Rural Policy Centre Research Briefing

October 2024 (RPC RB 2024/10)

BATTERY USE IN SCOTLAND NOW AND IN THE FUTURE – PHASE 3[1]

Ricardo Energy and Environment[2]

Key Message: Huge increases in domestic and global demand for lithium-ion battery manufacturing. Scottish & UK governments and industry collaboration needed to discuss battery cell re-use, recycling opportunities and waste. [28 words]

Main Findings [94 words]

- UK and Scottish governments have policies to de-carbonise transportation.
- Global demand for lithium-ion batteries will increase to 2000GWh (2028) (from 19GWh in 2010).
- UK battery manufacturing capacity currently 2GWh but needs to increase to 140GWh by 2040 to support British car manufacturing and transportation industries.
- EV batteries reach end-of-life stage when at 80% of original capacity. 5% currently recycled in Europe, with no dedicated facilities in Scotland or rUK.
- No standardisation nor collaboration within OEM battery manufacturers, 3rd party users (EV manufactures, power grid operators etc) and independent recyclers making re-use and re-cycling difficult.

Introduction [37 words]

UK government is outlawing sales of new I.C.E cars by 2030. Scottish Government has additional Net-Zero by 2045 policies (50% of transport to be from renewables by 2030), increasing demand for EV's and batteries and potential waste.

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[1] "Battery use in Scotland now and in the future, Phase 3" (https://cdn.zerowastescotland.org.uk/managed-downloads/mf-ktaoblk2-1677512134d) primarily focusses on batteries within EV's. The report was conducted by Ricardo Environmental Consultancy on behalf of Zero Waste Scotland, Transport Scotland and Scottish Enterprise.
The report was funded by The Scottish Government, to assist in achieving its aim of Scotland becoming net-zero by 2045. For more information please see Policy: Climate Change (https://www.gov.scot/policies/climate-change/)

[2] Ricardo Group - Environmental Consultancy (email: info@ricardo.com) (tel: +44 (0)1273 455611)
(web: https://www.ricardo.com/en/services/environmental-consulting)

Methods [21 words]

Limitations: When no Scottish specific data, UK data divided by Scotland's share of UK population (8.28%)

Main research:

Literature review

Year	Author	Document type	Report Title
2021	British Standards Institution	Report	PAS 7060: Electric vehicles – Safe and environmentally-conscious design and use of batteries – Guide
2014	Gaines	Article	The future of automotive Li-ion battery recycling: Charting a sustainable course
2018	Martinez-Laserna, et al.	Article	Battery second-life: Hype, hope or reality? A critical review of the state of the art
2021	The Climate Group	Report	Progress and Insights Report
2020	The Faraday Institution	Report	High-energy battery technologies
2020	The Faraday Institution	Report	The importance of coherent regulatory and policy strategies for the recycling of EV batteries
2019	World Economic Forum	White Paper	A Vision for a Sustainable Battery Value Chain in 2030

Figure 1 – Literature review sources

Stakeholder Engagement

Stakeholder Type	Number invited to interview	Reason for selection	Number of interviews completed
Regulators	3	Insights on regulatory environment	2
Trade Associations	2	Trends and market growth, regulatory environment	1
Compliance Schemes	5	Insights on policy & market trends	4
Manufacturers	9	Information on current research and novel technologies. Trends and market growth	2
Academia	4	Information on current research and novel technologies	4
Recyclers	2	Insights on recycling & reuse of current and new technologies, Trends and market growth	1

Figure 2 – Stakeholder engagement sources

Results

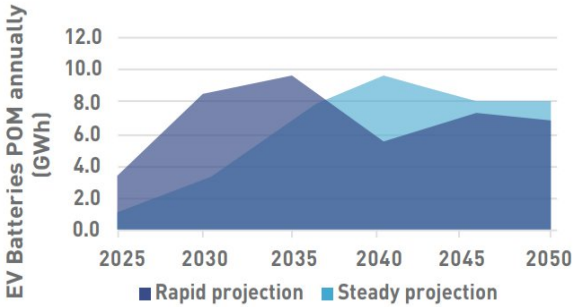

Figure 3 – (Scotland) Projection of EV batteries placed on market (POM)

- 2040, ~6-9GWh of batteries needed per year [7 words]

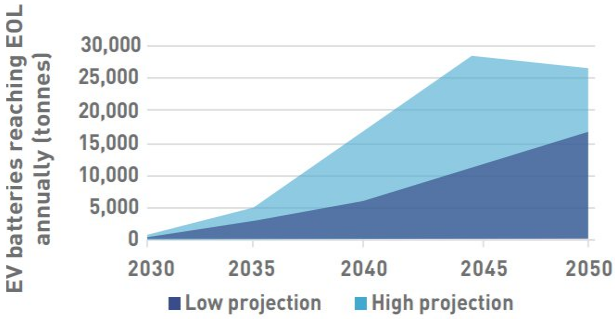

Figure 4 - (Scotland) Projection of amount of EV batteries reaching first end of life

- 2040, ~6000-16,000 tonnes of batteries reaching EOL [7 words]

Policy Implications [56 words]

Update EPR scheme for battery manufacturers and introduce targets to increase recycling.

BSI recommendations for battery standardisations needs implemented to increase battery re-use.

Potential for Scotland to facilitate second life battery re-use by testing and grading batteries, potential battery re-use in renewable energy storage.

Immediate term, little scope for Scottish based Gigafactory, but potential longer term.

250 words

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