AgriCHP Clean Farm Energy
Circular Economy in Rural Wales

Powering the Farms of Tomorrow:

The AgriCHP Clean Energy Demonstration





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The pressures facing agriculture

Farming needs to decarbonise - without compromising food production

Energy demand & cost

70.4%

of EU agriculture and forestry energy came from direct fossil-fuel consumption (Eurostat 2025).

307 TWh of energy in 2025

€42 billion

Productivity & resilience

Q2 2026 vs Q2 2025

+22.0%

Price increase energy & lubricants

+13.4%

Price increase fertilisers & soil improvers

(Eurostat 2026, EU-27).

Emissions & environmental pressure

89%

of UK ammonia emissions come from agriculture (Defra, 2024)

32% Global agrifood-system **12%** UK **17%** Wales

of greenhouse gas emissions from agriculture (FAO, 2025, Defra 2026, WG 2026).

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Policy drivers and why now

Common Agricultural Policy

- **2023–27 CAP** supports climate action, resource efficiency, knowledge transfer and innovation.

Welsh priorities

- **Wales: SFS 2026** supports rural resilience, innovation capacity, net-zero delivery and industrial collaboration in Wales.

Clean-energy transition

- **REPowerEU and wider EU programmes** support renewable hydrogen, low-carbon fuels and energy independence.

Sustainable growth

- **VInnovate**: interregional demonstration and SME collaboration.
- The project combines decarbonisation, regional supply chains, training and SME participation.

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AgriCHP at a glance

A farm-scale circular energy demonstrator hosted at Gelli Aur, Carmarthenshire

Integrate
Fuel, power and thermal systems

Validate
Performance, cost and emissions

Replicate
Deployment and skills

Core project proposition

- 30-month collaboration to design, integrate and validate a low-carbon farm-energy system.
- Hosted at Coleg Sir Gâr's Gelli Aur agricultural research farm (211 ha).
- Six-partner consortium spanning Wales and Italy, targeting TRL 6–8 validation.
- Integrated platform combines electrolysis, ammonia cracking, fuel-flexible CHP, heat recovery, cooling, a dual-fuel tractor and nutrient recovery.

Electricity
Reliable on-farm power

Heat
Useful thermal energy

Cooling
Milk/process cooling

Mechanical Power
Tractor and farm duty

A living demonstrator for hydrogen, ammonia and circular farm energy

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European collaboration in practice

Six partners across Wales, Lombardy and Emilia-Romagna

WALES

Cardiff University

Coordination, integration, combustion and safety

Coleg Sir Gâr & Coleg Ceredigion/ ARC

Working-farm demonstration and nutrient trials

University of South Wales

Bioprocesses, resource recovery and training

Quantum ES Gas Engines

Engine and tractor adaptation, hardware and trials

ITALY

Techinnova

Emilia-Romagna

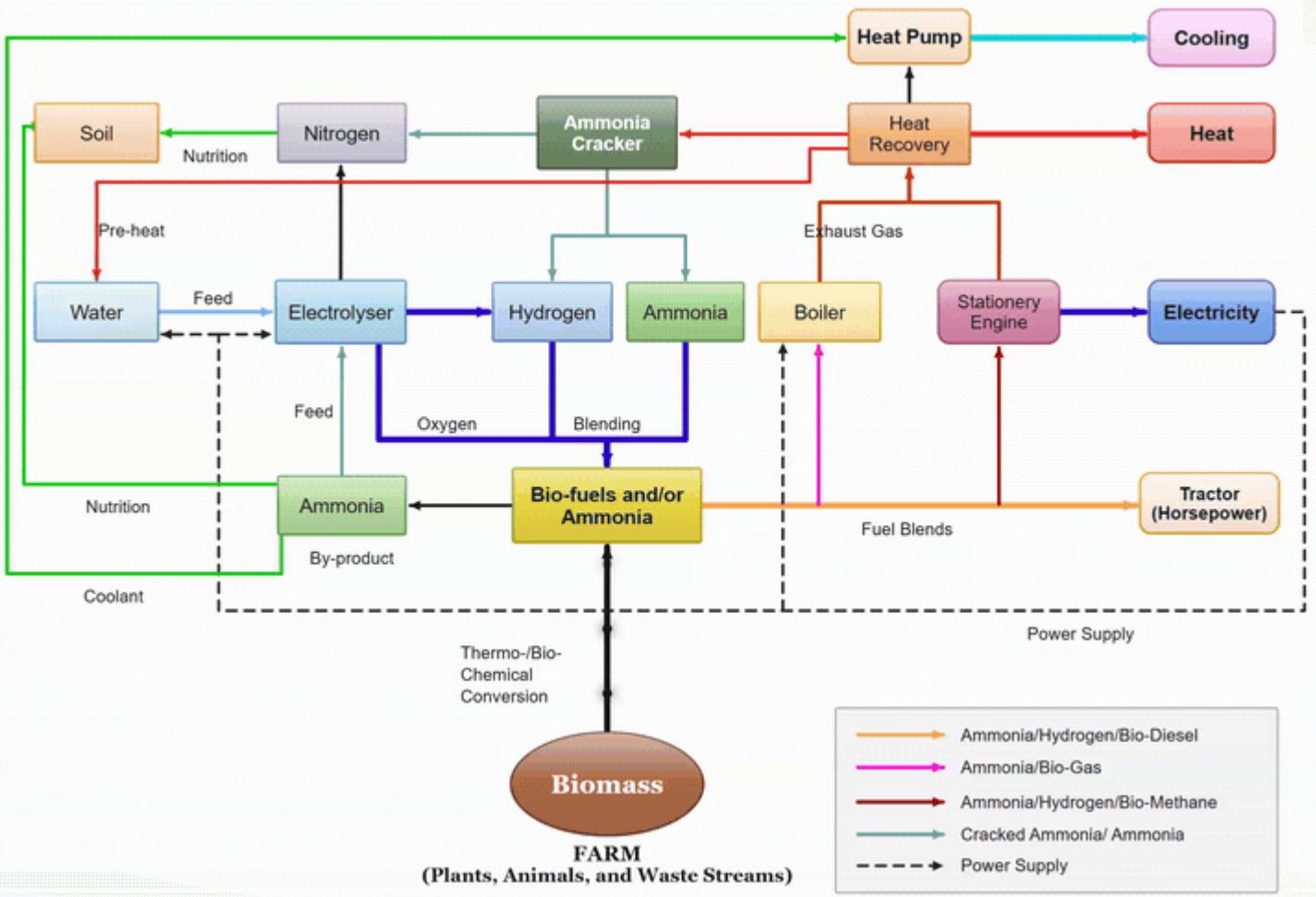
Electrolyser integration, electronics, controls and diagnostics

