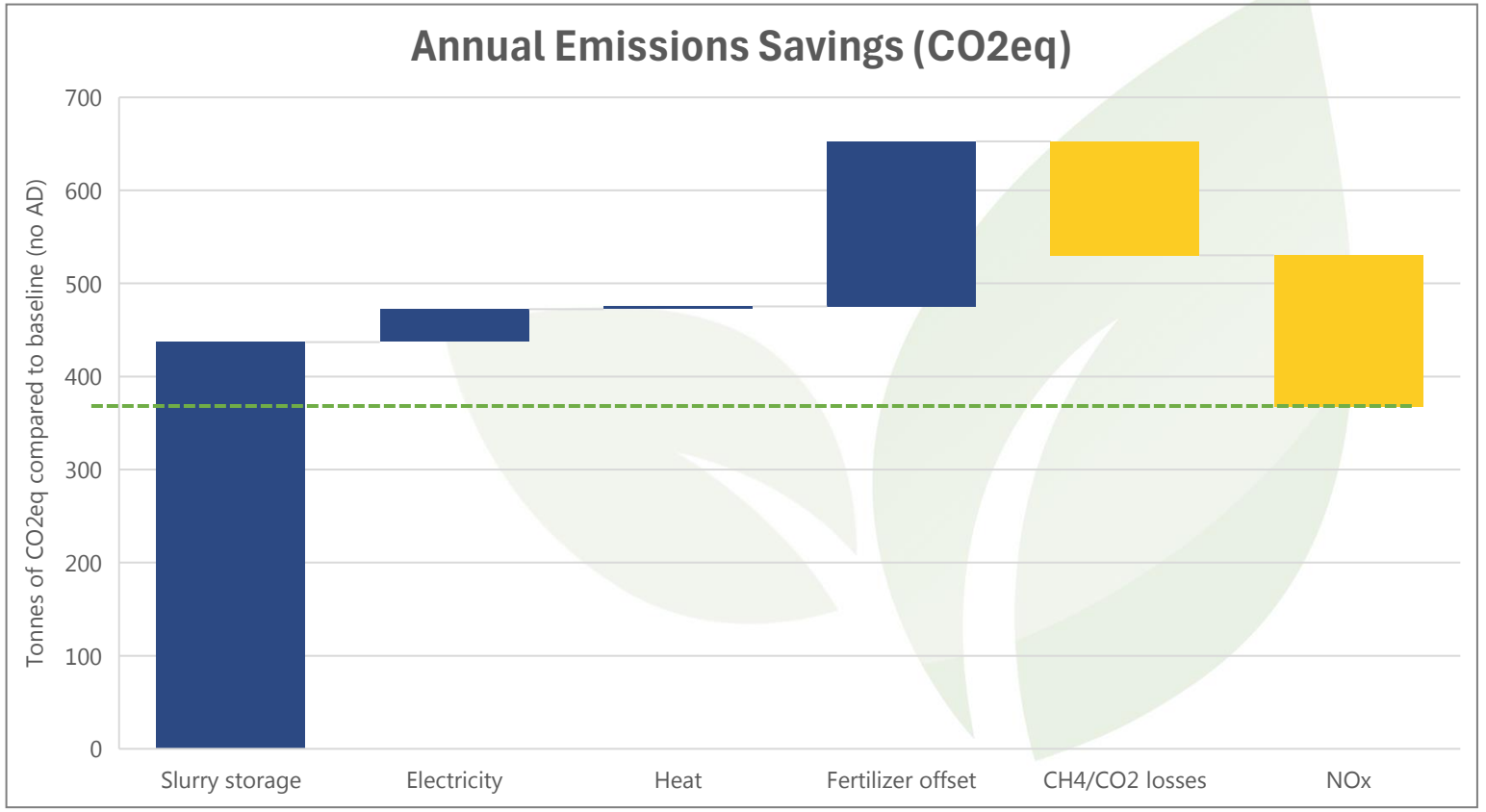
Emissions reduction potential



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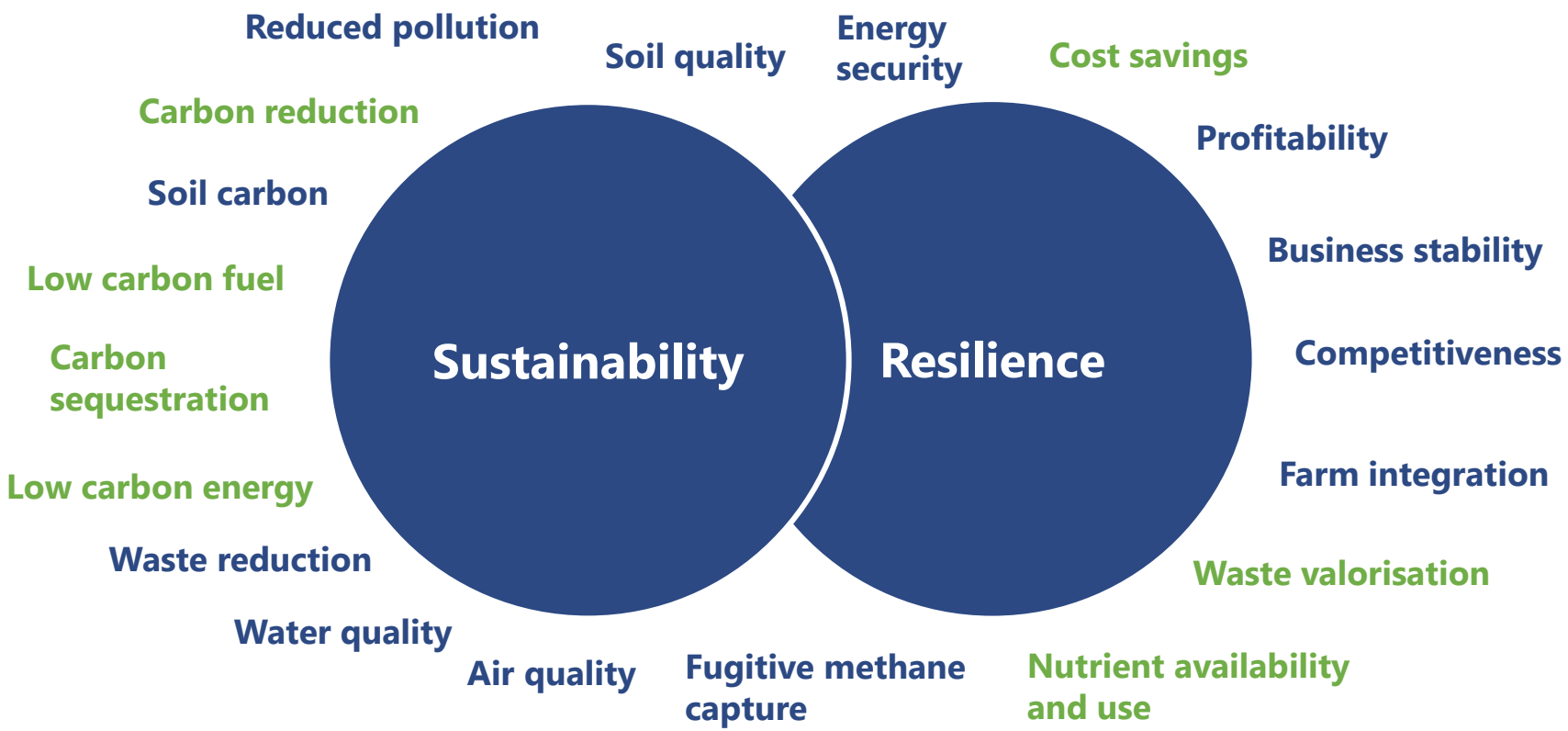
The wider benefits



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On-Farm AD: The Challenges

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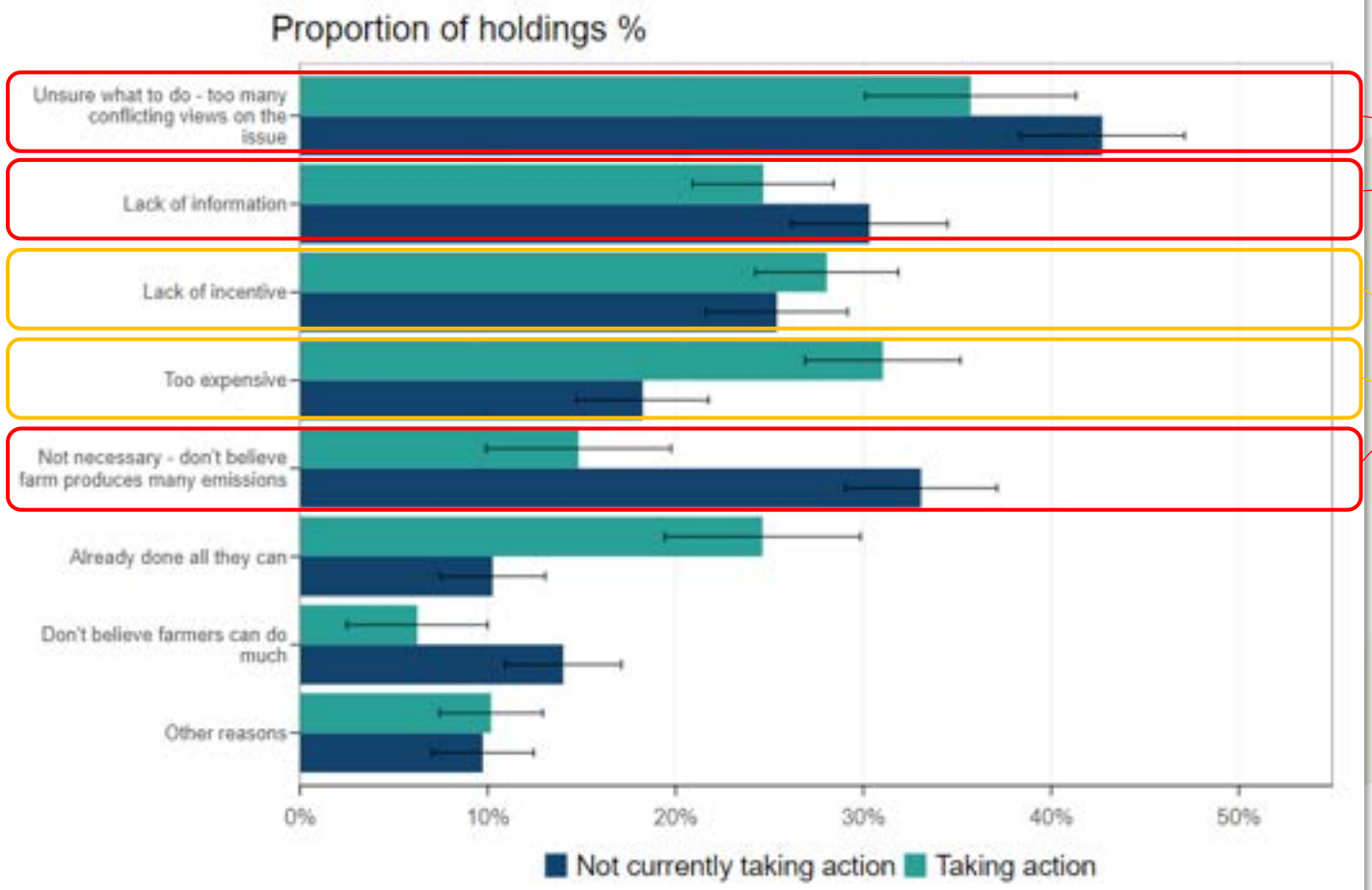
Key issues

Figure 3.5 Factors preventing action to reduce GHG emissions



Source: Farm Practices Survey 2023 – greenhouse gas mitigation practices

- Knowledge, information, clarity
- Costs, returns

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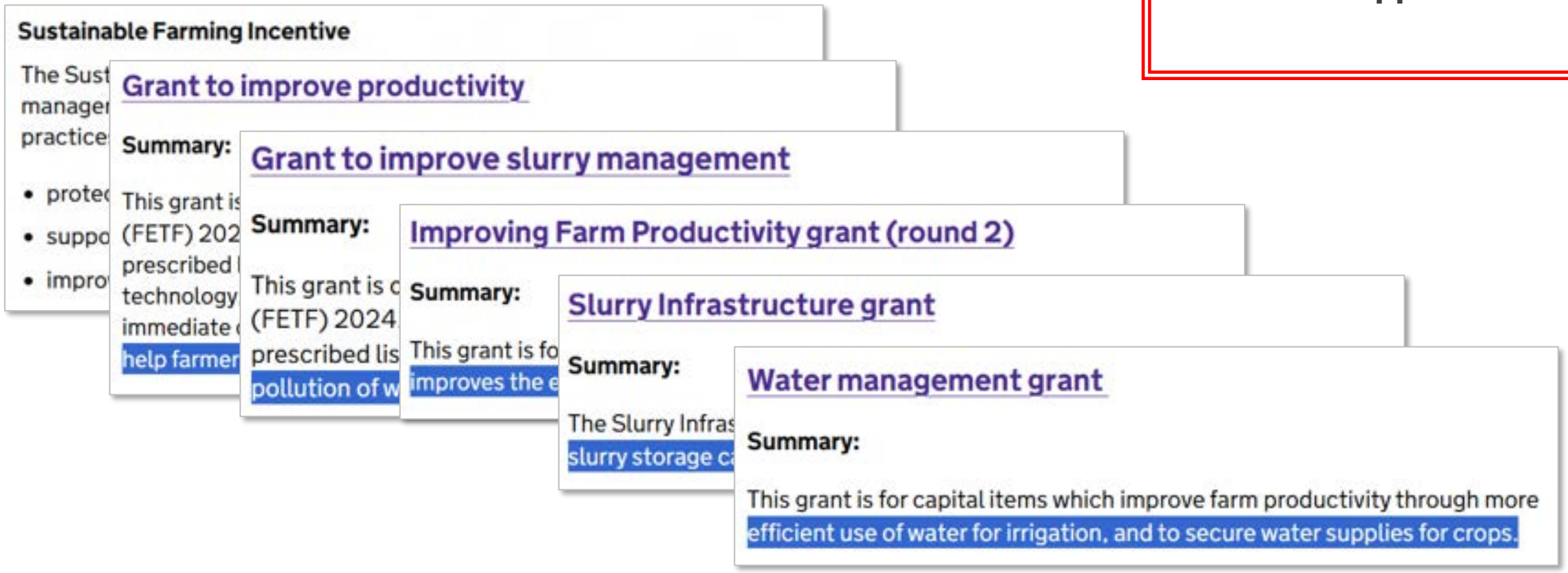
Sustainable Farming Support

Six Defra support schemes – NONE support AD.



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Key issues

- AD is perceived as a large-scale solution, considered not well suited at farm-scale; need clear communication around its potential, benefits and value.
- The regulatory landscape can be complex and onerous for small-scale; designed for larger-scale facilities.
- The funding landscape is also complex, and funders lack confidence so further complicate deals to for added protection.
- Legal and development costs are inordinate relative to the risk associated with on-farm AD.
- Other investment opportunities are more widely recognised, acknowledged and supported (slurry infrastructure, solar, etc)
- Policy focus, needs more recognition of AD and its value at site, sector and national level.

Actions

- More detailed analysis on scale of opportunity and interaction with other policy considerations.
- Recognition of wider benefits, acknowledgement of value and consideration of reward or support.
- Improved access to comprehensive and accurate information.
- Clear, consistent messaging and effective communication.
- Industry Task Force, working together to identify, address and monitor challenges.
- On-Farm AD Summit, bringing Government and Industry together to establish common interests, objectives and actions.
- **Others to be captured throughout the day ??**

Thank you

A specialist strategic business consultancy with over 20 years of bioeconomy experience

Website: www.nnfcc.co.uk
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Jonathan Scurlock, NFU

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The role of AD in net zero agriculture

On-farm AD and methane capture summit

Dr Jonathan Scurlock, FRSA
Chief Adviser, Renewable Energy
and Climate Change
National Farmers' Union of England and Wales

Askham Bryan College, 9 April 2025

NFU SUPPORTED BY NFU Mutual

Climate change, energy, net zero: NFU policy

The National Farmers' Union of England and Wales (NFU) represents the interests of ~44,000 members involved in 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 15-20 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.

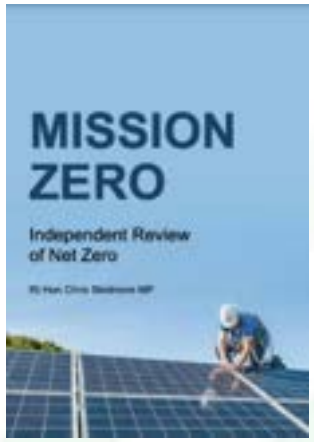
In 2019, the NFU set out its vision for agriculture to achieve a **net zero contribution to climate change** across the whole of agricultural production by 2040, focussed on three key themes or 'pillars'. **Many economic sectors may now need to reach net zero before 2050.**

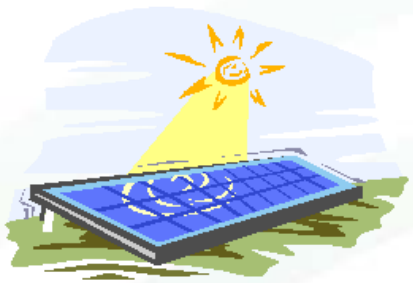
Farmers own or host **over half** of UK solar power and **AD capacity**, as well as the majority of onshore wind power, while playing a significant role in the supply or fuelling of renewable heat and thermal power generation.

