The webinar will commence shortly

Advanced Module & Pack Assembly: Exploring UKBIC's Capabilities and Lessons Learned

23 September 2025

Presenter:

Andrew Britton

Business Development Manager

Protocols for webinar

- To ask questions, use the Q&A function on Teams
- We'll try to get through as many questions as we can once the presentation has ended
- If you want to contact UKBIC after the webinar, you can email sales@ukbic.co.uk or info@ukbic.co.uk
- If you're a potential supplier, use suppliers@ukbic.co.uk
- A copy of the slides and a recording of the presentation will be available via UKBIC's website from 24th September.

UK BATTERY INDUSTRIALISATION CENTRE

Advanced Module & Pack Assembly: Exploring UKBIC's Capabilities and Lessons Learned

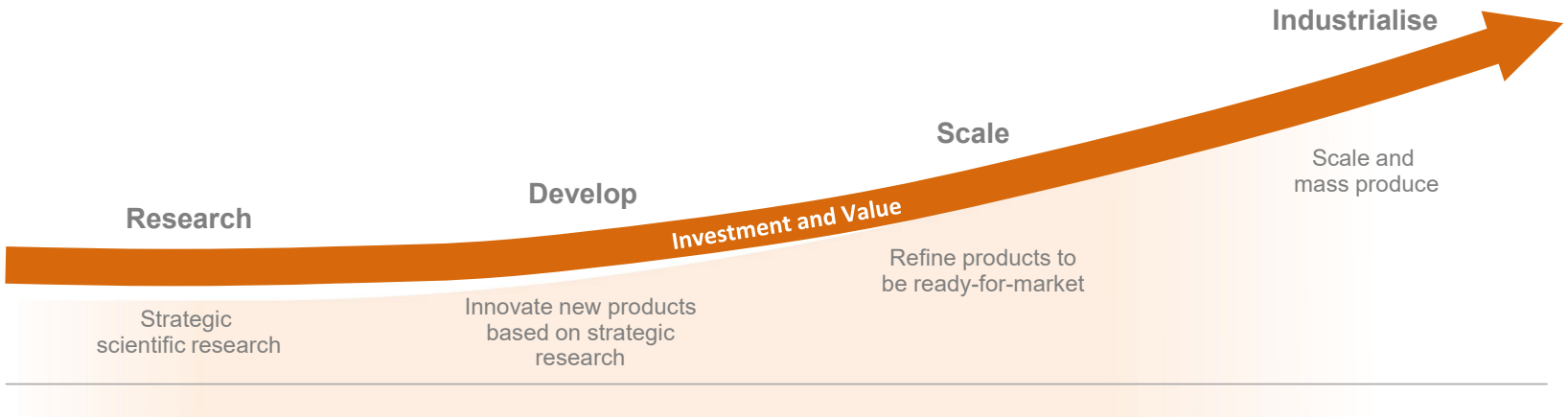
Andrew Britton, Business Development Manager

Agenda

UKBIC Introduction

Webinar: Advanced Module & Pack Assembly: Exploring UKBIC's Capabilities and Lessons Learned

The UK ecosystem



UK Research and Innovation
Battery Innovation Programme

THE FARADAY INSTITUTION
Building a Science Superpower

Collaborative R&D
Scaling high-tech businesses

UK BATTERY INDUSTRIALISATION CENTRE
Open access scale up with Gigafactory capability

