ERM
Sustainability is our business

BMG
an RSK company

frontier
economics

FARADAY BATTERY CHALLENGE PHASE 2 EVALUATION

13 OCTOBER 2025

Contents

frontier economics

frontier economics

Acknowledgements

Some of the secondary data analysis in this evaluation was produced using statistical data from the Office for National Statistics (ONS). The use of the ONS statistical data in this work does not imply the endorsement of the ONS in relation to the interpretation or analysis of the statistical data. This work uses research datasets which may not exactly reproduce ONS aggregates. ONS agrees that the figures and descriptions of results in the attached document may be published. This does not imply ONS's acceptance of the validity of the methods used to obtain these figures or of any analysis of the result.

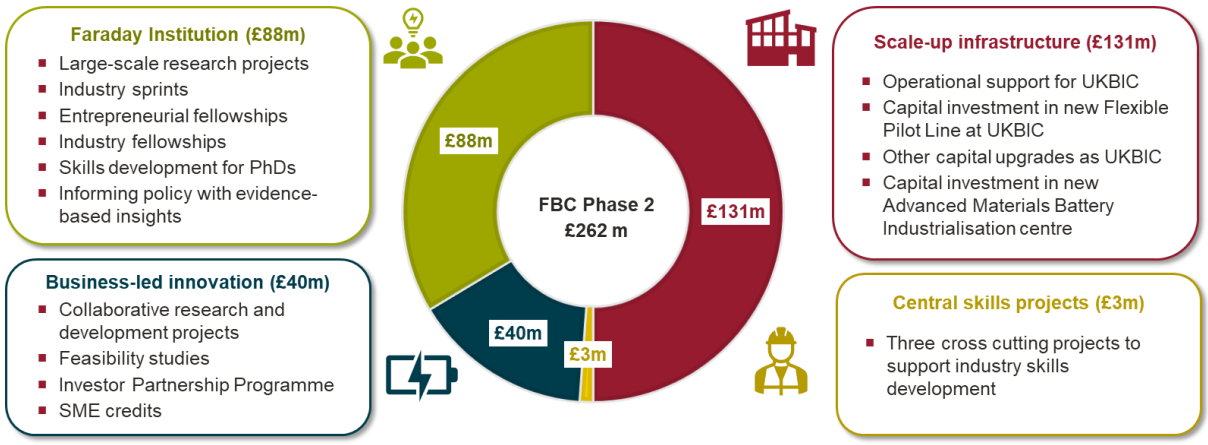
Executive summary

The Faraday Battery Challenge

The Faraday Battery Challenge (FBC) was a UK Research and Innovation (UKRI) mission-led investment programme to further develop a UK battery technology industry. The Challenge invested in applied research, innovation, and national scale-up infrastructure. The first phase ran between August 2017 and March 2022. The second phase, building directly on the foundations established in Phase 1, ran from April 2022 until March 2025. It has since been succeeded by the Battery Innovation Programme.

The FBC comprised three core elements:

- **The Faraday Institution:** supporting academic focused research in electrochemical energy storage, related skills development, market analysis and early-stage commercialisation. The Faraday Institution received around £88 million from the FBC under Phase 2, and supported 10 large-scale research projects, one cohort of funded PhDs along with multiple cohorts trained in an enrichment scheme, as well as industry sprints, industry fellowships and entrepreneurial fellowships.
- **Business-led innovation**: aiming to bridge the gap between early research and commercial readiness by helping the development of promising battery technologies that are at an intermediate Technology Readiness Level (TRL). The FBC invested around £40 million in Phase 2, supporting collaborative research and development projects, feasibility studies, and investor partnership projects.
- **Scale-up infrastructure**: delivered primarily by the UK Battery Industrialisation Centre (UKBIC), an open access manufacturing development facility in Coventry, to help scale-up technologies that work at lab or prototype level to reach mass production. Under Phase 2 the FBC provided £119 million of funding for the UKBIC to support operations and capital investment for new facilities. The FBC also provided £12 million capital investment to establish the new Advanced Materials Battery Industrialisation Centre (AMBIC).



Impact evaluation approach

This report presents the main findings of **an independent impact evaluation** of the second phase of the FBC. This examined what changes have occurred, and what can be attributed to the FBC Phase 2 activities. Since FBC Phase 2 builds directly on FBC Phase 1, while every attempt to focus on Phase 2 impacts have been made, some impact evidence will necessarily reflect the full continuum of the FBC intervention.

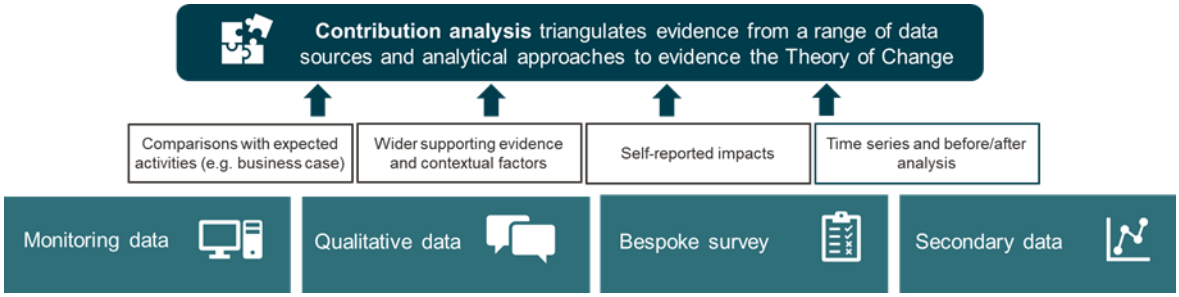
The evaluation takes a **contribution analysis** approach. Contribution analysis does not seek to provide a precise estimate of the size of the impact of Phase 2 of the FBC; it aims to understand the extent to which Phase 2 of the FBC contributed to any measured change in outcomes of interest, and why it did or did not achieve its desired impacts.

Contribution analysis starts from a reasoned Theory of Change, which sets out why and how the intervention is expected to have desired impacts. Empirical evidence on activities delivered, outcomes observed, underlying assumptions and wider barriers and enablers is then used to evidence the Theory of Change and build a narrative about the contribution of the intervention.

This evaluation evidenced the activities and outcomes relating to Phase 2 of the FBC using a variety of approaches and data sources. The main data sources were:

- **Monitoring data** on activities delivered provided by the FBC team.
- **Impact data** from the FBC team. This included data from Innovate UK's Impact Management Framework (data collected from grant recipients) as well as case studies.
- **In-depth interviews** with stakeholders. 30 interviews were held with delivery partners, supported businesses, wider businesses, and government and industry expects.
- **Bespoke primary survey**. This was designed to support the evaluation and circulated to businesses and academics who had interacted with the FBC (under Phase 1 or 2). 105 survey responses were received.
- **Secondary data**. This included bibliometric data (from SciVal), business data (from the Office for National Statistics), and desk review of other published information.

The evidence from all these sources is triangulated to inform the overall narrative regarding the impacts of Phase 2 of the FBC. The robustness of the evaluation is increased by the overall weight and breadth of the combined evidence.



Key findings

The FBC is largely achieving the key short-term outcomes hoped for from its Phase 2 activities.

The UK can be argued to be a global research power in battery-related sectors – at least in terms of academic and early Technology Readiness Level (TRL) research. Stakeholders qualitatively attribute much of the international reputation of the UK in battery research to the continued work of the Faraday Institution.

The FBC has continued to contribute to the development of battery technology under Phase 2. It has supported research and development work that would not have otherwise happened, and this has led to innovations and improvements in TRL across various aspects of battery technology and performance.

Support from the FBC has helped some companies commercialise their innovations and secure commercial contracts. Companies supported by the FBC raised around $500 million in venture capital investment in 2023 and 2024, and qualitatively some companies attribute their subsequent funding to FBC support.

Whether the longer-term economic benefits that it was hoped the FBC would contribute to are realised is more uncertain. There are significant systemic barriers to scaling and manufacturing in the UK – including access to finance, access to and cost of energy, labour costs, the availability of skilled labour, and uncertain UK demand. These barriers are not challenges that the FBC alone can hope to address.

A more detailed summary of the findings is provided below, structured around five themes.

Theme 1: Has the FBC increased investment in battery-related R&D and innovation?

The FBC has **directly supported application-led research and innovation in battery technologies**. The largest components of this support have been through the investment of the Faraday Institution in 10 large-scale research projects, 19 industry sprints, 8 entrepreneurial fellowships and 10 industry fellowships; and Innovate UK investment in 20 collaborative R&D projects, 17 innovation feasibility studies and 4 investor partnership projects. Without this support, the research would not have taken place or would have been taken forwards at smaller scale, elsewhere, or with a different emphasis.

The **research supported by the FBC has led to technological developments**. Over 400 academic publications were produced by Faraday Institution in 2023 and 2024. A total of 26 inventions were identified from Faraday Institution research projects during Phase 2, with seven patents filed and seven published in this period. Survey respondents who received financial support typically indicated that the Technology Readiness Level of their technology

increased, and 79% thought they got to a later stage of development than they would otherwise have done without FBC support.

The FBC has helped maintain the academic reputation of the UK in battery-related research in the face of international competition. There was consensus among stakeholders that the Faraday Institution continues to have a positive impact on the UK's international academic standing in battery-related research. The UK share of academic publications in key battery topics continued to increase between 2022 and 2024, and the impact of papers (as indicated by their citations) remains higher than the world average. That said, while 64% of academics who responded to the evaluation survey thought the UK is either the world leader or at least ahead of most other countries, 36% thought the UK is behind the world leaders in terms of the standing of UK universities in battery related disciplines. This indicates there is strong international competition.

The FBC has increased the amount of battery-related R&D by supporting projects that would not otherwise have happened. There are wider barriers to increasing the amount of R&D in the sector, however, with various stakeholders pointing to challenges for small and medium-sized enterprises in obtaining finance.

Theme 2: Has the FBC strengthened collaboration and connectivity?

The FBC has continued to facilitate collaboration on battery-related R&D under Phase 2. Over three-quarters of survey respondents thought the FBC had a positive impact on collaboration since 2022. Qualitatively, stakeholders pointed to key facilitating activities being events bringing the community together and enabling links to form, CR&D projects enabling direct collaboration, spin-outs building links between academia and industry, and Faraday Institution helping to signpost organisations who are looking to build connections. These activities have helped to maintain the high levels of collaboration achieved under Phase 1, rather than increasing the extent of collaboration further. That said, there has been an **increased emphasis on international collaboration** under FBC Phase 2. This builds on the collaboration and connectivity, and international standing, developed under Phase 1.

The FBC has helped the battery sector remain an area of focus for the government. The FBC was instrumental in the development of the UK Battery Strategy in 2023, and the battery sector was highlighted in the government's 2025 Modern Industrial Strategy as a frontier industry in one of the eight key growth-driving sectors. Feedback from stakeholders suggests, however, that the reorganisation of government departments in 2023 made coordination between the FBC and central government on innovation and the battery agenda more difficult as there are more parties to coordinate.

Theme 3: Has the FBC enhanced prospects for the commercialisation of battery technologies?

The FBC has supported businesses with the development of their technology and moves towards commercialisation. This has been delivered through: Faraday Institution industry fellowships, industry sprints, and entrepreneurial fellowships; Innovate UK funding of CR&D projects and investor partnerships; the Investor Readiness Programme; and support for the UK Battery Industrialisation Centre and Advanced Materials Battery Industrialisation Centre. in many cases, companies have been supported at various stages by different FBC activities (sometimes under both Phase 1 and Phase 2), therefore it is challenging to attribute outcomes to any individual component (or phase) of FBC support.

The package of activities to support late-stage development and commercialisation are broadly seen overall as having had a positive impact on supported businesses. Two thirds of survey respondents thought the FBC has had a positive impact on commercial readiness of UK battery technology since 2022.

Qualitatively, **business stakeholders reported using FBC CR&D funding to help them move from prototyping to reaching commercial performance, being ready to industrialise, or securing a commercial contract**.