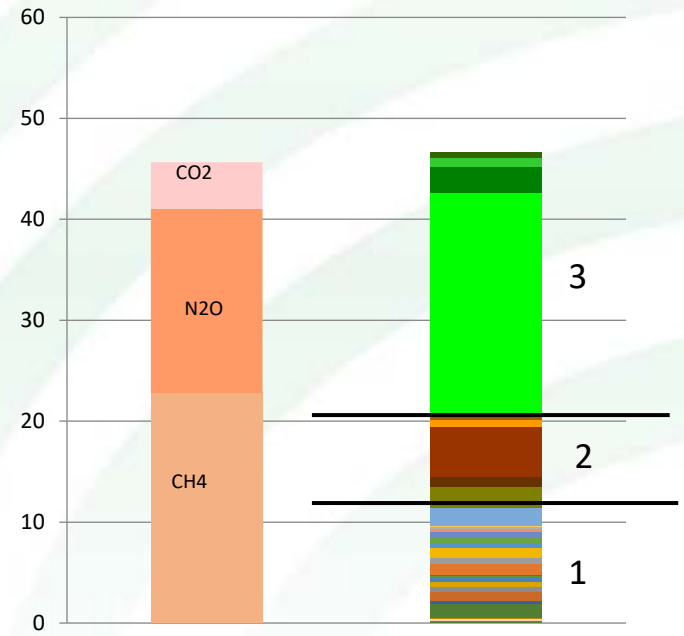
Action on the **twin crises of climate change and biodiversity loss** requires farmers and policy decision-makers alike to move on from regarding land as having one single purpose (food, non-food, conservation) – multi-functional land use, temporal and spatial

NFU NFU CYMRU NFU SUPPORTED BY NFU Mutual

NFU Net Zero approach has stood the test of time







"transition away from fossil fuels"

COP29 Baku Azerbaijan

- NFU at COP26 - 29 climate summits
- reduce emissions from production activities as far as possible
- counterbalance the residual emissions with carbon removals
- many other sectors have followed suit, 2019-24

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Defra/DESNZ: Land Use Framework and Net Zero

Statement of the Problem

Our countryside is predominantly an agricultural landscape – some land use change is inevitable

Farmers and growers overwhelmed by competing / conflicting demands on their land

Some land take from agriculture is **'hard' and permanent** (housing, critical infrastructure, afforestation, re-wetting) while other land use change may be **'soft' and reversible** (energy crops, solar farms)

Land sharing (the delivery of multiple outputs and benefits from the same land parcel), vs. **land sparing** (the re-purposing of farmland to deliver new single outcomes)

Some suggest 'silver bullet' answers to climate change and other environmental problems, e.g. cutting livestock numbers, boosting soil carbon, tree planting: but **we need a more diverse 'portfolio' approach….**

….that emphasises multi-functional land use (food, energy, environment)

LUF was promised by end 2023, then by late 2024, finally in consultation Feb-Apr 2025
"a conversation about future land use"

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Farmers can participate in AD at large scale…

NFU response (Apr 2024) to government consultation on 'Future of Biomethane':

- Broad range of applications: need consistent policy support, including infrastructure, and a 2040/50 volume target with 5-year milestones
- New-build large plants, converted CHP plants, more LA food waste collection, transport fuel, capture of biogenic CO_2 for AD-BECCS, inter-seasonal energy storage
- Distinguish between biomethane and fossil methane in ETS, new C-negative technologies like pyrolysis / electrolysis of biomethane for graphene

Multiple growing demands fuelling a resurgence in bioenergy:

Future Biogas, Gonerby/Grantham

- Industry-led GB Green Gas Taskforce (gas networks want biomethane, not H_2)
- Sustainable Aviation Fuel mandate (no crop feedstocks presently for UK: EU allows Annex IX cover crops)
- SAF presently costly (HEFA, e-fuels); borne by aviation marketing budgets, needs investment to drive down costs

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….and also small-scale on-farm AD

- **Multiple environmental benefits** (avoidance of methane and ammonia emissions, diffuse water pollution, efficient nutrient recycling, soil C storage)
- **Improved business case** - higher energy prices and improved technology/service
- **Enhanced tax allowances for investment** (probably more effective than grant funding)

Post-processing / upgrading of slurry and digestate

- potential UK supply of manure & slurry 90 million tonnes – only about 3 Mt used in AD
- not enough nutrients to meet all agricultural needs, but could be spread more evenly
- main barrier is total cost including transport and spreading, often uncompetitive vs. manufactured liquid and granular fertilisers [but also absent from some SFI options]

ELMS biofertilizer standard? Scope 3 reporting also creating signals from the food supply chain

- Novel nutrient concentration technologies → competitive low-carbon fertiliser products
- CCM Technologies – carbon capture organo-mineral fertilisers (Frontier Agri investment, offtake agreements for digestate)
- N2 Applied – plasma treatment boosts N content and stabilises NH4+ (ADAS, Arla)

A brighter future for on-farm AD?

Key factors to consider:

- estimated capital cost, return on investment, reliability/safety
- potential lack of year-round supply of feedstock (given aim to run mostly on manure/slurry)
- performance monitoring and service contract to free up farmers' time

BIOFACTORY

QUBE renewables

Bennamann

Biolectric

(other suppliers are available...!)

NFU

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Ciaran Burns, REA

The Bioeconomy Consultants
NNFCC

Small scale AD subsidies, planning and permitting

Ciaran Burns
Green Gas Policy Manager
REA

REA GREEN GAS

The Renewable Energy Association - REA

@reassociation

The largest trade body representing the renewable energy, clean tech and bioresources.
Established over 20 years ago with over 550 members.
Subsidiary company REAL operate assurance and certification schemes

REAL
RENEWABLE ENERGY ASSURANCE LIMITED

Consumer Codes
RECC
EVCC

Certification Schemes
Compostable Materials Certification Scheme
Compost
Biofertiliser certification scheme
GreenGas
Research Hub

Other Schemes
EV|ROAM

Content

- Historic and current financial support
- Planning
- Permitting
- Summary

Historic subsidies for AD

Renewables Obligation	Feed-In Tariffs	Renewable Heat Incentive
• 2 ROCs per MWh of electricity (approx. £50 each) • Included landfill, sewage, AD • closed to new entrants in 2016 • First plants will come to the end of 20 years in 2027	• Direct subsidy for renewable electricity generators • 11p/kWh in addition to the commodity price (4-5p) • Closed in 2019 • First plants will come to end of 20 years in 2030	• Direct subsidy for biomethane injected to the gas grid • Direct subsidy for biogas used for heating (>200kWth) • 6.5p/kWh in addition to the commodity price (2-3p) • Closed to new entrants in 2021 • First plants will come off RHI in 2033

Current AD Subsidies

Contracts For Difference

- Government guarantees a strike price for each unit of electricity.
- If the commodity price is lower than the strike price then the Government cover the cost difference
- If the commodity price is above the strike price then the generator pays the Government the difference back
- Only generators with a capacity above 5MW are eligible
- **Effectively excludes AD at any size**

Green Gas Support Scheme

- Pays a direct subsidy to biomethane producers injecting to the gas grid.
- Tiered rates;
  - Currently 6.5p/kWh for the first 60 GWh
  - In addition to the commodity price (4-7p/kWh)
- Started in 2021 and scheduled to close to new registrations in 2028
- Supports plants for 15 years
- 50% crop cap
- **Requires £10-20 million pound investment so excludes small scale AD**

Renewable Transport Fuel Obligation

- 1.9 RTFC for each kg of biomethane used in transport
- Double for biomethane from wastes (3.8 RTFC per kg)
- Buy out for obligated suppliers is 50p per certificate
- Non-road motorised vehicles are included
- Around 13.5p/kWh*

- Could fuel biogas tractors on-farm and then sell the certificates
- You could upgrade the biogas to biomethane and sell directly at a refuelling station but need to invest in infrastructure and have the customers

*Approx 13.9kWh/kg of methane

Smart Export Guarantee (SEG)

- Guaranteed tariff above 0.00p per kWh for every unit exported
- Must have smart meter capable of measuring export
- Must be renewable electricity
- Launched in 2021, currently no end date
- Eligible technologies are solar PV, wind, AD and hydro up to 5MW
- AD has additional requirements to report on crops used

- Suppliers are offering between 4p/kWh and 16p/kWh for solar PV generation.
- Usually have to import from that supplier to get the higher rates
- Generally export rates are only guaranteed 12 months but have mostly only gone up.

Suppliers are applying the same registration requirements on AD applicants as solar PV applicants which is not appropriate.
Notably requiring an MCS certificate (Microgeneration Certification Scheme) but there isn't an MCS standard for AD.

Current requests from suppliers

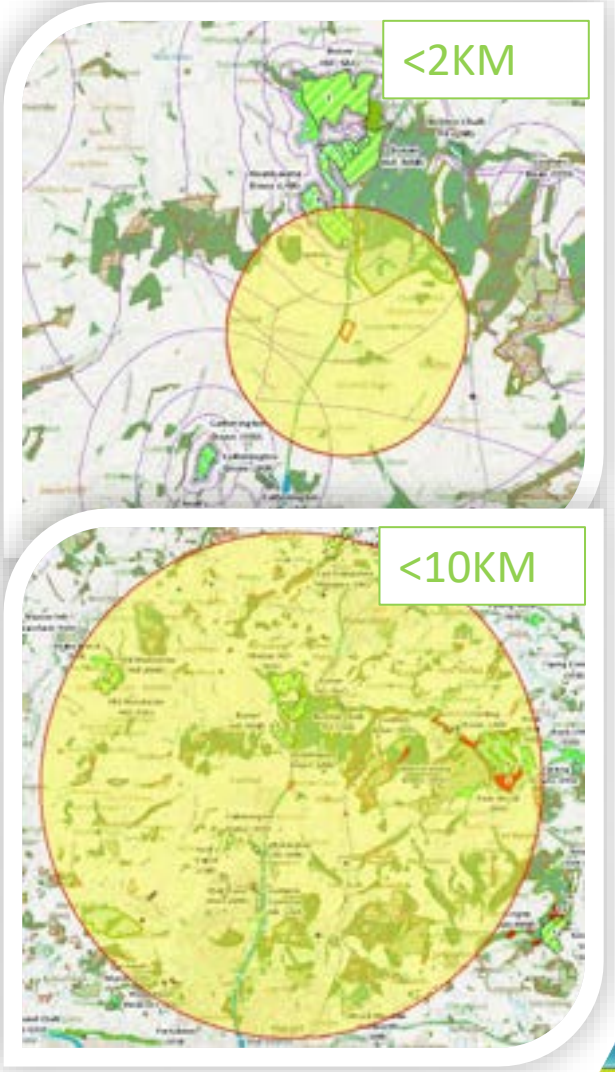
- G98/G99 Acceptance letter from the DNO
  - Usually the DNO will witness the connection and check that the appropriate relays and trip switches are in place
- An electrical install certificate from a suitably qualified electrician
- Certificate of compliance with Building Regulations
  - not required for structures more than 400 meters from other non-farm buildings
- Certificate from the installer
  - Effectively self certification from the installer

Currently application is stuck with a supplier not prepared to accept and start SEG payments

Issue has been raised with Ofgem but awaiting response

Planning

- Site sensitivities must be assessed
- Feedstock type
- If within a zone - Nutrient neutrality assessment and mitigation strategy
- Air quality impact assessment
- Ecological receptors
  - NOx, SO_2, NH_3, N Deposition, Acid deposition,
  - Ecological receptors ≤10km from site, LWS + AW ≤ 2km from site
  - Dust
- Human Receptors, typically up to <1km
  - NO_2, SO_2, CO, Benzene, NH_3, dust/ particulates (PM_{10} and $PM_{2.5}$)
  - Odour
  - Bioaerosols
- Odour impact assessment – Odour Management Plan
- Construction Environmental Management Plan
- Ammonia management – measuring, modelling and mitigation



Earthcare TECHNICAL

Permitted Development

Assuming that an on-farm AD plant will be a gas-tight slurry tank with a containerised CHP unit, permitted development might be an option that avoids requiring planning permission

- Can’t be any planning permission granted within the preceding 2 years
- No construction work on that site within the last 90 days (mostly gets ignored)
- Must be more than 25 metres from a local authority road
- Must be at least 400 metres from the curtilage of a protected dwelling (non ag' house, church or school etc.)
- Likely rejected in SSSI or National Landscape (AONB) – check with local planning office

Earthcare TECHNICAL

Thanks to Anna Becvar for the slides on Planning and Permitting.

Permitting Exemptions

AD plant operation:

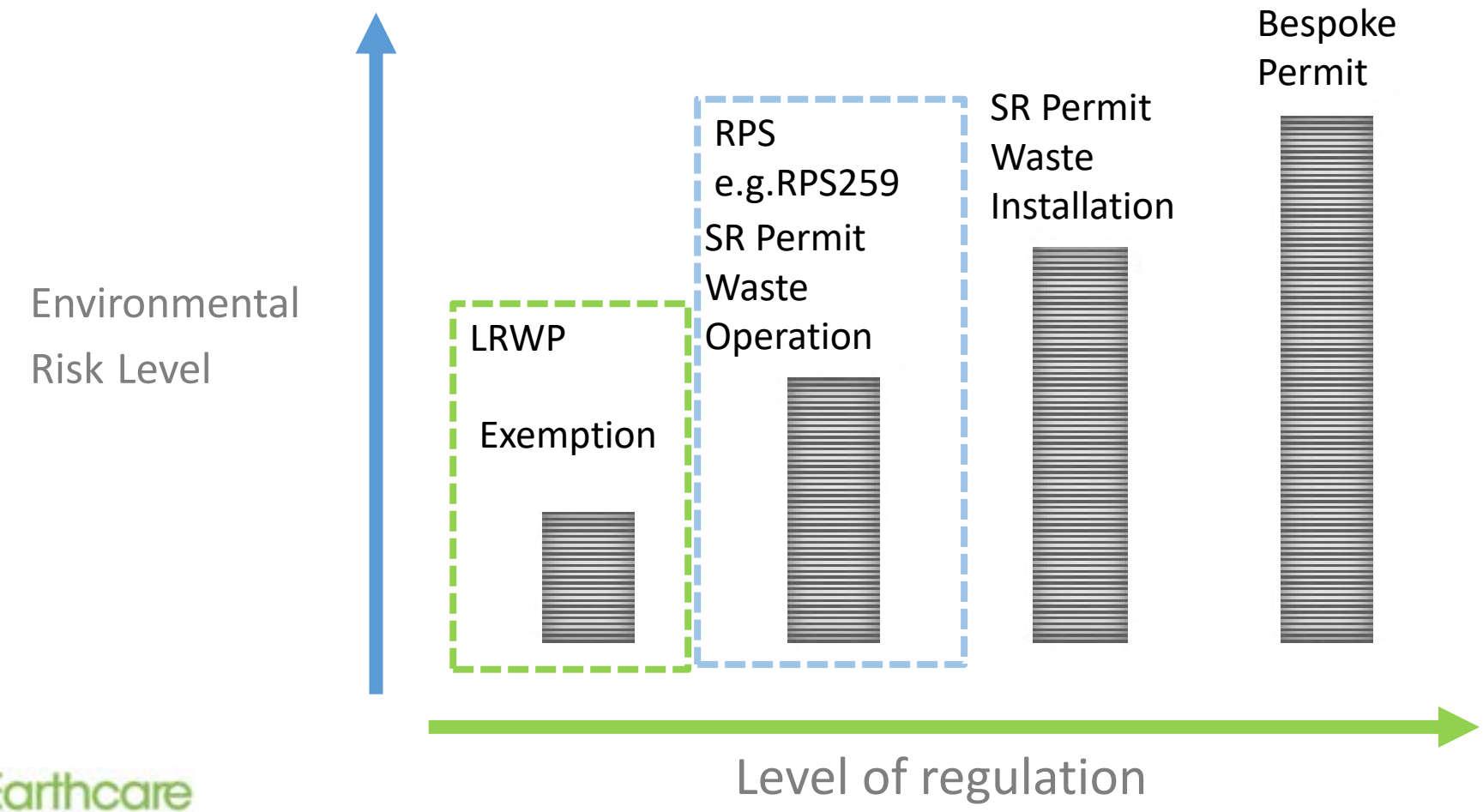
- Exemptions
  - T24 Anaerobic digestion on farm
  - T25 Anaerobic digestion not on a farm
- Standard Rule Permits
- Bespoke Permits

Using Digestate:

- Exemption U10
- Land-spreading permit and deployment
- Biofertiliser Certification Scheme (PAS110)

Environmental Regulation Levels

@reassociation



- Low Risk Waste Position (T24)
- Regulatory Position Statement
- an 'exemption' – no permit required but you must register your exemption
- Standard rules permit – a set of fixed rules for common activities
- a 'bespoke permit' – tailored to your business activities.
- An Operation is <100 tonnes per day
- An Installation is >100 tonnes per day

Earthcare TECHNICAL

Environmental Permitting Process

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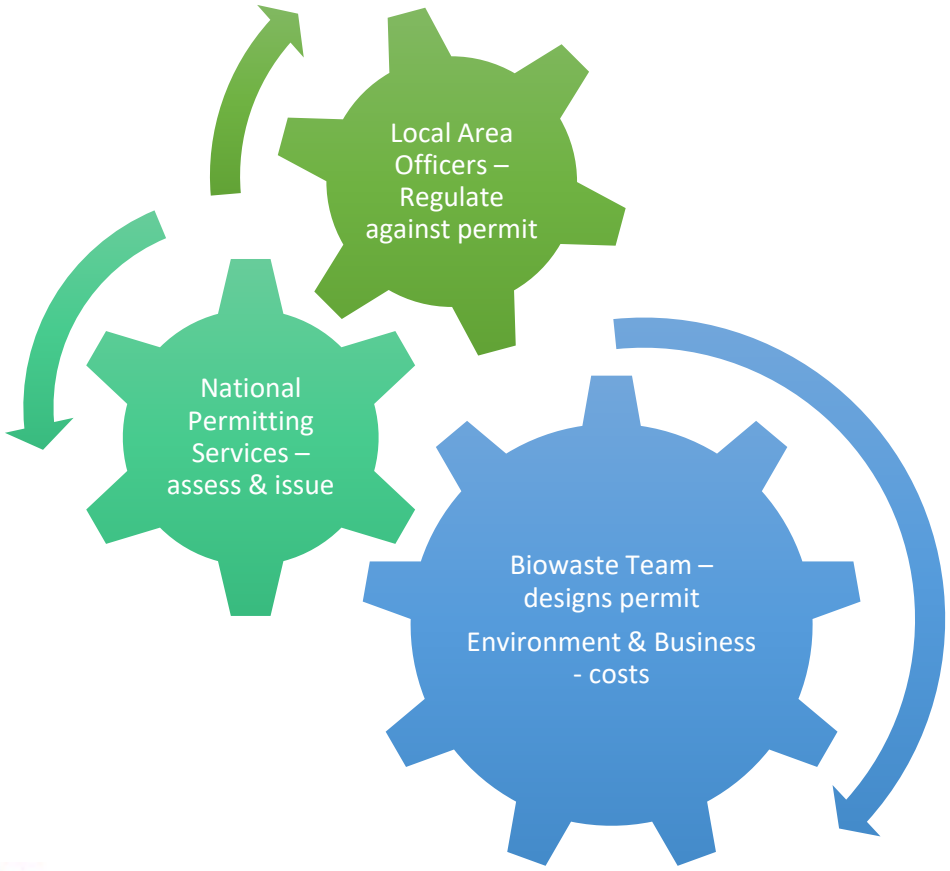

1. Check whether the process meets Exemption criteria
2. Or check whether the site can meet Standard Rules criteria if not a Bespoke permit is needed.
3. Apply for pre-application advice to confirm the permit type is correct
4. Register an exception
5. Or Prepare and submit the application:
   - Standard rules relatively straightforward
   - Bespoke application – complex and requiring extensive supporting information
   - Need to demonstrate competency
6. Duly Making checks
7. Permit determination – expect some questions via Schedule 5
8. Permit issued

Earthcare TECHNICAL

T24 Exemption (from permitting)

T24 Anaerobic digestion on farm

- anaerobic digestion of manure and plant tissue waste in a dedicated AD plant to produce a digestate
- burning the biogas to produce electricity for us or export
- sorting, screening, cutting, shredding, pulverising and chipping the waste to help the AD process
- Types of wastes:
  - Plant tissue waste
  - Horse and farmyard manure, slurry only
  - Fully biodegradable animal bedding
- Up to 1250m^3 at any one time (doesn't include slurry stores used to store own waste)

Must:

- keep the waste in the digester for at least 28 days
- collect and burn the biogas produced by the AD process to produce energy
- use a net rated thermal input of less than 0.4MW on the AD plant biogas burner
- have a combined net rated thermal input of less than 0.4MW if there is more than one burner associated with the AD plant
- Must comply with CoGAP, CoGAP for ammonia and NVZ

Exemption Registration fees £59
Compliance monitoring fees £440 for 3 years

Summarise

Planning - Small-scale on farm should have **Permitted Development Rights**

EA Operational Permit - Small-scale on-farm should only need to register a **T24 exemption** with the EA

Waste permits - on-farm waste **feedstock** should only require T24

Digestate Spreading – T24 plants can spread under U11

Subsidies – none - but can secure a good rate under the SEG

Summary

Planning	Small-scale on farm should have Permitted Development Rights
Operational Permits	Small-scale on-farm should only need to register a **T24 exemption** with the EA
Waste Feedstock Permits	on-farm waste **feedstock** should only require T24
Digestate spreading Permits	T24 plants can spread under U11
Energy Subsidies	none - but can secure a good rate under the SEG for export – at least 15p/kWh
Other income	Could enter a PPA but unlikely to find off-taker for smaller amounts Could check voluntary carbon offsetting schemes

REA Contacts

@reassociation

Ciaran Burns – Green Gas Policy Manager

Biogas, biomethane, hydrogen the support mechanisms

cburns@r-e-a.net

Jenny Grant – Head of Bioresources

Regulation, permitting, landspreading, composts, digestates, biodegradable products

jgrant@r-e-a.net

Team with broad coverage of grid connections, transport, regulations, planning policy, etc with links into DESNZ, Defra, Treasury, Cabinet members etc

Join the REA to get the support you need and influence policy that impacts you and your sector.

