

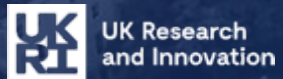


Energy Superhub Oxford - The First Year

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Contents



1. ESO Introduction & Overview
2. Battery
3. Private Wire and Superhub
4. Council Fleet
5. Buses
6. Heat
7. Beyond Oxford

What is Energy Superhub Oxford?

A world-first project pioneering an integrated approach to decarbonising power, transport and heat to accelerate Oxford's journey to zero carbon.

Showcasing a powerful network of:

- hybrid battery energy storage
- rapid electric vehicle charging
- low carbon heating, and
- smart energy management

providing a model for cities around the world to cut carbon emissions and improve air quality.



Our consortium



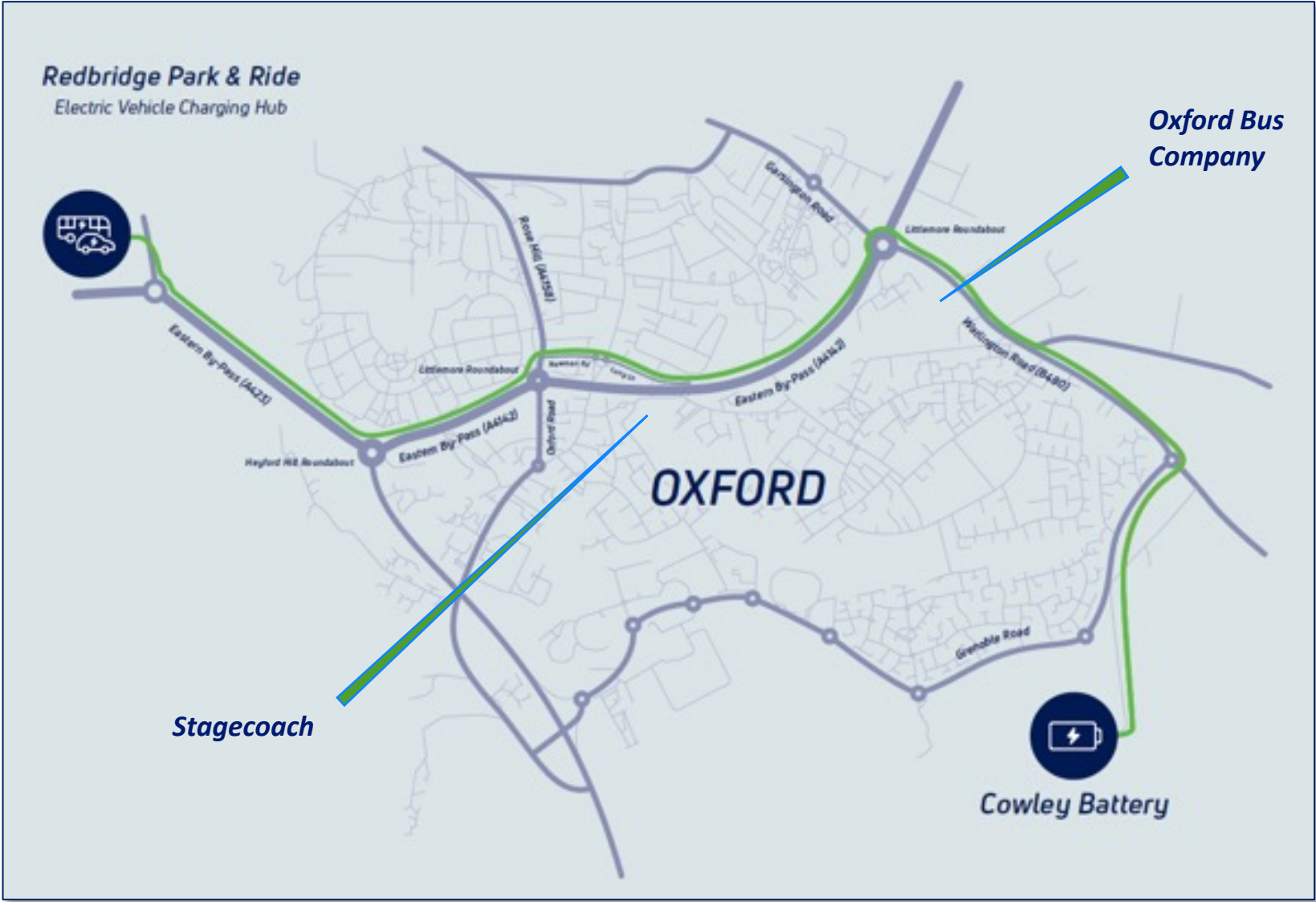


Hybrid Battery – Key messages/learnings

- More storage is absolutely critical to enable the flexibility National Grid needs in all Future Energy Scenarios
- The project has opened up the transmission network to the wider market, as alternative to DNO connection route
- Successful first year demonstrated in trading and Grid services, more batteries approved for construction...
- Regulatory lessons learned, eg how batteries are categorized by Ofgem needs to change

