Agenda

UKBIC Introduction: Andrew Britton, Business Development Manager

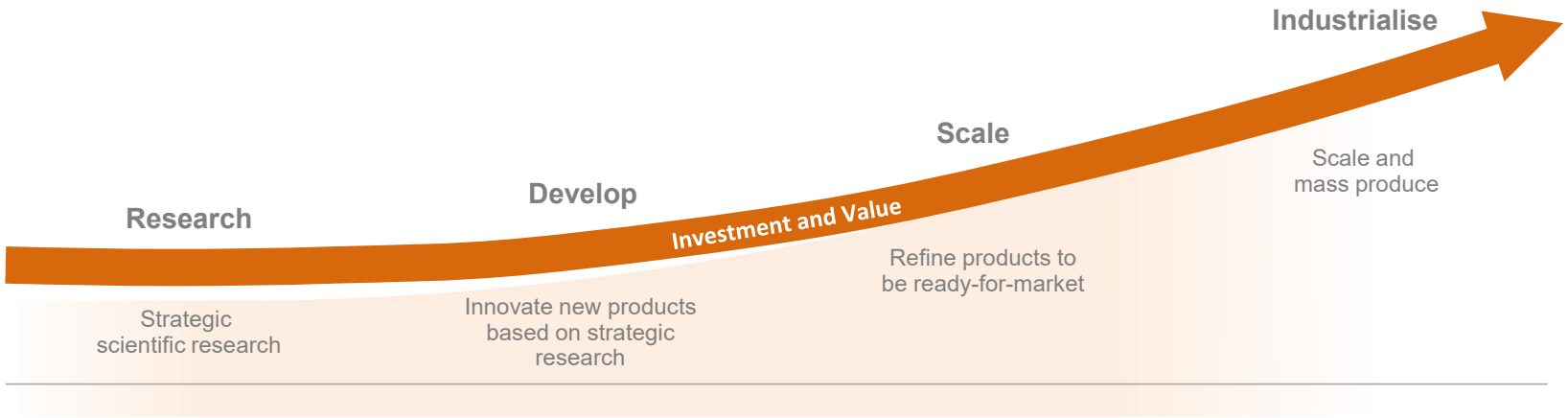
Bringing UKBIC's Flexible Pilot Line to market: Adam Dixon, Head of Flexible Pilot Line