Discussion & Menti Session

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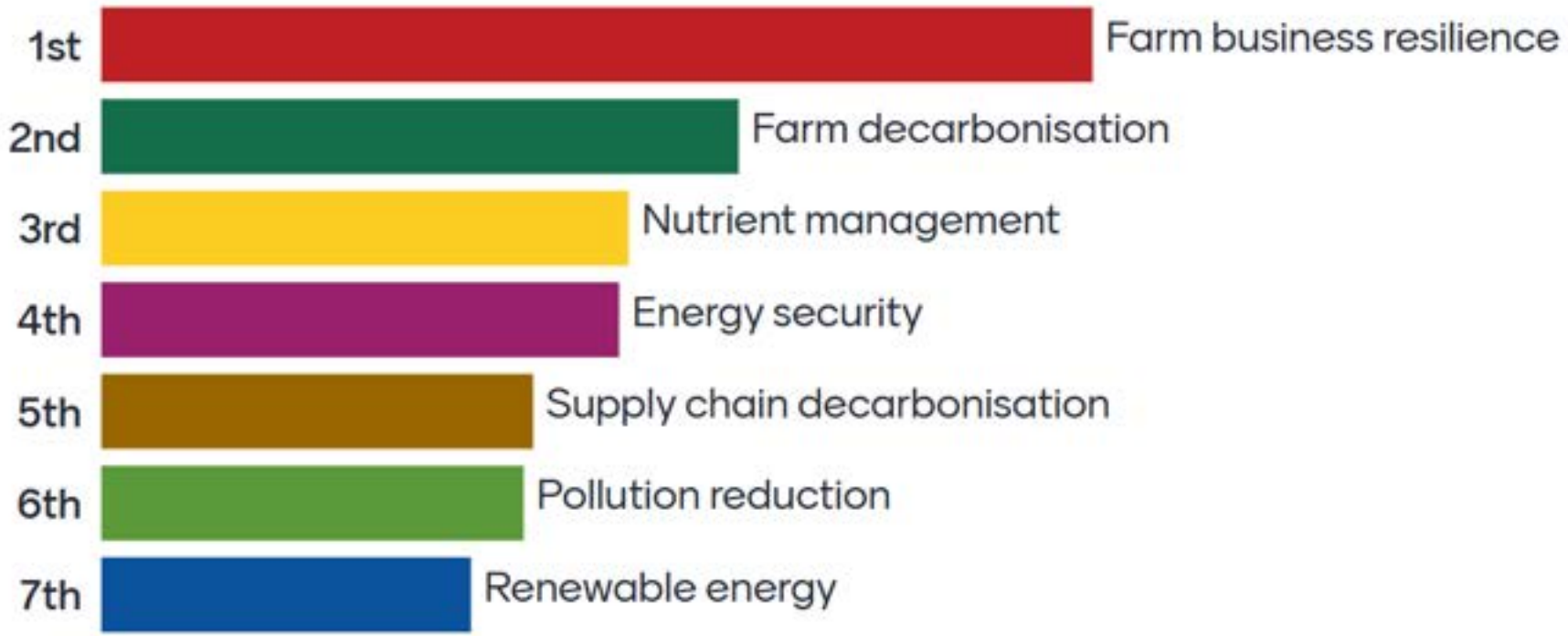
At sector level, what should be considered the main drivers for growth?



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For farmers and developers, what are the main frustrations or barriers?

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Key frustrations or barriers to growth...

62 responses

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Biolectric

Coffee & Networking

HSBC UK

QUBE renewables

Bennamann

BIOFACTORY

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Site Visit & Discussion

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Biolectric –

Askham Bryan Plant

The Electric Cow

AD Summit 2025

Biolectric

The Electric Cow

Biolectric

Askham Bryan College Dairy Farm

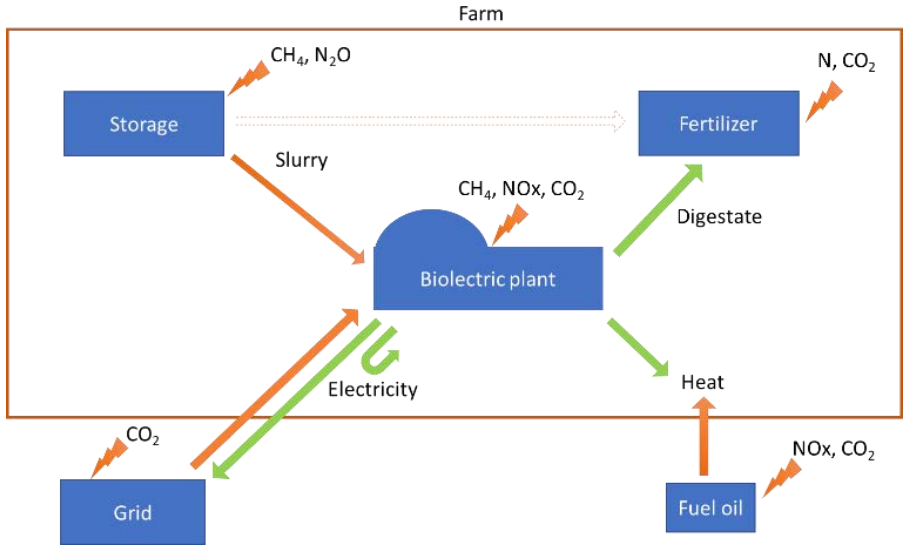
- Modern, working dairy farm located at the York campus
- 170 high-yielding Holstein cows
- Cows milked twice daily using a modern parlour & robotic systems
- Supports hands-on learning for agriculture and animal science students
- Focus on animal welfare, health, nutrition, and herd management
- Uses precision livestock and grassland management tools
- Commercially operated, with teaching and research integration
- Home to a **22kw Biolectric small scale anaerobic digestion unit** generating renewable energy
- Central to the college’s commitment to practical, future-focused agricultural education

Askham Bryan College – 2 month to produce / 48h to build

Biolectric

112 t of CO_{2eq} saved every year on the college

Boundaries of the calculation



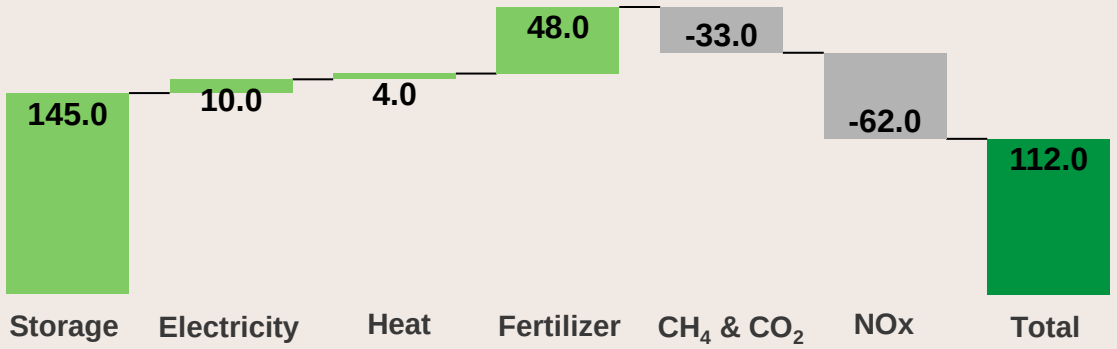
We have internally created a methodology to calculate the reduction in GHG emissions from manure.

It calculates the difference between the **yearly manure GHG emissions** in the

- baseline scenario
- Biolectric scenario

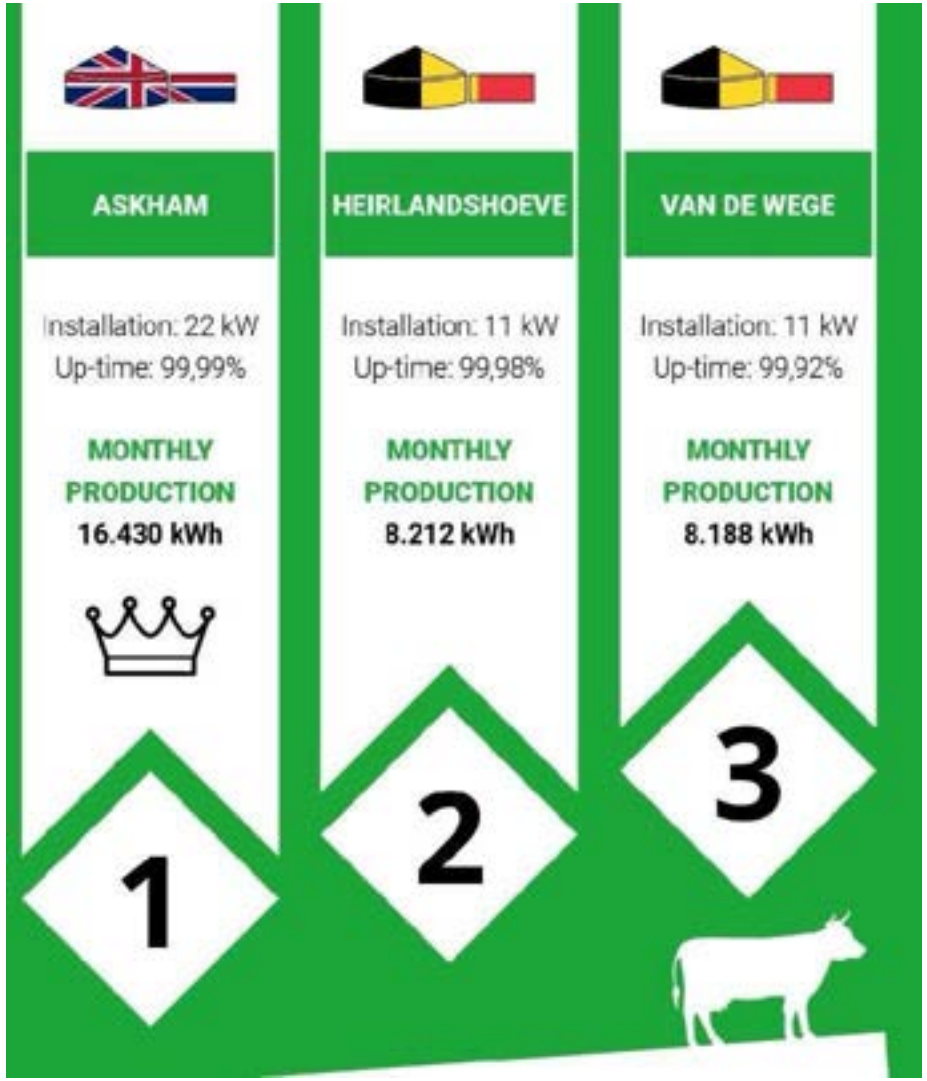
The difference between the 2 scenarios is taken as yearly GHG reduction and is the number that can be valorized through carbon credits.

Example of GHG reduction for 22 kW – S3 (UK)
in ton of CO_{2eq} reduction per year



35% GHG Reduction after Biolectric Install

Golden Cow Pat – Askham Bryan College



98,8%

Technical availabity since 1st October

92,2%

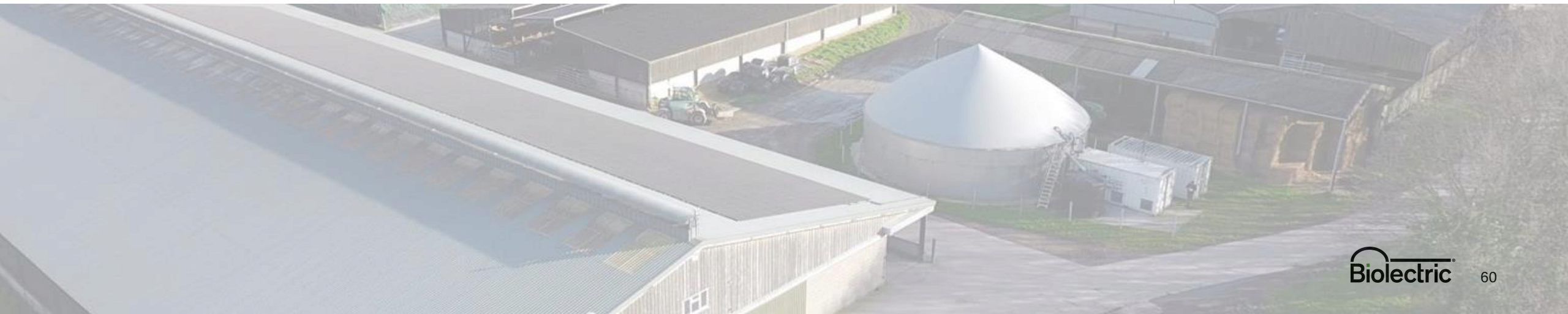
Running time since 1st October

Constant Technical Development over 15 years

Recent product innovations:

- New heating system
- Foam beater
- 60/74kW product line extension
- Automatic oil replenishment system
- Nitrogen stripper
- Biomethane Gas to Grid

2010 - 2012 | **2012 - 2014** | **2014 - 2016** | **2016 - 2021** | **2022 - …**



Biolectric has partnered with the leading sustainable dairy suppliers in Europe

Example

SODIAAL Nestlé

- **€65k upfront payment to farmers investing in eco-friendly practices and generating carbon credits.**
- **Part of broader Nestlé-Sodiaal agreement to help Nestlé achieve net-zero target.**

FrieslandCampina

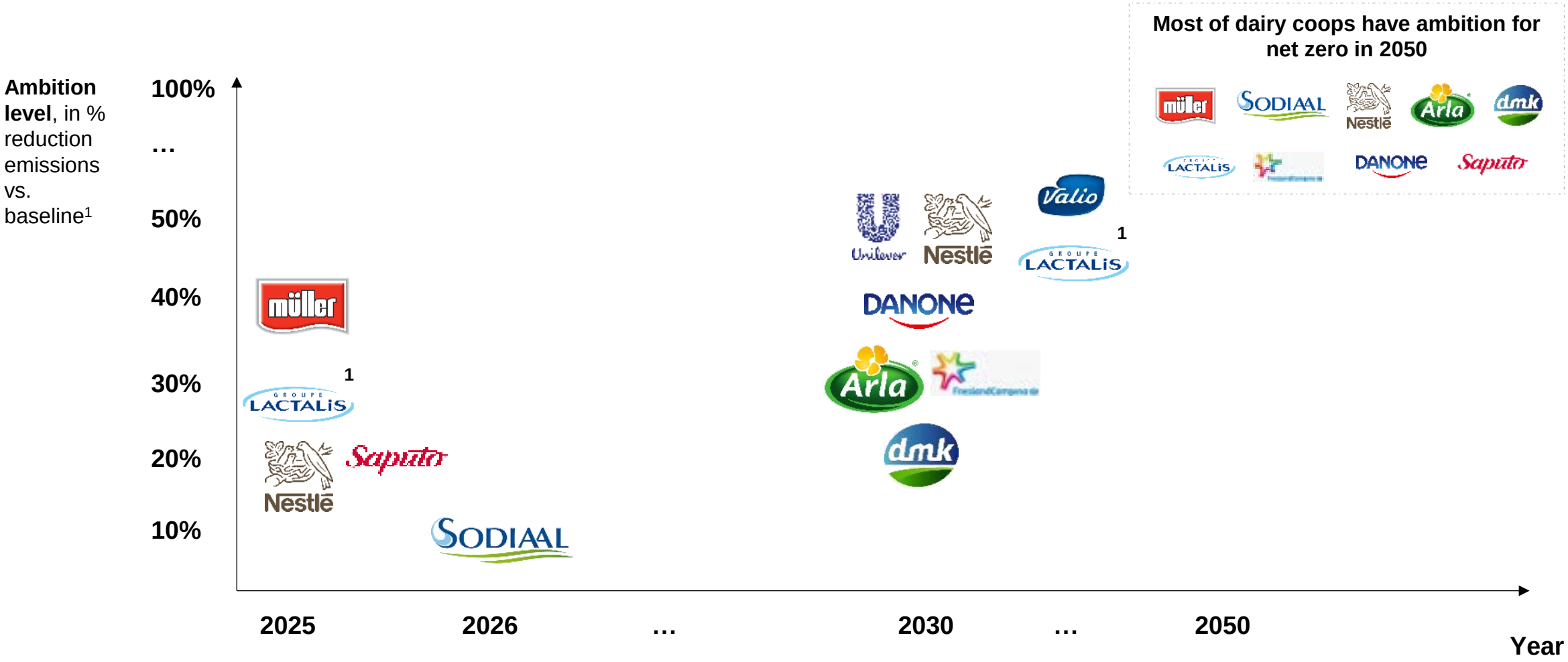
- **€0,25cts/L milk more when doing AD**
- **Project Management with support for farmers on loan and insurance from major Dutch companies**