The UK Battery Industrialisation Centre has had to adapt its operations under Phase 2. The collapse of Britishvolt and AMTE Power – two large scale expected customers of UKBIC – meant that UKBIC had to pivot using its existing Industrial Scale Line to support smaller companies than was originally planned. This has meant the line being used for relatively small-scale electrode and/or cell manufacture, which is not what it was designed for. However, while not fully utilised, UKBIC facilities have been used by numerous UK companies to develop and validate their technology.

The FBC has invested in the construction of a new Flexible Pilot Line at the UK Battery Industrialisation Centre under Phase 2. This is expected by stakeholders to be much more aligned with the scale of demand from UK businesses than the existing facilities. The new line is expected to offer a lower cost of entry to companies looking to take advantage of open access to UKBIC facilities, and enable companies to develop their technologies while securely retaining their intellectual property.

While the FBC has had a positive impact on commercialisation for some supported companies, **numerous stakeholders of different types highlighted the challenging ecosystem facing companies looking to commercialise in the UK**. Barriers mentioned included a lack of funding and finance, as well as a lack of technical expertise (particularly in process engineering, in manufacturing engineering and battery technicians).

FBC supported companies have raised around $500 million in venture capital investment over 2023 and 2024, and more than $1.6 billion in total since 2018. Not all this funding raised will be directly attributable to FBC support, but it is reasonable to believe that

the FBC has had a positive impact on access to finance at an individual firm level. Survey responses from those who had received FBC funding revealed that 60% thought that support from FBC had a positive impact on their ability to secure follow-on funding. Qualitatively, stakeholders felt that using FBC funding to validate technology, and the association with the branding of the FBC and Faraday Institution, were beneficial in attracting funding. The investor partnership programme also directly leveraged private investment.

However, at a more general level, access to finance in the industry is challenging. This is an issue in many capital-intensive sectors and is attributed in part to risk aversion among investors and the UK's high cost base. It is not something that the FBC alone can address, but it poses risks to some of the longer-term benefits that it was hoped the FBC would contribute to.

Theme 4: Has the FBC contributed to improved production capability and ecosystems?

The FBC hoped to deliver outputs that would contribute, over the longer-term, to strengthening of the UK battery sector's capabilities and developing a world-class intellectual and physical supply chain for batteries in the UK. There are some positive signs in this regard:

- The **FBC has had a positive impact on skills in the battery industry**, through its direct investments in skills and indirect support (by funding research through which individuals will 'learn by doing'). 72% of survey respondents think the FBC had a positive impact on skills levels in the industry since 2022.
- Two new UK gigafactories have been announced since the start of FBC Phase 2. One government source suggested that the **UK reputation for battery research played a role** in Tata's decision to invest in the UK.
- **Data on venture capital (VC) investment suggests that the UK continues to be a key player in the global battery sector**. Over the period 2018 to 2024 the UK received the 4th largest value of VC investment at $2.4bn (behind, the US, China and Sweden).

However, while the UK has received the fourth largest value of VC investment, it only ranked sixth in 2024 in terms of the combined enterprise value of VC-backed EV battery startups – suggesting the UK faces challenges in scaling battery production.

In qualitative fieldwork, stakeholders of different types agree that the FBC phase 2 has continued to contribute to the UK moving from lab-scale prototypes to credible pilot lines. But most see a stubborn gap between those pilots and gigawatt-hour manufacturing.

Stakeholders pointed to systemic issues that affect the competitiveness and attractiveness of scaling in the UK including: access to finance, access to and cost of energy, labour costs, and the availability of suitably skilled labour. Around half of survey respondents think that the UK is at least slightly behind most countries in its attractiveness as a location to manufacture batteries and its attractiveness as a location to manufacture electric

vehicles. 65% of survey respondents think that there are currently fewer people than the industry needs with the relevant skills, with gaps in junior engineering roles and battery technician grades the most commonly highlighted.

These wider factors are not within the scope of what the FBC was seeking to address. However, these challenges may represent a barrier to the potential longer-term benefits of FBC investments being realised.

Theme 5: Has the FBC had wider impacts?

The FBC aims to support decarbonisation in the UK over the long term and support a just and fair transition to net zero by helping to anchor battery and EV supply chains in the UK to replace the existing automotive sector. These long-term changes would occur over a time frame that extends into the future; they are not impacts that would be expected to be realised by 2025. There are, however, three aspects explored by this evaluation where some contribution to wider benefits is starting to be evident:

- **The FBC has promoted equality, diversity and inclusion in the battery sector**. 44% of survey respondents thought the FBC has had a positive impact on equality and inclusion in the battery sector since 2022.
- It is reasonable to believe that the technological developments that are arising from the FBC will have a positive impact on aspects of battery performance in due course.
- **There are indications that the FBC will have positive spillovers on other sectors.** Some supported businesses are already looking at applying their technology beyond the automotive sector, into sectors such as aerospace, defence and stationary storage.

1 Introduction

The Faraday Battery Challenge (FBC) was a UK Research and Innovation (UKRI) mission-led investment programme to further develop a UK battery technology industry that is high-tech, high value and high skill. The Challenge invested in applied research, innovation, and national scale-up infrastructure. The first phase ran between August 2017 and March 2022, and the second phase ran from April 2022 until March 2025. It has since been succeeded by the Battery Innovation Programme.

UKRI commissioned a consortium of Frontier Economics, ERM and BMG Research to design and conduct an impact evaluation of the second phase of the FBC. An evaluation of the first phase of the FBC was conducted by the same consortium and the report is available online.

This evaluation is focussed on the impact of Phase 2 activities. In other words, it seeks to answer 'What difference have the activities delivered by the FBC since 2022 made?'

The remainder of this report is structured as follows:

- The rest of Section 1 briefly summarises the Faraday Battery Challenge, the activities delivered under Phase 2, and the logic model.
- Section 1 provides a high-level overview of the evaluation methodology, including the impact evaluation themes. Further details on the methodology and data sources are available in a methodological annex.
- Sections 3 to 7 present the evaluation findings, structured under five themes:
  - Has the FBC increased investment in battery-related R&D and innovation?
  - Has the FBC strengthened collaboration and connectivity?
  - Has the FBC enhanced prospects for the commercialisation of battery technologies?
  - Has the FBC contributed to improving production capability and ecosystems?
  - Has the FBC had wider impacts?
- Section 8 concludes with an overall synthesis of the findings of the evaluation.

1.1 The Faraday Battery Challenge

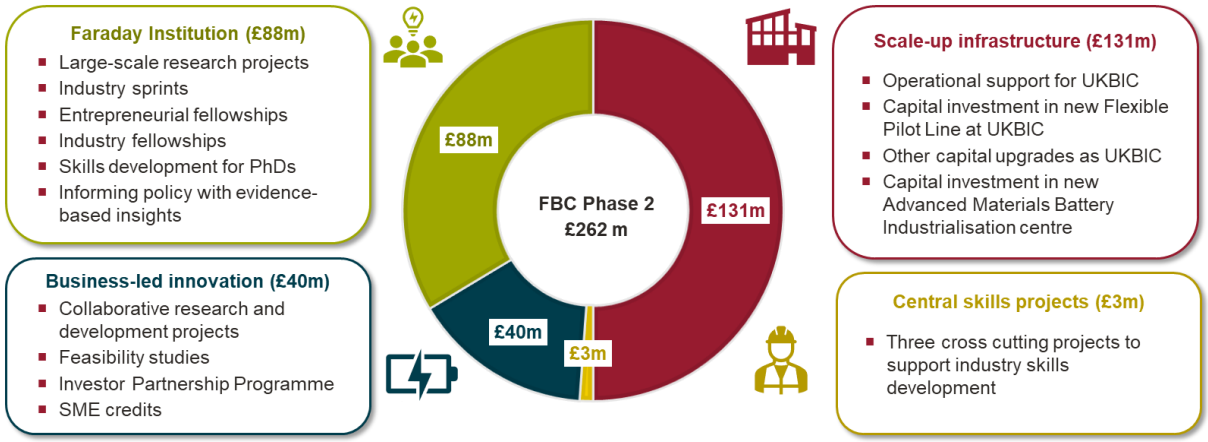
Overview of the FBC

The FBC comprises three core elements:

- **The Faraday Institution:** supporting academic focused research and capability development.
- **Business-led innovation**: delivered by Innovate UK.
- **Scale-up infrastructure**: delivered primarily by the UK Battery Industrialisation Centre.

Each of these elements is described briefly below, and Phase 2 funding and activities are summarised in Figure 1.

Figure 1 Faraday Battery Challenge Phase 2 activities



Source: Frontier Economics

Under Phase 1 the FBC had an investment of around £330 million, of which around £110m (33%) went to the Faraday Institution, £90 million to business-led innovation (27%), and £130m (39%) to the UK Battery Industrialisation Centre.

Phase 2 received an initial public investment of £211 million, but additional core funding was secured by the FBC team during Phase 2 – most notably £50 million from Pulse (a Horizon Europe programme at the Department for Science Innovation and Technology), taking total FBC investment under phase 2 to around £262m. The Faraday Institution received around £88 million (33% of Phase 2 funding), business-led innovation around £40 million (15%), support for the UKBIC and other scale-up infrastructure amounted to over £130 million (50%), and central skills projects received around £3 million (1%), The spend on the Faraday Institution and on central skills projects is in line with the original plan in the Phase 2 business case. Support for business-led innovation is slightly lower than what was initially planned (£47 million), while support for scale-up is greater than what was initially planned (£73 million).

The Faraday Institution

The Faraday Institution is the UK's independent institute for electrochemical energy storage research and related skills development, market analysis and early-stage commercialisation. Established under Phase 1 of the FBC, the Faraday Institution is a distributed institution, with a small, core HQ team, and working across 28 UK universities and around 150 industrial partners.

The Faraday Institution invests in a large-scale managed programme of research to address unresolved decarbonisation challenges and generate commercially relevant breakthroughs in battery technology. During Phase 1, the Faraday Institution received £110 million, which supported 10 major research projects, three shorter-term projects, 11 industry sprints and 6

entrepreneurial and 15 industrial fellowships. The Faraday Institution also funded four cohorts of PhD students.

The Faraday Institution received £87.5 million from the FBC under Phase 2. This supported 10 major research projects (£74.8 million), 19 industry sprints (£3.5 million), 8 entrepreneurial fellowships (£0.8 million) and 10 industry fellowships (£0.6 million). It also funded one cohort of PhD researchers and enrichment activities for multiple cohorts, as well as other skills development, commercialisation activities and policy advice.

Business-led innovation

The FBC support for business-led innovation aims to bridge the gap between early research and commercial readiness by helping the development of promising battery technologies that are at an intermediate Technology Readiness Level (TRL).

This is primarily delivered through Innovate UK providing grant funding for businesses to lead feasibility studies, and collaborative research and development (CR&D) projects. Under Phase 1 the FBC allocated £90 million, which was disbursed through four rounds of funding competitions. Under Phase 2 the FBC disbursed around £38 million through two rounds of funding competitions ("round 5" and "round 6").

Under Phase 2 the FBC has also invested £2.6 million through the Innovate UK Investor Partnership programme. This provides grant funding for innovative businesses who require equity funding to develop their technology.

The FBC also supported business innovation through "SME credits". Under Phase 2 £1 million was used to support three companies through four projects to work with the UK Battery Industrialisation Centre to scale up their technology.

Scale-up infrastructure

The main FBC investment in scale-up is the UK Battery Industrialisation Centre (UKBIC). The UKBIC is a manufacturing development facility in Coventry, to help scale-up technologies that work at lab or prototype level to reach mass production, which is a key stage in the commercialisation pathway. It provides open access to specialist equipment covering the whole battery production process.

The UKBIC was constructed under FBC phase 1 and operations began in July 2021. Phase 1 of the FBC included £130 million of funding for the UKBIC (to cover construction and the first year of operations).

FBC Phase 2 included two main aspects of support for the UKBIC:

- Funding to support ongoing UKBIC operations. This is required so that UKBIC can support strategic investments that might not otherwise be commercially viable.

- Capital funding for upgrades and new facilities. The largest component of this was the construction of the Flexible Pilot Line (FPL) within UKBIC. This allows the trialling and testing of materials with scaling customers for whom validation on the existing Industrial Scale Line would be too large.