ADVANCED PROPULSION CENTRE UK
Automotive Transformation Fund

ADVANCED PROPULSION CENTRE UK

Battery Innovation Programme
£1.1 billion over 12 years
2018-2030

Bridging the gap – industry needs

UKBIC | Gigafactory

Scale	Gram	Kilogram	10s Kilograms	100s Kilograms	Kilotonne
Example: mixing	 1 litre	 10 litre	 15-40 litre	 250 litre	 >1000 litres
Technology readiness	TRL1 Principles & research; TRL2 Explore applications	TRL3 Analytical experiments; TRL4 Validation & requirements	TRL5 Design & performance; TRL6 Model & prototype	TRL7 Performance & testing; TRL8 Test & demonstrate	TRL9 Real world & launch
Industry needs	▪ Ability to conduct basic battery research and to identify next generation materials. ▪ Ability to prove battery materials and components at gram scale and lower costs. ▪ Lead UK's early-stage materials and technology innovations.	▪ Piloting equipment capable of manufacturing 10s-100 cells, used in early-stage product development and validation activities. ▪ Facility which is capable of manufacturing several different cell chemistries and formats. ▪ Product design capability and scalability, manufacturability, quality knowledge of battery manufacturing.	▪ Equipment and knowledge capable of manufacturing 100s-1000 cells, used for product development, validation and commercial activities. ▪ Needs for process development, product quality, repeatability knowledge during scale-up. ▪ Ability to innovate and learn quickly on known equipment/ technologies.	▪ Ability to de-risk product and commercial investment before move to kilotonne scale. ▪ Verification and validation the products are fit of scale/market. ▪ Proof of product scalability. ▪ Proof of reproducibility and repeatability. ▪ Refinement of production processes and systems integration.	▪ Grow UKs gigafactory capacity to meet volume demands from industry, e.g. automotive, energy storage, etc. ▪ Increase investment in the UK's battery manufacturing sector.

UKBIC Industrial Scale-up Line (ISL)

Today's webinar

Electrode – anode	Cell Assembly (pouch, cylindrical)	Formation, Age & Test	Module	Pack
Electrode – cathode				

Mixing → Coating and Drying → Calendering → Slitting → Assembly → Formation, Age & Test → Module Assembly → Pack Assembly

- Manufacturing research facility based near Coventry
- Open to organisations looking to scale technology
- Access giga-scale equipment to de-risk commercial investment
- Trial and validation at industrial scale, speed and quality
- Available to any sectors looking to scale battery technologies
- Customers retain full ownership of their IP developed at UKBIC
- Delivering skills, training and knowledge transfer for the UK

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Webinar: Advanced Module & Pack Assembly: Exploring UKBIC's Capabilities and Lessons Learned

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UK BATTERY INDUSTRIALISATION CENTRE

Sectors we work with

Tier 1 suppliers

Equipment manufacturers

Automotive OEMs

Energy storage

Off-highway

Rail

Marine

Aerospace

Defence

What services does our M&P line provide?