Biolectric Already Recognized As a Leading Technology Provider

21st Century Technologies making an impact from International Farm Comparison Network

Dairy Supply Chain Climate Targets

Overview of Dairy Corporations/Cooperations' Sustainability Ambitions by 2030



1. No scope 3 targets, which account for 80+% of emissions, baseline typically between 2015 and 2020

Source: BCG analysis

European Incentives for Small Scale AD

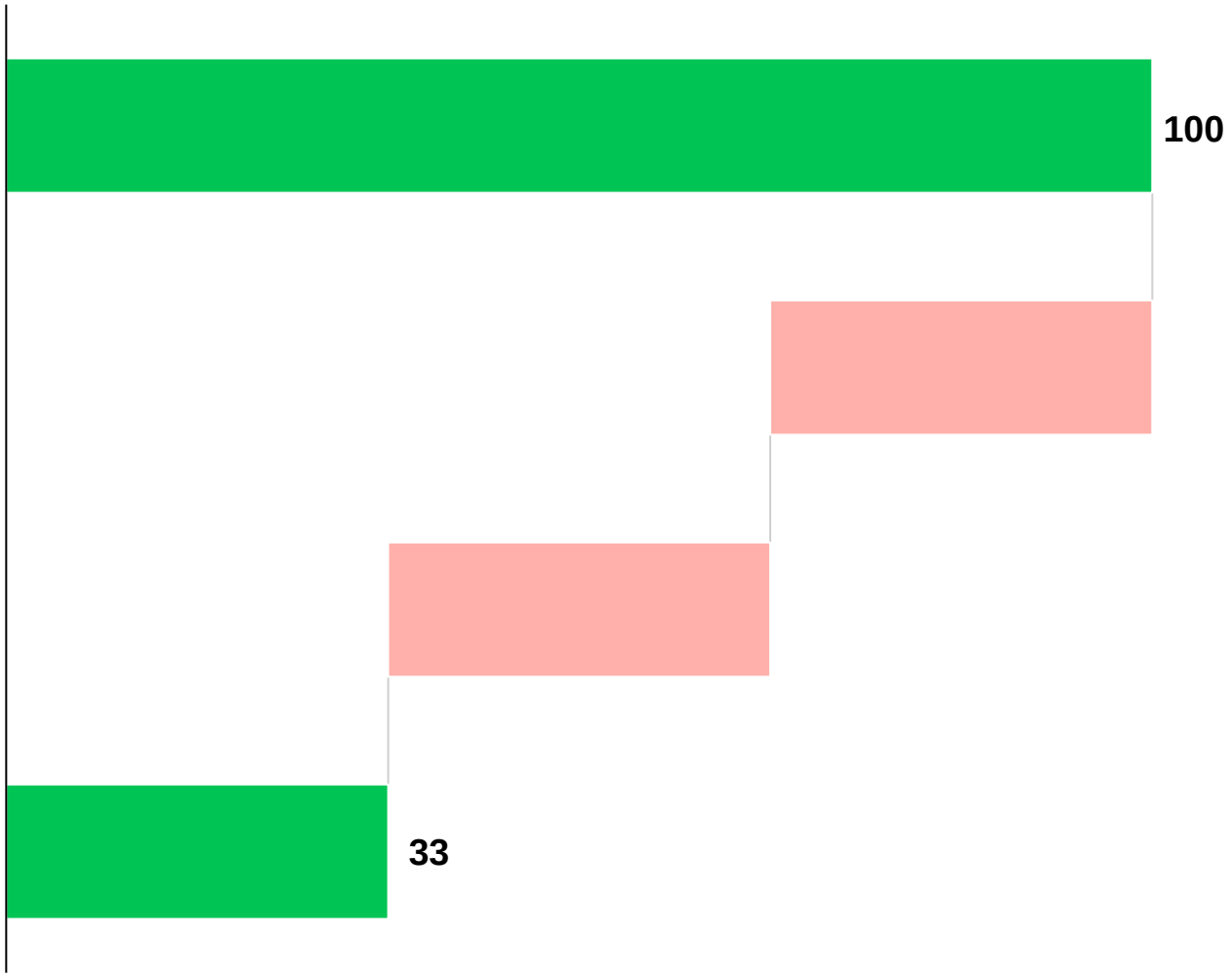
	Investment / capex related		P&L Subsidies		Product limitations
	Subsidy Applicable	Amount	Subsidy Applicable	Amount	
Netherlands	None		Yes (FiP)	SDE++ CHP Small (<110kW input): 0.2903 €/ kWh Medium (110kW-450kW input): 0.2473 €/ kWh	Manure only
Flanders	Yes (VLIF)	40% - 55% of silo, pump & mixer	Yes (TGC)	Green electricity certificates - 0.093 €/kWh on net production Green heat certificates - 0.056 €/kWh on net production (=1 heat)	Manure (optionally own farm feed)
Wallonia	Yes	27.5% on full investment for farmer: Biolectric + farm adjustments	Yes (TGC)	Green electricity certificates - 0.13 €/kWh on all production volume	MID Gasflowmeter
Germany	None		Yes (FiT)	FiT electricity - 0.222 €/kWh on all production volume	Manure only and up to 75 kW
France	Some	Potential investment subsidy in Grand-Est + 40% tax credit up to €40k	Yes (FiT)	FiT electricity - 0.205 €/kWh on all production volume	Flare & catalyser mandatory
Italy	Yes	20% on full investment for farmer: Biolectric + farm adjustments	Yes (FiT)	FiT electricity - 0.233 €/kWh on all production volume	Up to 250kW
Poland	Yes	40% on Biolectric investment for farmer	Yes (FiT)	FiT electricity - 0.162 €/kWh on all production volume	Up to 40kW
Luxembourg	Yes	20% on Biolectric investment for farmer but **dependent on farm**	Yes (FiT)	FiT electricity - 0.32 €/kWh on all production volume	Manure only and up to 100 kW
Sweden	None		Yes (TGC)	Green electricity certificates - 0.014 €/kWh	
UK	None		None		

- ❑ **10p/kWh Export Tariff – 10 years – Cap £20k – Retroactive plants without FIT/RHI**

Biolectric

Collective AD plants loose 2/3rd of the energy potential

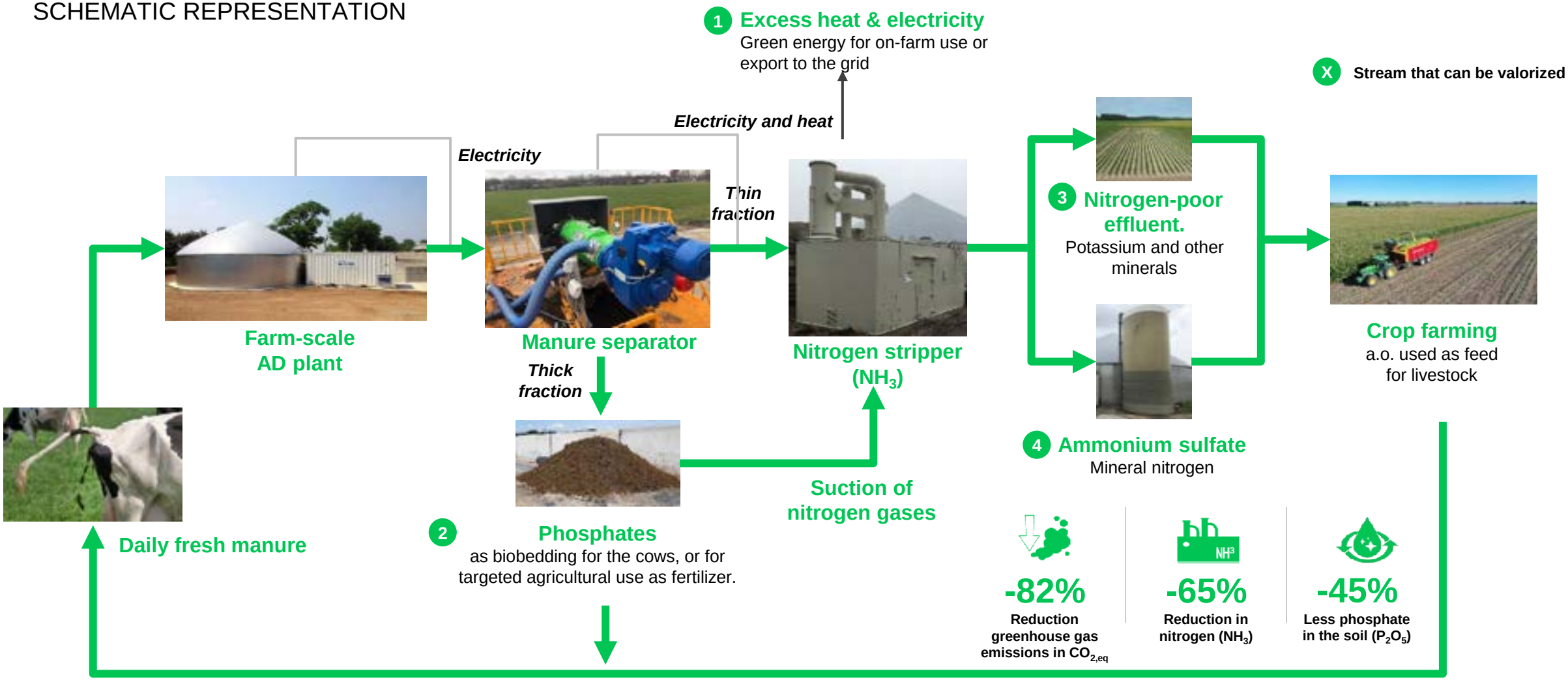
Compared to farm-scale anaerobic digestion with hourly fresh manure collection



Biolectric

We help farmers turn waste into energy and boost on-farm efficiency.

SCHEMATIC REPRESENTATION



… making farming more sustainable

Biolectric

Bron: Next Level Mestverwaarding – Wageningen University 2022, PhD Vergote 2020, testen Van Poppel & Voet Monteny milieu-advies 2020

Control & Monitoring

Technology in Action:

- See how the AD systems are remotely monitored using the **MyBiolectric** app.
- **Farmers can track biogas production, energy output, and system performance in real-time with remote troubleshooting**
- **Biolectric systems can be used as an energy battery, harvesting gas and releasing when required when using the SMART system.**

Takeaway:

Enhanced control and monitoring reduce the workload on farmers while maximizing system efficiency.

Still, where do we see the issues?

- **Project Management:**

❑ **Ease on Planning : As a modular system, it could be placed on a farm with minimal application**

❑ **Grid Connection : Compared to Solar or Wind, AD offers a stable 24/7 base load for the Grid. Offering the right connection and export is crucial**

- **Recognition of GHG reduction:**

❑ **Carbon Credits should be awarded to the farmers, based on a standardized calculation for all systems**

❑ **Per £1 Invested SOFAD offers the highest CO_2 reduction in renewables**

Joseph FAYOLLE - Biolectric Tour
Gary HAGUE - Biolectric Presentation

www.biolectric.com
joseph.fayolle@biolectric.com
gary.h@dairyenergy.co.uk

ASKHAM BRYAN COLLEGE

Biolectric

Lunch & Networking

HSBC UK

QUBE renewables

BIOFACTORY

The Bioeconomy Consultants NNFCC

Technology Showcase

Hosted by Olivia Midgley, Farmers Guardian

The Bioeconomy Consultants
NNFCC

Eoin Sharkey, BioFactory

The Bioeconomy Consultants
NNFCC

BIOFACTORY

Modular AD for Improved Slurry Management

Eoin Sharkey, CEO

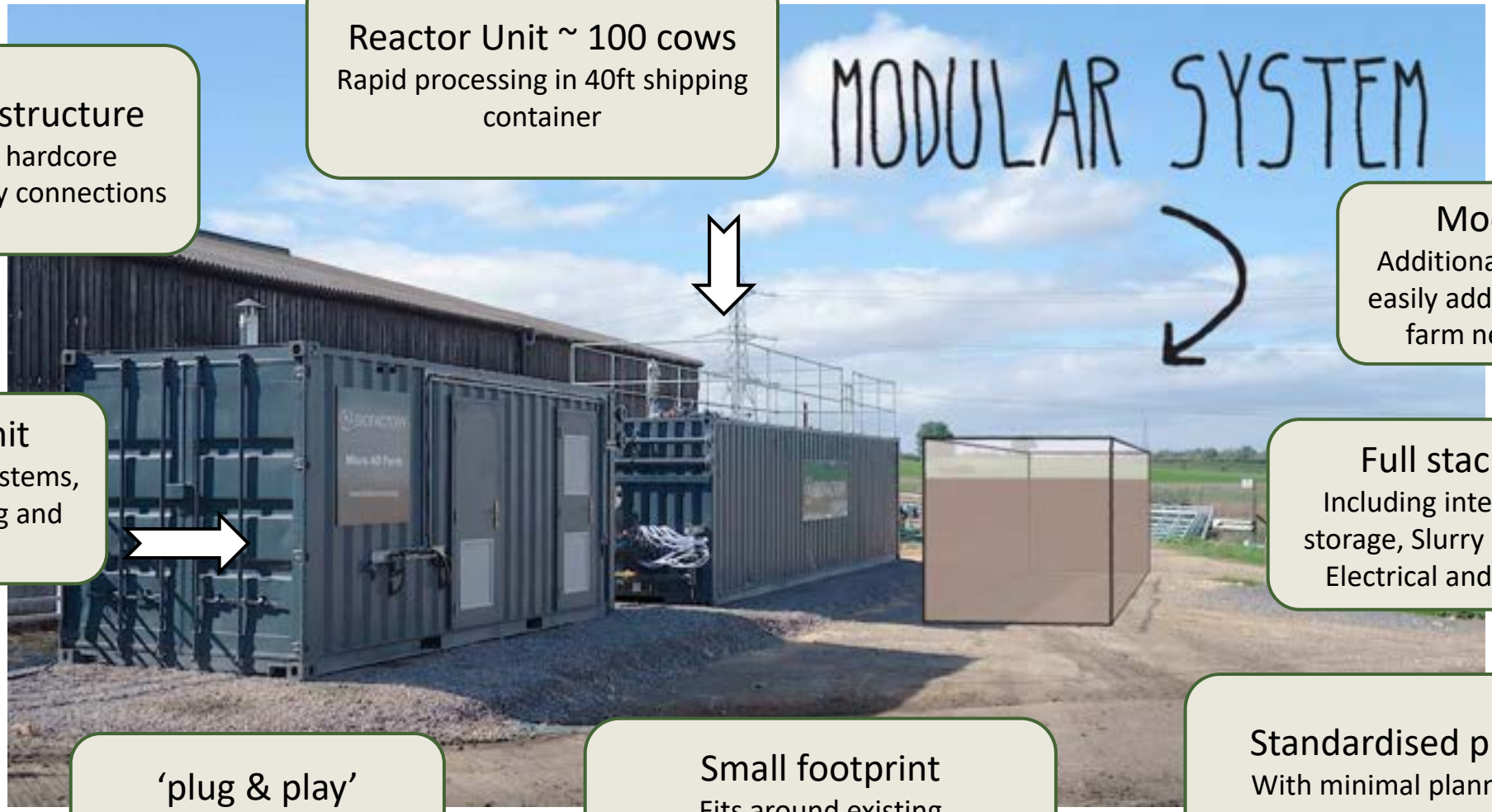
BACKGROUND 2018-2021

BIOFACTORY

2021 ONWARDS

TECHNOLOGY OVERVIEW

BIOFACTORY



Reactor Unit ~ 100 cows
Rapid processing in 40ft shipping container

Minimal infrastructure
Only requires a hardcore standing with utility connections

Modularity
Additional reactor units easily added/removed as farm needs change

Services Unit
housing control systems, biogas processing and CHP

Full stack solution
Including integrated CHP, gas storage, Slurry pumping system, Electrical and heat interface.

'plug & play'
into farm's existing slurry handling systems

Small footprint
Fits around existing infrastructure in "odd " spaces present on smaller farms.

Standardised process
With minimal planning and permitting requirements

Company Targets

BIOFACTORY

Customer Support

- Introduce rental options
- Customer finance package
- Bank finance support ✓

Technology Development

- Exhaust carbon capture
- Integrated Solids feed module (for FYM)
- Integrated digestate dewatering module
- Single phase electricity grid interface ✓
- Autonomous operation ✓

2024 → 2025 → 2026 → 2027 → 2028

New Markets /Products

- Pig slurry
- High-intensity beef manure
- International deployments
- Sanitation treatment

By 2028…

BIOFACTORY

- 75 units deployed
- 13 GWh/yr electricity generation (5000 homes)
- 26 GWh/yr heat generation
- 20,000+ T CO2/eq removed every year
- £3.5m energy costs saved by customers

2028

TO ACHIEVE THIS…

- Financial support for farmers to incentivise and help de-risk AD uptake on smaller farms
  - Milk Buyers through sustainability milk prices
  - Land-owners supporting tenant farms
  - Banks to more readily accept AD technology as a “normal” farm investment

- Local Council & central Government support to enable AD investment on the farm level
  - Clarity & stability at policy level, enabling farms to investment
  - Reduce financial burden on farmers resulting from IHT changes
  - Not exclude AD from other grant support e.g. Slurry Infrastructure Grant, and/or provide specific AD support more suitable than GGSS for small-medium rural farms.

- Looking for partners around the UK to demo our products & help us develop better solutions.