The eventual spend on these two aspects was £29 million for operational support and £90 million for capital investment.

FBC Phase 2 also provided capital funding for a new Advanced Materials Battery Industrialisation Centre. This will be delivered by the High Value Manufacturing Catapult through its Centre for Process Innovation (with its expertise in chemicals processing) and Warwick Manufacturing Group (with its cell development capabilities). It will provide innovation capability for the synthesis and processing of immediate and next generation battery materials, aiming to bridge the gap between the work done to develop new battery chemistries at the Energy Innovation Centre in the University of Warwick, and the scale-up work done at the UKBIC.

Support for skills

Phase 2 of the FBC included around £3 million of centrally coordinated funding to support skills development. This was deployed to three regional skills initiatives, aiming to align industry and skills providers across the UK through an electrification skills framework, and unlock battery manufacturing training demand in regions linked to industry need.

The FBC Theory of Change

The business case for FBC Phase 2 (written in 2021-22 under a previous government) stated that the programme was motivated by two high-level government priorities:

- To ensure the UK meets its climate commitments in the required timescales, by supporting the decarbonisation of transport and the energy industry; and
- To prosper from a fair and just transition across the nation, through taking action to develop a world-class intellectual and physical supply chain for batteries in the UK and secure the future of the UK automotive industry.

The continuation of the FBC with Phase 2 was seen by policy makers and delivery partners as a necessary, but not by itself sufficient, element of a wider ecosystem that is required to deliver these aims.

The logic model underpinning the Phase 2 evaluation of the FBC is shown in Figure 2. It provides a visual summary of how the inputs and activities of the FBC are expected to lead to the intended outputs, outcomes and impacts: the theory of change (ToC).

There are four short-term outcomes expected from Phase 2 of the FBC:

- Technological advancement

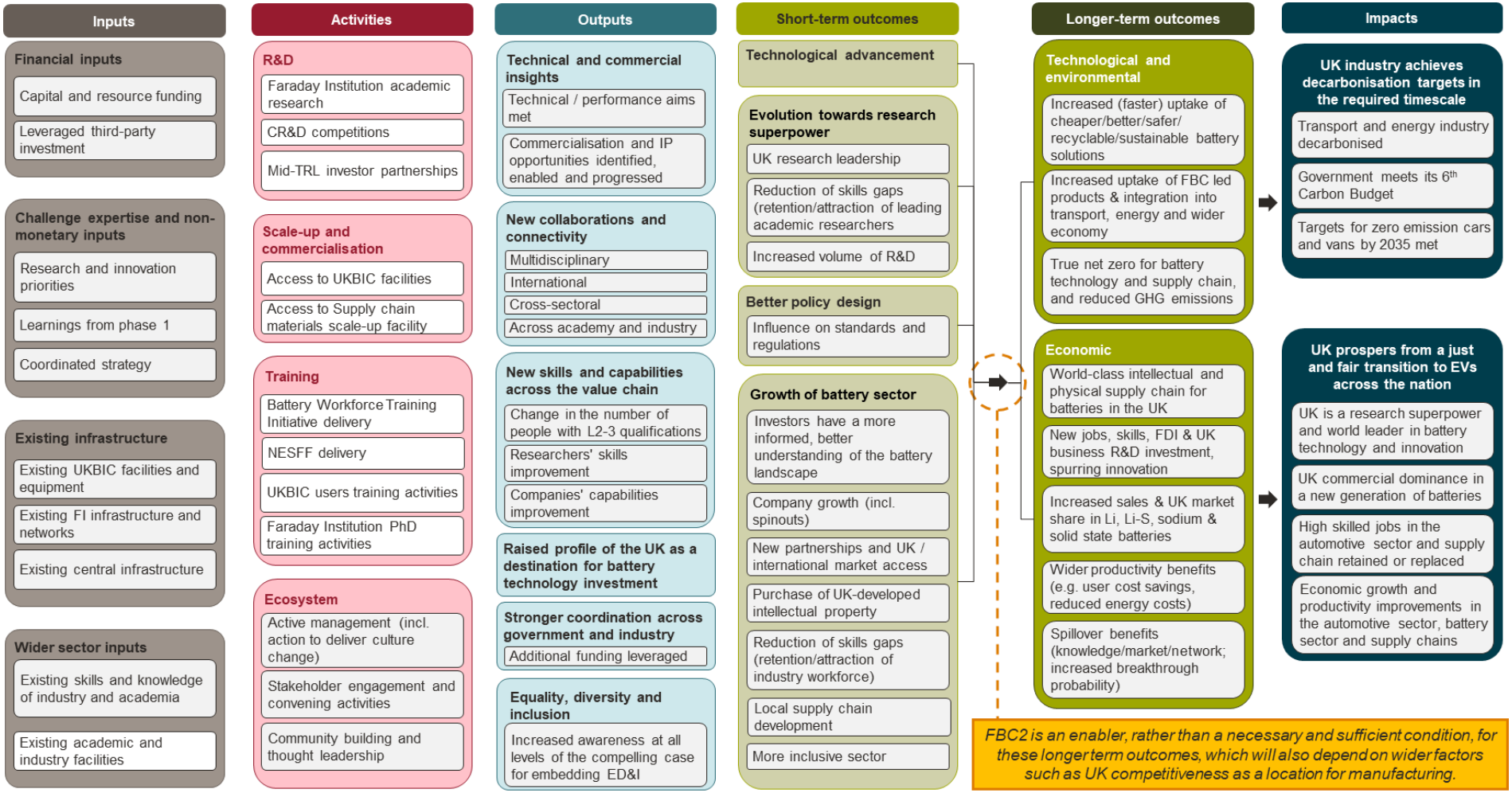
- Evolution towards the UK being a research superpower
- Better policy design
- Growth of the battery sector

Over the longer-term it is hoped that the FBC will contribute to additional broader outcomes:

- Environmental improvements through the adoption of new technology
- Economic benefits through the development of an intellectual and physical supply chain for batteries in the UK, and the associated employment and productivity gains.

However, it should be stressed that the FBC is an enabler rather than a necessary and sufficient condition for these longer-term outcomes. They will also depend on wider factors such as demand for technology and general UK competitiveness relative to other jurisdictions.

Figure 2 Faraday Battery Challenge Phase 2 Evaluation Logic Model



Source: Frontier Economics based on UKRI Logic model

2 Evaluation methodology

The impact evaluation takes a **contribution analysis** approach. This is a theory-based method and, as recommended by the HM Magenta Book, is suitable for the evaluation of complex policies in complex landscapes. Contribution analysis does not seek to provide a precise estimate of the size of the impact of Phase 2 of the FBC; rather, it aims to understand the extent to which Phase 2 of the FBC contributed to any measured change in outcomes of interest, and key mechanisms of impact.

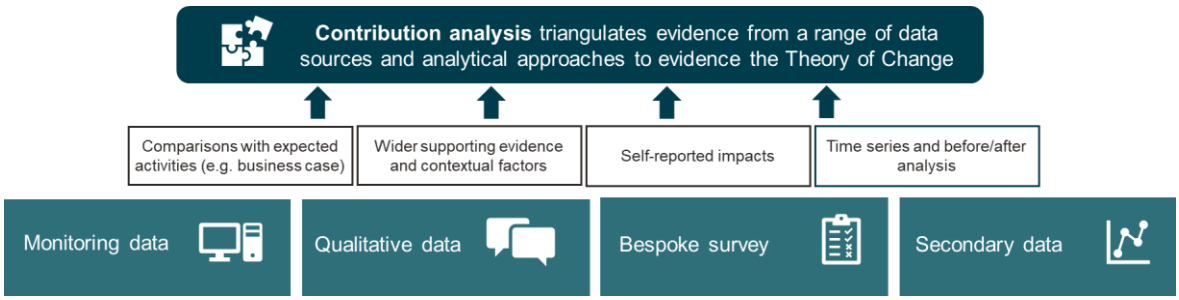
Contribution analysis argues that a reasonable causal claim of contribution can be made if:

- There is a reasoned theory of change for the intervention: the key reasoning and assumptions behind why the intervention is expected to work make sense, are plausible, may be supported by evidence and/or existing research, and are agreed upon by at least some of the key players.
- Activities of the intervention were implemented as per the theory of change.
- The theory of change is supported by and confirmed by evidence on observed results and underlying assumptions
- Other influencing factors have been assessed and either shown not to have made a significant contribution or their relative role in contributing to the desired result has been recognised.

The theory of change for Phase 2 of the FBC is summarised in the logic model in Figure 2. This was developed through engagement with the FBC delivery partners and sector stakeholders in 2023 as part of the evaluation design process.

This evaluation evidences the activities and outcomes in the logic model, and assesses the potential role of other influencing factors, using a variety of data sources and approaches summarised in Figure 3. The longer-term impacts are not evidenced, as these are not expected to be influenced by the FBC under the timeframes of this evaluation.

Figure 3 Overview of data and approaches



The main data sources used are:

- Monitoring data: This includes programme delivery data from FBC delivery partners (Faraday Institution, Innovate UK and the UK Battery Industrialisation Centre). It also includes some impact data collected by FBC teams, including impact case studies and Innovate UK Impact Management Framework data (which is self-reported data collected from Innovate UK grant recipients when their grant funded projects finish). These data support the assessment of whether FBC activities were delivered as planned and provide indicators for some of the programme's outcomes.
- Qualitative data: 30 in-depth interviews were conducted with a variety of stakeholders, including delivery partners, engaged businesses, government stakeholders, and other sector experts. The interviews were semi-structured, following a pre-designed topic guide, and used to examine in-depth stakeholders' perspectives on the FBC's impact, limitations and challenges, and how and why the outcomes observed have occurred. The qualitative feedback was consolidated to identify cross-cutting views.
- Bespoke survey: An online survey was circulated to academics supported by the Faraday Institution and businesses who had applied for support from the FBC in the past (either under Phase 1 or Phase 2, and whether or not their application was successful). This sample frame was chosen so that the survey could be used to capture a wide set of perspectives from relevant stakeholders on perceptions of the battery sector and the impact of the FBC in general. Specific questions on the impact of FBC support received were only asked of academics or businesses who had received funding under Phase 2. Responses were received from 105 stakeholders (58 business and 46 academic respondents). More detail on the survey is available in Annex A.
- Secondary data: This includes:
  - Bibliometric data on publications and citations from SciVal to assess the UK's academic standing on battery-related research.
  - Data on business size from the ONS Business Structure Database, to provide insight on the growth of the battery sector.
- Review of other published sources, such as a report by Dealroom on Venture Capital investment and the value of start-ups in the battery sector

The evidence from all these sources is triangulated to inform the overall narrative regarding the impacts of Phase 2 of the FBC. The robustness of the evaluation is increased by the overall weight and breadth of the combined evidence.

When describing qualitative findings, it is not appropriate to quantify these in terms of a proportion of respondents, due to the more flexible and variable nature of qualitative discussions (when compared with the quantitative survey). Instead, this report uses a range of terms to give the reader an indication of the scale of an experience or feeling expressed. For example, 'most' would refer to a sizeable majority of respondents, 'many' would refer to a mid-high proportion of respondents, 'some' would refer to at least a small amount to around half of respondents, and 'a few' would refer to a small minority of respondents.

Given the alignment between the objectives of both phases and the presence of overlap in the companies supported in each of them, it can be challenging, in some instances, to separate the effects of Phase 2 from the longer-term impacts of phase 1. Nonetheless, the evaluation draws on the available evidence to make this distinction whenever possible.