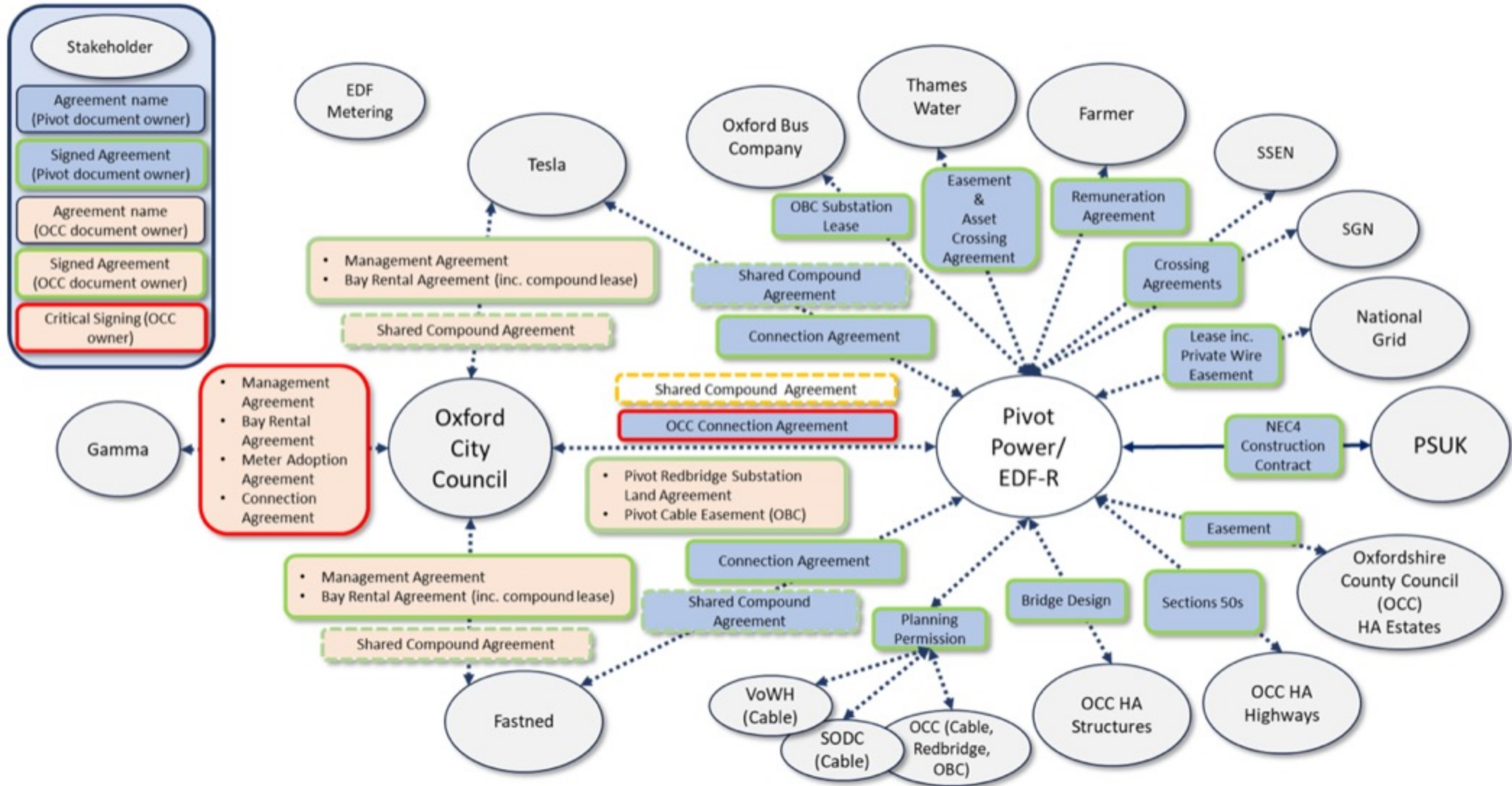


Private Network, 7km, transmission-connected





EV Networks Stakeholder Map



Superhub Project Timeline

	2019				2020				2021				2022				2023	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	
Hybrid battery	Planning & Prep																	
					Construction													
											Operation & Evaluation							
EV Hub					Permissions, Planning & Procurement													
								Landlord negotiations & contracting										
											Construction							
														Operation & Evaluation				

Private & Public Sector Partners – Team is Everything!



***Hundred's of people, partners
and stakeholders***

Residents & customers

Partners

Taxi Drivers & Trade Body

Suppliers

Engineers

Manufacturers

Consultants

Construction Companies

Designers

Government

The first year...



1,521 MWh has been delivered since the launch



The Superhub is powering **90 cars** per day on average

The average consumption is **34.5 kWh** per visit



4,408,695 miles has been driven since the launch of the Superhub



ESO has seen that there has been increasing uptake of the charging facilities by EV drivers, with a **72.2%** increase YOY



