Using Hydrotreated Vegetable Oil HVO as a diesel substitute experience from LB of Hackney

Presentation to The Big Energy Summit - APSE

from 9am on Thursday 29th February 2024 by

Angela Okoh | Senior Energy & Sustainability Officer

with inputs from

Norman Harding | Corporate Fleet Manager

Jeremy Martin | Head of Energy & Carbon Management

Guy Shackle | Design & Technical Standards Manager

Hackney

Housing Services | Climate, Homes & Economy

Central Energy Team | Finance and Corporate Resources

History - timeline of use of 'alternative fuels'

1998 | Hackney has a long history of operating alternative fuels dating back to the last millenium when it had a small number of 'fully electric' vans in the fleet

2008-09 | our fleet introduced renewable fuels in the form of **FAME** [Fatty Acid Methyl Ester] and successfully operated this at a 100% blend for many years

2015-16 | as a result of the above, around our Corporate Fleet Manager was seconded into the London Mayor's Biofuels Programme who was instrumental in introducing the next generation renewable fuels known as **HVO** [Hydrotreated Vegetable Oil]

2016-17 | through the London Mayors Biofuels Programme Hackney undertook formal emission testing of **HVO** at the Millbrook Proving Ground using one of our Euro 6 trucks. Our first controlled test cycle was representative of a 'multi-drop' parcel delivery type operation which produced absolutely outstanding results and prompted the creation of a broader range of test cycles conducted over a period of about eighteen months to represent different types of operation again achieving excellent results

2017-19 | Hackney used 100% **HVO** on a soft trial to see if any issues not identified in the formal testing surfaced. The fuel was used in all vehicles and plant drawing fuel from our bulk storage tanks which include all HGV's, many LCV's and all of our heavy plant

25+ years of reducing carbon emissions and pollutants from our vehicle fleet

Our Fleet of 577 vehicles incl' HGV's [107 are electric]

recycled cooking oil is used to make biodiesel, reducing reliance on standard diesel

The ‘Science’ Bit - lower carbon emissions

100% mineral diesel	**2.66 kg CO_2e per litre**
Diesel (average biofuel blend) pump]	**2.51 kg CO_2e per litre** [as available at the diesel
HVO Biodiesel	**0.03558 kg CO_2e per litre**

HVO is 98.6% lower carbon ‘wheel to wheel’ based on minimum reduction of **80% pre-com bustion + 12% post-combustion** than a normal Biofuel blend; included are all our Heavy Goods Vehicles [HGV], many of our Light Commercial Vehicles [LCV’s] and all our heavy plant

Note: the Office for National Statistics (ONS) carbon figures suggests a saving of about **99.5%**; this is much higher carbon savings then proposed by the HVO industry of **80-90%**

‘real’ carbon savings whilst waiting for the electricity grid to fully decarbonise by 2030-35

Main Benefits - reduction in pollutants

Because the fuel is made from any waste organic matter (not just recycled cooking oil) it is more than 80% CO_2 efficient before the combustion process. The formal emission testing proved a further 12% CO_2 reduction at the tailpipe making a total of 92% CO_2 savings

Additionally, the formal emissions testing for the multi-drop drive cycle demonstrated a **69% Nitrogen Oxides (NOx)** reduction at the tailpipe

A test cycle to represent a refuse collection round which included elements of urban (door to door) collection; rural collection; bin-lift movements; load pressures by using granulated rubber as the load and transit time to and from tip demonstrated a **28% Nitrogen Oxides (NOx)** reduction at the tailpipe. CO_2 reductions were again 12%

The testing concluded that CO_2 reductions (80% + 12%) are relative to the volume of fuel consumed. **Nitrogen Oxides (NOx)** reductions were related to the drive cycle - the lighter the load the higher the reduction. Formal testing at that time achieved a maximum **69% tailpipe Nitrogen Oxides (NOx) reduction**

The fuel is not only great from a climate perspective but also fantastic for local air quality in the dense urban environment in which Hackney vehicles work

Hackney now uses 100% HVO on almost all their fleet vehicles; only logistical issues currently prevent the remainder of the fleet accessing our bulk fuel supplies

annual CO_2 savings as a result of using HVO [Hydrotreated Vegetable Oil] of 2,600 tonnes

