Cross-Sector Battery Showcase – Advancing Innovation Across Industries

26 March | 9 am - 4 pm, Leicester
Increasing Talent and Skills across the ecosystem

**National Electrification Skills Framework & Forum (NESFF)**

https://ershub.co.uk

**No Limits**

https://nolimits.ukri.org

https://iuk.ktn-uk.org/programme/workforce-foresighting/
Faraday Battery Challenge

Cross-Sector Battery Showcase 26.03.24

Tony Harper, Challenge Director
Our Vision

The Government’s 2030 vision is for the UK to have a globally competitive battery supply chain that supports economic prosperity and the net zero transition. The UK will be a world leader in sustainable design, manufacture, and use, underpinned by a thriving battery innovation ecosystem.
Battery Eco-System: Where are we today?
Today’s cell production capacity (announced) vs projected 2030 demand

Sector

- Light duty automotive
- Heavy duty automotive
- Energy storage
- Off highway
- Aerospace
- Maritime
- Rail

Demand

AESC Capacity

Agratas Capacity

2030 Demand

Today’s cell production capacity (announced) vs projected 2030 demand

- 90 GWh
- 5 GWh
- 4-8 GWh
- <2 GWh

Delivered by Innovate UK
Today's cell production capacity (announced) vs projected 2035 demand

**Sector**
- Light duty automotive
- Heavy duty automotive
- Energy storage
- Off highway
- Aerospace
- Maritime
- Rail

Today's cell production capacity (announced) vs projected 2035 demand:

- **Demand**
- **AESC Capacity**
- **Agratas Capacity**

<table>
<thead>
<tr>
<th>Sector</th>
<th>2035 Demand</th>
<th>Today's Cell Production Capacity (announced)</th>
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<tbody>
<tr>
<td>Light duty</td>
<td>120 GWh</td>
<td>120 GWh</td>
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<tr>
<td>Heavy duty</td>
<td>9 GWh</td>
<td>9 GWh</td>
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<tr>
<td>Off highway</td>
<td>4-8 GWh</td>
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<td>Aerospace</td>
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<td>Maritime</td>
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**Delivered by Innovate UK**
Future Challenges & Opportunities

Circa. 90GWh annual production required by 2030

Pack Level energy density requirements 2030 UK vehicle production.

Overlap with All-Electric Flight

1 GWh
Supercars

18 GWh
Luxury Large Sedans & SUVs

60 GWh
High Volume Cars, Small SUVs & Vans

1.5 GWh
Sports & Perf. cars

10 GWh
Urban Utility

Overlap with Static Storage

LMFP 2025

NMC 2025

Wh/kg

Wh/l

200 250 300 350 400 450 500

Requirement for high gravimetric energy density solution e.g. LiS

Likely market entry point for SSB

No obvious High-Volume Market

Opportunity for low-cost, highly sustainable “good enough” performance solutions e.g. Na Ion

CIRCA. 90GWH ANNUAL PRODUCTION REQUIRED BY 2030

PACK LEVEL ENERGY DENSITY REQUIREMENTS 2030 UK VEHICLE PRODUCTION.

1 GWH
SUPERCAPS

18 GWH
LUXURY LARGE SEDANS & SUVs

60 GWH
HIGH VOLUME CARS, SMALL SUVs & VANS

1.5 GWH
SPORTS & PERF. CARS

10 GWH
URBAN UTILITY

OVERLAP WITH STATIC STORAGE

LMFP 2025

NMC 2025

WH/KG

WH/L

200 250 300 350 400 450 500

REQUIREMENT FOR HIGH GRAVIMETRIC ENERGY DENSITY SOLUTION E.G. LI S

LIKELY MARKET ENTRY POINT FOR SSB

NO OBVIOUS HIGH-VOLUME MARKET

OPPORTUNITY FOR LOW-COST, HIGHLY SUSTAINABLE “GOOD ENOUGH” PERFORMANCE SOLUTIONS E.G. NA ION

BENCHMARK DATA COURTESY OF BATTERYDESIGN.NET
Future Challenges & Opportunities

Scale up and industrialise sustainable UK Anode capacity. (Gr & Si/Gr)

Research & Develop Bio-based electrode materials

Research & Develop Cost effective UK manufacture of low/intermediate volume specialist CAM

Research & Develop Cost effective UK manufacture of low GWh/Pa battery cell volume

Research & Develop “Design to cost” chemistries and manufacturing processes.