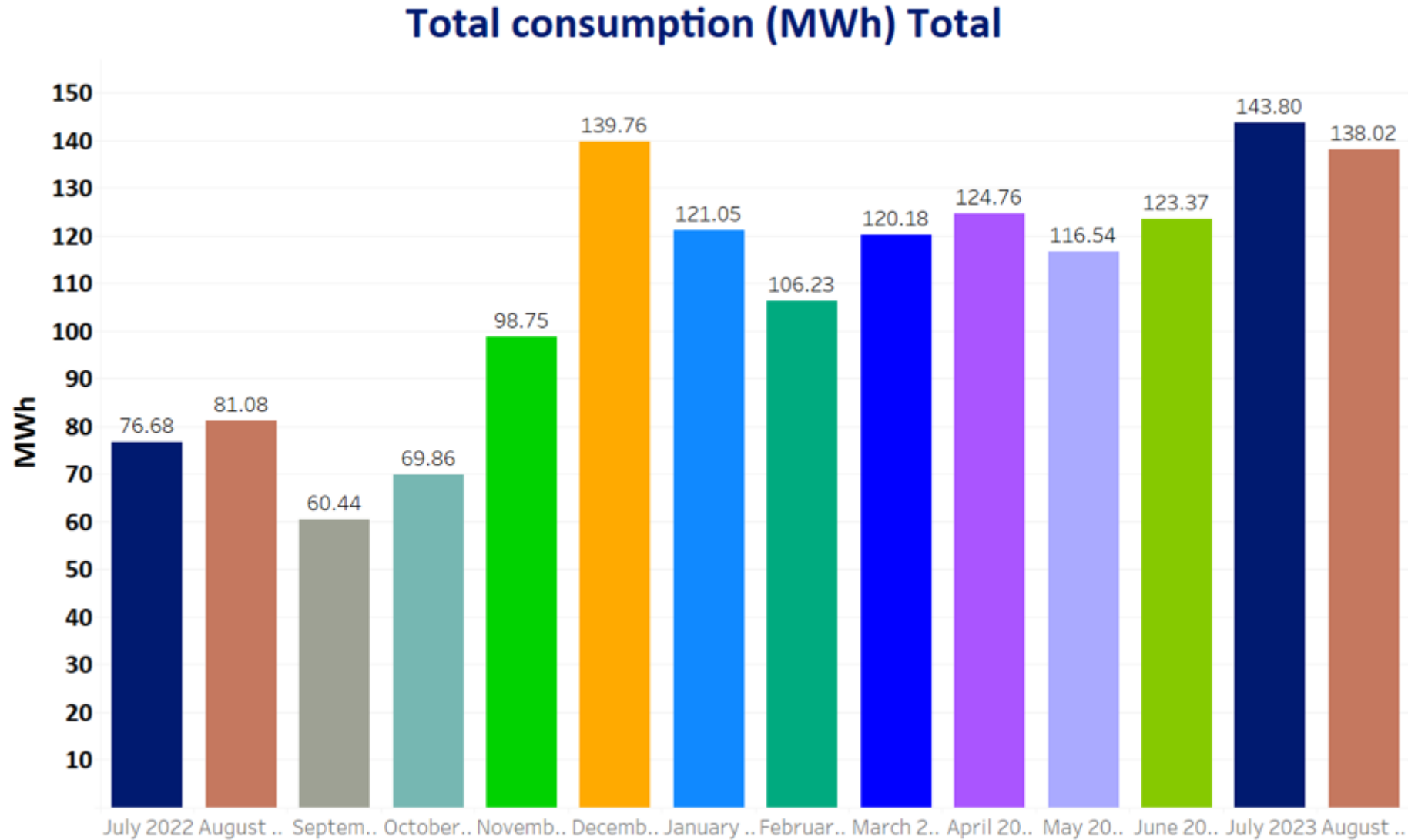
The average charging time is **25.9 min** (Tesla, Fastned)

Source:

[Average Electric Car kWh Per Mile \[Results From 231 EVs\] \(ecocostsavings.com\)](https://www.ecocostsavings.com/)

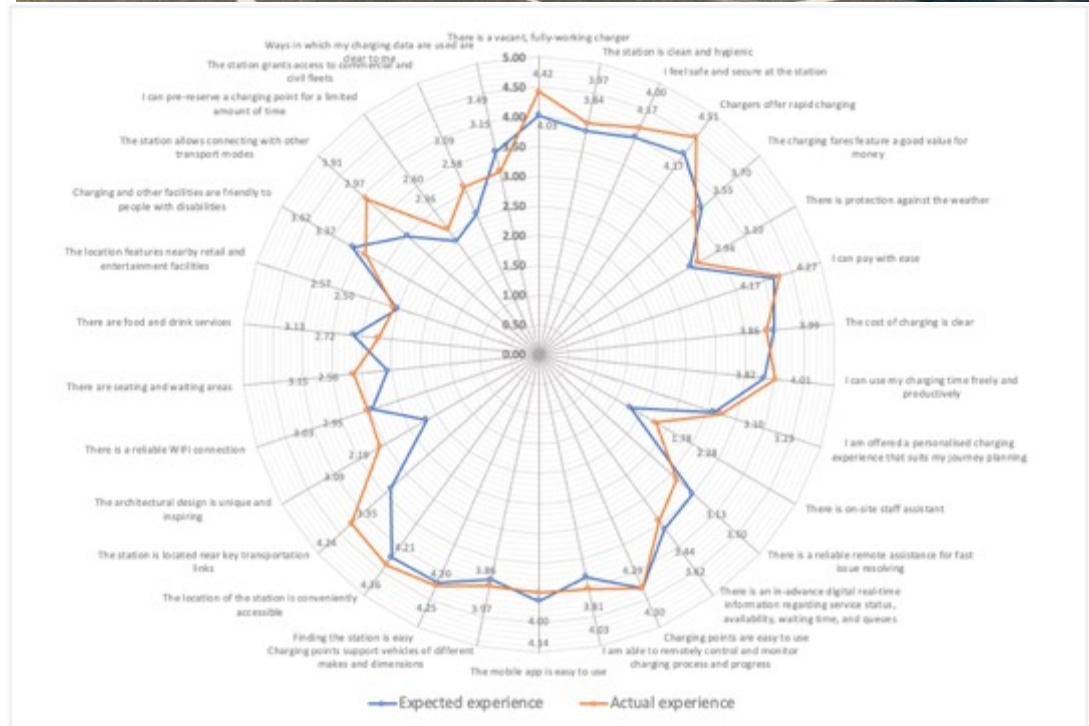
[Average CO2 Emissions per Car in the UK | NimbleFins](https://www.nimblefins.com/)

Monthly consumption (and visits) increasing...