Other Tangible Benefits - simple to implement

- No modifications to vehicles are required to operate HVO
- No modifications to service arrangements are required
- No issues relating to long term storage of HVO and it does not degrade over time unlike **FAME**
- HVO does not wax / solidify during cold weather
- Most vehicle manufacturers will warrant HVO if the fuel meets the EN 15940 quality standards - referring to the fuel as a 'drop-in' fuel
- HVO can be mixed with standard EN 590 road diesel; therefore if supplies of HVO are impacted for any reason we can revert back to normal diesel with no inconvenience
- The fuel can be manufactured from any form of organic waste and is therefore circular
- Hackney specifies (from its suppliers) fuel that contains zero virgin palm oil; most suppliers acknowledge this but can use palm oil effluent

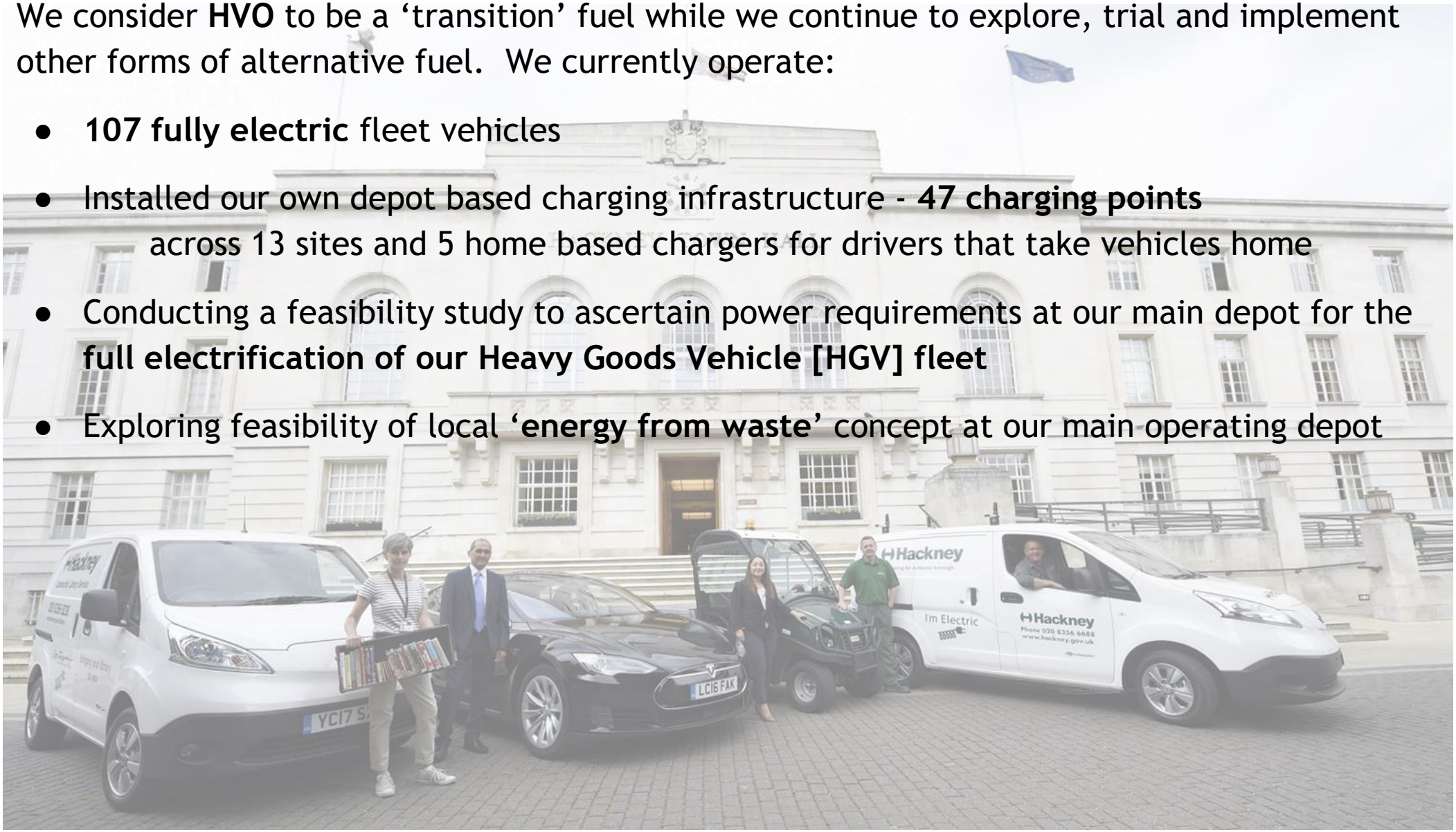
In 2023 Hackney consumed 1.3 million litres of fuel; 1.1 million was HVO, 180,000 litres was normal road diesel and 20,000 litres was petrol consumed on agricultural plant & hand tools

the many practical benefits of using HVO [Hydrotreated Vegetable Oil] in our fleet

