

Welsh ZE Waste and Recycling Vehicle Programme – RRV Deployment and TCO Tool –

Session Chair, Vicente Jofré

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ZE Waste and Recycling Vehicle Project



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Aims to Accelerate and De-Risk

Access to Support

WG Net-Zero Target

Try Before you Buy

Vehicle Purchase Grant Support

Shared Learning and Dissemination

Objectives for Day

- **Share** learnings from newly deployed eRRVs in NPT
- **Revelation** of the brand-new programme website
- **Discover** new financial tools to help you plan your transition
- **Discuss** exciting plans for FY24/25

Agenda

- 13:15 Welcome and Programme Status
 - 13:25 eRRV Deployment Experiences
 - Opportunity for NPT to share their experience with the Terberg/Electra RRV
 - 13:45 Programme Website Showcase
 - Initial release of new programme website
 - 13:55 Total Cost of Ownership Tool
 - Showcase of the capabilities of this new planning tool for LAs
 - 14:15 Looking Forward to 24/25
 - Highlighting the next support opportunities for 24/25
 - 14:30 Close
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Programme Update

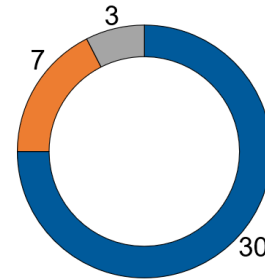


Welsh ULEV – LA Engagement Workshop

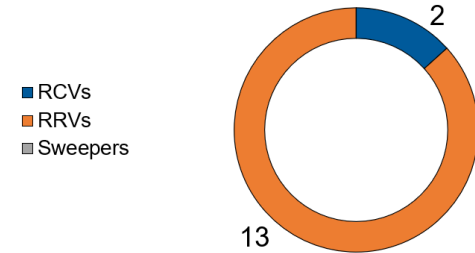
Deployment Status

| Local Authority | Deployed | Potential Procurement |
|-------------------|----------|-----------------------|
| Cardiff | 12 | |
| Carmarthenshire | 3 | |
| Conwy | 4 | 3 |
| Denbighshire | 2 | 3 |
| Flintshire | 2 | |
| Merthyr Tydfil | | 3 |
| Neath Port Talbot | 2 | |
| Newport | 7 | 2 |
| Powys | 1 | |
| Swansea | 3 | |
| Torfaen | 2 | |
| Vale of Glamorgan | | 2 |
| Wrexham | 2 | |

Deployed so far (38)



Potential Procurement (15)



53 Vehicles Delivered or Pending Procurement
13 Different Local Authorities

Deployment Status



26t eRCV

- Providers:
 - Dennis Eagle (26) (2)
 - Electra (3)
 - RVS/E Moss (1)



12t eRRV

- Providers:
 - Romaquip (4) (5)
 - Terberg (3) (8)



eSweeper

- Providers:
 - Bucher (3)

Blue: Deployed
Orange: Potential

Local Authority Updates



Programme Website Showcase



Welsh ULEV – LA Engagement Workshop

New Programme Hub



ULEV PROGRAMME HUB

About Knowledge Hub Performance Updates Vehicle Catalogue FAQs Contact **EN** CY

Waste And Recycling ULEV Programme Hub

Welcome! The Waste and Recycling Ultra-Low Emission Vehicle Programme hub is an online resource created to provide information, guidance, support tools, and updates on the performance of vehicles for Welsh local authorities.

KNOWLEDGE HUB **ABOUT THE PROGRAMME**

Waste and Recycling ULEV Programme

As part of its 2050 path to net zero, the Welsh Government has the ambition to achieve a carbon neutral public sector by 2030.

The Waste and Recycling ULEV Programme provides grant support to Welsh local authorities to accelerate and de-risk the transition to ultra-low and zero emission technologies within Welsh public sector waste fleets.

Total Cost of Ownership Tool



Why is this Useful?

- Full transparency of financial benefits of ULEV transition
- Power to choose how to optimise your fleet operations
- Make the most out of your vehicles

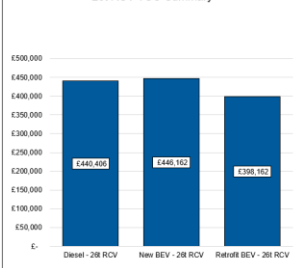
Welsh ULEV – LA Engagement Workshop

Acquire the Knowledge to Transition!