User Experience at Redbridge

- 151 users interviewed
- Actual charging experience is exceeding expected experience
 - "Easy to use"
 - "Good location"
 - "Easy to pay"
- The hub attracts users from inside and outside Oxfordshire...
- And of many different journey purposes
- We hope the hub will help to accelerate Oxford's EV uptake in the next years



Continuing an Electric Vehicle Revolution

Major fleet decarbonisation

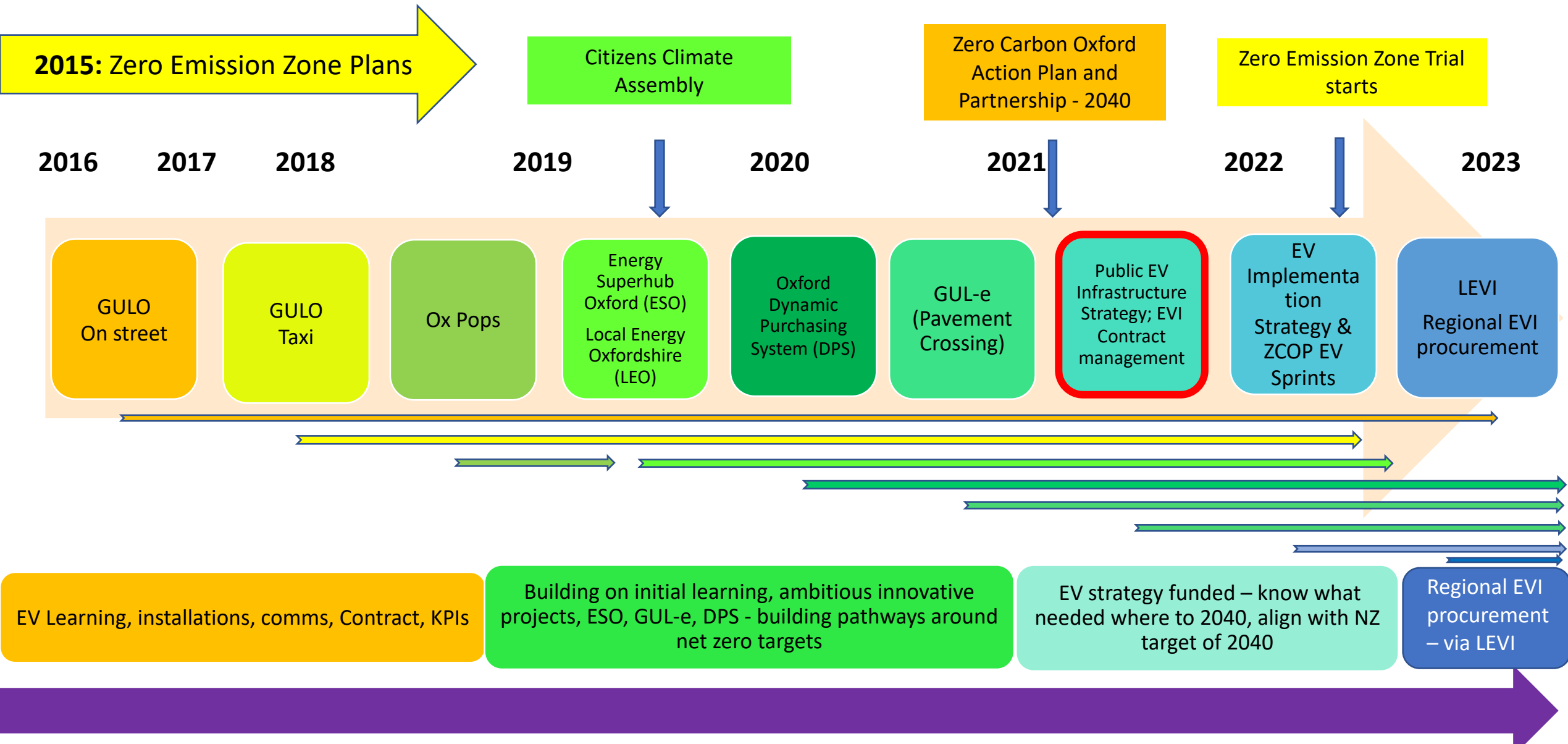
- 35% of City fleet electric by end of 2023
- 160 tonnes of CO2 saved to date
- Financial savings - 2022 electricity costs were 1/3 price of fuel

Taxi decarbonisation

- 25% Hackney cabs migrated to electric (£5k grants/Try B4 you Buy)
- 200 tonnes of CO2 saved