Get in touch

Eoin Sharkey: 07738 639608

Enquiries: 01225 536707

info@biofactory.energy

https://biofactory.energy

James Rundell, Qube Renewables

The Bioeconomy Consultants
NNFCC

SMALL SCALE AD TECHNOLOGY – lagoonQUBE

CONVERTING YOUR WASTES INTO RENEWABLE ENERGY

On-Farm Anaerobic Digestion (AD) and Methane Capture Summit - April 2025

QUBE renewables

Blue Planet Environmental Solutions

loglogic

aardvark environment matters

OUR HISTORY

- 2011 MOD requested an AD solution for Forward Operating Bases in Afghanistan as fuel costs were over $200 per litre.
- Aardvark EM have worked in the AD sector since 2000's were unable to find anything small-scale on the market.
- 2013 Aardvark EM and UK based engineering firm, Loglogic Limited, established QUBE Renewables. Our first anaerobic digester is still producing biogas today.
- 2021 Qube received an equity position by Blue Planet of Singapore

lagoonQUBE

LagoonQUBE is a flexible, removable cover that operates as a digester, floating on a lagoon or open top tank to collect biogas and importantly rain water, from the slurry

Technology Overview:

- lagoonQUBE floats and is removable to allow changing levels of slurry and maintenance of the lagoon
- 'Pods' or 'full covers' - the 'pods' each cover 94m2, 11.4m in diameter, hexagon shaped and tessellate together to form full or partial covers
- Suitable for lagoons and tanks
- Compliant with Government Air Quality Ambitions to cover slurry stores
- Mitigates Green House Gas emissions – biogas that is collected from the system would otherwise have been released into the atmosphere
- Rainwater landing on the cover area is captured and pumped from the cover increasing storage capacity
- Biogas from each lagoonQUBE can be collected and used in small scale CHPs, or in biogas boilers for hot water generation

Progress to Date:

- lagoonQUBE deployed in UK as well as Northern Spain
- Our first lagoonQUBE project was developed on an 80 x 65m lagoon in Norfolk in 2019 up to our latest, current project capturing gas from a large lagoon in North Lincolnshire.
- Technology is approved and data available

QUBE renewables

Where is this Technology heading – Scale, Ambition and Impact?

- Market size is clear – as seen by the number of SIG applications. Currently in the region of 7,200 dairies in UK – AHDB 2024
- QUBE currently has more than 200+ viable on-farm opportunities on our books
- A dairy farm of 200 cows which grazes out in the summer will still produce a minimum of 74,000 kWh electric per year from gas captured from slurry
- That same farm will save 389 tons CO2e per year purely on avoided methane emissions
- Covering lagoons is a ‘dead’ cost to farms – this technology offers a return on investment (the example dairy farm will save £23,000 per annum on imported power costs at £0.21 p/kWh based on most conservative model)

CO_2e

QUBE renewables

Where we are now with Farm Slurry - what are the key challenges?

- No clarity around Air Quality Ammonia Mitigation Regulations
- Grants Delayed and pulled – again with no clarity on future
- Confusing EA Position on the capture and use of biogas from slurry stores – SR2023 No 1
- QUBE Focus is away from farming towards other effluent water stores and other markets (eg slurry in Spain, palmoil effluent water streams in SE Asia)

Environment Agency

Statutory guidance

SR2023 No 1: capture, treatment and storage of biogas from lagoons and tanks

Updated 6 November 2024

Why would a farmer invest when the regulations are unclear and any future grant support has not been identified?

QUBE renewables

QUBE renewables

- **Spain – where Government Supports Innovative Fugitive Gas Capture Technology:**

- There are significant Issues with slurry management in the Pig & Dairy Industry in Northern Spain

- QUBE have worked on several sites with existing covers in place to capture biogas and use on farm.

- Structured subsidy system that offers practical support for farmers covering slurry stores and capturing gas – some of which is offered retrospectively

Thank You

QUBE renewables

James Rundell

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Tel: +44 (0) 1984 263263
www.quberenewables.co.uk
Higher Ford, Wiveliscombe, Somerset, TA4 2RL

Gary Hague, Biolectric

The Bioeconomy Consultants
NNFCC

Biolectric - SOFAD

Small On Farm Anaerobic Digestion

Technology

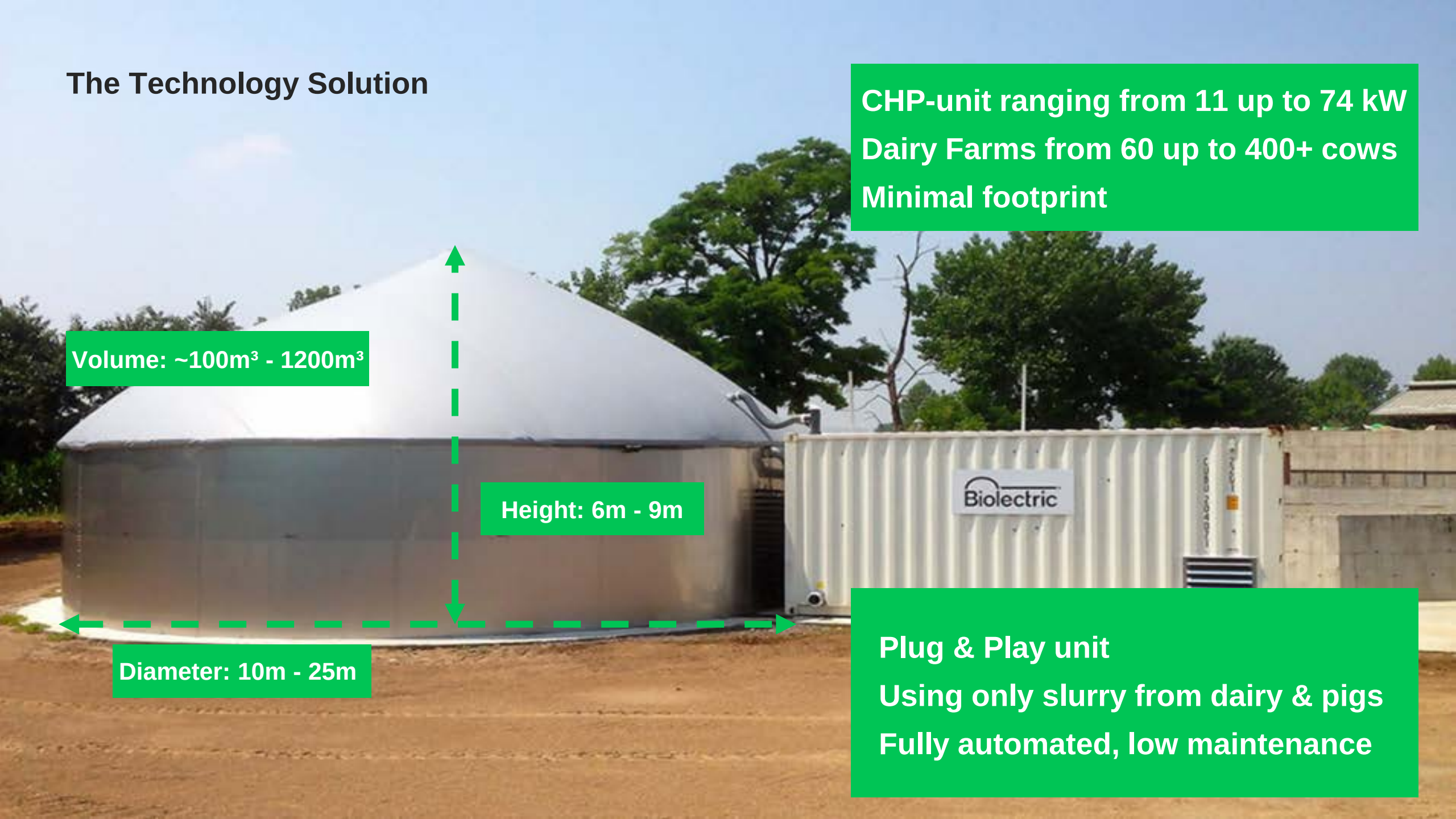
AD Summit 2025

Biolectric

Who Are We?

- **Biolectric**: Europe's leading provider of farm-scale anaerobic digestion technology, specializing in converting livestock waste into energy, since 2010
- **Technology**: Small-scale, award winning, on-farm biogas systems that use animal slurry only to generate electricity, heat, and biogas
- **Key Features**: Modular systems, easy 2-4 day installation, reliable, high efficiency and low maintenance, designed specifically for dairy farms.

The Technology Solution



CHP-unit ranging from 11 up to 74 kW

Dairy Farms from 60 up to 400+ cows

Minimal footprint

Volume: ~100m³ - 1200m³

Height: 6m - 9m

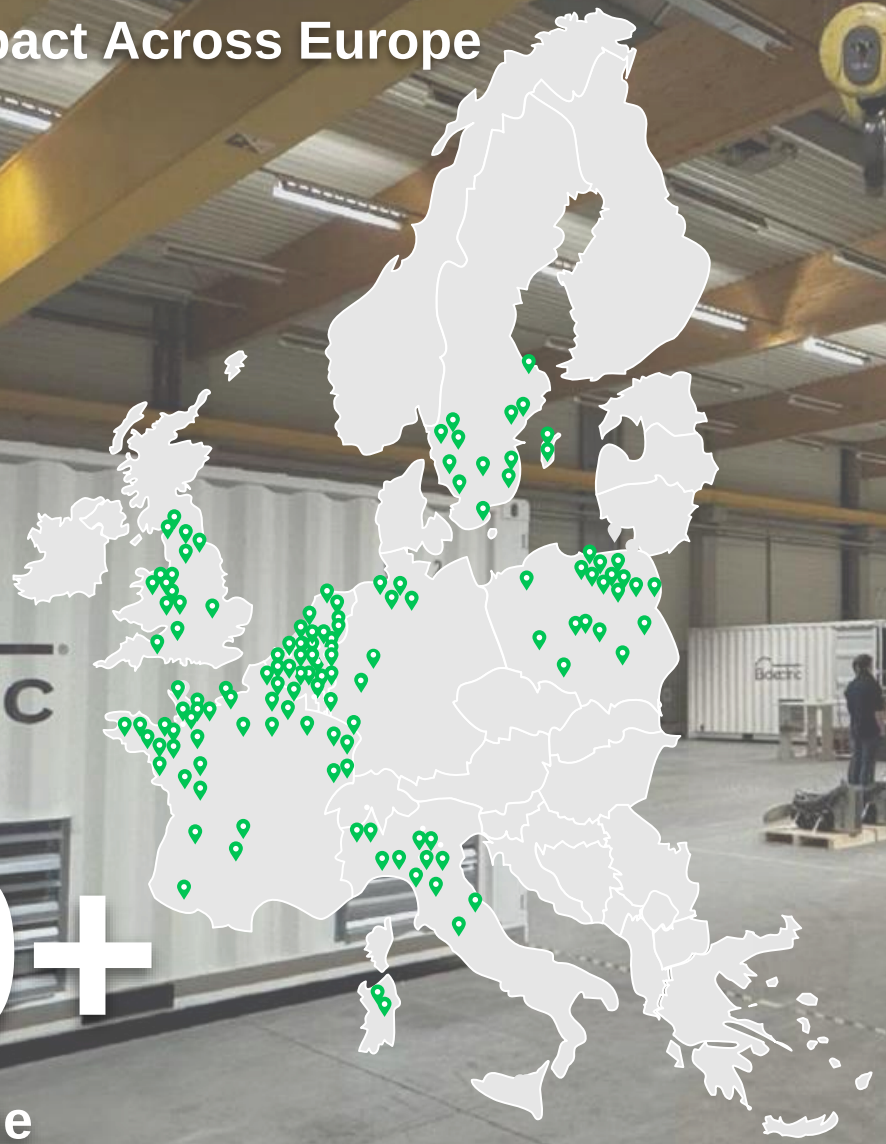
Diameter: 10m - 25m

Plug & Play unit

Using only slurry from dairy & pigs

Fully automated, low maintenance

Biolectric Impact Across Europe



450+

Built farm-scale biogas installations in Europe

2

new installations each week

70 GWh

Produced electricity in 2024

110.000 t

CO_2eq saved in 2024

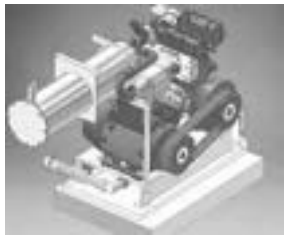
91%

Technical availability

Biolectric Small Scale AD Options - CHP or Bio-methane Injection

CHP
60-400+ cows

- **Generate and burn biogas to generate green electricity and heat**
- **Individual system** per farmer



Biogas-upgrading

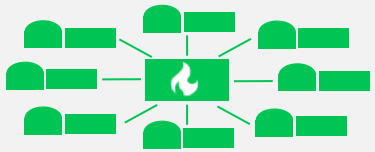
Individual

>300 dairy cows

- **Generate and upgrade biogas (up to 97,5% CH_4)**
- **Individual system** per farm with heat pump, gas counter and blower, compressor, membranes, gas analyser

Cluster

<300 dairy cows



- **Generate and upgrade biogas**
- **Individual silo** per farm
- **Individual container** per farm with heat pump, gas counter and blower + gas pipeline to central upgrading point
- **Central biogas upgrading unit** (shared) from partner Host with compressors, membranes, gas analysis

HOST BIOENERGY SYSTEMS

Scale of Ambition & Impact

- Doubling UK installations over next 2 years and rising to one installation per week
- Supporting the dairy sector to reach net-zero goals avoiding 40,000t CO_{2eq} annually by 2030
- Reducing methane emissions and improving nutrient management.
- Promoting circular economy models and sustainable farm-based energy production.

Key Challenges & Asks

- Planning, DNO and permitting delays remain a significant barrier.
- Lack of consistent policy support for small-scale AD in the UK.
- Need for recognition in carbon markets and farm-level emissions accounting.

Ask: Support from policymakers, farm advisors, and buyers to help scale adoption.

Biolectric®

Andrew Parsons, Bennamann

The Bioeconomy Consultants
NNFCC

We make fugitive methane emissions a solution ...

not a problem.

Turning Biogas into Bio-Methane - Renewable fuel solutions 2025

Andrew Parsons

01

Bennamann Introduction

A Renewable Energy Innovator, Pioneering An Energy Independent Future

Who

2012 – Founded in Cornwall, UK by Dr. Chris Mann

2023 - **Majority investment by CNH**

What

We provide end to end renewable fuel solutions.

Our technology enables more energy independence, increased profits and significant CO_2 reductions.

Our Solution

We harness an AD plants latent potential, upgrading biogas into vehicle grade biomethane, storage and refuelling.

The Result

The biomethane can displace fossil diesel and power vehicles like a methane Tractors from New Holland or CNG HGV trucks.

Our Purpose

To provide renewable fuel solutions to progressive businesses looking to decarbonise operations for future generations.

It all started with our Smart cover

02

The Bennamann CAPCH4™ AD Ecosystem

Harness Latent Potential & Decarbonize Transport Operations

Why Upgrade?

- **Bennamann develops** scalable solutions to upgrade **biogas** into a transport grade **biomethane fuel.**
- Harness your **plants latent potential** and **unlock new revenue streams.**
- **Reduce** dependency on **diesel and insulate against** volatile **fossil fuel** price swings.
- Skid units are **modular** & can be **'daisy chained'.**
- The **transport sector** accounts for **more than a fifth** of global CO2. In-house **biomethane upgrading** is a solution.

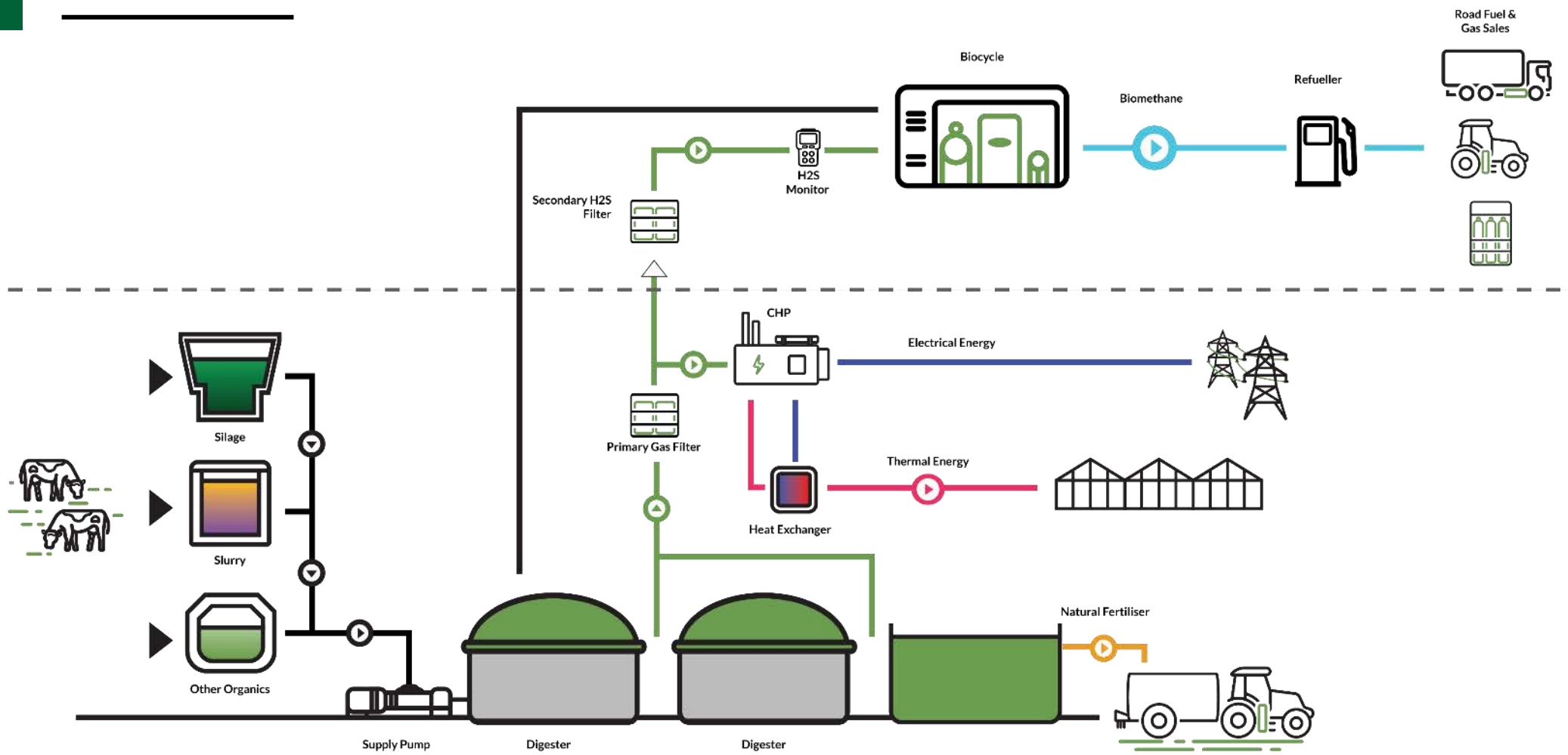
Farmer / Customer Benefits

- **Displace** diesel, **decarbonise** transport **operations**
- **Reduce** CO2 footprint
- **Generate incremental** revenue streams through **sales of renewable green energy**
- **Claim valuable** renewable fuel **credits** (RTFC)
- **Reduced** fuel **costs with proven Biomethane** (CNG) vehicles available from:
  - **IVECO, Scania & Volvo**
  - **New Holland**

03

CAPCH4 AD - System Overview

System Overview



Bennamann Upgrading Solution

Existing AD Plant Infrastructure

04

Biocycle Output

Maximise your CNG fleet

10x New Holland T6 CNG
@ 1,000 hrs/yr each
@ medium load 13 kg/hr

5x New Holland T7 CNG
@ 1,500 hrs/yr each
@ medium load 17 kg/hr

6x Iveco Eurocargo (12-19t)
@ 100,000 km/yr each
@ Consumption 20 kg/100km

4x Iveco S-Way Artic (6x2 44t)
@ 100,0000 km/yr each
@ Consumption 30 kg/100km

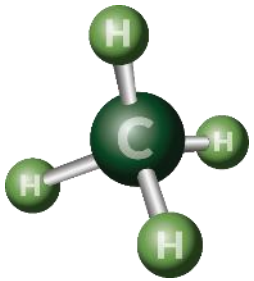
140,000kg CH_4

Gas Sales:

- 160 kg CH_4 per bundle
- 875 Bundles per year
- Purity allows for virtual pipeline injection # subject to input gas quality

Fleet Simulation:

- 2x T6 @1000 hrs/yr ea.
- 2x S-Way Artic @ 100,000km/yr ea.
- 2x T7 @1500 hrs/yr ea.



