Agricultural Waste AD Portfolio

Invest Net Zero Cheshire

IKIGAI ea technology CATAPULT Energy Systems Cheshire and Warrington 87 Local Enterprise Partnership Cheshire energy hub

Project reference number: 025

Project type: A portfolio of four regenerative farming-focused, on-farm gas-to-grid anaerobic digestion ("**AD**") projects, with carbon capture to be installed as a second phase ready for connection to the HyNet network.

Project maturity: Early-stage development (pre-planning but with strong local authority and stakeholder support).

Key strategic drivers:

- Decarbonisation of milk tanker fuels used by dairy processing cooperative connected to farms involved
- Local water course pollution abatement (reduction of run off of phosphates and nitrogen from dairy slurry)
- Monetisation of agricultural waste (in the context of legal obligations to cover slurry pits)
- Farming income stabilisation
- Research and implementation of best practice in regenerative farming and future biochar production.

Locations:

- Four estate sites (Cholmondeley, Bolesworth and two other nearby multi-tenant farming estates) strategically located on 4 estates to cluster feedstock supply and benefit from a shared gas injection point into the high transmission network near Malpas)
- Exact locations may be disclosed under NDA.
- Land rights to be negotiated at the next stage following further due diligence.

Proposed phases:

1. Commissioning of genesis AD plant and upgrading and gas injection infrastructure (Phase 1 pre-development and feasibility work significantly progressed. Development completion in 2021 with construction targeted for Q1 2022 and commissioning by Q1 2023).
2. Installation of carbon capture equipment (2023) and connection to HyNet Co_2 distribution network (2025/2026).
3. Commissioning of 3 further AD plants that will share the upgrading and gas injection infrastructure completed in phase 1 (Phase 3 pre-development and feasibility work significantly progressed. Development completion in Q2 2023 with phased construction between 2023-2024. Target completion 2024 – 2025).

Total estimated carbon savings p.a.:

- Captured CO_2: 29,000 tonnes CO_2 / year (7,250 / AD plant)
- CO_2 avoided through milk tanker diesel displacement: 33,750 tonnes CO2 / year (8,435 / AD plant)

Total estimated biomethane production p.a.*:
Phase 1: Target 5.25 million scm3/year (2,700 tonnes net)
Phase 3: Target an additional 15.75 million scm3/year (8,100 tonnes net)

*Total biomethane production from all Phases approximates 40% of total dairy processing company national milk tanker requirements (assuming 100% fleet conversion to LNG by end of Phase 3 of the AD project). There may be scope to further expand the AD plants to take in feedstock from more farms in order to meet this additional demand, as well as local demand from the sustainable refuelling hubs identified as part of Invest Net Zero Cheshire.

Estimated project costs: £14 million (Phase 1); £1 million (Phase 2); £42-£45 million (Phase 3).

Feedstock:

- A combination (proportions to be confirmed following further feedstock due diligence) of local dairy slurry, rotation crops and waste straw from dairy operations.
- Feedstock will be aggregated through a local special purpose feedstock cooperative counterparty (which will be incentivised towards high performance under a profit-sharing arrangement) and will benefit from the fertiliser produced by each plant (i.e. digestate and any CO_2 derived fertiliser which may be produced in later phases – it may be possible to further monetise this in order to cross-subsidise carbon capture capital expenditure). Feedstock will be supplied by the cooperative under a 'take or pay' arrangement.
- Negotiations underway with a large feedstock merchant to ensure additional feedstock will be available to manage seasonal / yield variation and biomethane yields

Technology, construction and operation:

- Digester: Multiple-options being evaluated by an independent technical advisor with a focus on proven technologies, creditworthiness of the supplier, future-proofing and capacity for biomethane output optimisation.
- Carbon capture: Multiple options being evaluated with a focus on proven technologies and nature of outputs (industrial grade CO_2 for reutilisation or permanent storage vs conversion into fertiliser).
- Construction: EPCM/EPC, to be considered for each Phase further with prospective investors.
- O&M: Only highly experienced operators with strong sustainability credentials will be considered.

Revenue streams:

- Biomethane sales revenue (under a long-term offtake arrangement with an identified national gas distribution company providing for a cap and floor price).

- Renewable Transport Fuel Certificates (to be purchased from the national gas distribution company under a ‘sleeve’ arrangement with a national dairy processing company).
- ‘Pollution-Abatement-as-a-Service’ revenue (under pay-to-save contract with a regulated water utility pursuant to which a proportion of the avoided costs associated with waterway clean-up are paid to the Project SPV).

Initial stakeholders: Cholmondeley estates, Bolesworth estates and two other multi-tenant farming estates (feedstock and land); milk processing company (end user of biomethane); United Utilities (water utility counterparty for pollution-abatement-as-a-service); National gas distributor (Biomethane refuelling) and HyNet (Co_2 distribution and permanent storage).

Professional advisors to date: Ikigai (bankability); Integrity Energy Services (AD technical) and Gowling (legal).

Opportunity:

- Private sector project/portfolio level investors/co-investors with the landlords
- Technology, construction and operation partners

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