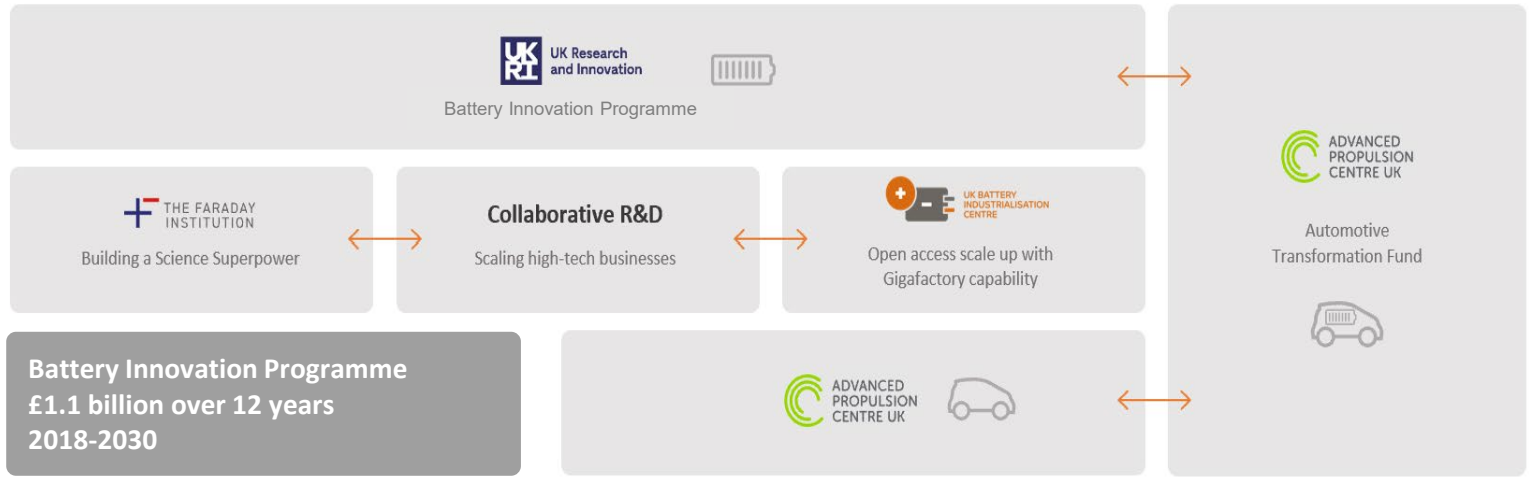
UK BATTERY INDUSTRIALISATION CENTRE

Introduction to UKBIC

Andrew Britton, Business Development Manager

The UK ecosystem





Bridging the gap – industry needs

				UKBIC				Gigafactory	
Scale	**Gram**		**Kilogram**		**FPL**		**ISL**		**Kilotonne**
Example: mixing	 1 litre		 10 litre		 15-40 litre		 250 litre		 >1000 litres
Technology readiness	**TRL1**	**TRL2**	**TRL3**	**TRL4**	**TRL5**	**TRL6**	**TRL7**	**TRL8**	**TRL9**
	Principles & research	Explore applications	Analytical experiments	Validation & requirements	Design & performance	Model & prototype	Performance & testing	Test & demonstrate	Real world & launch
Industry needs	▪ Battery research to identify next generation materials ▪ Prove battery materials and components ▪ Lead UK's early-stage materials and technology innovations		▪ Early-stage product development ▪ Multiple cell chemistries and formats ▪ Product design capability and scalability		▪ Process development ▪ Product quality and repeatability improves ▪ Innovate and learn quickly on equipment		▪ De-risk product and commercial investment before move to kilotonne scale ▪ Verification and validation the products are fit for market ▪ Proof of product scalability and repeatability ▪ Refinement of production processes		▪ Meet volume demands from industry

UK Battery Industrialisation Centre (UKBIC)

Electrode – anode

Electrode – cathode

Cell Assembly (pouch, cylindrical)

Formation, Age & Test

Module

Pack

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

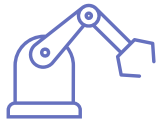
- UK manufacturing research facility based in the Midlands
- Open to organisations looking to scale technology
- Access Giga-scale equipment to de-risk commercial investment
- Trial and validation at industrial scale, speed and quality
- Customers retain full ownership of their IP developed at UKBIC
- Delivering skills, training and knowledge transfer

Industrial Scale up Line (ISL)

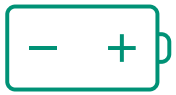
- Volume-scale battery manufacturing equipment as found in gigafactories around the globe
- As a development facility, the line is designed to be modular. Not all parts of the facility need to be used
- The equipment covers the whole production process, from electrode manufacturing, cylindrical and pouch cell assembly, to formation and ageing, and battery module and pack assembly
- UKBIC has two baseline cell designs that can be used by customers to further develop and scale their own technologies

UKBIC's additional capabilities

Battery Development Laboratory (BDL) facilitates product characterisation of cells processed on our ISL and FPL



Clean and Dry Zone (CDZ): Flexible 800m² space provides controlled conditions for equipment testing, temporary equipment installation



Cell cycling capability (CC): Additional standalone cell cycling equipment for extended cell cycling – 192 channels for cylindrical cells and 96 channels for pouch cells

UK BATTERY INDUSTRIALISATION CENTRE

Bringing UKBIC's Flexible Pilot Line to market

Adam Dixon, Head of Flexible Pilot Line

What is the Flexible Pilot Line (FPL)?