Assembly
Of modules and packs using our facilities

Development
Of manufacturing processes for industrialisation

Testing
Of your technology from prototype to volume scale

Conducting experiments
and research and development

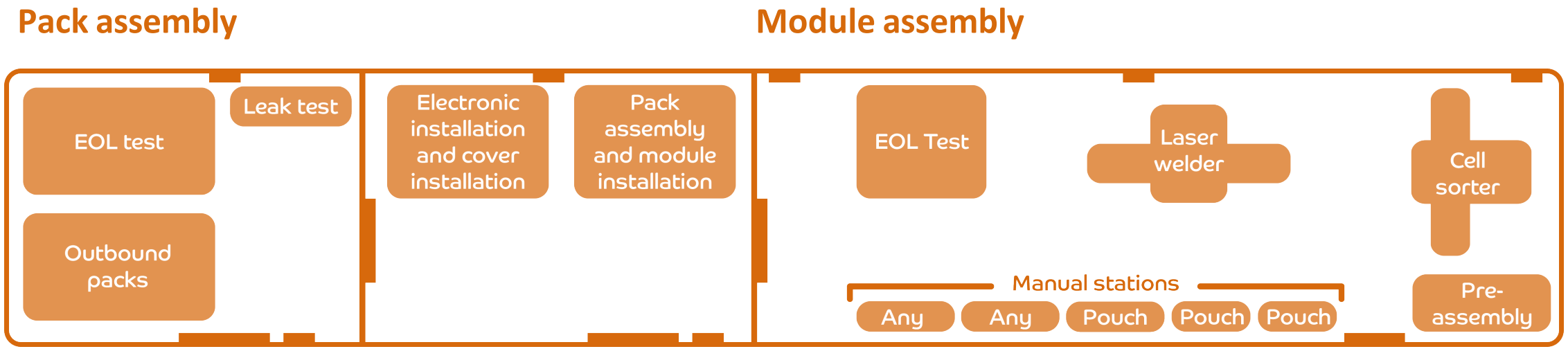
Full traceability
Of process steps

Keep IP ownership
UKBIC does not take a share

Upskilling your workforce
Alongside our skilled, specialist staff

Practising safe working
With guidance from our trained staff

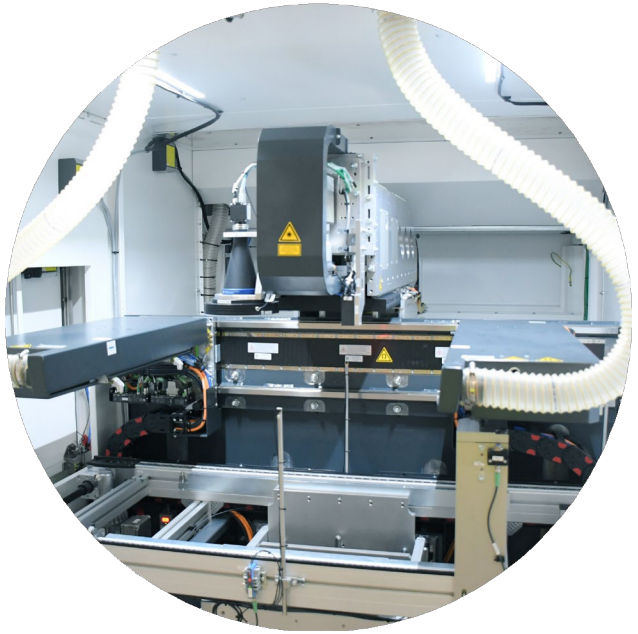
Layout UKBIC's module & pack line




AVL

Laser welding

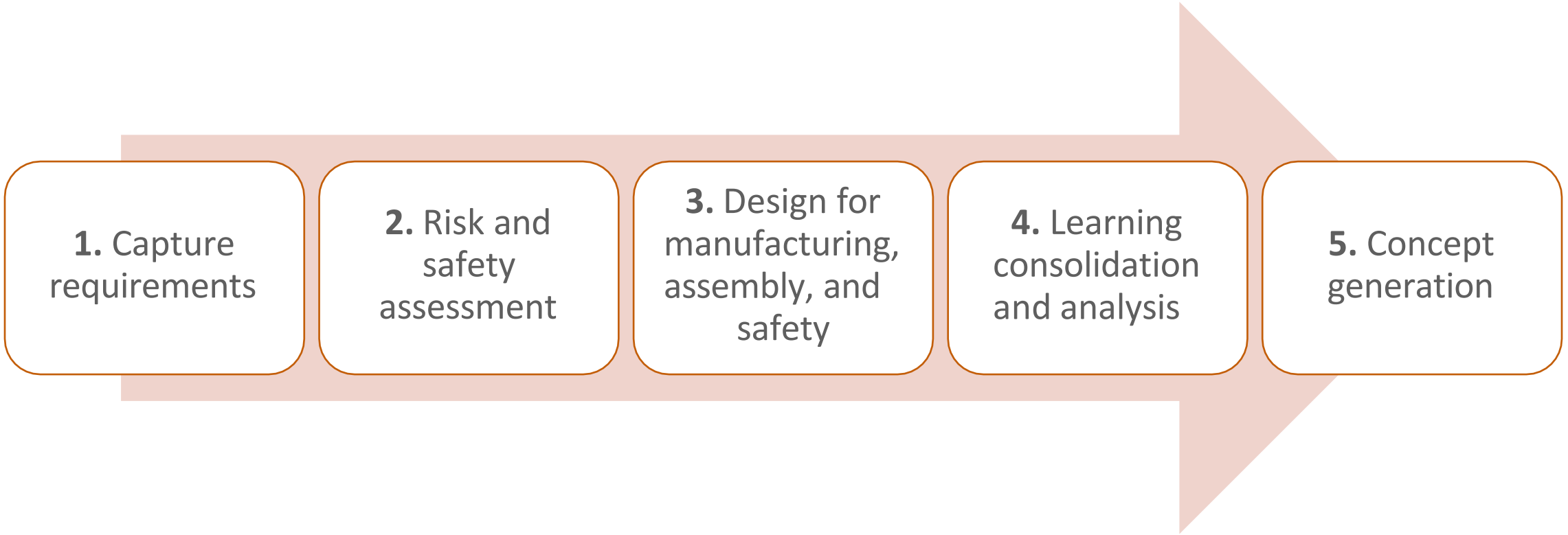
- Ultra-fast welding speed
- Laser class: 4
- 1kW fibre laser
- Wavelength: 1080nm
- Finger clamping system
- Inline metrology system



