Vauxhall Net Zero

Invest Net Zero Cheshire

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

Project reference number: 010

Project type: Vauxhall Motors are looking to implement a multi-vector decarbonisation project comprising Internet of Things ("**IoT**") based demand reduction interventions, onsite wind and solar generation (or a private wire solution) and heat optimisation solutions (boiler replacement and heat recovery).

Project maturity: Late stage feasibility assessment (but with strong management and local authority support).

Key strategic drivers:

- Decarbonisation and future-proofing of Vauxhall's operations, in anticipation of a new line of vehicle production at Ellesmere Port and extended production hours (a switch from 1 to 3-shift production).
- Monetisation of available land onsite following reconfiguration of buildings.

Location: North Rd, Ellesmere Port CH65 1AL

Proposed phases:

1. Phase 1 - Installation of a new Building Management System ("**BMS**") including 'edge IoT' based real time data capture, automation and optimisation of lighting, compressed air processes, process-heating, HVAC, pumping and fan systems (commissioning in 2022 to deliver savings and establish energy base-line).
2. Phase 2 - Building integrated energy efficiency measures to improve insulation.
3. Phase 3a - Development and construction of:
    a. **Solar:** up to 6.14MW nameplate capacity (combination of carport and ground-mount) sized to reflect available land. Phase 1 to commence development in 2021; commissioning by Q3 2023.
    b. **Wind:** Two Wind Turbine Generator ("**WTG**") options are under consideration, sized to reflect available land with commissioning expected in 2026. Further due diligence is required to determine optimal WTG size
        i. up to 1.6MW nameplate capacity producing 4.08 GWh / year or,
        ii. up to 8MW producing 20.8 GWh / year, larger noisier machine likely to have a more complex permitting process.
    c. **Grid export connection:** available 33kV connection. Further due diligence required to determine the extent of additional export capacity required in order to de-risk offtake from renewable generation.
4. Phase 3b **- heat solutions**, with installation anticipated at in Q1 2022 with commissioning completed by 2023):

a. Installation of a new efficient gas boiler plant (to be hydrogen-ready in order to facilitate fuel switching if electrolyser comes online at the neighbouring Hooton energy-from-waste combined heat and power plant ("**Hooton EFW**") – see **EFW to Sustainable Refuelling Hub** summary).

b. Heat recovery equipment to recover up to 17.5 GWh of heat and supply for process uses and up to 16.2 GWh for utilisation in space heating.

c. Development of new hot water heat distribution network for process and space heating.

d. Potential for a bilateral heat supply agreement for the supply of steam from Hooton EFW (to be supplied to the point of connection by Hooton EFW). This could replace most, if not all, existing gas usage at the Vauxhall plant to reduce carbon emissions and potentially heating costs.

Total estimated carbon savings p.a.:

- Demand reduction and energy efficiency
  - IoT/BMS: subject to further due diligence, up to 24% reduction in energy usage achievable
  - Insulation 550-850 tonnes / year based on savings of 20-30%
- Onsite Generation
  - Solar: 1,300 tonnes CO_2 / year
  - Wind: 942 or 4,800 tonnes CO_2 / year (dependant on turbine)
- Heat
  - New boilers: 971 tonnes / year
  - Waste heat recovery for process and space heating: 10,000-12,000 tonnes CO2 / year
  - New steam supply from Hooton EFW: up to 33,000 tonnes CO2 / year (assuming Hooton installs carbon capture equipment, as is being considered as part of this Invest Net Zero Cheshire project)

Estimated project costs:

- Demand reduction: to be provided on a fully funded Software-as-a-Service basis such that there is very limited upfront capital expenditure required.
- Generation:
  - Solar: Circa. £5.6 million.
  - Wind: £2.2-£6.6 million (depending on WTG choice)
  - Grid export connection upgrade: c.£2 million.
- Energy efficiency / heat: total £7.5 - £12 million, comprising:

- New boilers: £0.5-1 million
- Waste heat recovery for process and space heating: £1-2 million
- New net network to distribute heat from recovered and boiler raised heat: £2-4 million
- New steam supply from Hooton CHP: £3-4 million for carbon steel piping from point of connection, detail of cost sharing with Hooton to be established

Technology, construction and operation:

- Solar - Ground mounted Solar PV (0.9MW) and carport solar PV (5.3MW)
- Wind – 2 X 0.8MW WTGs, or 2 X 4 MW WTGs (depending on WTG choice)
- Grid electrical export – existing 33kV grid import connection, 2.6MW export capacity required
- Heat - New gas boiler, building fabric improvements, additional sensors and new BMS (capable of utilising legacy data capture equipment), heat recovery equipment (heat exchangers and insulated ductwork) and new piping installed across site
- 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:

Assuming all aspects of the project are developed under a separate special purpose vehicle to facilitate non-recourse/limited recourse financing (as opposed to procured directly by Vauxhall):

- electricity generated onsite will be sold under a power purchase agreement to Vauxhall and any surplus generation will be spilled to the grid. Assuming 6.14 MW PV and 1.6MW wind, c.96% of annual generation will be consumed onsite, serving c.43% of site demand in a full operational scenario; and
- operational savings resulting from demand reduction and energy efficiency measures would be shared with the project vehicle under an energy savings agreement (including a floor payment and upside sharing).

Initial stakeholders: Vauxhall (landowner, electricity offtaker) and Foghorn Systems (Edge IoT specialist provider)

Professional advisors to date: Ikigai (bankability); EA Technology (electrical technical); Atkins (heat technical); Energy Systems Catapult (Whole systems modelling).

Opportunity: Seeking public and private sector project/portfolio level investors and technology, construction and operation partners.

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