2.1 The evaluation themes

The evaluation has been structured around five themes. These capture different aspects of the logic model in Figure 2 and each address specific questions or hypotheses about the FBC's progress and impact that the evaluation seeks to answer. Sections 2 to 6 structure the presentation of findings around these five themes:

1. Has the FBC increased investment in battery-related R&D and innovation?
   - Has the FBC supported application-led research in battery technologies?
   - Has the FBC supported technological development in the Challenge areas?
   - Has the FBC improved the academic standing of the UK?
   - Has the FBC increased the amount of R&D?
2. Has the FBC strengthened collaboration and connectivity?
   - Has the FBC contributed to increasing collaboration in the Challenge areas?
   - Has the FBC contributed to increasing the coordination of government?
3. Has the FBC enhanced prospects for the commercialisation of battery-technologies?
   - Has the FBC delivered its intended activities to support late-stage development and commercialisation?
   - Has the FBC contributed to an increase in late-stage development and commercialisation?
   - Has the FBC contributed to improving access to finance?
4. Has the FBC contributed to improving production capability and ecosystems:
   - Has the FBC contributed to an increase in the skills base of the battery-related sector?
   - Has the FBC contributed to increasing the production capacity for batteries in the UK?
   - Has the FBC contributed to increasing growth in the battery-related sector?
   - Has the FBC contributed to the increasing application of appropriate regulations and standards?
5. Has the FBC had wider impacts?
   - Has the FBC supported an improvement of Equality, Diversity and Inclusion (ED&I) in the battery sector?
   - Has the FBC contributed to an improvement of battery performance?
   - Has the FBC had positive impacts on the wider value chain or other adjacent sectors?

3 Findings – Theme 1: Has the FBC increased investment in battery-related R&D and innovation?

Key Findings

- **The FBC has directly supported application-led research in battery technologies**. The largest components of this support have been through the investment of the Faraday Institution in 10 large scale research projects, and the investment of Innovate UK in 20 collaborative R&D and 17 innovation feasibility studies. Without this support, the research would not have taken place or would have been taken forwards at smaller scale, elsewhere, or with a different emphasis.
- **The research supported by the FBC has led to technological developments**. Over 400 academic publications were produced by Faraday Institution in 2023 and 2024. Survey respondents who received financial support typically indicated that the Technology Readiness Level of their technology increased, and 79% thought they got to a later stage of development than they would otherwise have done without FBC support.
- **The FBC has helped maintain the academic reputation of the UK in battery-related research in the face of international competition**. There was consensus among stakeholders that the Faraday Institution continues to have a positive impact on the UK's international academic standing in battery-related research. The UK share of academic publications in key battery topics continued to increase between 2022 and 2024, and the quality of papers remains higher than the world average. That said, a significant minority (36%) of academics who responded to the evaluation survey thought the UK is behind the world leaders in terms of the standing of UK universities in battery related disciplines, indicating there is strong international competition.
- **The FBC has increased the amount of battery related R&D.** It has supporting projects that would not otherwise have happened. Collaborative R&D projects supported by Innovate UK have also been able to raise around £121 million in additional investment, to further support the R&D project, build on those projects or conduct further R&D in aligned areas.

This first evaluation theme reflects the FBC's ambition for the UK to be a research leader and a global science superpower in batteries, to attract R&D investment and to produce technical and commercial advancement. The evaluation questions explored are:

- Has the FBC supported application-led research in battery technologies?
- Has the FBC supported technological development in the Challenge areas?
- Has the FBC improved the academic standing of the UK?
- Has the FBC increased the amount of R&D?

3.1 Supporting application-led research in battery technologies

FBC Phase 2 has directly supported research in battery technology.

The largest aspects of this are £74.8 million of continued funding for 10 large-scale research projects supported by the Faraday Institution (listed in the Faraday Institution Annual Report 2024), and 20 collaborative R&D and 17 feasibility projects funded by Innovate UK (with total FBC funding of £38.5m). In addition, there has been smaller scale support from the Faraday Institution through seed projects, entrepreneurial fellowships, industrial sprints and industrial fellowships; and four Investor Partnership projects funded by Innovate UK. These are discussed further under Theme 3.

These delivered activities were **largely in line with the original planned activities in the FBC business case**. However, achieving this required considerable work behind the scenes by the FBC delivery team at Innovate UK. Qualitative engagement with delivery partners revealed that higher than expected costs of operating the UK Battery Industrialisation Centre (due in part to the surge in energy prices in 2022), meant that the final Innovate UK funding round (round 6 innovation feasibility studies) was nearly cancelled. This was only delivered because the FBC team managed to raise an additional £50 million in funding from Pulse (a Horizon Europe programme at the Department for Science Innovation and Technology).

The evidence suggests that the funding the FBC provided **did enable research to happen that would not otherwise have taken place**, i.e. it supported additional research in battery technologies. Among respondents to the primary survey who said they had received funding under FBC Phase 2, **39% said that they would not have taken forward their project in any form in the absence of FBC funding**. **Among those who would have taken forward the project without FBC funding, all would have changed the project in some respects**. 78% would have had a reduced scope, 67% would have taken the project forward over a longer timescale and 28% would have taken forward the project in a different country. Qualitative feedback from various supported businesses also indicated that the research undertaken would not have happened to the extent that it did in the absence of FBC funding.

3.2 Supporting technological development in the Challenge areas

The research supported by the FBC has led to technological developments.

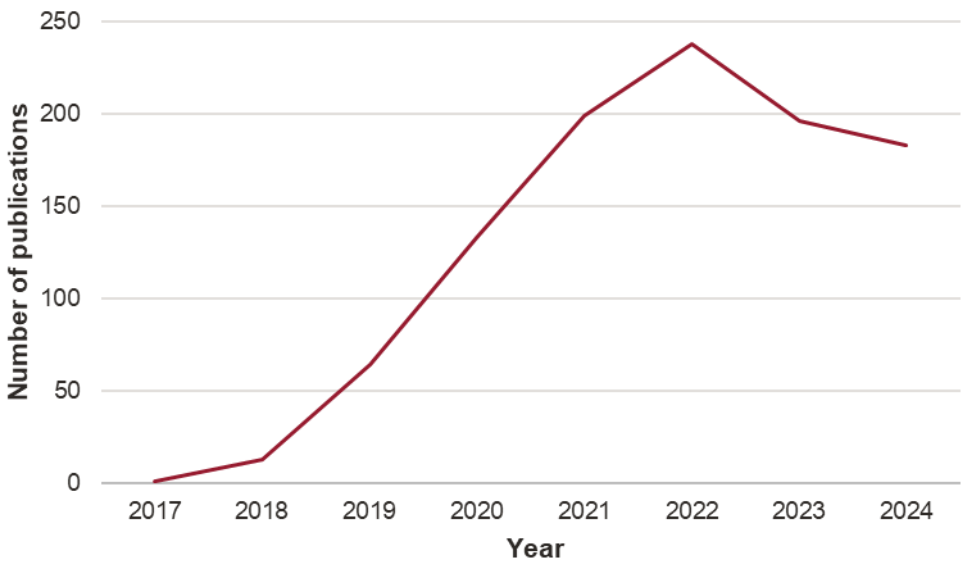
Numerous case study examples published by the FBC and the Faraday Institution highlight examples of technological innovations that have been developed from funded research. Many projects supported under Phase 2 are building on research supported under Phase 1 of the FBC, which makes attributing impact to Phase 2 challenging. However, examples of Phase 2 investments and their technological developments include:

- the NEXLFP project led by Integrals Power, which developed lithium manganese iron phosphate (LMFP) battery cells with higher manganese content and voltage than existing cells (which is important for making batteries lighter and more economical);

- a project conducted at the University of Leicester under the Faraday Institution's ReLiB project has developed a technique for sustainably extracting valuable metals from a waste product of used batteries with a mix of water and cooking oil;
- the Faraday Institution ZEST Industry Sprint conducted by the University of Southampton and a subsidiary of Morgan Advanced Materials investigated whether glass fibres of lithium aluminium titanium phosphate could be used as the basis of a compositive electrolyte for solid-state batteries. They developed a continuous, single-step fabrication process to manufacture ultrafine specialist glass fibres with high speed and very high yield. The patent-pending process is fundamentally scalable and shows great promise to meet the demands of high-volume industries.
- as part of the Faraday Institution funded Nextrode project, a collaboration between researchers at the Warwick manufacturing Group and UKBIC identified a method to differentiate between intentional gaps in electrode coating and imperfections in coatings. This helped UKBIC accurately measure process capability and yield.

Publications are a partial proxy for technological development, although they primarily reflect the dissemination of knowledge rather than necessarily practical or commercial applications. During the period spanned by FBC Phase 2 (April 2022 and March 2025), 630 academic papers were published from Faraday Institution research. Some of these will have arisen from Phase 1, rather than Phase 2, funded research, given the time taken for research to happen and for papers to be reviewed and published. Figure 4 shows the number of publications by year for papers indexed in the SciVal database. **During 2023 and 2024, nearly 400 academic papers were published by the Faraday Institution**. This is similar to the level of publications in 2021. The peak in publications in 2022 is believed to be the result of academics having greater time to write publications during the covid pandemic.

Figure 4 Number of Faraday Institution publications over time

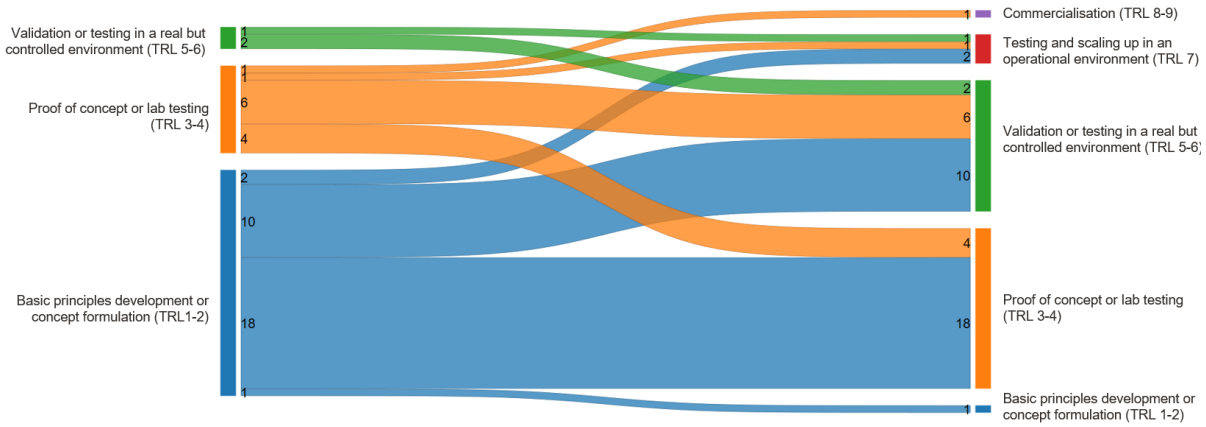


Source: *Elsevier's SciVal platform*
Note: *Elsevier's SciVal platform is a tool for providing statistical information on publications within its database.*

The Faraday Institution commercialisation team works with research projects to identify what IP should be protected, for example through patents, and what should be published in the open literature. The team does this by actively promoting novel means of translating the results of academic battery research into technological advance. In Phase 2, a total of 26 inventions were identified, with seven patents filed and seven published to date. Three licence agreements are currently in place, generating £20,658 in income from licensing activities according to Faraday Institution monitoring.

Respondents to the evaluation survey who said they had received funding under FBC Phase 2 were asked about the Technology Readiness Level (TRL) of their technology at the start of their engagement with the FBC and the time of the survey. Figure 5 shows that at least **85% of respondents who received funding reported an increase in TRL since the start of support from the FBC**. Whilst most respondents reported an increment of one or two levels (e.g., from a TRL of 3-4 to one of 5-6), some reported larger improvements.