Bio-Methane

Methane (US: /ˈmɛθeɪn/ METH-ayn, UK: /ˈmiːθeɪn/ MEE-thayn) is a chemical compound with the chemical formula CH_4 (one carbon atom bonded to four hydrogen atoms). It is a renewable green fuel which can improve your bottom line and help decarbonise your business operations.

Bennamann

Thank You

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Mob. +44 (0) 7918748126

Web. https://bennamann.com/

CNH

Join at menti.com | use code 8106 9432

Questions around technology, operation and support?

1/14

Asked on Instructions

Has MP Ed Miliband ever been invited to visit an on farm AD ?

3

Press ENTER to mark as answered

Farmer Panel Discussion

Hosted by Olivia Midgley, Farmers Guardian

The Bioeconomy Consultants
NNFCC

Small-Scale AD Awards

The Bioeconomy Consultants
NNFCC

Biolectric

Small Scale AD Awards

Golden Cowpat Award

Askham Bryan College

The Golden Cowpat award is presented to Biolectric's top-performing anaerobic digestion plant in Europe each month, recognizing exceptional efficiency and sustainability in **on-farm energy production 99.99%**

Platinum Cowpat Award

T D Goodalls

The Platinum Cowpat is awarded to Biolectric systems that surpass **1,000,000 kWh** of renewable energy generation from slurry — a major milestone in **small-scale anaerobic digestion** and sustainable farming.

Presented by Rt Hon George Eustice, the former Secretary of State for Environment, Food and Rural Affairs

Ben Makowiecki, Lloyds Banking Group

The Bioeconomy Consultants
NNFCC

LLOYDS

Exchange Market

Ben Makowiecki
Agriculture Sustainability Director

BUSINESS & COMMERCIAL

Why?

Context

c. 45,000 farming customers (around 1/3 of UK market share) across 3 brands

Largest lender to the sector c£6.6bn

Work with businesses up and down the food supply chain

Sector challenges & headwinds

Drivers

Support our clients on their transition journey

Need to reduce our financed emissions

Governance & Reporting requirements – TNFD, NZBA, SBTi

Systems thinking approach – bringing together nature, supply chain and agriculture

How

Thought Leadership & Training

UNIVERSITY OF CAMBRIDGE
INSTITUTE FOR SUSTAINABILITY LEADERSHIP

Partnerships

WOODLAND TRUST

TERRA CARTA
Sustainable Markets Initiative

SOIL ASSOCIATION EXCHANGE

Policy & Advocacy

Market Leading Propositions

- Soil Association Exchange
- Exchange Market
- Green Buildings Tool
- Clean Growth Finance Initiative
- Working Capital & Loans

Soil Association Exchange

Measure - accurate and trusted farm sustainability data, backed by cutting edge science and technology

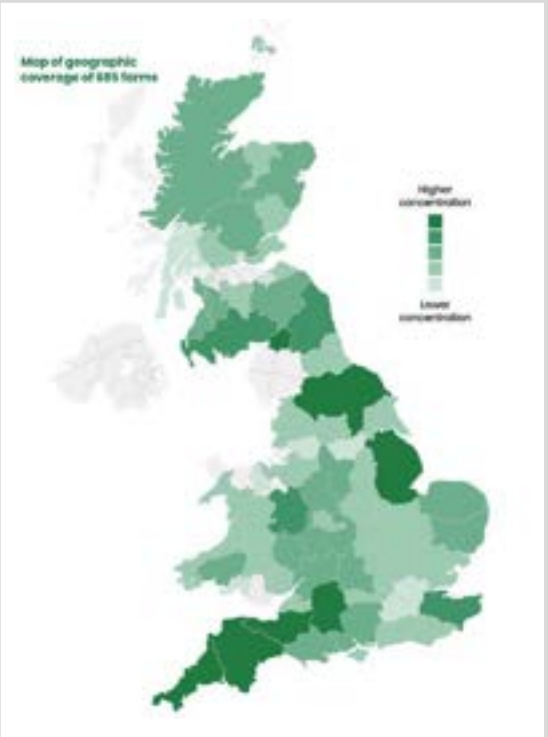
Improve - expert advice on how to improve so farmers can boost their farm's sustainability credentials and profitability.

Reward - pinpoint and benefit from the financial opportunities available to farmers from farming more sustainably.

Key features

- Whole farm measurement approach across 6 dimensions
- Dynamic benchmarking
- Searchable funding tool

UK coverage (Lloyds farms)



740 farms registered
264,393 hectares surveyed
45,418 worms counted

Farmer Impact & Benefits

- 96% said Exchange met or exceeded their expectations
- 79% impact on their profitability
- 86% are changing practices after Exchange

Soil Association Exchange

Detailed Baseline – What Exchange Assesses on Farm

Exchange collects environmental outcome data using remote sensing and collecting primary data from farms via their team of technicians and advisors

Soils

- Soil Organic Matter
- Bulk Density
- Earthworm count*
- pH
- VESS*
- C:N Ration
- Soil cover %*

Carbon

- Carbon balance*
- Emissions*
- Sequestration in:
  - Woodland*
  - Individual trees*
  - Hedgerows*
  - soils

Biodiversity

- Space for nature*
- Connectivity*
- Detailed habitat map aligned to UKHAB*
- Bird species abundance*
- Flora species abundance*
- Crop and livestock diversity*
- Hedgerow assessment
- Habitat management score*

Water

- Flood risk mitigation*
- Drought risk mitigation*
- Nitrogen balance*
- Potash balance*
- Phosphate balance*

Animal Welfare

- Antibiotic usage*
- Welfare outcomes*

People and Society

- Land access*
- Community engagement*
- Food production*

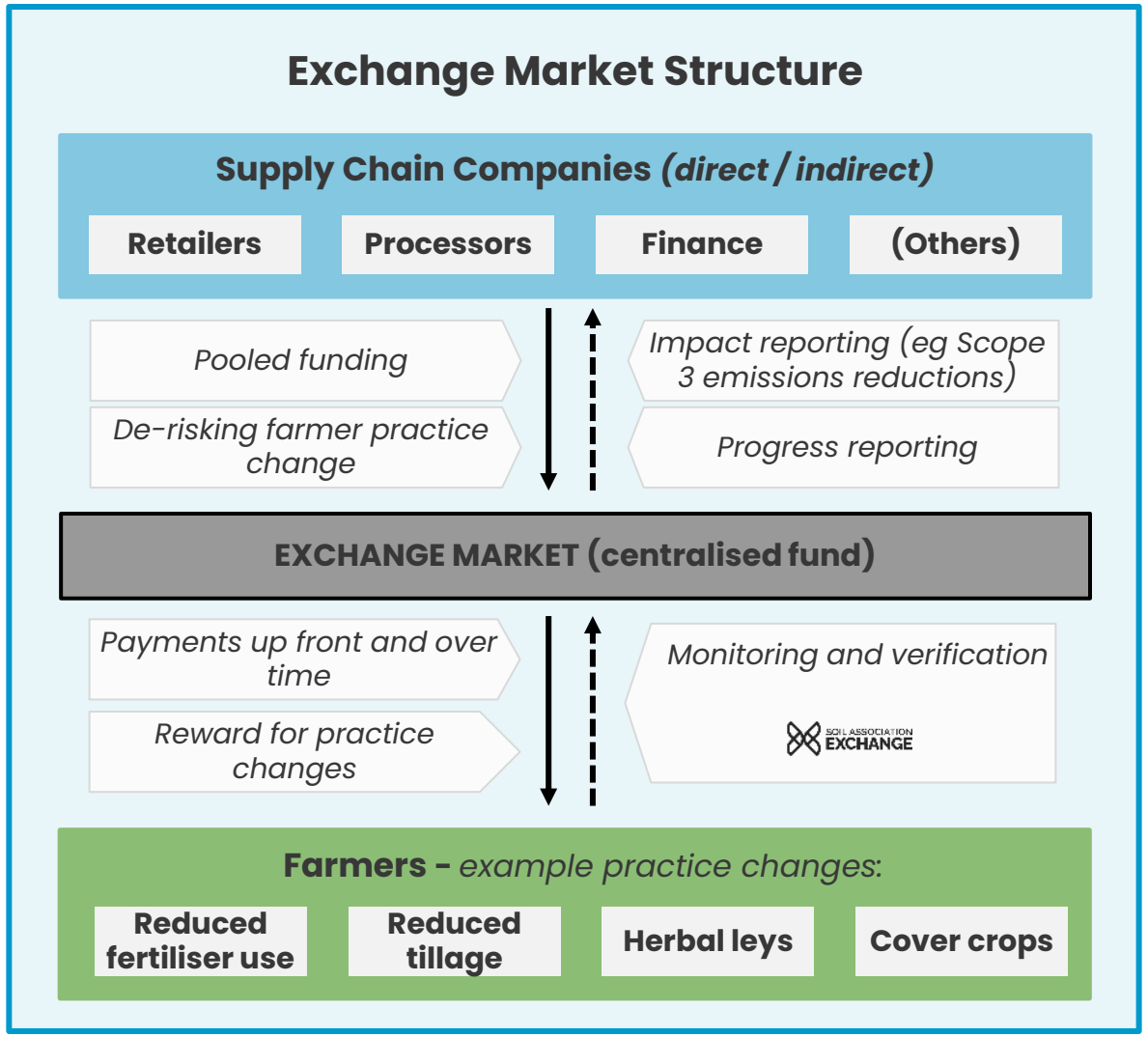
* Asterisked metrics can be measured every year. The others only required in Years 1 & 4

Exchange Market

Exchange Market

An insetting scheme that makes carbon reductions affordable, credible and collaborative

- **Affordable** – the cost of GHG emission reductions shared with businesses with a shared Scope 3.
- **Credible** – the mechanism aligns with the GHG Protocol and goes beyond carbon.
- **Collaborative** – an opportunity to work with farmers and other businesses in your value chain to decarbonise.
- **Flexible –** ability to scale the funds you contribute
- **Supply shed** – you do not need to know individual farmers in your supply chain, using the supply shed methodology.



Participating companies

Church Commissioners for England

“As long-term stewards of the land, we recognise the critical role we play in addressing climate change. By supporting Exchange Market, we aim to help farmers access the critical funding and advice they need to achieve meaningful, measurable reductions in greenhouse gas emissions.”

Joe Hulme - Senior Climate Change Manager, Co-op

“As part of our continued partnership with Soil Association Exchange we’re excited to back Exchange Market, helping farmers make practical changes to reduce emissions and enhance sustainability. Supporting initiatives like this ensures we can continue to work hand-in-hand with farmers to deliver real environmental impact and work towards out net-zero goals.”

Claire Lorains, Group Quality and Sustainability Director at Tesco

“Through Exchange Market, we’re proud to support farmers in reducing emissions and building a sustainable future for UK agriculture. We’ve already put in place incentives to support many of our farmers in tracking and reducing their emissions, as well as improving biodiversity and animal welfare on farm. This pilot reflects our commitment to finding innovative ways to lower emissions in our supply chain while ensuring farmers have the tools and funding they need to thrive.”

Farmer steering group

James Hay, of Barton Place Farms, and member of the farmer steering group comments “Exchange Market has been created in collaboration with farmers from the start. The result is a fund that offers the flexibility we need to do the right thing for our farm and provide the financial support for us to try new ways to reduce our emissions. As subsidy funding changes in the UK, schemes like Exchange Market give our business further resilience by offering new income streams from private markets”

Benefits for farmers

This approach offers several advantages for farming participants in the Exchange Market:

Flexibility in choice or combination of actions – any action is possible, provided it can be reflected in FCT; more readily applicable in a range of regions, with different cropping practices and different approaches

Flexible duration - 1 year contract with the option to extend for up to 5 years (subject to funding availability)

Up-front payment - 50% total expected amount

First mover farmers compensated for existing lower emission production through the introduction of an annual maintenance payment

More accessible to farmers with a higher-than-average carbon footprint, incentivizing improvements

Farmer Payments

Payment Rates

Payments for emissions reductions

1. 50% payment upfront once agreement signed.
2. Implement your actions on farm, and keep a record of your evidence.
3. 2nd 50% paid upon completion of a final Farm Carbon Toolkit calculator based on what you achieved.

Payments for reductions already made

If you are already below typical emissions for arable farming systems you could receive maintenance payments. This rewards farmers that have already made improvements, and supports them to continue their work. Payments will be on a one-off basis upon enrolment and would be available to those who:

1. Have an emissions profile that is already lower than a typical arable farm [2.05 t/CO_2e/ha*];

   and

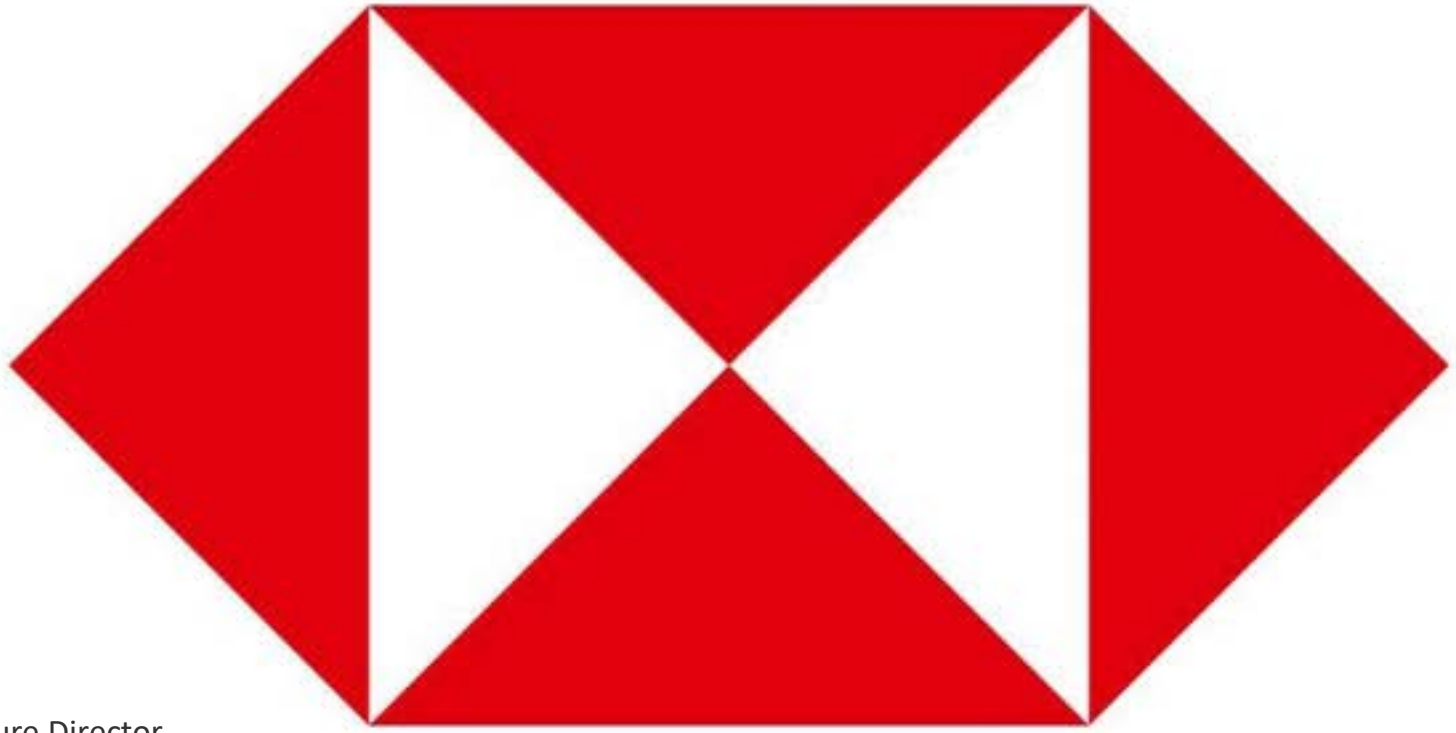
2. Commit to further emissions reductions via Exchange Market

	Farmer baseline emissions	Payment to farmers (capped at 300ha) per farm
Tier 1	Less than 1.6t CO_2e /ha/ year	£20 per hectare
Tier 2	1.6 -1.8 tCO_2e / ha / year	£15 per hectare
Tier 3	1.8 - 2.05 tCO_2e / ha / year	£10 per hectare

Steve Dunkley, HSBC

The Bioeconomy Consultants
NNFCC

HSBC UK Agriculture



March 2025

Prepared by:

Steve Dunkley Regional Agriculture Director

steve.dunkley@hsbc.com

07841 570549

HSBC UK

HSBC UK Agriculture

We are
UK wide

Specialist sector support for over
50 years

Over **100**
team members supporting the agri sector

£4.7b
committed to Agriculture

HSBC UK

Our Ambition

Our ambition – ‘To continue to **grow our agricultural lending significantly**, working **with existing clients to support investment** in the Agriculture Sector, including in the new practices and technologies needed to evolve and grow, and bring **on board new clients** who share that vision and want **to produce food** and farm sustainably’

Martin Hanson - Head of Agriculture HSBC UK

Our experience of on farm AD

Successful projects take many forms, but good advice, suppliers and commitment are key

- c50 examples within our client's base, first were around 2012 with many now running for over 10 years

Feed stocks

- Slurry
- Silage and energy crops
- Abattoir waste
- Food waste – pre or post its processing

Use of energy

- Heating poultry units / glasshouses and CO2 enrichment
- Gas to grid
- CHP energy for on-site use and export

HSBC UK

What we would look for in an on-farm application

Considerations

Before

- Please talk to HSBC Agri well in advance!
- Good underlying farm performance / foundation, usually alongside larger livestock enterprises and ability to grow feedstock
- Management ability both technical and financially
- Track record of suppliers / contractors

During the application

- Usual financial forecasts / budgets
- Evidence of planning / env. regulations
- What's the feed source, and its security/consistency of supply
- Is there a Gov incentive available and its term
- What plans are in place for day to day running, and maintenance support / spares
- Is enough land available for organic fertiliser use / export
- Loan Term – we'd aim to match the lifespan of asset
- Interest only period to get up and running
- Is there enough security or are X guarantees needed

After the application

- Bank Panel – Professional Project Monitor through build phase / commissioning
- Once up and running, regular MI and operational updates as per any other RM client in case issues arise that require support

HSBC UK

HSBC Agriculture

Levers – HSBC Go Greener Reward **1% cash back**

Loans start from £25,001 with a maximum potential loan value of £300,000

1. Eligible Activities. Please review the HSBC Go Greener SME Reward Eligibility Guide for further details on the eligible activities.