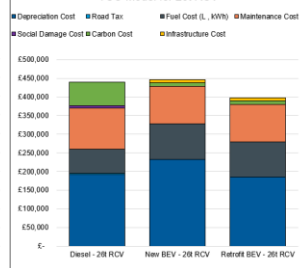
| Lifetime Financial Factors | | | |
|----------------------------------|------------------|-------------------|------------------------|
| | Diesel - 26t RCV | New BEV - 26t RCV | Retrofit BEV - 26t RCV |
| Depreciation Cost | £ 191,541 | £ 233,200 | £ 185,200 |
| Road Tax | £ - | £ 3,150 | £ - |
| Fuel Cost (L, kWh) | £ 66,206 | £ 94,559 | £ 94,559 |
| Maintenance Cost | £ 108,836 | £ 100,347 | £ 100,347 |
| Social Damage Cost | £ 8,703 | £ - | £ - |
| Carbon Cost | £ 83,971 | £ 10,214 | £ 10,214 |
| Infrastructure Cost | £ - | £ 7,842 | £ 7,842 |
| Total Cost of Ownership | £ 440,406 | £ 446,162 | £ 396,162 |
| Capital Cost Infrastructure | £ - | £ 5,658 | £ 5,658 |
| Operating Costs Infrastructure | £ - | £ 2,184 | £ 2,184 |
| Total Infrastructure Cost | £ - | £ 7,842 | £ 7,842 |

| Lifetime Economic Factors | | | |
|-----------------------------|------------------|-------------------|------------------------|
| | Diesel - 26t RCV | New BEV - 26t RCV | Retrofit BEV - 26t RCV |
| Return on Investment (ROI) | - | -1% | 11% |
| CAPEX | £ 203,000 | £ 492,000 | £ 396,000 |
| Avg. yearly OPEX | £ 25,456 | £ 27,844 | £ 27,844 |
| AQ Damage Cost Savings NOx | £ - | £ 6,497 | £ 6,497 |
| AQ Damage Cost Savings PM | £ - | £ 206 | £ 206 |
| Carbon Costs Savings | £ - | £ 53,757 | £ 53,757 |

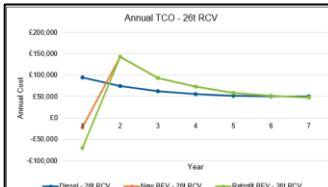
26t RCV TCO Summary



TCO Model for 26t RCV



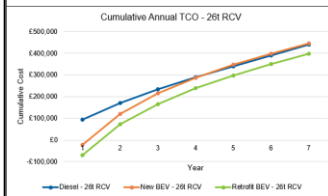
| Battery Use and Vehicle Range | | | | | |
|----------------------------------|---------|-------------|-----------|---------------|-----------|
| Vehicle Assessed: 26t RCV | | | | | |
| | | Average Day | | Max Usage Day | |
| | | Used | Remaining | Used | Remaining |
| Battery use (%) | Average | 57% | 43% | 73% | 27% |
| | Winter | 61% | 39% | 77% | 23% |
| | Summer | 53% | 47% | 69% | 31% |
| Energy Used (kWh) | Average | 155 | 115 | 198 | 72 |
| | Winter | 165 | 105 | 208 | 62 |
| | Summer | 144 | 126 | 187 | 83 |
| Vehicle Range (miles) - Year 1 - | Average | 30.3 | 22.5 | 30.3 | 11.0 |
| | Winter | 30.3 | 19.4 | 30.3 | 9.1 |
| | Summer | 30.3 | 26.6 | 30.3 | 13.5 |
| Vehicle Range (miles) - Year 7 - | Average | 30.3 | 15.2 | 30.3 | 0.7 |
| | Winter | 30.3 | 12.6 | 30.3 | -0.8 |
| | Summer | 30.3 | 18.7 | 30.3 | 2.5 |