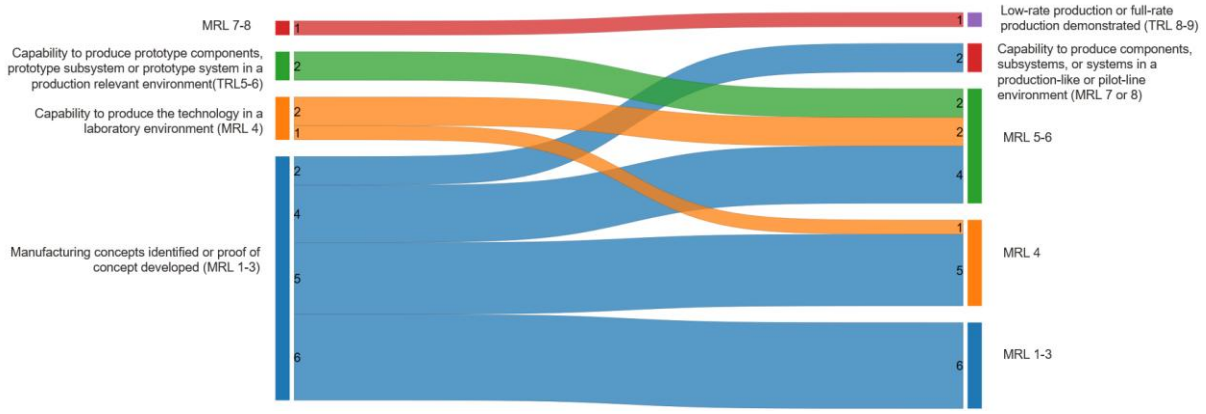
Figure 5 Change in technology readiness level after FBC support



Source: *Evaluation survey. Questions C11 and C12*
Note: *Sample size is 46 respondents.*

Respondents who reported receiving FBC Phase 2 funding were also asked about their manufacturing readiness level (MRL) at the start of their engagement with the FBC and at the time of the survey. Results are more modest than for TRL but still suggestive of improvements overall, with at least **61% of respondents reporting an improvement of MRL since the start of FBC support**.

Figure 6 Manufacturing readiness level change as a result of FBC support



Source: Evaluation survey. Questions C11B and C12B.
Note: Sample size is 37 respondents.

There is further evidence supporting the conclusion that FBC support was instrumental in driving observed technological process.

Survey respondents were also asked their perceptions of the impact of FBC funding on their technology. **79% thought that they got to a later stage of development than they otherwise would have done without FBC support, while a further 12% reported getting to the same stage of development but doing so faster**.

In addition, all survey respondents (irrespective of whether they themselves were supported by FBC) were asked about their perceptions of the impact of FBC on various outcomes of interest. 80% thought that the FBC has had a positive impact on the pace of technological development in the battery sector, with 27% thinking the FBC has had a large positive impact.

Finally, qualitative feedback from most businesses consulted for the evaluation revealed a consistent view that FBC support had led to them achieving development of their technology relative to what would otherwise have been possible. Illustrative quotes from such businesses include:

> *"Through the Faraday … we have been able to design and develop a brand-new cell that didn't exist, in a completely different format to anything we've done before."* Business stakeholder.
>
> *"We developed new processes for cell characterisation that simply wouldn't have happened without FBC."* Business stakeholder.

The feedback from stakeholders pointed to multiple factors as being important mechanisms for this development. The most obvious was the funding received, enabling them to conduct the research. However, in addition, businesses highlighted the advantages of being able to gain access to university labs and facilities through the Faraday Institution and CR&D projects, which was described in one case as being transformative.

Qualitative feedback revealed that businesses had some concerns over the technological direction of FBC funded research. Specifically, some businesses perceived the Faraday Institution to have too large a share of FBC funding relative to the support available for businesses. These views are likely influenced by the context that funding for the Faraday Institution comprised a larger share of FBC resources under Phase 2 than Phase 1 (described in section 1.1) In addition, a few businesses also thought that Faraday Institution funded research lacked focus on industry-relevance. However, by design the Faraday Institution is funding research on technology at an earlier stage of development. It is also reasonable for businesses to vary in their views on which early-stage research is most likely to be most relevant to industry, given their varying areas of interest. Overall, this feedback is judged to be issues relating to the design of the FBC Phase 2, rather than whether the activities as designed and delivered had the intended impact.

3.3 Improving the academic standing of the UK in battery-related research

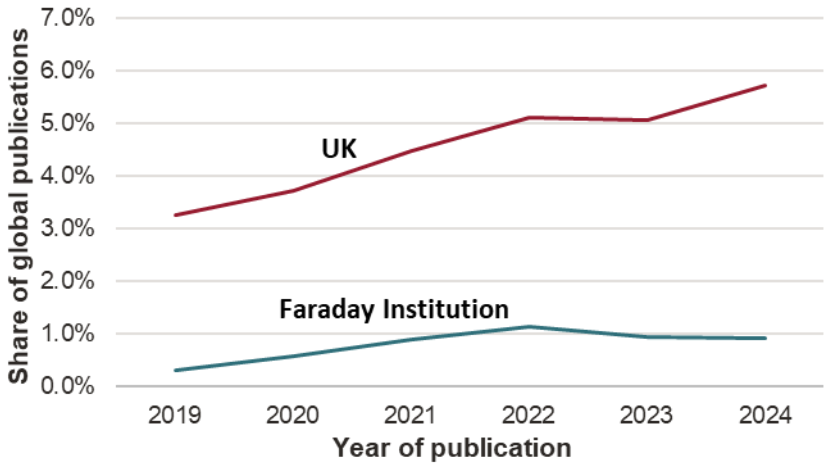
Qualitative perceptions from stakeholders of different types (including business and wider sector experts) suggested a consensus that the FBC – through the Faraday Institution – has continued to have a **positive impact on the UK's international academic standing in battery-related research**.

> *"The people I speak to all around the world respect the UK, and much of that is due to the work Faraday has done".* Business stakeholder

This impact was believed to come through various channels, including increasing the number of academics working in batteries, supporting high quality research outputs and intellectual property, creating strong networks and a community where people know how to tap into others, providing a 'front door' to assist with connections, and (through all these) attracting talent from abroad.

The **UK share of global academic publications in four main battery topics has continued to increase over time**. Figure 7 shows the share of global publications accounted for by UK publications increased from around 5% in 2022 to nearly 6% In 2024. That this increase occurred even while the share of Faraday Institution publications remained stable is particularly encouraging, and points to the FBC having helped establish a robust academic ecosystem in the UK that is not entirely dependent on the Faraday Institution to deliver academic outputs.

Figure 7 Share of worldwide battery publications from FI and the UK



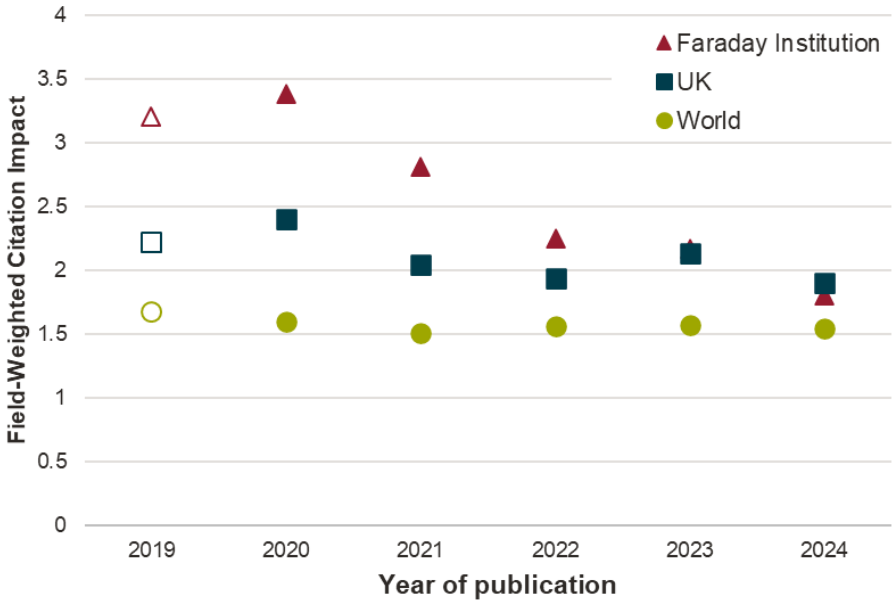
Source: *SciVal*

Note: *Includes publications from the topic clusters TC.303 "Lithium Ion Battery, Cathode, Manganese", TC.96 "Lithium Ion Battery, Battery, Anode", TC.927 "Battery, Battery Management System, Lithium Ion Battery" and TC.1239 "Solid Electrolyte, Lithium, Battery". These four topic clusters account for around 70% of Faraday Institution publications to date.*

Academic publications from the UK also continue to be high quality. A commonly used quality metric is the Field-Weighted Citation Impact (FWCI), which indicates how the number of citations received by a publication compares with the number of citations received by publications of the same type published in the same year and discipline.

Figure 8 shows the average FWCI of publications in four main battery topic clusters. These four topic clusters include 70% of Faraday Institution publications to date. The world average FWCI for papers in these topic clusters is around 1.6, indicating that on average papers in these topics are cited around 60% more often than papers in the broader field. The average FWCI for UK and Faraday institution papers across these four topic clusters is consistently higher: over the period 2022 to 2024 the average FWCI for the UK was 2.0. This suggest that UK papers are high impact, being cited twice as often as the global average for the field and 25% more often than the global average for the same topic clusters. While the FWCI for Faraday Institution papers appears to have declined over time, this picture needs to be interpreted cautiously. The average FWCI will change over time as publications receive more citations. It takes at least three years post-publication for the FWCI of a paper to stabilise, and therefore data for 2022 to 2024 in particular is susceptible to change in future.

Figure 8 Field-Weighted Citation Impact of FI and UK battery publications over time



Source: *SciVal*

Note: *Includes publications from the topic clusters TC.303 "Lithium Ion Battery, Cathode, Manganese", TC.96 "Lithium Ion Battery, Battery, Anode", TC.927 "Battery, Battery Management System, Lithium Ion Battery" and TC.1239 "Solid Electrolyte, Lithium, Battery". These topic clusters account for around 70% of Faraday Institution publications to date.*

The FWCI of the World is not equal to one as the four topic clusters considered are a subset of the fields considered when the FWCI is computed.

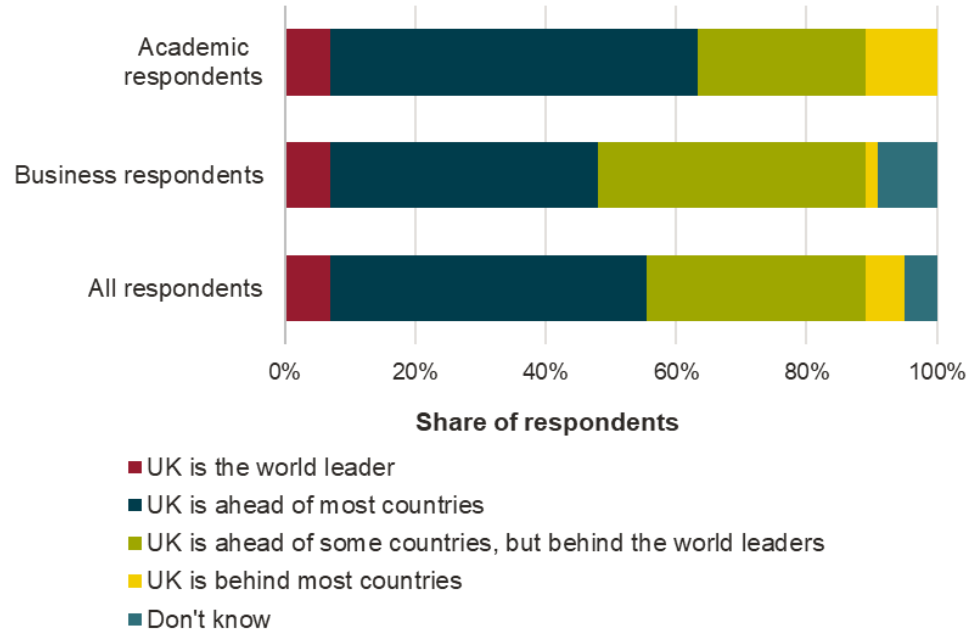
FWCI can be skewed by outliers when there are few papers. Data for the Faraday Institution FWCI in 2019 is based on only 45 papers. In subsequent years the sample size is 86,132,170,140 and 136.

The average FWCI will change over time as publications receive more citations. It takes at least three years post-publication for the FWCI of a paper to stabilise. Data for 2022 to 2024 is therefore susceptible to change in future.

Examining all the Faraday Institution papers published during the Phase 2 period that appear in the SciVal database (604 of the 630 published papers), 61% were published in the top 10% of journals, and 13% were in the top 1% (where journals are ranked by their impact factor).