Research, Develop & Scale up Decarbonising cell manufacture
Future Challenges & Opportunities

Mining & Processing

- Scale up & Industrialise UK Li Extraction and Processing

Research & Develop Recycling Processes for Next-gen Chemistries.

Recycling

- Research, Develop & Scale-up Decarbonising upstream Material Processing

- Exploit the UK’s “Mass Balance” Advantage

Skills

- New Skill, Re-skill, Up-skill Programmes at Scale
Future Challenges & Opportunities

Sodium Ion
Research, Develop, Scale-up UK upstream supply chain for Sodium Ion

Li Metal
Research & Develop sustainable, cost effective , high throughput production processes for Li metal anodes.

Software & AI
Research & Develop and scale-up Lithium Sulfur batteries.

Large-scale deployment of AI for material discovery
Future Challenges & Opportunities

- **Production Equipment**: Develop and Scale-Up a UK Battery Production equipment capability
- **Battery Systems**: Develop and Scale-up novel cell to pack/cell to vehicle concepts.
- **Access to finance**: Interventions to catalyse scale-up investment
- **Large-scale R&D**: Attract Global battery R&D centres in the UK

Delivered by Innovate UK
Find out more about the Faraday Battery Challenge
Thank You!

Faraday Battery Challenge
The Cross-Sector Battery Systems Innovation Network

Anna Wise – Head of Strategy, Nyobolt

Kevin Brundish – CEO, LionVolt
CSBS Innovation Network

Mission
To create an open and collaborative cross-sectoral community for researchers and innovators in battery manufacturing (including next generation batteries), the related supply chain and end-users.

Objectives
• **Open new markets for the battery industry**, by introducing this community to new sectors, thus support the growth of the UK economy;

• **Promote innovation in batteries** by identifying technical gaps for their introduction to various sectors;

• **Help decarbonise a wide range of end-users** from rail, maritime, aviation, construction etc. by enabling the adoption of batteries thus supporting the Net Zero agenda.
CSBS Innovation Network - Structure

Working Group
Kevin Brundish – Chair, Anna Wise – Deputy Chair, Nikoleta Piperidou – Project Lead, Sheena Hindocha – Project Co-Lead, Neelam Mughal – Project Co-Lead

Advisory Board
Working Group, Innovate UK, Delta Cosworth, DSTL, RIA, ATI, EMR Faraday Institution

Membership
5450 members from different parts of the supply chain, end use industries and supporting industries

Working Group
Propose, develop and deliver network activities to meet objectives and drive membership. Monthly meetings

Advisory Board
Represent the membership, shape future direction and activity, share challenges and opportunities from their community. Quarterly meetings

Membership
Engage with communications, share challenges and opportunities, connect and collaborate with each other
Connect with the CSBS Innovation Network

Stay informed: Sign up to our newsletter for news, insights, funding opportunities and future sessions

Connect: Register to the platform and share your challenges and solutions with other members in the networking hub

Showcase your capabilities: Explore our landscape map and add your organization
Connect with the CSBS Innovation Network

Hear expert views: Listen to our Battery Caffe Podcast series

Read the Vision: Download the Battery Recycling Industry Vision
Cross-Sector Targets Work led by WMG

- Initial discussion and framing work as a result of the early CSBS group
- Martin Dowson at WMG and his team led the report
- First draft of the targets were validated through a workshop led by the CSBS group
- The launch of the report was held as part of the launch of the Innovation Network

Objective 1: open new markets for the battery industry
Objective 2: promote innovation in batteries
Objective 3: help decarbonise a wide range of end-users
Join the CSBS Innovation Network

linktr.ee/innovateuk