Oxford's EV innovation Journey



Zero Carbon Oxford Roadmap Targets

Expected No. of Plug-in Vehicles to 2040

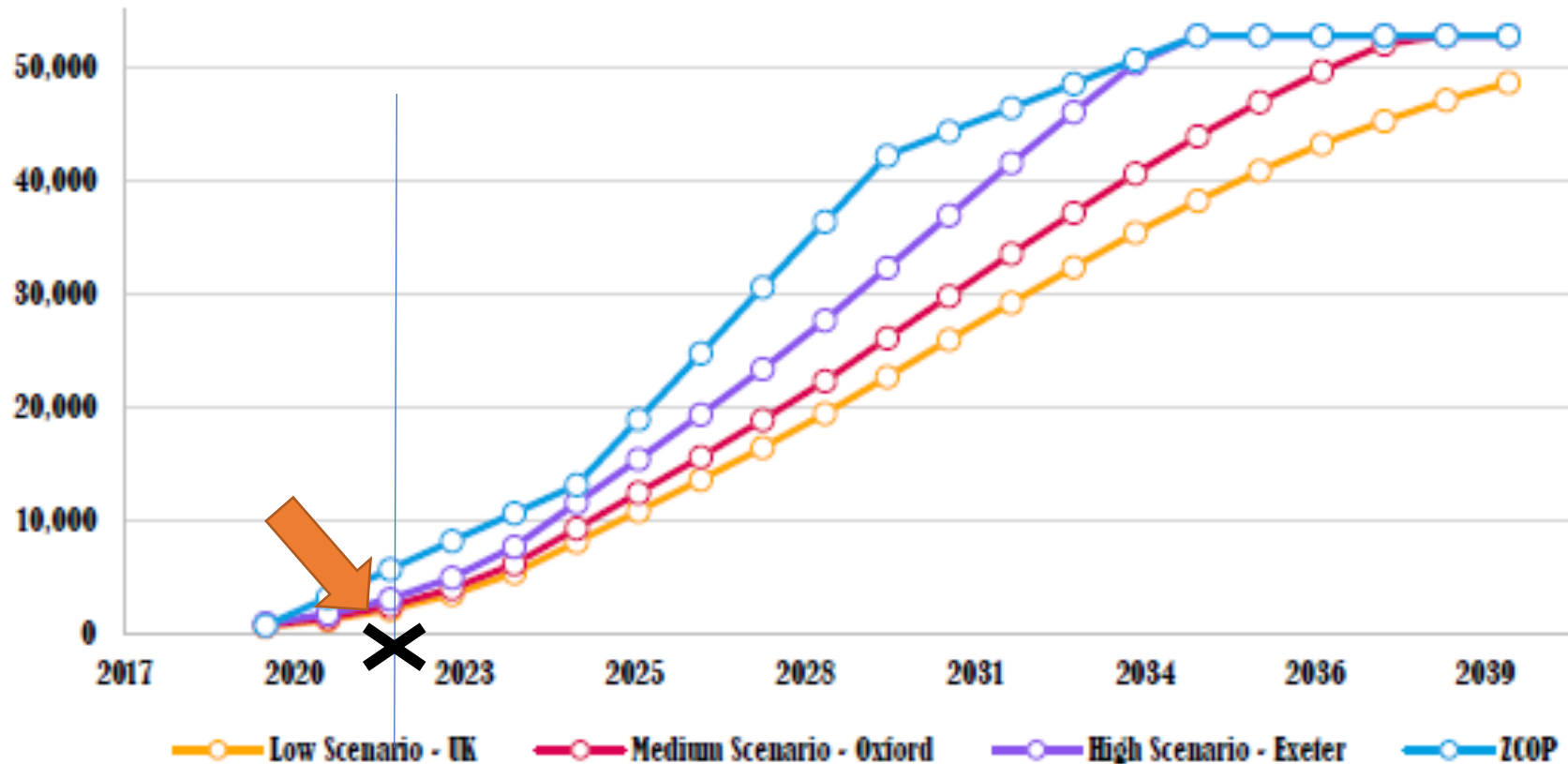


Figure 3 Expected number of plug-in vehicles to 2040

Oxford in 2030 (ZCOP)

Population	Cars & Vans	Electric Vehicles
163,637	52,753	42,202

Charging Hubs



No of each other type of chargers

Total Rapid Posts		Total Fast Posts		Total Home Chargers	
212		749		30,069	
Solution	No. of Locations (2030)	Additional Locations Needed (2026 - 2030)	Additional Chargers Needed (2026 - 2030)		
			RAPID	FAST	
Rapid Hubs	7	4	24	12	
Mixed Hubs	84	46	67	92	
Gulf-e	2,562	1,409	-	44	
On-Street Residential	172	95	-	130	
Off-Street Car Park	16	9	-	36	
Destination	58	32	-	46	



Replication, buy-in and dissemination



Private wire and superhub. ESO has demonstrated the benefits of delivering high-powered EV charging in the city of Oxford. **This model is being replicated in Coventry and Birmingham**, and is suitable for the outskirts of many UK cities, especially where local grid constraints hinder the roll out of solar, EV chargers and heat pumps.

Replication - EDF have 40 grid connection sites in the UK

'EVs are for Everyone' public/business event – 27th May

- Test drive an affordable EV car or van
- Insights on owning, leasing EVs for personal & business use.
- Meet our friendly bunch of experts and local EV champions
- Discover car club/car sharing solutions
- Find out about used/pre-loved EV cars/vans
- Listen into our '10 minute how to' sessions on all things EV from how to charge, to 'which cable is which?'
- Get an action pack to help you decide next steps

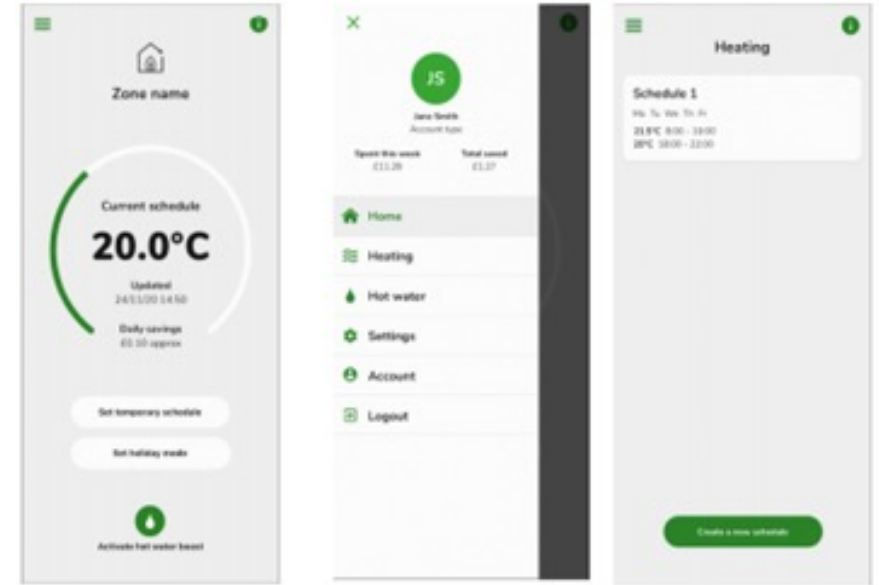


Oxford's Electric Bus Fleet

- ZEBRA scheme enables £82m bus electrification
- Oxford Bus Company 104 buses
- 8MW OBC Agreement to take power from ESO (EDF Renewables) private wire
- 150kW chargers, 170 mile range
- Stagecoach 55 buses
- Stagecoach agreement signed and cable route installed summer 2023
- Major NOx air quality benefit for Oxford