Based on these metrics the **academic standing of the UK in battery-related research continues to be strong**. However, this is an internationally competitive field. Among the evaluation survey respondents, 7% think the UK is the world leader in terms of the standing of UK universities in battery-related disciplines, and a further 49% think the UK is ahead of most other countries. Perspectives are more positive among academic than business respondents: among academics 64% of respondents either think the UK is the world leader or at least ahead of most other countries, while 36% either think the UK is behind the world leaders or behind most countries; among business respondents these proportions were 48% and 43% respectively (9% of business respondents said they did not know).

Figure 9 Global standing of UK universities in battery-related discipline



Source: Evaluation survey. Question B6/6.
Note: Sample size consists of 58 businesses and 46 academics.

Overall these are somewhat less positive perspectives than were reported in a similar survey in 2022, when 13% thought the UK was the world leader, 57% that the UK was ahead of most countries, and 23% thought the UK was ahead of some countries but behind the world (see Figure 5 in the FBC Phase 1 evaluation report). However, comparisons should be made with caution given the limited sample sizes for these surveys and differences in the underlying respondent base, and there is a higher proportion of respondents who did not have a view in the current evaluation survey.

The academic standing of the UK in battery-related research is viewed particularly positively, even compared to the UK research and innovation landscape in batteries as a whole. When asked about perceptions of the UK in terms of its current reputation as a centre for research and innovation in battery technology, 3% think the UK is a world leader, and a further 30% think the UK is ahead of most countries. This is lower than the 7% and 46% respectively reported above for perceptions of the academic standing of the UK.

Perceptions of the UK's reputation as a centre for research and innovation are, as with perceptions of the UK's academic standing, lower than reported in 2022 (5% and 38%, see Figure 6 in the FBC Phase 1 evaluation report). However, 86% of survey respondents think that the FBC has had a positive impact on the UK's reputation as a centre for research and innovation since 2022. This supports the interpretation that the **FBC has had an important positive impact to help maintain the academic reputation of the UK for battery-related research**, even if maintaining an international position is challenging as other countries also develop.

Qualitative feedback from some stakeholders also highlighted international competition. In particular, the challenge that the future direction of battery technology is still uncertain, and yet the UK only has capacity to invest in research in some areas. This also creates problems in attracting investment, as investors recognise the uncertainty about which battery technologies will prevail and how the UK efforts fit into the global landscape.

> *"On the innovation end of it, you know they seem to be right at the frontier of solid-state batteries and lithium iron phosphate batteries… [but] there is an interesting question even about the Faraday you know, can they keep up? The Chinese have just rolled out the first sulphur-based battery."* Government stakeholder.
>
> *"There's a fear of the innovation itself creating technology obsolescence. If you're a big investor and you go all in for lithium ion and then you hear about solid-state coming down the line and you're like, is this going to be a stranded asset?" Sector stakeholder.*

3.4 Increasing the amount of battery-related R&D

FBC Phase 2 has **directly increased the amount of battery-related R&D being undertaken.**

The FBC has supported research that would not otherwise have happened (discussed above). More relevant for understanding the impacts of the FBC, however, is whether FBC activities have led to follow-on R&D, or wider increases in battery-related R&D, which would not otherwise have happened.

This perception is supported by self-reported data from Innovate UK grant recipients. This data is collected by Innovate UK through their Impact Monitoring Framework process at project close, with further detail collected by monitoring officers and the FBC team at Innovate UK. Across all organisations supported with grant funding through rounds 5 and 6, these organisations report an additional £21 million was spent on the supported R&D projects over and above that committed to in the project plans. A further £53 million of follow on R&D has been realised, directly building on the funded investments, and an additional £47 million R&D spending has been realised in technology or research areas aligned with (but not directly building on) the supported project. Of this total £121 million, £96 million was reported to be from private sources.

However, in the qualitative fieldwork stakeholders pointed to challenges in increasing the amount of battery-related R&D. Businesses pointed to a lack of public funding opportunities, in particular in recent years. Stakeholders of many different types (including businesses, delivery partners and finance experts) also pointed to challenges for small and medium-sized businesses in obtaining finance as a barrier to increasing the amount of R&D. This is discussed in more detail in section 5.

4 Findings - Theme 2: Has the FBC strengthened connectivity and collaboration?

Key Findings

- **The FBC has continued to facilitate collaboration on battery-related R&D under Phase 2**. Over three-quarters of survey respondents thought the FBC had a positive impact on collaboration since 2022. Interviewees pointed to key facilitating activities being events bringing the community together and enabling links to form, CR&D projects enabling direct collaboration, spin-outs building links between academia and industry, and the Faraday Institution helping to signpost connections. These activities have helped to maintain the higher levels of collaboration achieved under Phase 1. A few stakeholders, however, thought that some collaborative R&D projects involved collaboration for the sake of the funding requirements, rather than because it was needed for the technical development.
- There has been an **increased emphasis on international collaboration under FBC Phase 2.** This builds on the collaboration and connectivity, and international standing, developed under Phase 1.
- **The FBC has helped the battery sector remain an area of focus for the government**. The FBC was instrumental in the development of the UK Battery Strategy in 2023, and the battery sector was highlighted in the government's 2025 Modern Industrial Strategy as a frontier industry in one of the eight key growth-driving sectors.

This evaluation theme reflects the FBC's desire to increase collaboration in order to increase the efficiency of research and development (e.g. through scale and scope effects), increase diffusion of knowledge, and strengthen coordination across government and industry. This would contribute to the ambition for the UK to become a global science superpower in batteries. The evaluation questions explored are:

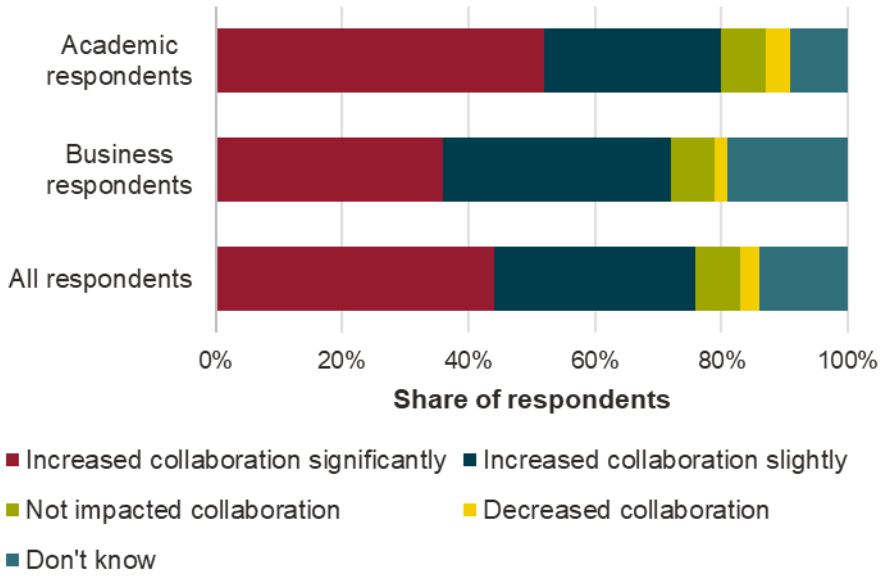
- Has the FBC contributed to increasing collaboration in the Challenge areas?
- Has the FBC contributed to increasing the coordination of government?

4.1 Increasing the extent of collaboration in the Challenge areas

FBC Phase 2 has helped maintain the improvements in collaboration achieved under Phase 1.

Over three-quarters (76%) of survey respondents thought that the FBC had a positive impact on collaboration in research and development concerning battery technology since 2022. 44% thought that the FBC had increased collaboration significantly. Figure 10 shows that academic respondents were slightly more positive than business respondents, but overall perspectives were similar.

Figure 10 Impact of FBC in battery-related R&D collaboration



Source: Evaluation survey. Question C23.
Note: Sample size is of 56 businesses and 46 academics.

The qualitive feedback from stakeholders (including both delivery partners, businesses and wider sector stakeholders), reinforced the view that the **FBC has continued to play a key role in facilitating collaboration around battery research and innovation**. Stakeholders pointed to various mechanisms for this, including:

- Faraday Institution **events** serving as networking opportunities. Events include the annual Faraday Institution Conference, which in 2024 was attended by nearly 550 delegates, from 140 different organisations (of which 68 were from industry). Among attendees to the 2024 event who responded to a Faraday Institution survey, 77% reported making five or more new connections. Under Phase 2 the Faraday Institution also delivered two Early Career Researcher Conference and Training Events, and funded research projects also routinely run their own project or topic focussed research events.
- **CR&D projects**: direct collaboration between partners that would not otherwise have happened.
- **Spin-outs** from Faraday Institution funded research: building enduring connections between academic teams and industry players.
- **Faraday Institution** facilitating connections: businesses or academics who are interested in developing something or doing something in the UK sometimes reach out to the Faraday Institution, who is then able to signpost them to relevant UK organisations. Approaches to the Faraday Institution were felt to arise because there is a high level of awareness of the Institution, both within the UK and internationally.

For example, qualitative insights from stakeholders included:

> *"FBC connected the two founders of [our company]."* Business stakeholder.
>
> *"There are several hundred people attending these events and you walk around networking, speaking to people and just learn about what's available. I mean the [technology] that we use for our batteries came about because I met somebody at a Faraday event."* Business stakeholder.
>
> *"[The CR&D project] was a fantastic opportunity to work with a whole load of academics… it was very much about accessing resources that we did not have access to."* Business stakeholder.

However, a few business stakeholders thought that collaboration on CR&D projects was a box ticking exercise to be eligible for funding, and that collaboration was not a key benefit of the funding, nor necessary for the technological development of the project. In particular, sometimes it was felt to be challenging to find the right kind of collaborator in the UK.

There was also feedback from some businesses that extracting value from funded programmes into start-ups and working with universities could be challenging and expensive. This is likely tied to wider issues arising from universities trying to capitalise on their commercial opportunities and indicates a headwind against which the FBC is trying to work to increase collaboration in the battery sector.

The survey responses suggest that **much of the positive impact of the FBC has been about maintaining levels of collaboration achieved under Phase 1, rather than necessarily increasing the extent of collaboration further**. Almost half (44%) of survey respondents thought that collaboration on research and development concerning batteries had increased since 2022, while 30% thought collaboration has not changed, and 17% thought collaboration has decreased. The equivalent figures suggested more positive perceptions of the level of improvement in FBC Phase 1 (Figure 13 in the FBC Phase 1 evaluation report), but this should be expected. FBC Phase 1 was building up collaboration from a low starting point, whereas Phase 2 is starting from that higher level of collaboration established under Phase 1.

This is consistent with qualitative feedback received, particularly from delivery partners. They pointed to the continued delivery of FBC activities as being vital to maintain networks and relationships because the players in academia and industry change over time, the needs or opportunities for collaboration change, and networks should continually evolve over time.

Qualitative feedback from delivery partners indicated that the FBC team did not play as large a role in connecting industry players, particularly connecting SMEs with OEMs, under Phase 2 as they had initially planned. This was due to capacity constraints within the FBC team, a challenge arising from the FBC having no defined operational expenditure budget and Innovate UK recruitment freezes limiting the size of the FBC operations team.

Delivery partners also indicated an **increased emphasis on international collaboration** under FBC Phase 2. For example, the Faraday Institution highlighted that it had been engaging with leading research institutions and universities in the United States, Japan, Europe and the lithium triangle countries of Chile and Argentina, to leverage complementary expertise and access to advanced facilities. Through its leadership of the Ayrton Challenge

on Energy Storage, the Faraday Institution is also bringing together battery ambassadors from emerging economies into the UK research community.

These activities all build on the collaboration and connectivity, and international standing, developed under Phase 1. This was felt to be increasingly important, to enable the UK to compete with countries such as China that are already more advanced.

> *"Once you've got a what's perceived as a successful UK, really raised the profile of the UK work and research, then you can bring in the international dimension as well."* Delivery partner.

Among survey respondents, **almost half (48%) indicated that the FBC had a positive impact on their number of international collaborations since 2022**. 18% thought that it had a large positive impact. This was particularly true among academics: 61% of academic respondents thought the FBC had a positive impact on their number of international collaborations, compared to 36% of business respondents. 28% of academic respondents reported a large positive impact, compared to 9% of businesses respondents.