Transition - to operational ‘net zero’ by 2040

We consider **HVO** to be a ‘transition’ fuel while we continue to explore, trial and implement other forms of alternative fuel. We currently operate:

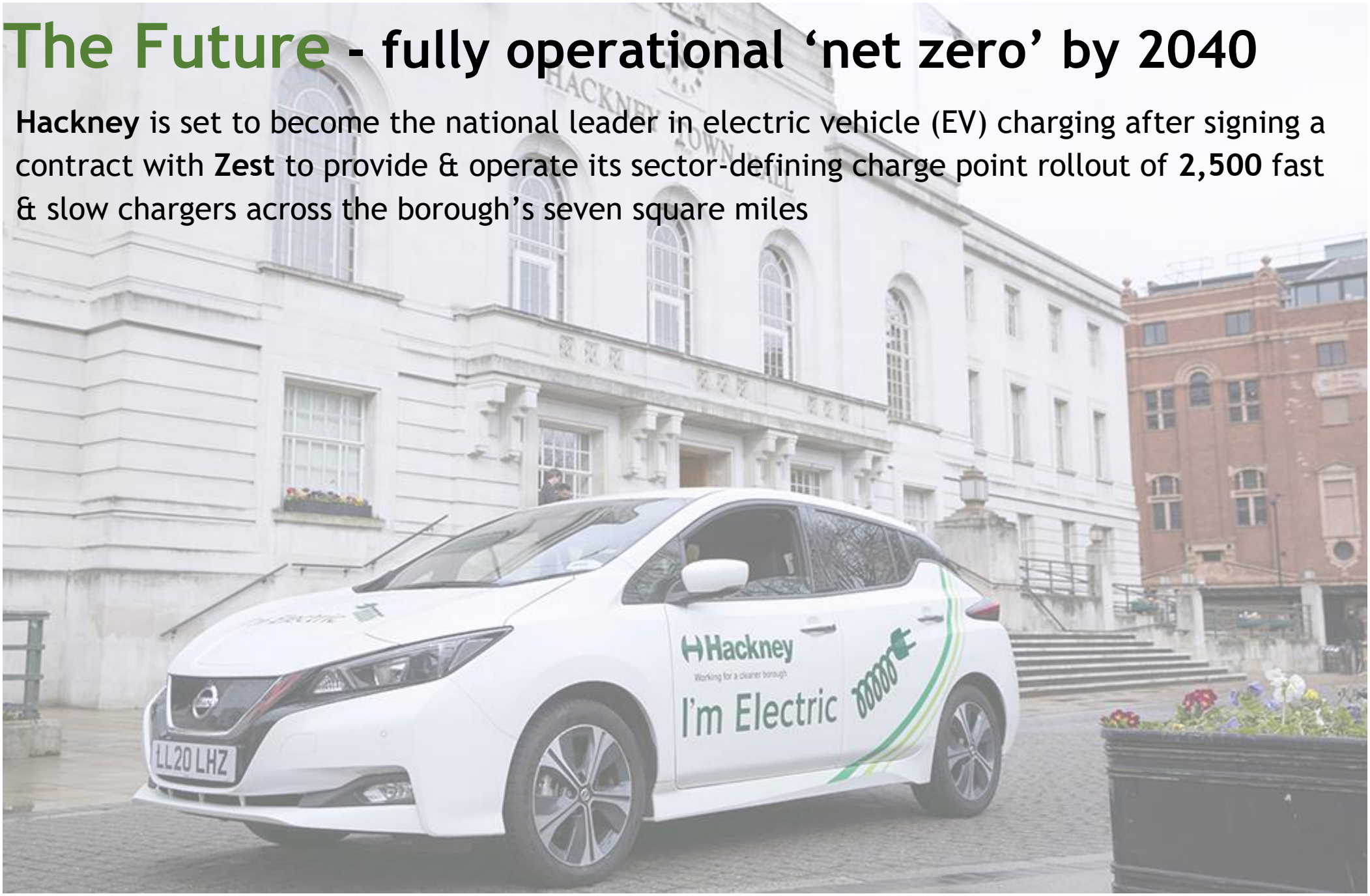
- **107 fully electric** fleet vehicles
- Installed our own depot based charging infrastructure - **47 charging points** across 13 sites and 5 home based chargers for drivers that take vehicles home
- Conducting a feasibility study to ascertain power requirements at our main depot for the **full electrification of our Heavy Goods Vehicle [HGV] fleet**
- Exploring feasibility of local ‘**energy from waste**’ concept at our main operating depot