- ✓ Renewable energy
- ✓ Energy efficiency
- ✓ Natural resources
- ✓ Clean transportation
- ✓ Waste management
- ✓ Climate change adapation
- ✓ Eco-efficient and/or circular economy
- ✓ Sustainable Buildings
- ✓ Sustainable water and wastewater management

External Opinion:

SUSTAINALYTICS

Sustainalytics, a leading global provider of environmental, social and corporate governance research and ratings, has reviewed HSBC's Eligible Criteria for Green Activities and consider them to be environmentally impactful.

Sustainalytics has extensive experience in reviewing eligibility criteria developed by financial institutions for green products and funds and providing external review for Green bonds and Green loans.

Use case

A farmer would like to borrow £157,000 to purchase a direct seed drill. This will decrease the amount of soil disturbance therefore carbon released from the soil and allows artificial fertiliser to be placed more acuratley. As more than 90% of the loan was used for eligible purposes, the cashback will be provided on the total loan which equates to ***£1,570***

HSBC UK

HSBC Agriculture

Levers – HSBC Sustainable Farming Pathway – **0.5% arrangement fee**

21 deals done / £20m in total

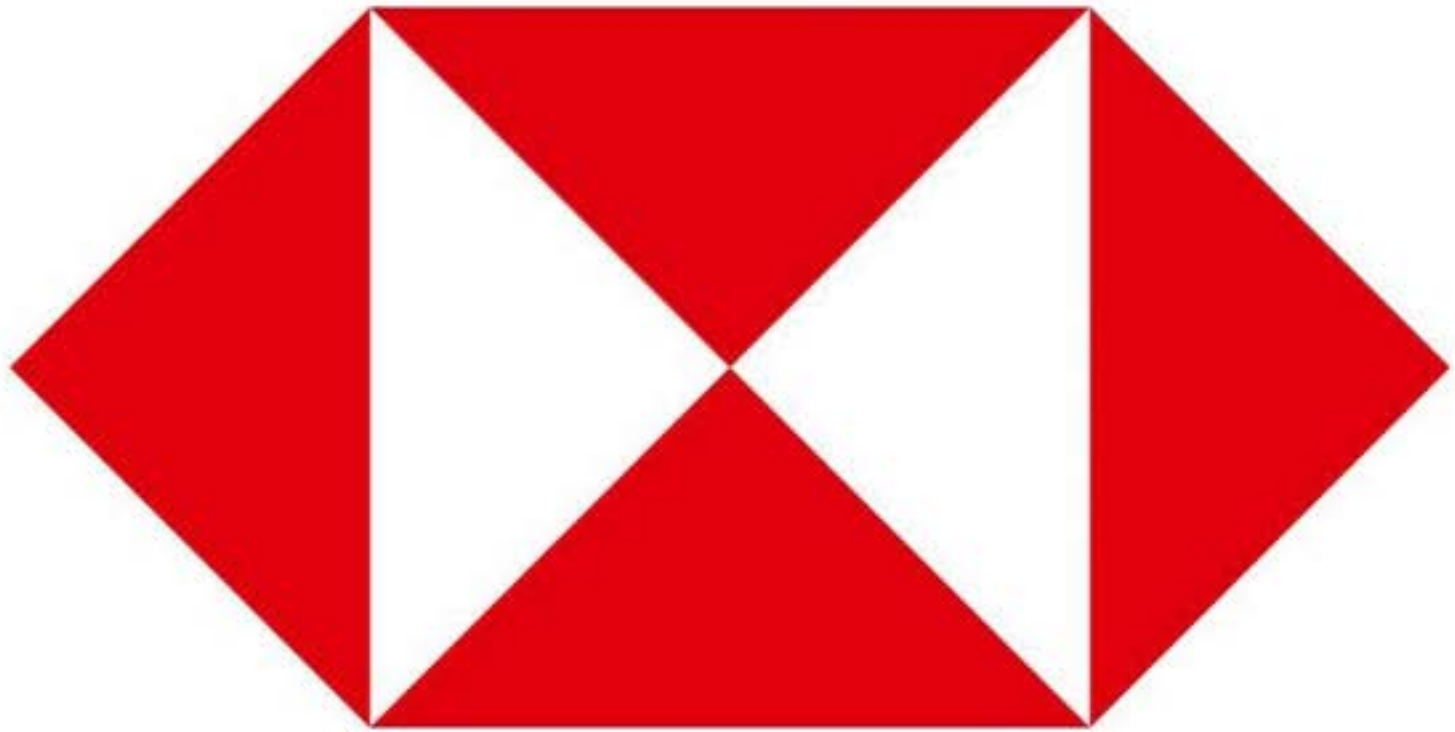
Average deal size £950,000

HSBC UK

Summary

- HSBC Agriculture is here to support the sector, on farm AD is part of that and is an area we have over 15yrs experience working with
- We can supply an agricultural relationship manager when over 100k lending, and support projects through our mainstream lending, and/or our Green products subject to our usual lending terms
- We’re happy to consider new to market ideas / technologies that are supported with feasibility studies / trial results

HSBC UK



Ollie Braithwaite, York & North Yorkshire Combined Authority

The Bioeconomy Consultants
NNFCC

09/04/2025

Decarbonisation and Climate Change Resilience Funding

Ollie Braithwaite
Net Zero Programme Manager

George Richmond
Grow Yorkshire Partnership Officer

YORK & NORTH YORKSHIRE COMBINED AUTHORITY

Context in York and North Yorkshire

Routemap to Carbon Negative

Grow Yorkshire

Growth Plan

Net Zero Fund

Carbon Negative Challenge Fund

Energy Generation Accelerator Programme

Local Net Zero Accelerator

YORK & NORTH YORKSHIRE COMBINED AUTHORITY

Combined Authority Ambition

Ambition to become England's first carbon negative region.

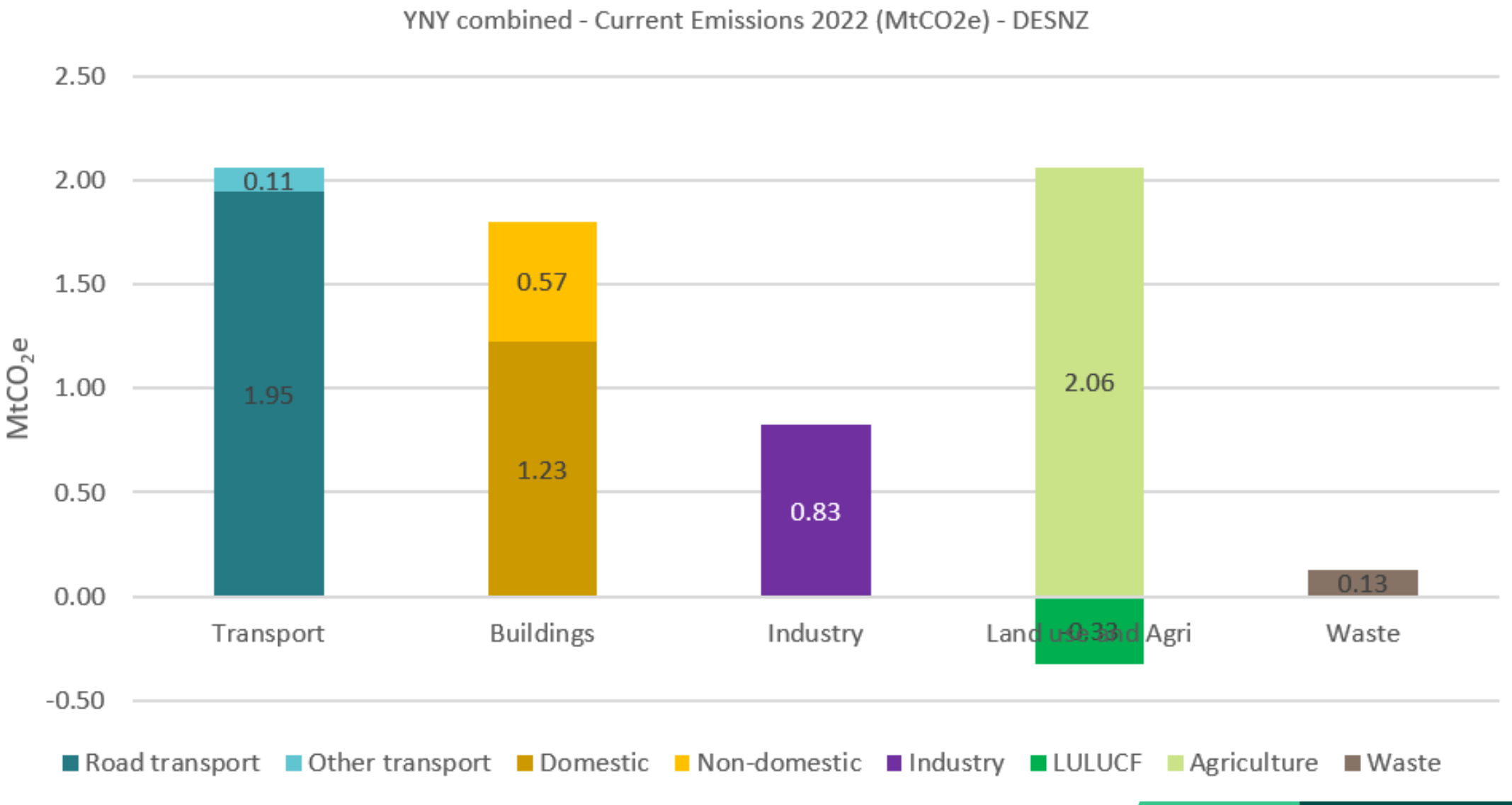
- Net Zero by 2034
- Carbon Negative by 2040

Unique Opportunity

- 2 National Parks, 3 National Landscapes and over 70% of our geography being used for agriculture – unique regional opportunity.

YORK & NORTH YORKSHIRE COMBINED AUTHORITY

Emissions in York and North Yorkshire



ORK
NORTH
ORKSHIRE
BINED AUTHORITY

Routemap to Carbon Negative

Clean Power vision:

- A resilient and affordable net zero power system by 2035, using a mix of complementary technologies, community-led and decentralised energy generation and storage, and making the most of existing landscapes and infrastructure. It will aim to seek multiple benefits e.g. in biodiversity, and create high value, sustainable jobs.

Environment Vision:

- Collaborating to protect, restore, and enhance rural, marine, and coastal environments, as well as maintaining and strengthening biodiversity and supporting more resilient businesses. Food production is central to this approach, using a bottom-up approach to empower farmers and land managers.

YORK & NORTH YORKSHIRE COMBINED AUTHORITY

Grow Yorkshire

Key contact:
George Richmond

- Initiative led by YNYCA which recognises food and farming as vital sectors within the region.
- Strategic remit across environment, innovation, skills and resilience.
- Secured SPF Funding and delivered Farm Sustainability Programme.

Grow Yorkshire Strategy

Change in Agriculture is constant – so planning for the future can be a daunting process.
Grow Yorkshire delivers initiatives presented under 4-strategic pillars ensuring alignment with partners and the needs of Yorkshire based farming businesses are met.

The relationship between agricultural production and the environment is increasingly essential to modern profitable and sustainable farming. Grow Yorkshire provides access to specialist information and support to help Farmers understand policies and plan for the future.

Grow Yorkshire bring together experts who ensure Farmers' physical and mental health and wellbeing aren't pushed to one side. We provide access to business support which help Yorkshire Farmers ensure their businesses are resilient and best placed to attract additional support and funding.

Through Partners, Grow Yorkshire connects farmers with farming research working with leading agricultural colleges, researchers and businesses to develop the knowledge and Agri-technologies that will make modern farming more sustainable, resilient, and productive.

Technology is becoming more central to even the most traditional roles in agriculture. Grow Yorkshire collates resources covering Business and Individual skills to help existing and future Yorkshire Farmers as they transition to delivering environmental benefits alongside food production.

Local Growth Plan

What is the local growth plan?

- Central Government ask of Strategic Authorities (CA's)
- Developing key growth areas for our region
- Consultation currently open – 21st April

Food & Farming Innovation

- Focus on Agritech
- Farming Innovation
- Controlled environment agriculture

Clean Energy

- Harnessing natural capital to produce clean energy
- Decarbonising industry and buildings
- Emerging technologies and innovative approaches to energy

YORK & NORTH YORKSHIRE COMBINED AUTHORITY

Net Zero Fund

Funding

- £7million of net zero projects and project development

What projects did it fund?

- 21 projects across the region:
- From kelp surveys to solar installations
- Village heat network plans to Active Travel links
- Heat Pumps & EV planning

And of course:

- Askham Bryan College – Electric Cow

YORK & NORTH YORKSHIRE COMBINED AUTHORITY

Electric Cow – Why it is interesting?

This project was interesting as a demonstrator of using the technology of an AD plant.

In particular, the use of electricity across the site and then using the heat in the accommodation blocks.

The use of innovation and proving concepts is something the CA has been looking for.

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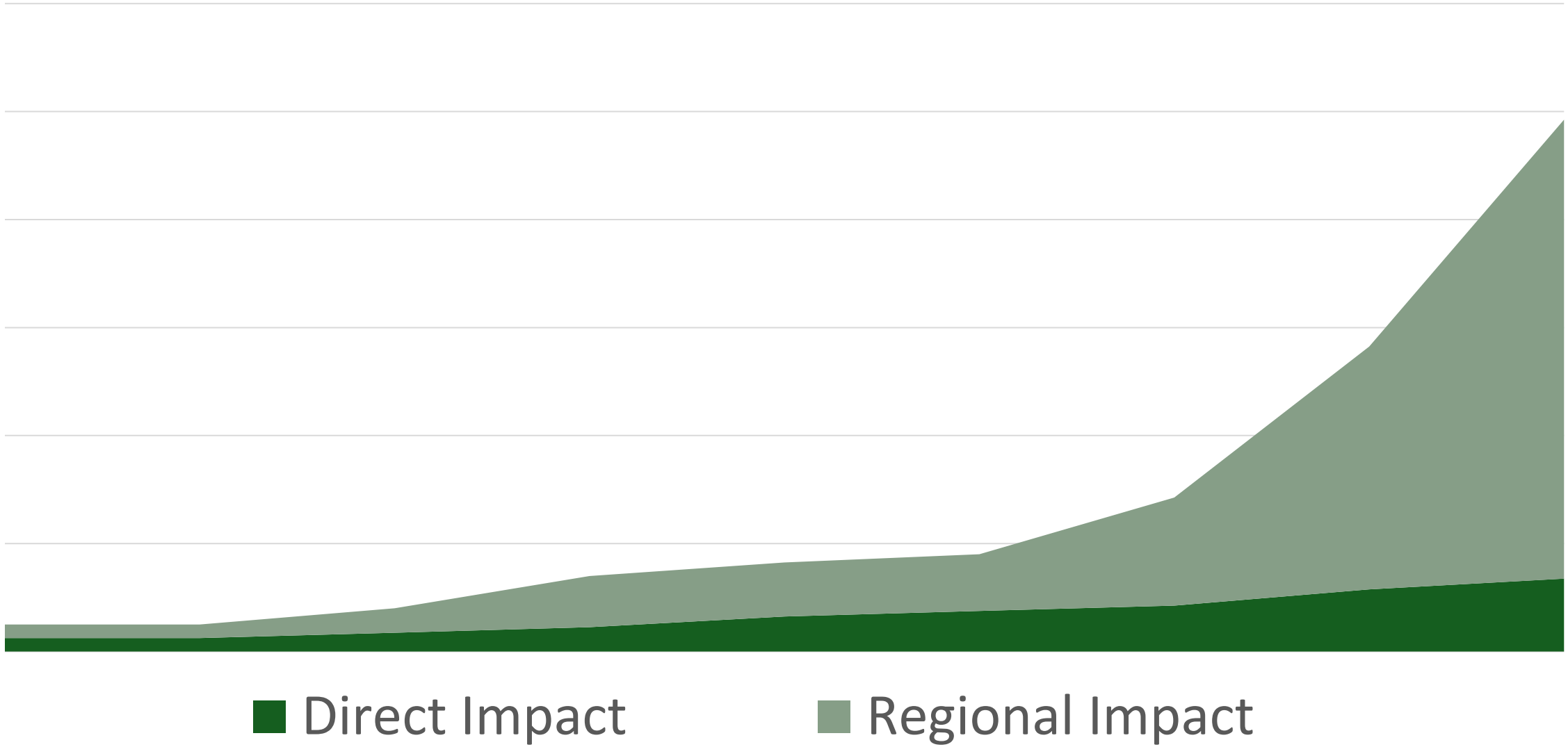
Carbon Negative Challenge Fund



COMBINED AUTHORITY

Carbon Negative Challenge Fund

Notes on the current funding opportunity:

- Capital – Closed
- Revenue – Open until 11th April at 10am

- £7million available

Scaling Up Regenerative and Sustainable Agriculture

Retrofit Finance and innovative approaches to placed-based heat decarbonisation

Community Energy and Circular Economy Demonstrators

Innovative approaches to increase carbon sequestration in marine and coastal areas

Energy Generation Accelerator Programme (EGAP)

Understanding the energy landscape in York and North Yorkshire

- This will look at future opportunities and working with the public sector and communities to understand barriers and options for breaking these down

Project Development Support: Feasibility Studies & Business Cases

- Delivering feasibility and business cases in the region.

Future Technological Options

- Research into future opportunities in delivering sustainability in the region.

Finance Innovation

- Investigation into delivery models for energy projects and how to unlock the potential energy generation in the region.

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LNZA – Local Net Zero Accelerator

Aim

- Looking at the opportunity to *replicate* Bristol City Leap

What is Bristol City Leap

- Bristol City Council partnership with Ameresco UK & Vattenfall to deliver net zero projects
- Unlocking £500m in funding.