End-of-line testing

- **Testing for**
  - Balancing
  - Capacity
  - Impedance
  - Internal resistance
  - Isolation
  - Power
  - Software communication
  - Sensor calibration
  - Voltage
- **Module**
  - Maximum power: 40 kW
  - Maximum voltage: 60V
  - Maximum current: 770A
- **Pack**
  - Maximum power: 500 kW (continuous)
  - Maximum voltage: 1200Vdc (continuous)
  - Maximum current: 800A (continuous)

Design for Manufacture (DfM) and Design for Assembly (DfA) at UKBIC



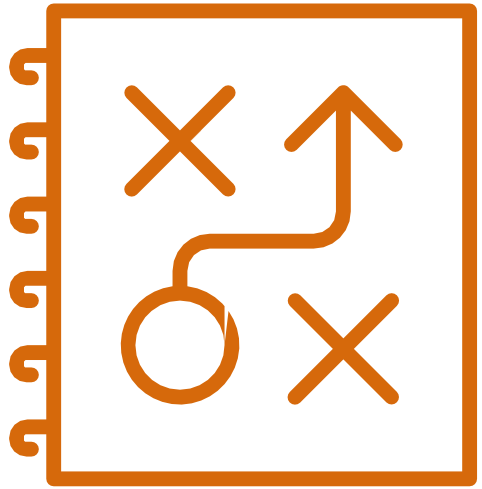
Customer case study: typical engagement

- **Customer A is:**
  - Large organisation
  - Looking to build own battery packs for the first time
- **They wanted us to:**
  - Assemble prototype packs
  - Using already designed and developed modules
  - Carry out end of line testing

Customer case study: typical engagement

- **Reality was:**
  - Design was sub-optimal
  - Product didn’t fit together
  - Fundamental flaws in supplied components

- **The project changed from build to print to:**
  - R&D consultancy
  - Design for manufacture
  - Physical component modification
  - EOL test protocol development



Customer case study: typical engagement

- **What we did:**
  - 12-month programme of working to resolve issues
  - Produced quality components
  - Fully documented SWIs
  - Assembled 50 packs

- **Outcomes:**
  - Demonstrating capability at UKBIC enabled client to get sign off to build their own facility
  - Facility opened in late 2023, with the last pack built at UKBIC in December 2023

Lessons learnt

1

Freeze your design
Reworking things we've already done can be costly

2

Nail down your supply chain before you start the project
Failure to do this leads to parts shortages during the assembly operation which is costly and shreds timing plans

3

Train your staff alongside the project
The need for a trained workforce

Training available

Familiarisation of Battery Manufacturing Module & Pack Design

£900 excluding VAT

This course is designed to introduce the decisions undertaken which impact the design philosophy for modules and packs. The course gives delegates an insight into which choices are made, and why and how they impact the final look and characteristics of the module and pack

Introduction to Battery Manufacturing

£750 excluding VAT

This course is designed to provide an introduction to battery manufacture and use and the essential role battery storage plays as part of Net Zero the movement away from fossil fuels to renewable or low carbon energy.

Summary

- Unique **safe and secure** facility for developing processes in a production representative environment
- Access to **skilled engineering** and technical staff to guide your development
- We can conduct **DfM/DfA studies** to ensure your product is optimised for efficient manufacturing
- Design for Disassembly to ensure the product can be efficiently and cost effectively recycled at end of life
- We have **space to install additional production facilities** for higher volumes if required
- We **don't seek to own any IP** when we work with clients
- We can **train** your employees
- **ISO9001** and **ISO14001** certified

Upcoming webinar: Battery trendspotting: The view from UKBIC's CTO

October 2025

Presented by:

Richard LeCain

CTO

The Business Development team

Naseer Ahmed
Commercial Director

Yahya Alvar
Head of Business Development

Andrew Britton
Business Development Manager

Richard Lockwood
Business Development Manager

Meet us at

Institution of MECHANICAL ENGINEERS

21st Oct, Warwickshire, UK

Speaker: Andrew Britton
Presentation title: The opportunities and Lessons learned in battery manufacturing scale-up