HVO [Hydrotreated Vegetable Oil] as a transition fuel to a fully ‘electrified’ vehicle fleet

The Future - fully operational ‘net zero’ by 2040

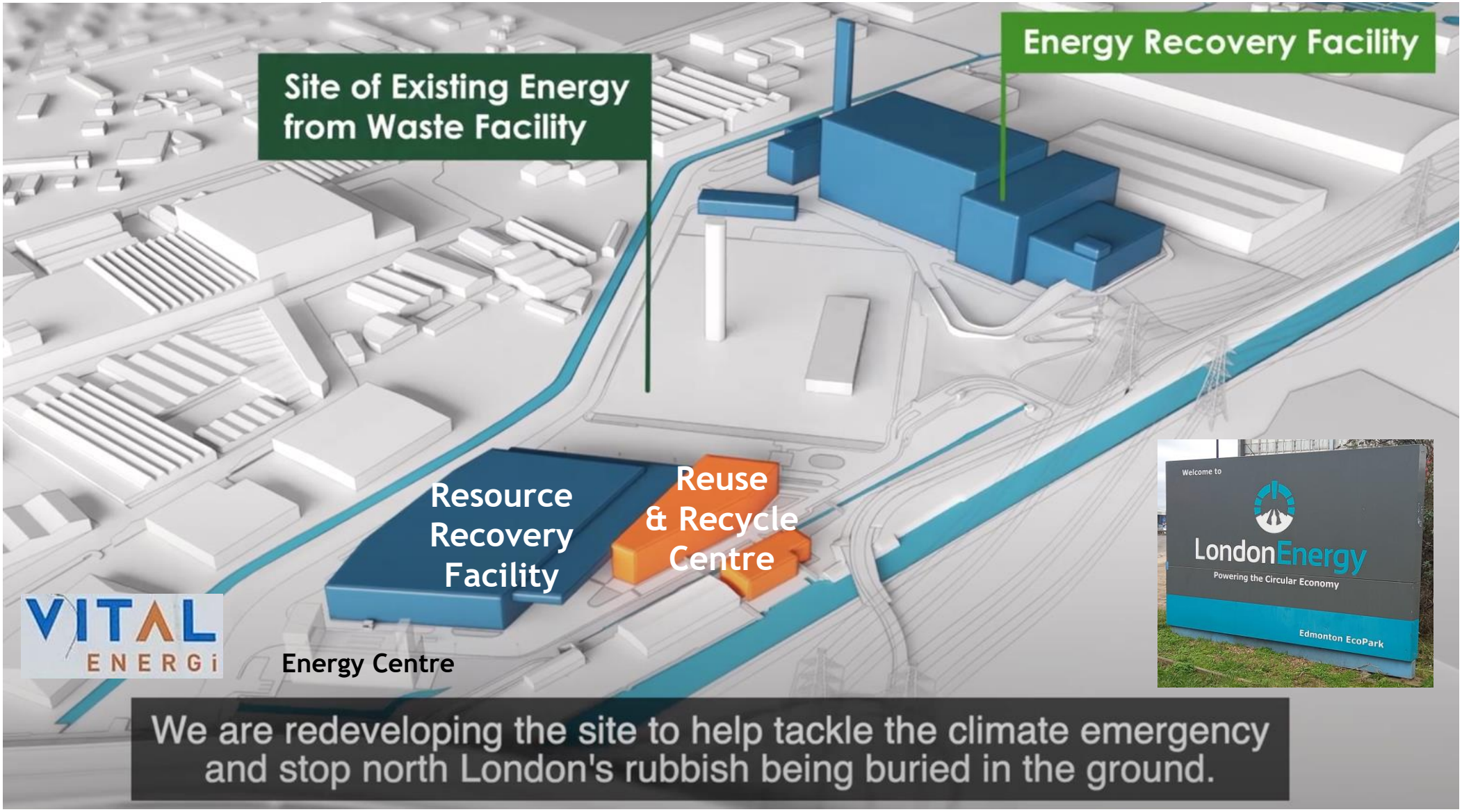
Hackney is set to become the national leader in electric vehicle (EV) charging after signing a contract with **Zest** to provide & operate its sector-defining charge point rollout of **2,500** fast & slow chargers across the borough’s seven square miles



alongside our existing EV charge points, the total number in Hackney will be 3,000 by 2026

NORTH LONDON WASTE AUTHORITY

Edmonton Eco Park - 'Waste to Energy'



operational 'Recycling Centre' and Energy Recovery Facility (ERF) due to handover in 2026