Renewable Heat – Ground Source Heat Pumps



- *Smart controls +*
- *Load shifting +*
- *Time of Use Tariffs*

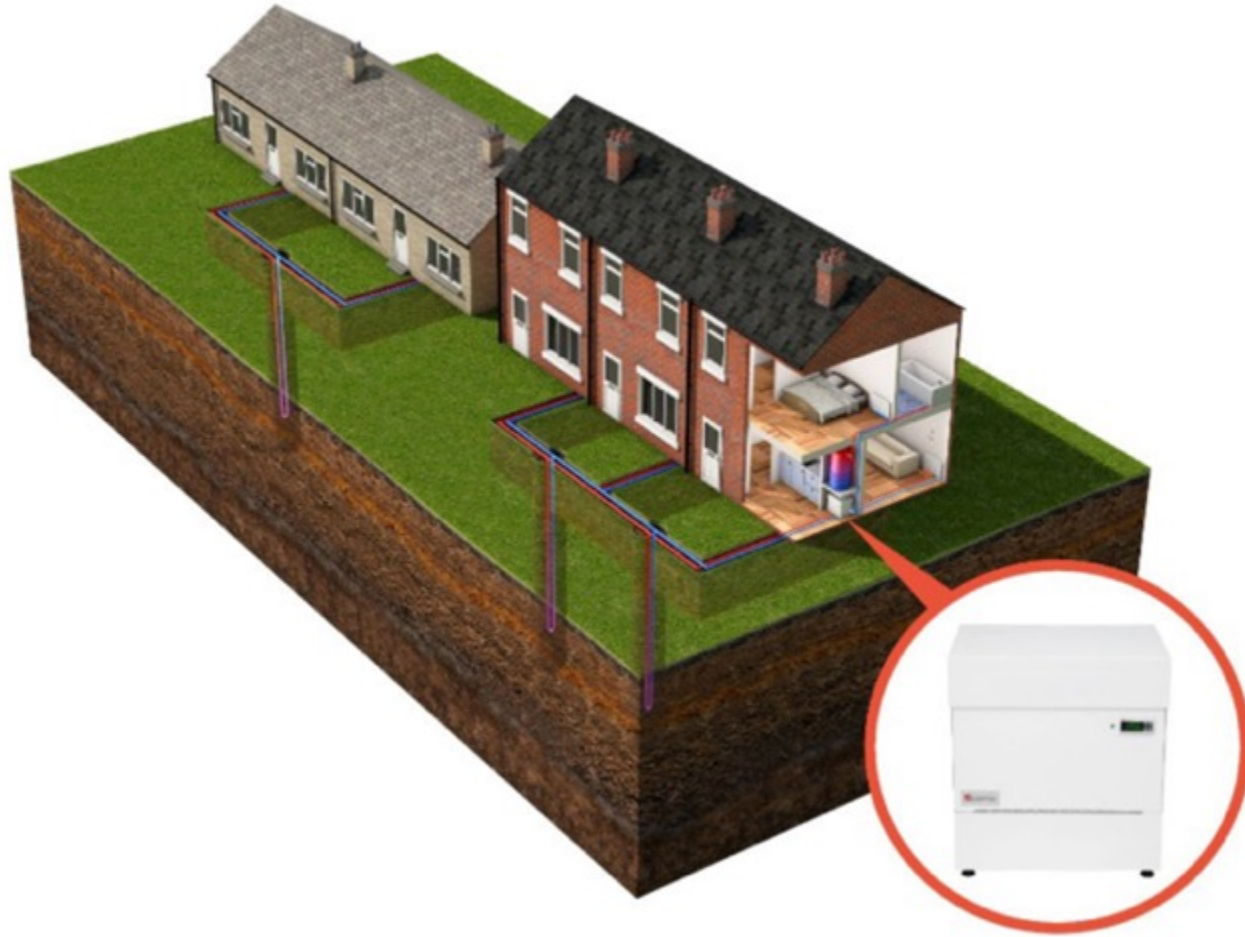
=>

*Reduced net
work loads*



*57 social housing properties
installed & commissioned*

Integrated GSHP/Heat Battery



5 prototypes installed



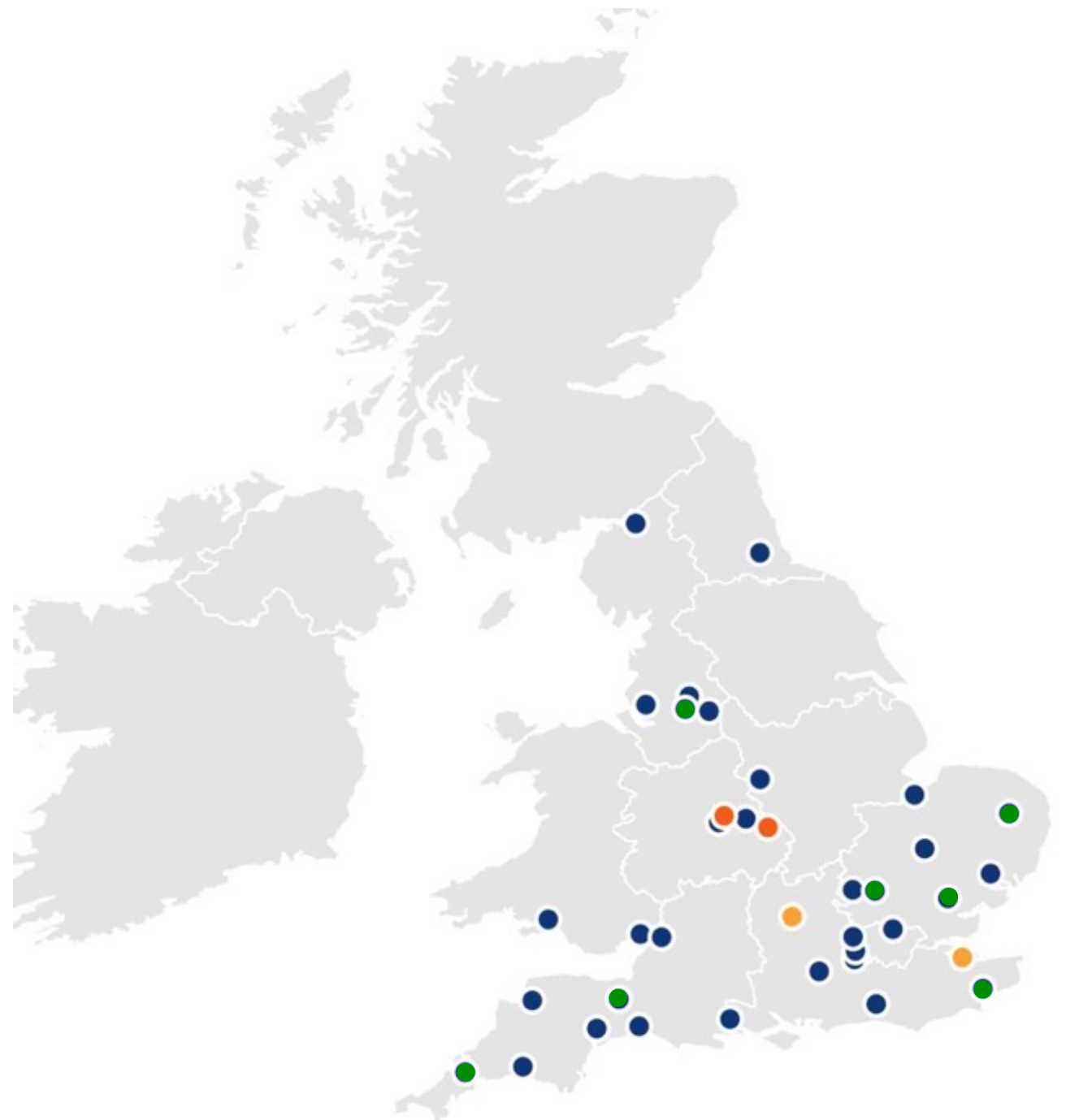
Heat Network – Key messages/learnings

- Heat pumps drive savings of up to 50% for residents, even without smart controls
- Load shifting using building fabric (with Smart Controls) can shift domestic heating, further reduce cost and evening peak load
- Integrated GSHP/Heat Batteries can shift that heat by 12-15 hours to times when grid has spare/unused capacity
- Behavioural change a key part of heat electrification
- Time of use Tariffs are critical to maximise customer savings and change behaviours