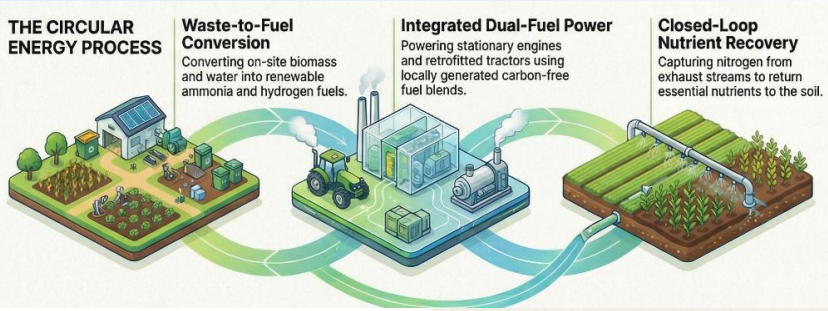
Acca Industries

Lombardy

Electrolysis, thermal integration and Italian deployment

How AgriCHP works





HIGH-IMPACT OUTCOMES

80%

Reduction in GHG Emissions

Achieving deep decarbonisation by displacing traditional diesel and LPG energy sources.

70%

Lower Fertiliser Costs

Substituting expensive mineral fertilisers with on-farm recovered nitrogen and nutrients.

100+

Learners Trained Annually

Building a hydrogen-ready workforce through accredited CPD and higher education pathways.

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Gelli Aur: demonstration on a working farm

The site brings agricultural operations, integration infrastructure and training together



Demonstration setting

Agricultural college & working-farm environment.

Space for visible demonstration and training.



Operational farm context

Live agricultural operations & farm infrastructure

Supports realistic duty cycles & stakeholder engagement.



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What the project aims to demonstrate

Reduce GHG emissions

Demonstrate and quantify on-farm GHG reductions through clean energy solutions

Advance technology readiness

Increase the TRL of integrated clean energy systems to enable real-world deployment

Build skills and capacity

Train farmers, advisors and stakeholders in clean energy technologies and best practices

Demonstrate on-farm impact

Validate technical, economic and environmental benefits in real farming conditions

Enable replication

Develop models, tools and guidance to support wider adoption across Wales and beyond

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EIN DYFODOL NET ZERO!
GREEN HYDROGEN PRODUCTION
H_2
CLEAN ENERGY FOR HOMES & TRANSPORT
WIND
SOLAR
TREES
NET ZERO IS FOR US!
AMMONIA HYDROGEN POWER!
Draig Verdd Cymru
NET ZERO CYMRU
GREEN WALES
WALES NET ZERO 2050
AMMONIA HYDROGEN FLAME
TÂN HYDROGEN & AMMONIA
AMMONIA HYDROGEN FLAME
AMMONIA/HYDROGEN FUEL CELL
Dewi y Draig Lân
(Wales)

The future farm and opportunities to collaborate

Demonstrate in **Wales**.
Develop with **Italy**.
Replicate across **regions**.

Future farm vision

- Safe and useful provision of electricity, heat, cooling and mechanical power on farm.
- Measured evidence on emissions, economics, operability and nutrient circularity.
- A practical route from TRL 6–8 validation to wider adoption in agriculture.

Opportunities to collaborate

- ❑ Engagement with funders, policymakers and end-users for scale-up.
- ❑ Joint R&D, testing, training and industrial partnerships.
- ❑ Replication pilots with farms, colleges and regions.

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Thank you
Grazie
Diolch

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