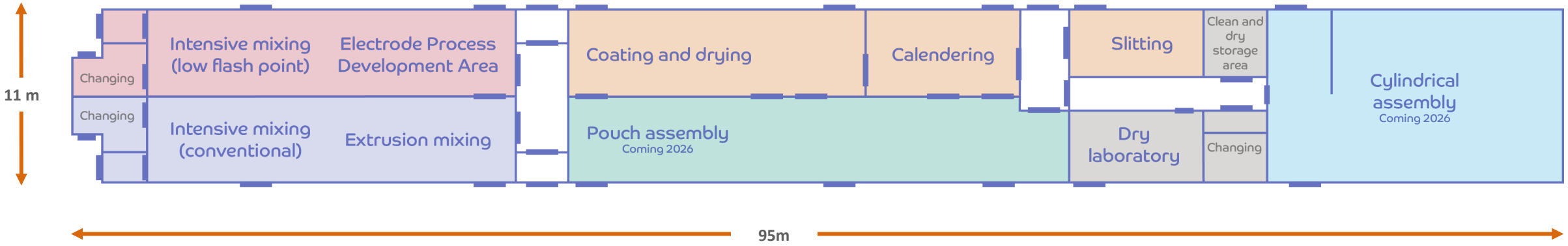
- A space for executing early-stage optimisation cycles and production trials to demonstrate products
- The line will:
  - Accommodate multiple solvents, chemistries and cell formats
  - Bridge the gap between UKBIC's existing Industrial Scale-up Line and other kilogram scale demonstrator lines
- Individually controlled zones – each capable of -40°C dew point, allowing a controlled environment in each area
- Secure material air lock access points which protects customer Intellectual Property

Click here to watch the video
https://youtu.be/km-V2dkRIas

What are the benefits of FPL?

- Offers developers early access to battery manufacturing scale up
- Flexible approach for developing electrode
- Low cost, efficient and quick turnarounds
- Lower quantity material entry requirements
- Scale-up from lab to production via FPL and ISL
- Work alongside UKBIC’s experts

FPL layout


11 m
Changing
Changing
Intensive mixing (low flash point)
Electrode Process Development Area
Intensive mixing (conventional)
Extrusion mixing
Coating and drying
Calendering
Pouch assembly
Coming 2026
Slitting
Clean and dry storage area
Dry laboratory
Changing
Cylindrical assembly
Coming 2026
95m

Mixing capability

- Two independent Mixing Areas encompassing:
  - Intensive (conventional): 15-40L
  - Intensive (low flash point): 15-40L
  - Extrusion: continuous throughput 20L/Hr
  - Electrode process development area
    - Small intensive (1-10L) and planetary options (2L)
    - Roll-to-roll coater with 1m dryer
- Containment of materials and suitable environmental controls to protect key ingredients and/or emissions.
- Semi-automated material weighing and dosing.
- Line side material qualification
- Degassing and final preparation of Slurries ahead of analysis / Coating

Coating capability

Watch the video at
https://youtu.be/KlaHQqtNe7s

- Single-sided coating with of 6m convection drying ovens
- Slot die technology with other technologies available across two coating stations
- Solvent abatement system capable of handling low flash point solvents
- Coating boundaries:
  - Max foil width of 320mm ; 305mm Coating width
  - Coating speeds up to 6m/min
  - Intermittent, stripe, and continuous coat patterns
- In line inspection systems and line side analysis of electrode
- Infrastructure supports quick changeovers of chemistries

Calendering capability

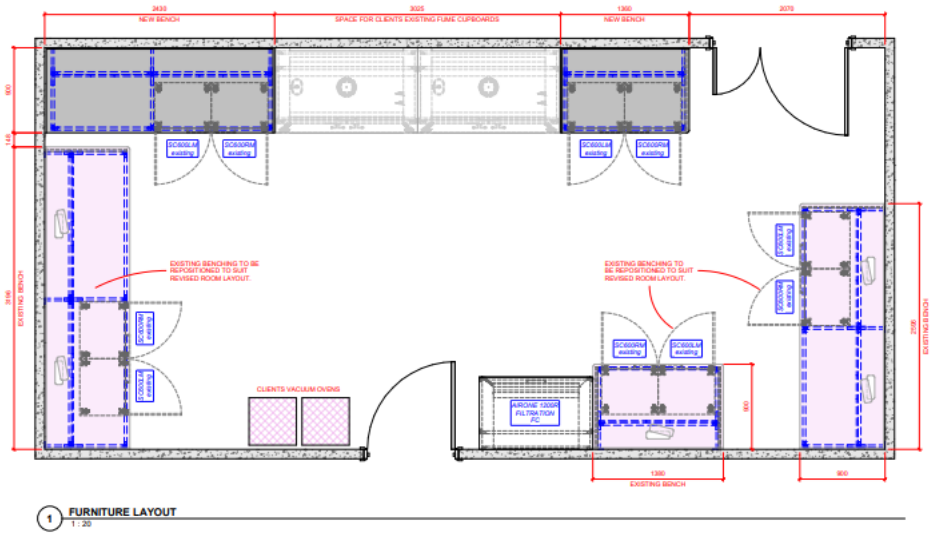
- Processing between ambient and 150 °C Calender roll temperature
- Line Loads up to 2200kN
- Max electrode product width of 430mm
- Electrode heating pre and post Calendering
- Rewind Electrode roll inspection
- Intermittent, Stripe and Continuous coating patterns (asymmetric ready)