4.2 Increasing the coordination of government

The FBC has **engaged with policymakers to raise the profile of the battery sector within government.** Despite this success stakeholders felt that in some respects engagement with government has been harder under Phase 2 than previously.

The most significant output of FBC engagement with government under Phase 2 was the UK Battery Strategy, published in November 2023. This was co-authored with DBT and extensively cited evidence generated by the FBC – Faraday Institution reports were cited more than 50 times. The prioritisation of the battery sector has continued under the Labour government that was elected in 2024. The Labour government's Modern Industrial Strategy identified batteries (battery manufacturing, including the supply chain) as a frontier industry in the Advanced Manufacturing Sector.

The Faraday Institution has been active in making information available to inform policymakers and industry players alike, through evidence-based reports, insights and briefings. During Phase 2 the Faraday Institution has published nine insights and authored or co-authored seven major reports – for example, its updated study on UK Electric Vehicle and Battery Production Potential, and contributions to a report on the variables that influence the demand for EV battery recycling. The Faraday Institution submitted written evidence to four parliamentary inquiries (including the House of Commons Business and Trade Committee Inquiry into Batteries for EV Manufacturing and the House of Lords Science and Technology Committee Inquiry into Long-duration Energy Storage for Net Zero), providing oral evidence on two occasions. The Faraday Institution also provided input into government consultations, including the Department for Transport's call for evidence on zero emission heavy goods vehicles.

The FBC has also been engaging with government on the issue of small business access to finance. The FBC team worked with the Green Finance Institute to highlight the scale-up challenge to DBT. The FBC attribute recent government focus on this area, including the 2024 call for evidence on access for finance for advanced manufacturing, to their activities.

Qualitative engagement with stakeholders, however, revealed that engagement with government has been more challenging under Phase 2 than under Phase 1. There has been a greater amount of political turnover, with three Prime Ministers in post during FBC Phase 2. More directly, the **changes to government departments in 2023 made coordination between the FBC and central government on the battery agenda more difficult as there were more parties to coordinate**. Previously FBC interests overlapped with those of primarily one department: the Department for Business, Energy and Industrial Strategy. Since 2023, FBC interests have overlapped with those of the Department for Business and Trade (DBT), the Department for Science, Innovation and Technology (DSIT) and the Department for Energy Security and Net Zero (DESNZ).

5 Findings - Theme 3: Has the FBC enhanced prospects for the commercialisation of battery technologies?

Key Findings

- The FBC has delivered various activities under Phase 2 to support businesses with the development of their technology and moves towards commercialisation. These include Faraday Institution industry fellowships, industry sprints, and entrepreneurial fellowships, Innovate UK funding of CR&D projects and investor partnerships, the Investor Readiness Programme, and support for the UK Battery Industrialisation Centre (UKBIC) and Advanced Materials Battery Industrialisation Centre.
- **The various activities to support late-stage development and commercialisation are overall broadly seen as having had a positive impact on supported businesses.** Two-thirds of survey respondents thought the FBC has had a positive impact on the commercial readiness of UK battery technology since 2022. Qualitatively, business stakeholders attribute FBC support to helping them move from prototyping to reaching commercial performance, being ready to industrialise, or securing commercial contracts.
- **UKBIC operations have had to adapt under phase 2**. Britishvolt and AMTE Power were two large-scale companies that planned to use the UKBIC for volume production of cells before establishing their own gigafactories, However, both went into administration before volume manufacturing at the UKBIC was required. The UKBIC has supported other companies to develop their technology. However, it is widely accepted to be too large for the scale of companies in the current UK battery ecosystem. A few businesses also reported that, in their experience, the quality of UKBIC cell production was lower than that from international facilities. Delivery partners and others suggest that this is due to the UKBIC being used for relatively small-scale electrode and/or cell manufacture, which is not what the facility operational under Phase 2 was designed for.
- **The new Flexible Pilot Line at the UKBIC that has been constructed under Phase 2 is seen to be much more aligned with market demand**. Various stakeholders are positive about expected demand for the facility and see the protection of companies' intellectual property as a key benefit of the facility.
- While the FBC has had a positive impact on commercialisation for some supported companies, **numerous stakeholders of different types highlighted the challenging ecosystem facing companies looking to commercialise in the UK.** Barriers mentioned included a lack of funding and finance, as well as a lack of technical expertise.
- **The FBC has had some impact on access to finance at an individual firm level.** A Dealroom report indicates that FBC supported companies have raised around $500 million in venture capital investment over 2023 and 2024. Not all this funding raised will be directly attributable to FBC support, but it is reasonable to believe that the FBC had some positive impact. Survey responses from those who had received FBC funding revealed that 60% thought that support from the FBC had a positive impact on their ability to secure follow-on funding. Qualitatively, stakeholders felt that using FBC funding to

validate technology, and the association with the branding of the FBC and Faraday Institution, was beneficial in attracting finance.

- More generally, **access to finance in the industry is challenging**. This is an issue in many capital-intensive sectors and is attributed in part to risk aversion among investors and the UK's high cost base. It is not something the FBC alone can address, but it poses risks to some of the longer-term benefits that it was hoped the FBC would contribute to.

This evaluation theme reflects the FBC's desire to foster the development and commercialisation of innovations in EV battery technologies and position the industry to be able to adopt future EV battery technologies.

The evaluation questions explored are:

- Has the FBC delivered its intended activities to support late-stage development and commercialisation?
- Has the FBC contributed to an increase in late-stage development and commercialisation?
- Has the FBC contributed to improving access to finance?

5.1 Has the Challenge delivered its intended activities?

The FBC has delivered various activities under Phase 2 with a view to supporting late-stage development and commercialisation.

Faraday Institution focus on commercialisation

The Faraday Institution had a greater focus on commercialisation under Phase 2 than previously, in light of the maturing of technology developed under Phase 1. They have a commercialisation team, who review all projects on a regular basis for early-stage commercialisation potential and identify a plan for areas with most potential. In addition, the Faraday Institution have funded:

- **Industry Fellowships**: these enable academics and industrialists to undertake a mutually beneficial, electrochemical energy storage research project that aims to solve a critical industrial problem and that has the potential for near- and longer-term benefit to the wider UK battery industry. 10 industry fellowships were awarded under FBC Phase 2, with around £0.6 million funding in total.
- **Industry Sprints:** these dedicate small multidisciplinary teams of researchers to solve a commercially relevant research opportunity identified from within the research programme and prioritised by an industrial partner. 19 sprints https://www.faraday.ac.uk/opportunities/industry-sprints/were awarded under FBC Phase 2, with around £3.5 million funding.

- **Entrepreneurial Fellowships** programme: this supports UK researchers in establishing new businesses and commercialising battery technologies. Eight Entrepreneurial Fellowships were awarded under Phase 2, with around £0.8 million funding in total.

CR&D and Investor Partnerships

The FBC has supported SMEs with later-stage development through **grant funding for CR&D projects** and the **Investor Partnership Programme**.

- The FBC supported 20 collaborative R&D projects under Phase 2 (as well as 17 feasibility projects focussed on earlier-stage research).
- The Investor Partnership Programme is a wider Innovate UK programme to support SMEs to access equity investment by connecting SMEs with a pool of potential investor partners and providing associated grant funding for supported projects. Phase 2 supported four SMEs with Investor Partnerships. This is fewer projects than was originally planned for Phase 2, and therefore less overall FBC funding (£2.6 million rather than the initially planned £12 million). Engagement with delivery partners suggests this was due to delays with the wider Innovate UK programme.

The FBC also ran an **Investment Readiness Programme** for two cohorts of businesses under Phase 2, with 29 participants overall. This was a 12-week programme of workshops, mentoring and a showcase event, to help the participating SMEs to refine their proposition and hone their investor pitches.

UK Battery Industrialisation Centre

The UK Battery Industrialisation Centre (UKBIC) is the main FBC investment in scale-up. The UKBIC is a manufacturing development facility in Coventry designed to help scale-up technologies that work at prototype level to reach mass production, which is a key stage in the commercialisation pathway. It provides open access to specialist equipment covering the whole battery production process. The UKBIC was constructed under FBC phase 1 and operations began in July 2021. FBC Phase 2 included two main aspects of support for the UKBIC: funding to support ongoing UKBIC operations, and capital funding for upgrades and new facilities. The eventual spend on these two aspects was £29 million for operational support and £90 million for capital investment.

Funding to support UKBIC operations is necessary so that the facility can support strategic investments that might not otherwise be able to cover the full operating costs of the UKBIC. This is intended to reduce barriers to product development and increase the rate of development and commercialisation in the battery sector.

However, the required support for operational funding (£29 million) has been much higher than anticipated in the Phase 2 Business Case (£15 million). In part this is due to what delivery partners now believe to be inappropriate initial expectations of the extent to which the UKBIC could commercially fund its operations, and in part due to substantial increases in energy

costs. This required considerable effort from the FBC team to reprofile existing budget and secure additional funding from a Horizon Europe programme, to minimise the impact on other aspects of FBC Phase 2 planned activities.

UKBIC supported 25 companies in 2023 and 20 companies in 2024 (defined as companies that were invoiced by UKBIC for work, excluding room rental). However, it is widely acknowledged that UKBIC has struggled to find enough companies looking to use their facilities. The **Industrial Scale Line (ISL) that is operational is too large for current market demand.** Britishvolt and AMTE Power were two large-scale companies that planned to use the UKBIC for volume production of cells before establishing their own gigafactories elsewhere in the UK, However, both went into administration in 2023 before volume manufacturing at UKBIC was required. Few other UK companies have the resources, or the desire, to use UKBIC at the scale of the ISL.

> *"UKBIC is too large and too expensive to run". Business respondent.*

In qualitative feedback, cost was the most reported obstacle to businesses using UKBIC facilities. However, a small number of companies that had used UKBIC also **voiced concerns about the quality of output and skills of UKBIC sometimes being lower than expected.** The quality of cell production specifically was reported to be lower than could be obtained from international facilities. The FBC delivery team and a few businesses contextualised that this could arise from the UKBIC being used for relatively small-scale electrode and/or cell manufacture, which is not what the ISL was designed for.

> *"UK BIC is not doing thousands of cells. They might, if they're lucky, do hundreds of cells and then they're doing somebody else. So then they're having to turn the equipment off. Down reset everything, reload it all back up and you're not getting that throughput, so any learnings that you've got around this particular cell is then lost when you go to another one because it is a different cell." Business respondent.*

While not fully utilised, the existence of the facilities at the UKBIC has meant that some companies were able to use UK facilities for product development, which otherwise they would not have been able to. There was the impression among stakeholders (both businesses and deliver partners) that Intellectual Property is better protected at the UKBIC than would be the case if using commercial facilities in Asia. This was seen as a potential benefit for companies looking to validate their technology at scale without risking losing their technological edge through corporate espionage.

The main capital upgrade at the UKBIC under Phase 2 has been the development of the Flexible Pilot Line (FPL) and its associated facilities. The FPL allows companies looking to scale to trial and test materials and develop their production capabilities at a lower scale and lower cost of entry than the ISL. The FPL was being commissioned and was awaiting approvals from its regulator in Autumn 2025. It will therefore be operational later than planned at the outset of Phase 2 (mid-2024), due in part to changes to the specification of the facility.

It is too early to assess usage and therefore the impact of the FPL. However, qualitative feedback from the spectrum of stakeholders (delivery partners, businesses and wider sector stakeholders) suggests that the FPL is better suited to the current scale and technology readiness of UK companies. It is expected to offer a lower cost of entry to companies looking to take advantage of open access to UKBIC facilities, and enable companies to develop their technologies while securely retaining their intellectual property.

Other capital investments

FBC Phase 2 also provided capital funding for a new Advanced Materials Battery Industrialisation Centre. This will be delivered by the High Value Manufacturing Catapult through its Centre for Process Innovation (with its expertise in chemicals processing) and Warwick Manufacturing Group (with its cell development capabilities). It will provide innovation capability for the synthesis and processing of immediate and next generation battery materials, aiming to bridge the gap between the work done to develop new battery chemistries at the Energy Innovation Centre in the University of Warwick, and the scale-up work done at the UKBIC. Delays to procurement mean that facilities will not be operational until late 2025, a year later than originally planned. It is too early for this evaluation to assess use, and therefore impact, of the AMBIC facility.