Battery Tech Expo

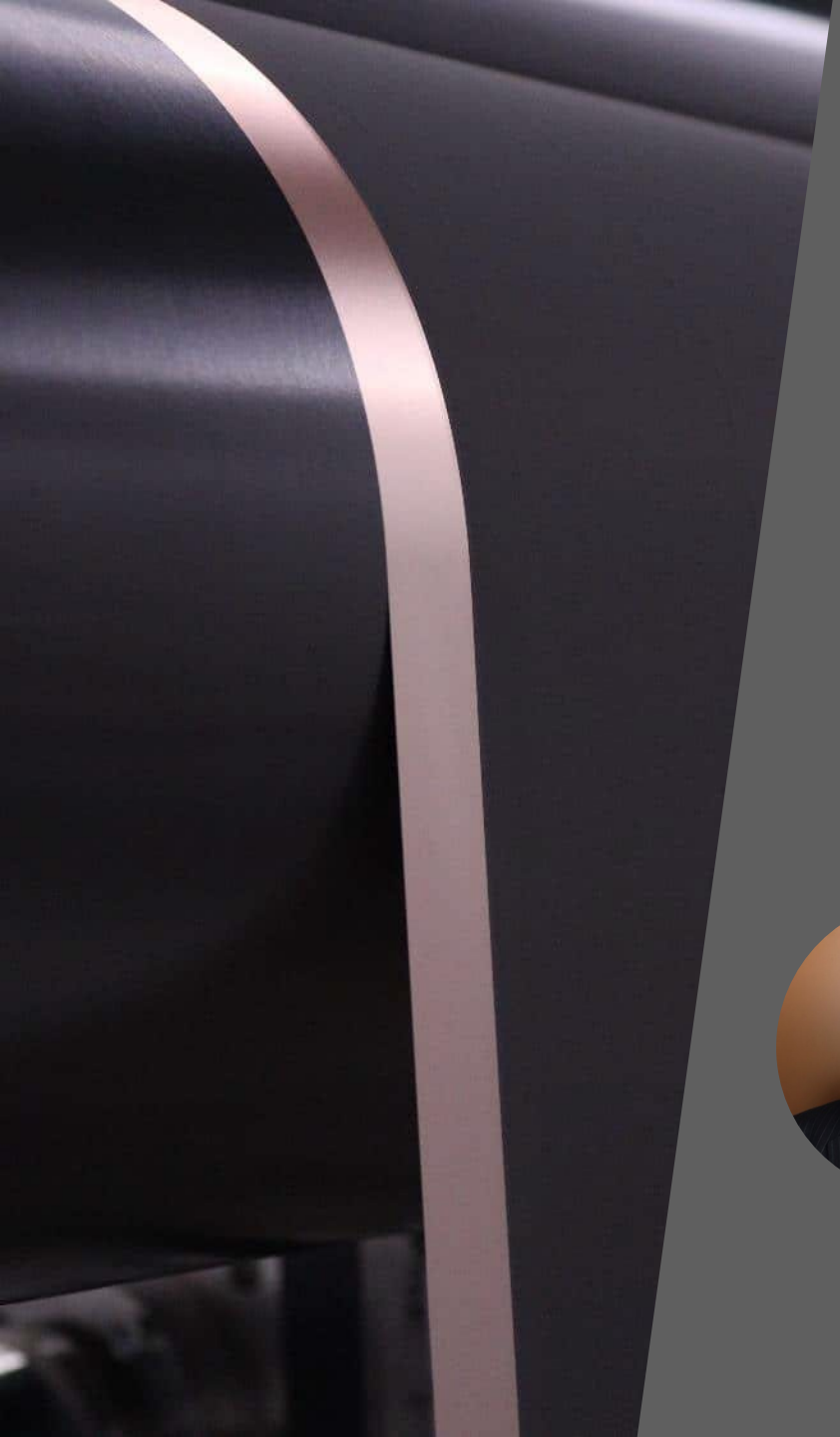
16th Oct, Gothenburg, Sweden

Speaker: Richard Lockwood
Presentation title: Overcoming the challenges of battery manufacturing scale up

Andrew Britton
Business Development Manager

Q&A

Please only use the Q&A function to ask questions



UK BATTERY INDUSTRIALISATION CENTRE

Thank you!

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