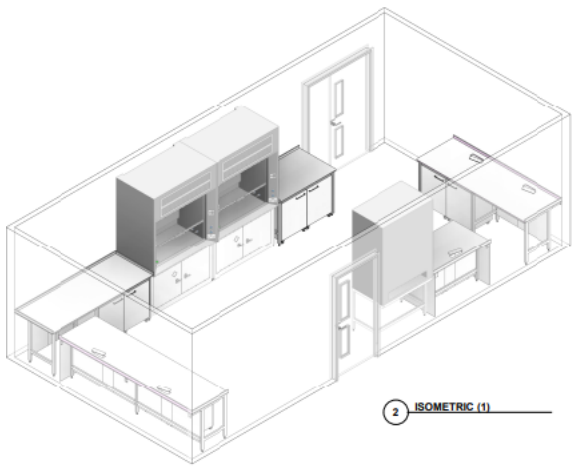
Slitting capability

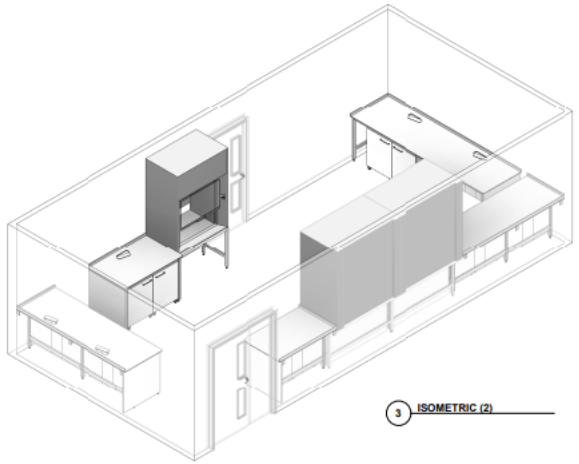
- Dedicated Anode and Cathode Slitting cassettes
- Line speeds up to 80m/min
- In line web cleaning pre and post Slitting
- Product widths up to 500mm

BDL - Dry laboratory

- Extension of UKBIC's new Battery Development Laboratory with equipment and processing in Dry environment.
- The lab is designed to support small-scale mixing and coating, as well as assembly of coin cells and small pouch cells







Cell assembly

- FPL will (on customer request) cascade Electrode material to ISL assembly lines until FPL assembly is available in 2026.
- FPL capability will be complementary and additional to the ISL Line.

	ISL	FPL (coming 2026)
Cylindrical Formats	21700 Tabbed	21700 Tabbed 21700 Tabless 46XX Tabless
Pouch Formats	300 x 100	220 x 115 Tooling for 300 x 100

Recap: The benefits of FPL

- Offers developers early access to battery manufacturing scale up
- Flexible approach for developing electrode
- Low cost, efficient and quick turnarounds
- Lower quantity material entry requirements
- Scale-up from lab to production via FPL and ISL
- Work alongside UKBIC's experts

Q&As – Please only use the Q&A function to ask questions

Hosted by:
Andrew Britton
Business Development Manager

Presentation by:
Adam Dixon
Head of Flexible Pilot Line

UKBIC Webinar: Working across the battery manufacturing value chain

17 September 2025

Sign up at www.ukbic.co.uk/webinars

Presenter:
Richard Lockwood
Business Development Manager

Previous webinars:
www.ukbic.co.uk/webinars

UK BATTERY INDUSTRIALISATION CENTRE

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