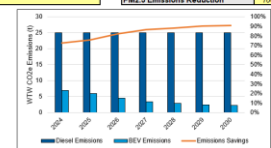
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Diesel - 26t RCV | | | | | | | |
| Depreciation Cost | £88,384 | £45,341 | £30,072 | £19,844 | £13,228 | £8,773 | £5,819 |
| Road Tax | £450 | £450 | £450 | £450 | £450 | £450 | £450 |
| Fuel Cost (L, kWh) | £9,458 | £9,458 | £9,458 | £9,458 | £9,458 | £9,458 | £9,458 |
| Maintenance Cost | £7,059 | £7,059 | £7,059 | £7,059 | £7,059 | £7,059 | £7,059 |
| Social Damage Cost | £356 | £356 | £356 | £356 | £356 | £356 | £356 |
| Carbon Cost | £8,730 | £8,863 | £8,997 | £9,135 | £9,274 | £9,415 | £9,558 |
| Infrastructure Cost | £ - | £ - | £ - | £ - | £ - | £ - | £ - |
| Annual Cost of Ownership | £95,020 | £74,960 | £62,656 | £55,496 | £51,749 | £50,266 | £50,266 |
| Cumulative - Annual Cost of Ownership | £95,020 | £169,860 | £232,636 | £288,132 | £339,889 | £390,148 | £440,434 |

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| New BEV - 26t RCV | | | | | | | |
| Depreciation Cost | £46,127 | £118,675 | £70,464 | £41,838 | £24,842 | £14,750 | £8,758 |
| Road Tax | £ - | £ - | £ - | £ - | £ - | £ - | £ - |
| Energy Cost (kWh) | £13,508 | £13,508 | £13,508 | £13,508 | £13,508 | £13,508 | £13,508 |
| Maintenance Cost | £7,059 | £7,059 | £7,059 | £7,059 | £7,059 | £7,059 | £7,059 |
| Social Damage Cost | £ - | £ - | £ - | £ - | £ - | £ - | £ - |
| Carbon Cost | £2,410 | £2,123 | £1,610 | £1,218 | £1,072 | £919 | £861 |
| Infrastructure Cost | £1,120 | £1,120 | £1,120 | £1,120 | £1,120 | £1,120 | £1,120 |
| Annual Cost of Ownership | £22,027 | £142,489 | £93,765 | £73,237 | £58,925 | £51,511 | £48,291 |
| Cumulative - Annual Cost of Ownership | £22,027 | £120,462 | £214,227 | £287,464 | £346,389 | £397,899 | £446,190 |

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Retrofit BEV - 26t RCV | | | | | | | |
| Depreciation Cost | £94,127 | £118,675 | £70,464 | £41,838 | £24,842 | £14,750 | £8,758 |
| Road Tax | £ - | £ - | £ - | £ - | £ - | £ - | £ - |
| Energy Cost (kWh) | £13,508 | £13,508 | £13,508 | £13,508 | £13,508 | £13,508 | £13,508 |
| Maintenance Cost | £7,059 | £7,059 | £7,059 | £7,059 | £7,059 | £7,059 | £7,059 |
| Social Damage Cost | £ - | £ - | £ - | £ - | £ - | £ - | £ - |
| Carbon Cost | £2,410 | £2,123 | £1,610 | £1,218 | £1,072 | £919 | £861 |
| Infrastructure Cost | £1,120 | £1,120 | £1,120 | £1,120 | £1,120 | £1,120 | £1,120 |
| Annual Cost of Ownership | £70,227 | £142,489 | £93,765 | £73,237 | £58,925 | £51,511 | £48,291 |
| Cumulative - Annual Cost of Ownership | £70,227 | £212,462 | £306,227 | £379,464 | £438,389 | £489,899 | £538,190 |