Beyond Oxford...

- Up to 40 EDFR sites (Battery + Private Wire)
- Coventry & Birmingham batteries built & operating
- Further 5 sites have investment approval
- Further 8 with planning permission
- Private wires to follow batteries



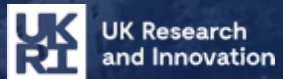


Thank you

ESO Final Report @ energysuperhuboxford.org

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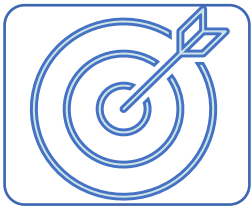
tmould@oxford.gov.uk



Improving Housing Stock Sustainability

Ben Harrison- Sustainable Housing Officer

Context



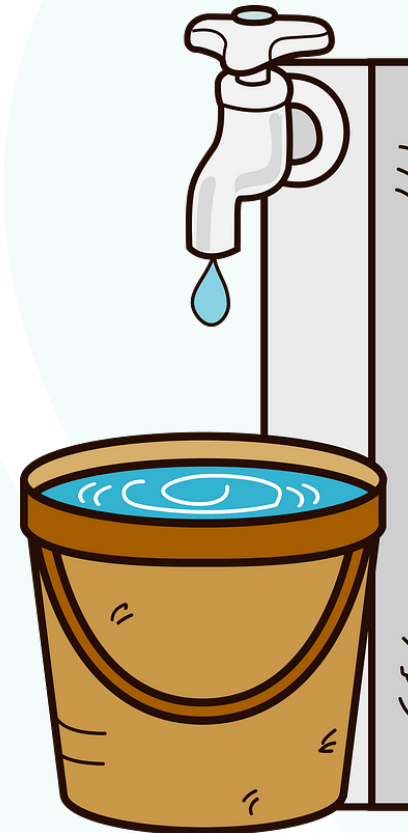
2030 net zero target
6,000 homes



Homes = 45% of emissions
30% of homes below EPC C

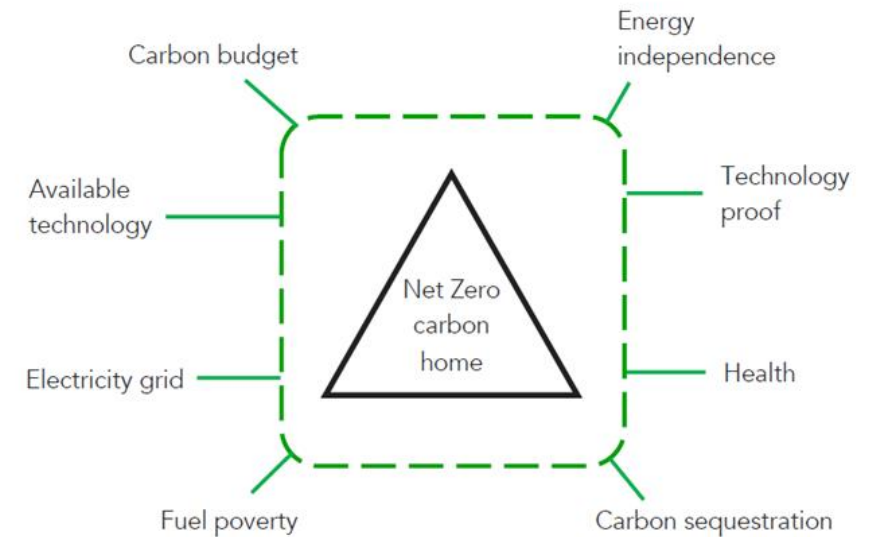


New builds need to be net zero



Why Retrofit?

