

EfW to Sustainable Refuelling Hub

Invest Net Zero Cheshire

IKIGAI



CATAPULT
Energy Systems



Project reference number: 021

Project name: Energy from Waste (“**EFW**”) to Sustainable Refuelling Hub

Project type: The development of the UK's first sustainable multi-fuelling hub (combining retail premises with EV charging, bio-CNG/LNG, hydrogen and potentially e-fuels refuelling infrastructure), located adjacent to the M53 motorway and intending to benefit from private wire electricity from nearby Hooton energy-from-waste plant and connection to the gas grid.

Project maturity: Early feasibility / conceptual stage

Key strategic drivers:

- Shared charging and refuelling infrastructure provision facilitate conversion of local HGVs, LGVs, buses and fleets based on the optimal vehicle technology choice and servicing of high frequency transitory demand visiting Ellesmere Port and the surrounding industrial area.
- Combining multiple fuels attracts and retains whole business anchor customers and cross subsidises, together with retail park revenues, hydrogen / e-fuel refuelling infrastructure as demand ramps up over time.
- ‘Store-front’ project for OrangeGas in the UK, Europe’s market-leading sustainable refuelling hub provider with operational multi-fuel hubs in the Netherlands, Sweden and Germany.
- Potential demonstrator project for carbon capture and e-fuel production in the UK with market leading British technology identified.
- Optimisation of Hooton EFW plant economics.

Locations: Adjacent to the M53 motorway near to the Hooton EFW site. Further information regarding land arrangements available to prospective investors under NDA.

Proposed phases:

1. 2022: Development and installation of EV charge-points, hydrogen (350 & 700 bar) and bio-CNG/LNG refuelling infrastructure, connection via private wire to the Hooton EFW plant and hub retail proposition.
2. 2023: Development and installation of a small-scale electrolysis facility at either the Hooton EFW plant or onsite at the sustainable refuelling hub.
3. 2024: Feasibility analysis for the production of e-fuels onsite (combining hydrogen and Co2) at a larger scale to match expected demand growth.

Total est. carbon savings p.a.:

Vehicle Fuel	Estimated Emissions Impact Range
EV	55%
H2	98% to +10%
CNG	100% (biomethane)
LNG	100% (biomethane)

Calculated on a well-to-wheel lifecycle emissions basis compared with diesel emissions at kgCO₂e/100 km.

Est. project components and estimated capital expenditure for Phase 1 (excl. retail):

- Private wire connection to Hooton EFW: £0.5 - £1m. This does not include additional costs for a grid study with SP Energy Networks, anticipated to confirm status of import capacity.
- Connection to the gas network: Subject to further due diligence, but the medium pressure network runs adjacent to the proposed site.
- Electrolysis system (and hydrogen storage): Subject to further due diligence, but initial literature review with respect to the electrolyser suggests CAPEX could be c.£1,118/kW for a 5MW PEM electrolyser (at 30 bar).
- EV charging and refuelling infrastructure: subject to final technology composition.

Inputs:

- **Hydrogen:** Produced by way of a circa. 5MW electrolyser collocated with (or via private wire connection to) the Hooton EFW plant, with scope for further expansion of hydrogen/e-fuel production in line with transport demand. Supply arrangements will be determined after electrolyser site location and funding confirmed.
- **Biomethane:** This will be supplied via refuelling hub site connection to the gas grid (preferably) or by tanker under a 'sleeved' gas supply agreement with a distributor/trading company. Medium pressure gas grid runs close to the location identified. RTFCs/Green Gas Certificates would guarantee renewable content on a mass-balancing basis.
- **Electricity:** This will be supplied via private wire connection to the Hooton EFW under a power supply agreement with the project vehicle. Minimum contracted supply can be contractually guaranteed as Hooton EFW is grid connected (subject to confirmation from SP Energy Networks). Term and pricing to be agreed following further due diligence.

Technology, construction and operation:

- EV Chargers: Opportunity for third parties with proven technology to consider. Note that one of the revenue models being considered is chargepoint bay rental to technology providers (as opposed to purchase of chargepoint technology by the sustainable refuelling hub project company).
- Refuelling infrastructure: Opportunity for third parties with proven technology to consider.
- Private wire installation: Cogen/Hooton EFW plant responsibility (to be delivered pursuant to the offtake arrangements with the sustainable refuelling hub).
- Electrolysis plant: Opportunity for third parties with proven technology to consider.
- Refuelling hub installation and operation: OrangeGas (and local contractors).
- E-fuel production: Integrated technology solution identified if carbon capture and e-fuel blending demonstrator was possible in a later phase.

Revenue streams for sustainable refuelling hub:

- Retail offer rental
- EV charging bay rental to charge point technology providers / power sales (model to be confirmed following further technology due diligence and consideration of site specific EV demand/utilisation risk).
- Biomethane and hydrogen sales:
 - CNG: Typically, 82-95 p/kg CNG before VAT. Biomethane is expected to cost around 10 p/kg more than fossil fuel based natural gas from the grid
 - LNG: Typically, 90-100 p/kg LNG before VAT. Bio-LNG is expected to cost around 10 p/kg more than fossil fuel based natural gas from the grid
 - Hydrogen: approx. £10-£15 per kg (though hydrogen for transport applications not widely deployed – further due diligence with OEMs, logistics companies seeking to switch to hydrogen/hybrid HGVs will be required) and distributors.
- In respect of the electrolyser (whether located at the hub or collocated with Hooton EFW): the production facility will be entitled to 'Development Fuel' Renewable Transport Fuel Certificates based on the biogenic component of EFW's feedstock.

Initial stakeholders: Cogen, the developer of Hooton EFW Plant, and OrangeGas.

Advisors: Ikigai (bankability and concept design) and Atkins (technical advisor)

Opportunities:

- Retail partners for collocation with the sustainable refuelling hub
- Technology and delivery partners
- Local suppliers/distributors of biomethane to provide sleeving arrangements
- Additional investors with an appetite to replicate this model at other sites in Cheshire and Warrington.

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