York and North Yorkshire

- looking at models of how to deliver net zero projects by unlocking private finance in the region

Large scale projects using AD?

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What next?

- Applications to the revenue of CNCF
- Future projects through EGAP/LNZA
- SPF Business Sustainability Programme is being worked up
- Other future models of funding…

YORK & NORTH YORKSHIRE COMBINED AUTHORITY

Thank you

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Geoff Perrott, Arla

The Bioeconomy Consultants
NNFCC

INCENTIVE OVERVIEW

Geoff Perrott
Sustainability Manager, Agriculture
Arla Foods

FarmAhead™ TECHNOLOGY

FarmAhead™ Check
(Carbon Footprint)

FarmAhead™ Incentive
(Sustainability Incentive Model)

Arla

FarmAhead™ TECHNOLOGY

We introduced a point-based model in 2023

FarmAhead™ Incentive

To reward past and future actions

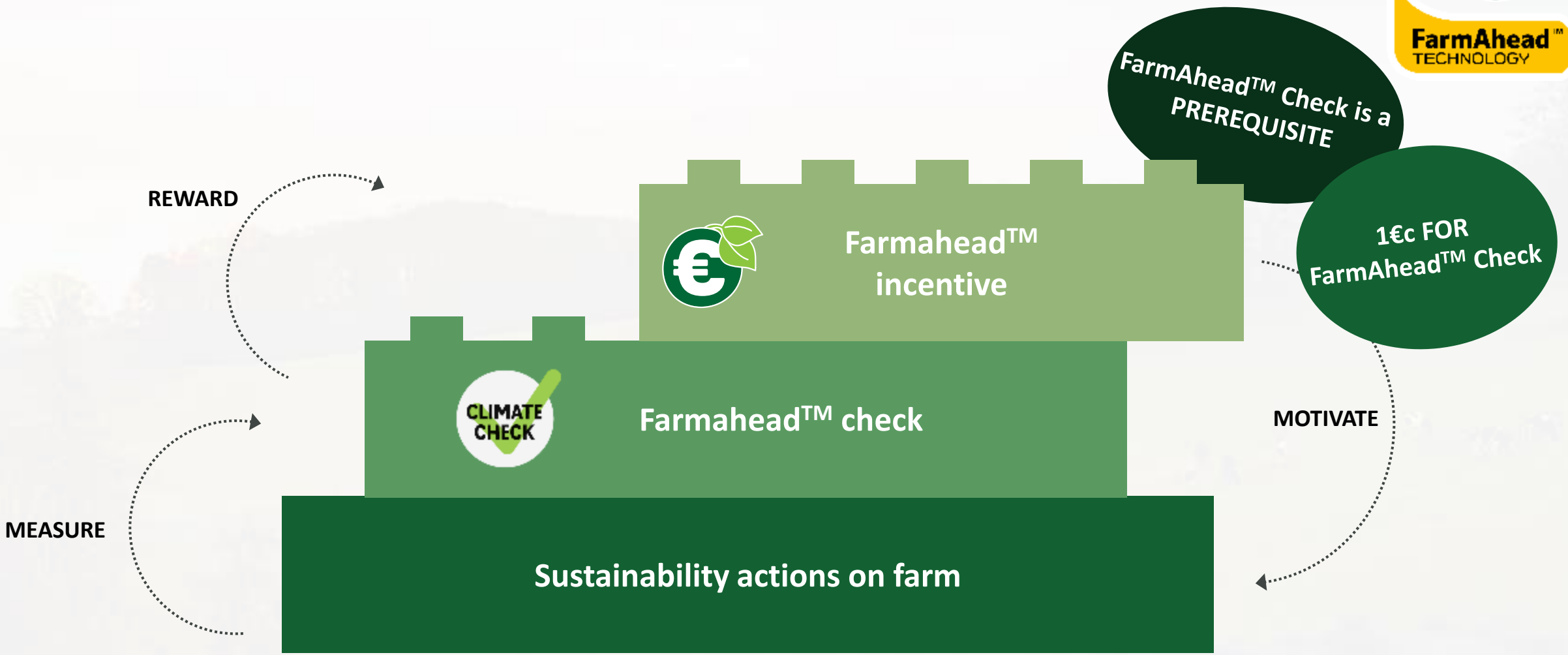
Arla

CRITERIA FOR THE

FarmAhead™ Incentive

1. Fair for all owners
2. Motivating to reduce CO_2e (now) and guide farmer owners to focus on their greatest improvement potential
3. Easy to understand
4. Enable commercialisation of on-farm sustainability initiatives
5. Leave farmer owners the choice of deciding which actions work on their farm
6. Future proof model that allows for incentivising new sustainability elements
7. Reward past and future actions

THE FARMAHEAD™ INCENTIVE BUILDS ON CARBON FOOTPRINT DATA AND REWARDS PAST AND FUTURE ACTIONS



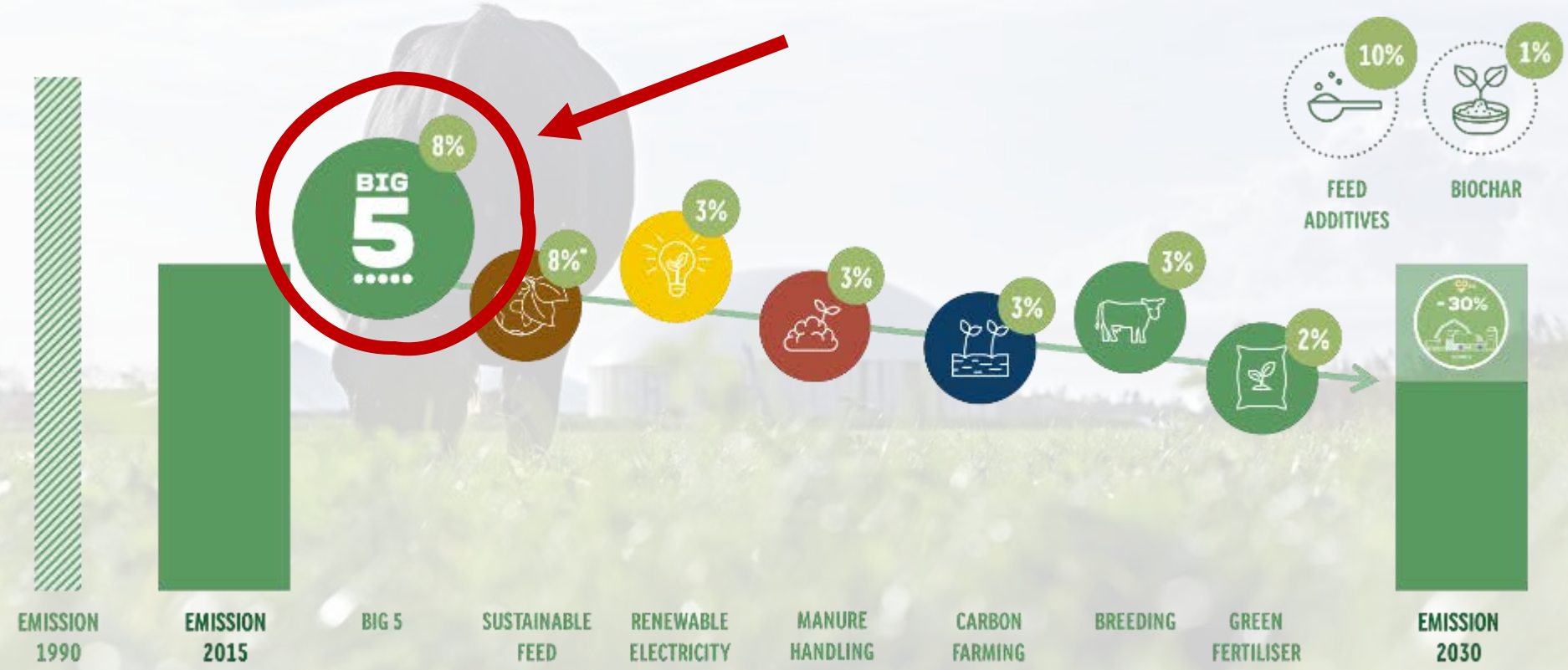
SCIENCE BASED TARGETS & ROADMAPS

SCIENCE BASED TARGETS

DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

FarmAhead™ TECHNOLOGY

Levers farmers can use to reduce their Greenhouse Gas emissions and drive progress towards 2030 reduction targets



*Requires direct Land Use Change (DLUC) and carbon sequestration to be included in the Science Based Target and the 2015 baseline to be updated accordingly

Arla

BIG 5

THE BIG 5: THESE FIVE LEVERS WILL GET US ONE THIRD OF THE WAY

FarmAhead™ Check shows that the Big 5 are the **main drivers** of differences in performance. Big 5 are good **for both climate and the bottom line**.

5

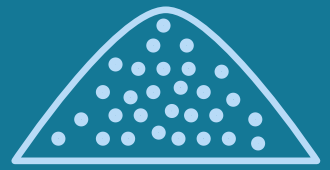
FEED EFFICIENCY

More milk per feed input

(kg DM/kg Milk)

PROTEIN EFFICIENCY

Reduce protein surplus in feed ration



(% N eff./cow)

ANIMAL ROBUSTNESS

Healthy cows with longer life expectancy

(%)

FERTILISER USE

Reduce nitrogen surplus from feed production

(Kg total N/ha)

LAND USE

Efficient use of land for milk production

(m^2/kg milk)

FarmAhead™ Incentive

Points available from 1st April 2025

BIG 5 (49 PTS)

- FEED EFFICIENCY
- FERTILISER USE
- LAND USE
- PROTEIN EFFICIENCY
- ANIMAL ROBUSTNESS

- FEED MONITORING
- BIG 5 ASPIRATION PLAN

SUSTAINABLE FEED (11 PTS)

- SOY USE

BIODIVERSITY & CARBON FARMING (8 PTS)

- GRAZING
- CONTINUOUS PLANT COVER
- PERENNIAL CROPS
- PERMANENT GRASSLAND
- SOIL SAMPLING
- SURVEY

MANURE HANDLING (7 PTS)

- BIOGAS/IN-HOUSE ACIDIFICATION
- MANURE OUTDOOR WHILE GRAZING
- BAND SPREADER
- OTHER

RENEWABLE ELECTRICITY (5 PTS)

- RENEWABLE ELECTRICITY USE

KNOWLEDGE BUILDING (1 PT)

- PARTICIPATION IN KNOWLEDGE BUILDING EVENTS

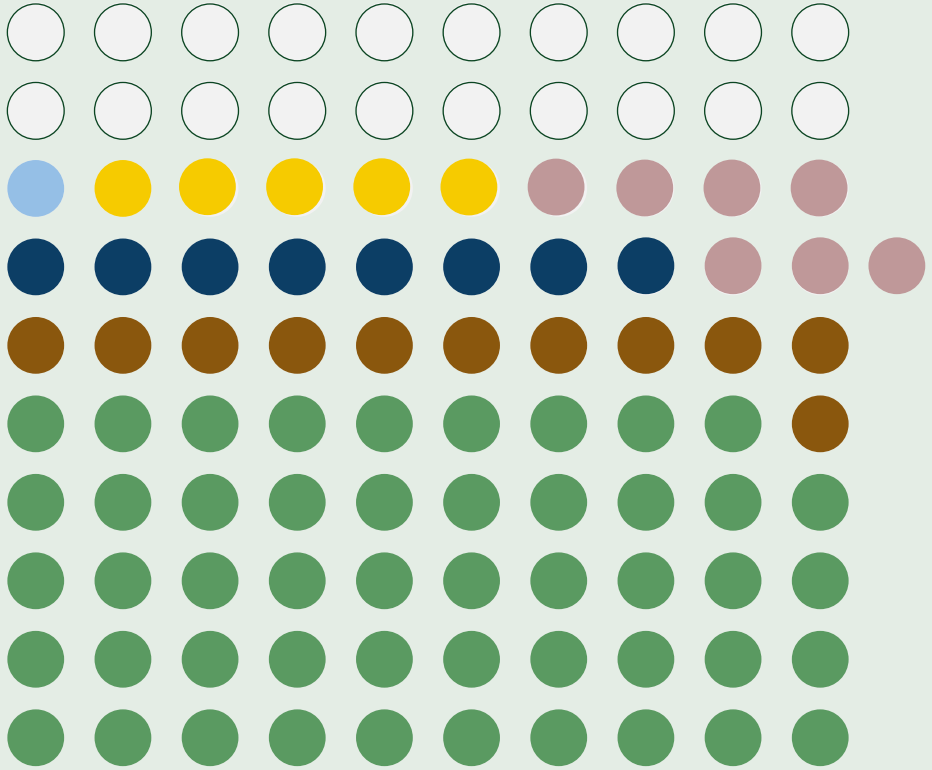
Each point leads to 0.03 eurocent kg/milk on the milk price – more levers will be added

TOTAL POINTS IN THE FUTURE:

100 POINTS =
3 EUROCENT

POINTS AVAILABLE FROM 2025:

81 POINTS =
2.43 EUROCENT



- FUTURE LEVERS
- KNOWLEDGE BUILDING
- RENEWABLE ELECTRICITY
- MANURE HANDLING
- BIODIVERSITY & CARBON FARMING
- SUSTAINABLE FEED
- BIG 5

BIOGAS LEVER

FarmAhead™ Incentive

BIOGAS/IN-HOUSE ACIDIFICATION

1. Biogas/In-house Acidification (% tiers)
2. Manure deposited Outdoors whilst grazing (less methane)
3. Band spreader (dribble bar, trailing shoes etc – no splash plates)
4. Other (covered slurries)

Summary points:

- Incentive to drive action on farm
- UK performs significantly below other markets in the lever
- Opportunity for our farmer owners, need the structural landscape to be in place
- Need to act together for positive change

THANK YOU!

Discussion & Menti Session

The Bioeconomy Consultants
NNFCC

Join at menti.com | use code 8106 9432

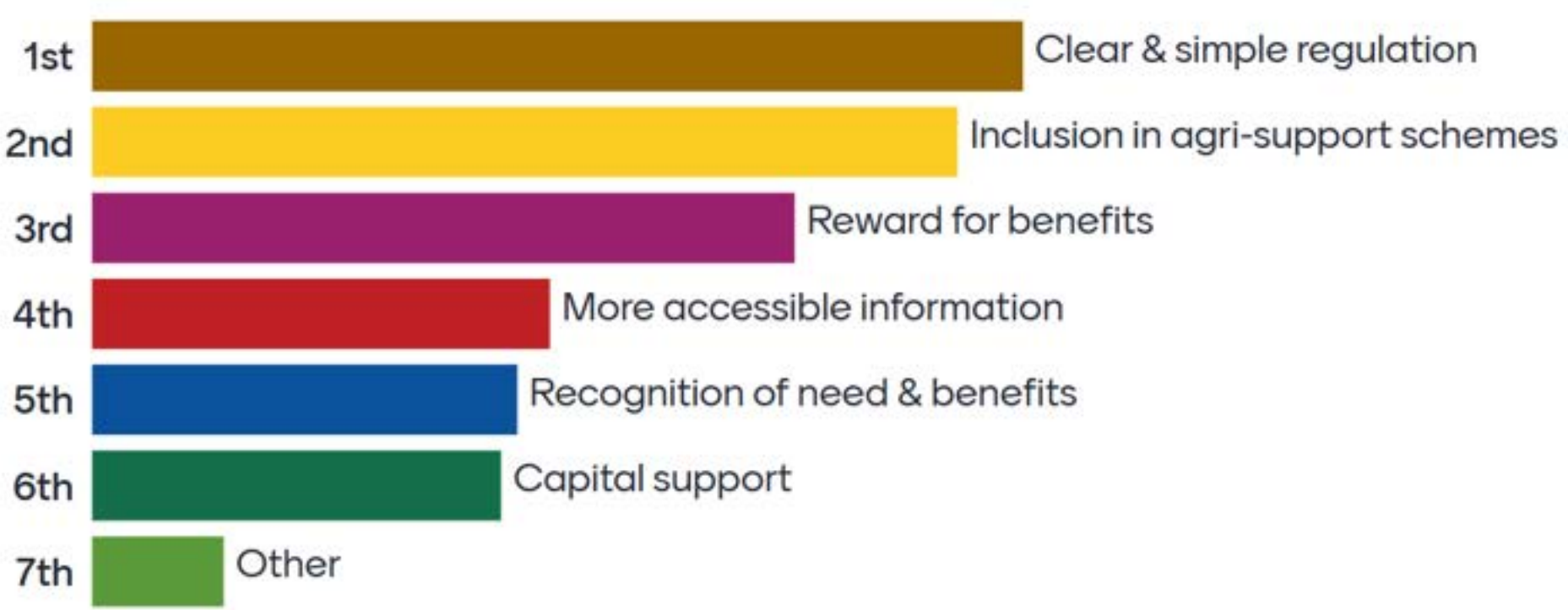
Give 1-2 word answers only (e.g. policy, planning, funding, information, etc)

What areas require action to accelerate uptake?

24 responses

Join at menti.com | use code 8106 9432

What are the sectors key policy asks?



Be clear and concise

Briefly describe the key asks and actions - who, what, when?

Enhanced tax allowances for green technologies which would cost the treasury no cash and a consumer levy funded export tariff in the region of 10p/kw which would again cost the treasury nothing!

3 Popular

Regional (YNYCA) and central govt (DEFRA, DESNZ, Circular Economy task force) to see FARMING as part of the SOLUTION & listen to those who are forward thinking to understand. NOW.

2

Government: long term policy, aligned with Agri-environment (Defra) aspirations, but also including planning and grid access. Independent toolkit for awareness raising. EA regulation (RPS? Or?)

2

Key ask, supply chain funds AD plants to reduce the emissions of the food it makes huge profit on & helping their Net Zero target. This reduces farmers input cost to produce food without extra £

1

Clariry from policy makers & EA asap

1

Wider knowledge exchange to farmers on the ROI & benefits of on farm small scale AD

1

Clarity from policy makers EA to review policies around gas capture from slurry

Extend incentives for slurry storage to digestate. Planning and regulations appropriate for farm scale AD.

Be clear and concise

Briefly describe the key asks and actions - who, what, when?

Scaling small-scale AD needs clear policy, grid access, and financial support — but real growth will only happen if all stakeholders engage in the conversation and act together, starting now.

To accelerate small-scale AD, we need joined-up action on policy, funding and grid access — and full engagement from farmers

We're running a pilot to test financial model related to recovering methane from post-AD slurries. I am looking for (i) a milk producer to work through pricing and (II) a farm to deploy the tech.

YNYCA to support funding for demonstrator AD with public visibility eg community based AD to use as vehicle to drive awareness and buy in from all stakeholders

Gareth Mottram, ADBA

Key Policy Asks & Actions

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Closing Remarks

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