- **Lettable standards-** EPC D Homes will be unlettable from 2030.
- **Green economy-** £15bn opportunity across Essex.
- **Fuel poverty-** 21% of Essex are currently in fuel poverty.
- **Carbon cost-** One of the biggest sources of Co2 emissions.
- **Health-** Savings to the NHS would pay retrofit back in 9 years.



Retrofit Action Plan and Parity Projects

- Parity Projects software used to obtain baselines and model improvement pathways.
- Retrofit Action Plan created.
- Data is crucial but key central EPC issues are ongoing.



Retrofit Show Home

- Solid wall EPC D 1950s home.
- Partnership with Morgan Sindall for completion by the end of 2023.

Deep retrofit works including:

- External Wall Insulation and Loft Insulation.
- Ventilation Improvements and Tripple Glazing.
- ASHP, Electric Appliances, Solar PV and Battery.
- Smart Controls + Monitoring.
- Grey water recycling and sustainable drainage.



Retrofit Show Home



Funding

- £2.3m SHDF bid for 110 EPC D/E 1950s Solid wall homes.
- SHDF will be 50% match funded. Delivered by March 2025.
- Will reduce bills and Co2 emissions by 30%



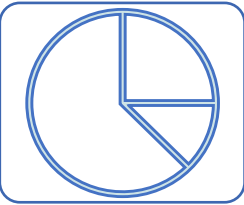
New build

Context



Future Homes Standard

2021 + 2025



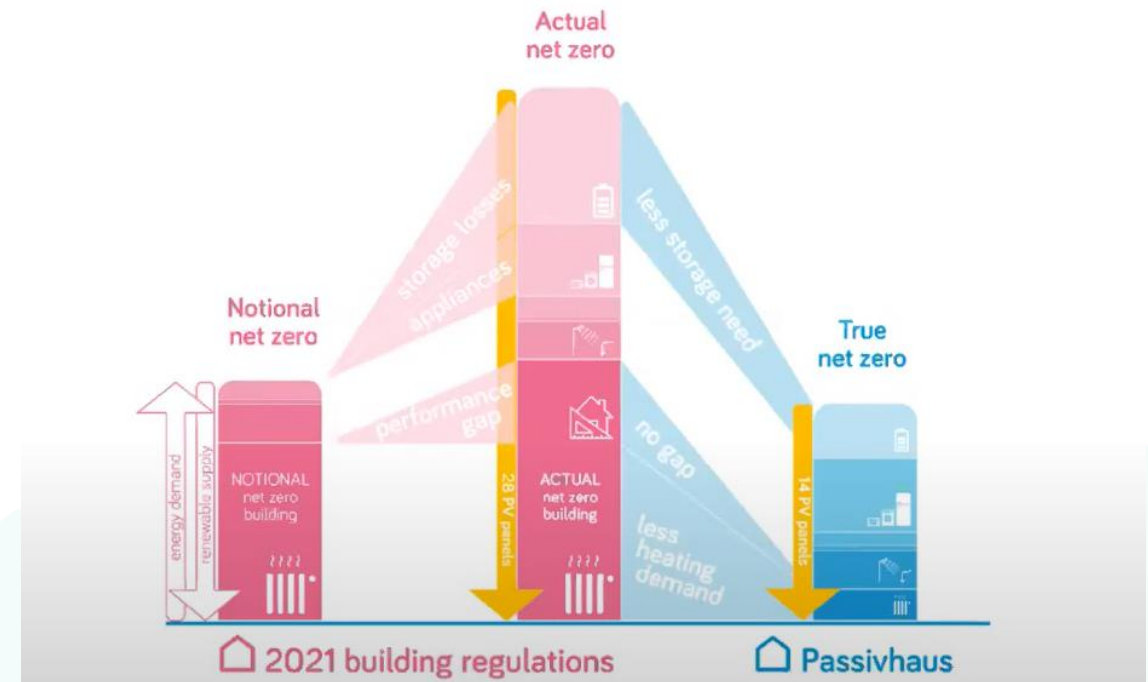
No more Gas Boilers from
2025



Radical standards becoming
more common

Passivhaus

- Fabric First approach
- Ultra-high thermal performance and air quality
- Very low fuel bills
- Reduced rent arrears
- Reduced overheating risk
- Uplift is decreasing (5-8%)
- Best route to delivering **true net zero homes**



Our projects

HRA Phase 3+4 (3 sites)

- **17 Houses 1 Bungalow 20 flats**

Key features:

- FHS 2025 and SAP Net Zero.
- ASHP for houses GSHP for flats.
- Biodiversity enhancement- Swift boxes, hedgehog and badger bypasses, green roof cycle storage.
- EV charging.

Passivhaus Pilot:

- 3 houses across 2 sites for pilot project next year.
- Designed in with in-house Passivhaus Architect.
- Will investigate embodied carbon

Beyond Heating

- Embodied Carbon
- Circular economy
- Sustainable drainage
- Biodiversity
- Electric vehicles