| Vehicle Assessed: 26t RCV | | | | | | | | | | | |
|---------------------------------|--|------------------|-------------------|------------------------|---|-------|-------|-------|-------|-------|-------|
| Vehicle Emissions | | Diesel - 26t RCV | New BEV - 26t RCV | Retrofit BEV - 26t RCV | Yearly Vehicle Emissions | | | | | | |
| Lifetime WTW CO2e Emissions (t) | | 174.9 | 28.2 | 28.2 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| Lifetime NCO Emissions (kg) | | 509.7 | 0.0 | 0.0 | 72.6 | 72.6 | 72.6 | 72.6 | 72.6 | 72.6 | 72.6 |
| Lifetime PM2.5 Emissions (g) | | 2,231.0 | 0.0 | 0.0 | 318.7 | 318.7 | 318.7 | 318.7 | 318.7 | 318.7 | 318.7 |
| WTW CO2e Emissions (t) | | 174.9 | 28.2 | 28.2 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 |
| NCO Emissions (kg) | | 509.7 | 0.0 | 0.0 | 72.6 | 72.6 | 72.6 | 72.6 | 72.6 | 72.6 | 72.6 |
| PM2.5 Emissions (g) | | 2,231.0 | 0.0 | 0.0 | 318.7 | 318.7 | 318.7 | 318.7 | 318.7 | 318.7 | 318.7 |
| WTW CO2e Emissions (t) | | 6.9 | 6.0 | 4.5 | 3.3 | 2.9 | 2.4 | 2.2 | 2.2 | 2.2 | 2.2 |
| NCO Emissions (kg) | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| PM2.5 Emissions (g) | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Emission Savings | | | | | Transition from Diesel to BEV with Grid Electricity | | | | | | |
| WTW CO2e Emissions (t) | | 146.5 | 146.5 | 146.5 | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| NCO Emissions (kg) | | 509.7 | 0.0 | 0.0 | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| PM2.5 Emissions (g) | | 2,231.0 | 0.0 | 0.0 | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| WTW CO2e Emissions Reduction | | 84% | 84% | 84% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| NCO Emissions Reduction | | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| PM2.5 Emissions Reduction | | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Yearly Emission Savings | | | | | Yearly Emission Savings | | | | | | |
| WTW CO2e Emissions (t) | | 18.7 | 19.0 | 20.5 | 21.8 | 22.7 | 22.5 | 22.7 | 22.7 | 22.7 | 22.7 |
| NCO Emissions (kg) | | 72.6 | 72.6 | 72.6 | 72.6 | 72.6 | 72.6 | 72.6 | 72.6 | 72.6 | 72.6 |
| PM2.5 Emissions (g) | | 318.7 | 318.7 | 318.7 | 318.7 | 318.7 | 318.7 | 318.7 | 318.7 | 318.7 | 318.7 |
| WTW CO2e Emissions Reduction | | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| NCO Emissions Reduction | | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| PM2.5 Emissions Reduction | | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |



Looking Forward to 24/25



2021 to 2024 Project Activity

2021/22

Programme Start-up
and Early Learning

- Est. data availability
- Data collection protocols
- Analysis routines
- Internal performance reporting

2022/23

Creating Knowledge
Resources and Insights

- Quarterly reports
- Vehicle performance and planning models
- Cost analysis
- Vehicle catalogue

2023/24

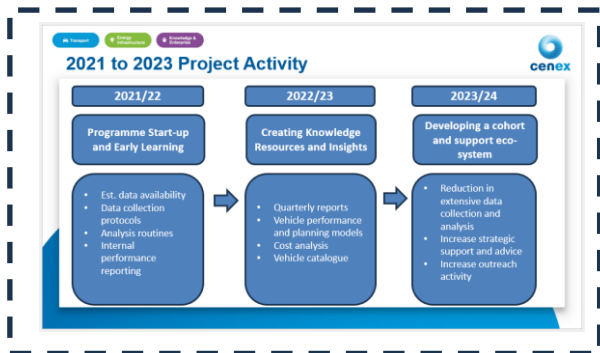
Developing a Support
Eco-system and
Cohort

- Provide strategic support and advice
- Increase outreach and joint learning

2023/24 Delivery Items

| Item | Notes |
|---|---|
| Quarterly workshops and newsletters | Increase engagement and outreach. Allow LAs to share implementation experience and best practice. |
| Project knowledge hub | Improved, dedicated one stop shop for all past, current and future project activity and information. |
| Procurement and implementation support | Procurement checklists, resources and 1:1 support. |
| Business case support tools | Spreadsheet and documents to aid better procurement and deployment decisions |
| Vehicle performance monitoring and data collection | Time allocated reduced by ~ 50% compared to 22/23. Focus on new vehicles and vehicle types. Publish public reports. |

2024/25 Work programme feedback



2024/25 Leading by Example

| Continue | New areas | Potential activity |
|--|---|---|
| Performance reporting (6-monthly) | RRV vehicle performance model | Reliability data collection and reporting |
| Quarterly workshops | Programme Teams channel | |
| Quarterly newsletters | Case study support – development of fleet and infrastructure strategies | |
| Procurement check list and 1-1 support | Case study support – procurement and implementation | |
| | Case study support – disseminate case study processes and analysis through workshops for joint learning | |

Thank you for your time!

Contacts for Grant Applications

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Contacts for Planning and Implementation Advice

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Thank you for listening

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