There are other capital investments that were originally planned to be delivered under FBC Phase 2 that have cancelled, due to a reprioritisation of FBC resources towards UKBIC cost overruns. This includes investment in prismatic cell capability at the UKBIC and a pilot line at the Energy Innovation Centre. These changes were endorsed by the independent FBC advisory group.

5.2 Has the Challenge contributed to an increase in late-stage development and commercialisation?

The activities described above have contributed to late-stage development and moves toward commercialisation among some supported companies. However, in many cases, companies have been supported at various stages by different FBC activities (sometimes under both Phase 1 and Phase 2), therefore it is challenging to attribute outcomes to any individual component (or phase) of FBC support.

The Faraday Institution has directly supported 14 start-ups before or at the point of incorporation, including 5 who were incorporated under Phase 2. These 14 companies received an initial Faraday Institution investment of around £1 million between them. Faraday Institution analysis reports that as of March 2024, these 14 start-ups employed around 118 people (with plans to expand to around 200). More broadly, the Faraday Institution has supported 25 UK based startups through its various programmes, who between them supported 282 jobs under Phase 2.

The commercial focus of the Faraday Institution was positively perceived by one wider sector stakeholder.

> *"The Faraday Institution has taken stock of the fact that actually it generated some really good IP in the early days… We've seen the ability to draw that academic knowledge out and actually land it straight into industry." Wider sector stakeholder.*

Among survey respondents, **two-thirds thought the FBC has had a positive impact on commercial readiness of UK battery technology since 2022** (with 14% thinking the FBC has had a significant positive impact).

Innovate UK monitoring data collected at project completion from CR&D round 5 recipients show that 65% of them expected to introduce a new product to market within the next five years as a result of their project. This share was of 40% for Feasibility Studies grant recipients. In round 6, 60% of both CR&D and Feasibility Studies recipients expected to introduce a new product, service, or process to market within the next 5 years as a result of the support they had received. At the time of project completion, 30% of CR&D recipients reported to have already launched a product to market.

Qualitative feedback from supported businesses supports the view that the FBC had a positive impact on commercial readiness. Various business stakeholders reported using CR&D funding to move from prototyping to reaching commercial performance, being ready to industrialise, or securing a commercial contract. One CR&D recipient explained that the support enabled them to test several design iterations before arriving at a market-ready product, noting they "will receive a major contract as a consequence of round six".

While supported businesses were positive about the impact of the FBC on their commercial readiness, there was also widespread concern from different stakeholder groups about the challenges of the environment facing businesses seeking to scale up in the UK. Stakeholders pointed to a lack of funding (discussed further below), as well as a lack of technical expertise, meaning that companies were more likely to go to the US or Asia to scale up, rather than remain in the UK.

> *"The fact that we haven't really had much CR&D out of Faraday in the last 18 months is, I think, been very unhelpful because I think a lot of these companies will go and it just creates a lesser bond with the UK."* Wider sector stakeholder.

This suggests that there may be barriers to the longer-term benefits from FBC investment in technology at an earlier technology readiness being realised, unless there is ongoing policy action to support scale-up and commercialisation in the UK.

5.3 Has the Challenge contributed to improving access to finance?

The FBC has helped some companies to access finance but more generally access to finance remains a key challenge facing the industry.

The FBC supported four SMEs to access private finance through the **Investor Partnership Programme** under Phase 2. These received grant funding from the FBC totalling £2.6m, with additional finance of £2.0m from private investors contributing the remainder of total project costs. While it is not possible to say whether these companies would have obtained private investment in the absence of the FBC, the presence of the Investor Partnership Programme is likely to have made this easier. Two of the companies funded, Anaphite and LiNa Energy, have since raised further funding. According to Crunchbase data Anaphite raised £10 million of Series A funding in September 2024 while LiNa Energy raised £3.5 million of corporate funding in February 2025. Given the successes of these companies, it is unfortunate that fewer businesses were supported through the Investor Partnership Programme than originally planned.

Some businesses who participated in the FBC Investment Readiness Programme have also subsequently raised private investment. Analysis of Beauhurst data conducted by the FBC delivery team indicates that 7 of the businesses who participated under Phase 2 have since raised over £2.5 million between them – though again it is not possible to say whether these firms would still have been able to raise this finance in the absence of the programme.

Startups and spinouts supported by the Faraday Institution Entrepreneurial Fellowship scheme under Phase 2 have also attracted subsequent funding – over £12 million in follow-on funding rounds according to Faraday Institution analysis.

A 2024 Dealroom report commissioned by the FBC examined access to venture capital investment in the sector more generally. That identified over 100 companies in the EV battery sector and related areas such as EV charging and stationary storage that the FBC had funded. Those FBC supported companies have raised more than $1.6 billion in venture capital investment since 2018, with around $500 million across 2023 and 2024. Not all this funding raised will be directly attributable to FBC support, some would likely have been raised by companies even if the FBC did not exist. Indeed, the Dealroom report also indicates that EV battery start-ups in the UK which did not receive FBC support had also raised $1.7 billion since 2018. However, it is reasonable to believe that some of this investment received by FBC supported firms arose as a result of the FBC support.

Survey responses from those who had received FBC funding revealed that **60% thought that support from the FBC had a positive impact on their ability to secure follow-on funding**, with 30% reporting a large positive impact and 30% a small positive impact.

Data collected by Innovate UK from grant recipients indicate that organisations self-reported realising an additional £121 million of investment to support, to build on, or related to their FBC funded projects. Of this £96 million was reported to be from private sources. Focusing on grant recipients who were businesses, those businesses reported realising £101 million, of which £95 million was reported to be from private sources.

Qualitative feedback from stakeholders highlighted two main mechanisms through which the FBC had a positive impact on access to finance for some supported businesses. First, by

enabling companies to progress their technology to a higher readiness level that is more attractive to investors.

> *"[it] helped us secure the level of technical validation with our customers to be able to raise our Series A," Supported business.*

Second, multiple companies felt that FBC branding and being able to signal an association with the FBC served as a signal of quality when engaging with investors.

> *"When the government invests in a company like us... it makes us more attractive to other third-party foreign investors." Supported business.*

Around half (55%) of survey respondents thought the FBC has had, since 2022, a positive impact on access to finance in the UK battery sector. Within that, 17% of survey respondents thought the FBC had a significant positive impact.

Access to finance is still felt to be a significant barrier to business scale up and growth, however. Businesses, delivery partners, and wider stakeholders all pointed to various factors deterring investment in the UK, including:

- Risk aversion from investors – particularly in light of high-profile business failures in the sector such as Britishvolt and AMTE Power. Investors are thought to be concerned about technology becoming obsolete, and about levels of demand. Risk aversion is perceived to be particularly problematic for capital-intensive businesses, as scale-up requires capital investment that investors do not want to risk funding.
- High costs in the UK as compared to other countries – including high energy costs, high land costs and a lack of subsidies. This makes investing in scale-up businesses in the UK less attractive than investing in those businesses if they operated overseas.

None of these barriers are exclusive to the battery sector. They are also wider systemic issues rather than factors that the FBC has any direct control over. However, they are important to acknowledge, as various stakeholders thought that the result of the scale-up finance barrier was companies either failing or moving abroad. This could inhibit some of the longer-term impacts that it was hoped FBC investments would contribute to – including the development of a battery supply chain in the UK.

The FBC delivery team acknowledges the lack of scale-up finance, particularly beyond series A, being a key challenge for businesses. They have worked with the Green Finance Institute and DBT to highlight the scale up challenge, and attribute the recent government focus on this area to their activities, including the 2024 DBT call for evidence on access for finance for advanced manufacturing scale-ups. The 2025 Advanced Manufacturing Sector Plan also acknowledged the need to "increase access to finance to scale up innovations in the UK".

6 Findings – Theme 4: Has the FBC contributed to improving production capability and ecosystems?

Key Findings:

- **The FBC has made direct and indirect investments in skills under Phase 2**. 72% of survey respondents think the FBC had a positive impact on skills levels in the industry since 2022. While progress on skills has been made, gaps remain. 65% of survey respondents think that there are currently fewer people than the industry needs with the relevant skills. Gaps in junior engineering roles and battery technician grades were the most highlighted. These gaps do not represent a failure of the FBC, as the FBC only planned modest investment in skills. However, they are a challenge facing businesses looking to grow.
- **Two new UK gigafactories have been announced since the start of FBC Phase 2.** Stakeholders are varied in their perceptions, but one government source suggested that the UK reputation for battery research played a role in Tata's decision to invest in the UK.
- The combined enterprise value of UK EV battery companies has increased over time, from $3 billion in 2022 to over $3.8 billion by 2024. However, the UK appears to face challenges in scaling battery production. While the UK has received the fourth largest value of VC investment over the period 2018 to 2024, the UK only ranked sixth in terms of the combined enterprise value of VC-backed EV battery startups.
- Stakeholders of different types agree that FBC Phase 2 has continued to contribute to the UK moving from lab-scale prototypes to credible pilot lines, but most see a stubborn gap between those pilots and gigawatt-hour manufacturing. **Stakeholders pointed to systemic issues that affect the competitiveness and attractiveness of scaling in the UK**, including access to finance, access to and cost of energy, labour costs, and the availability of suitably skilled labour. Around half of survey respondents think that the UK is at least slightly behind most countries in its attractiveness as a location to manufacture batteries and its attractiveness as a location to manufacture electric vehicles.
- These wider factors are not within the scope of what the FBC was seeking to, or is able, to address. However, **these challenges may represent a barrier to some of the potential longer-term benefits of FBC investments being realised**, e.g. that FBC investments in research and innovation could contribute to the growth and development of the supply chain for batteries in the UK.

This evaluation theme reflects the FBC's desire to strengthen the sector's capabilities and contribute to developing a world-class intellectual and physical supply chain for batteries in the UK. Building the surrounding ecosystem is an important component of this, as the location of production capacity will depend on agglomeration effects, including the presence of well-developed markets for skills, other inputs, and outputs.

It is important to acknowledge that, at best, the FBC could play only a contributing role in these aspects. The logical pathway through which this could happen is set out in the logic model Figure 2, but these impacts being realised will depend on wider factors outside the control of the FBC. For example, developing a physical supply chain for batteries in the UK will depend on factors such as the cost competitiveness of production in the UK.

The evaluation questions explored are:

- Has the FBC contributed to an increase in the skills base of the battery-related sector?
- Has the FBC contributed to increasing the production capacity for batteries in the UK?
- Has the FBC contributed to increasing growth in the battery-related sector?
- Has the FBC contributed to the increasing application of appropriate regulations and standards?

6.1 Has the FBC contributed to increasing the skills base of the battery sector?

The FBC has made direct and indirect investments in skills under Phase 2, and stakeholders perceive these as having had a positive impact on skills levels in the battery industry. However, skills gaps are still seen as a barrier to growth in the sector.

The FBC Phase 2 made modest direct investment in skills. For example, direct support for skills development was delivered through:

- **Support for PhD students.** A fifth cohort of 14 PhD students were funded by the Faraday Institution through Phase 2. In addition, enrichment training for 32 PhD students provided networking opportunities and specialised battery-focused courses to PhD students, upskilling researchers with industry-relevant knowledge, skills and expertise in battery technology.
- **Training courses provided by the UK Battery Industrialisation Centre**: Five public courses were attended by 98 people. Eight bespoke private training courses to 'train the trainer' were delivered for companies operating in the electric vehicles sector, with 55 people attending and learnings taken back to the commercial organisations.
- **National Battery Training Skills Academy**. A collaboration between Newcastle University and New College Durham, the FBC funded academy provides learning and qualifications (focused on level 2 and 3 training and skills) to ensure that existing and new operators and technicians in the battery industry have the necessary skills.
- **Electrification Skills Network**. This project worked with stakeholders from across the electrification landscape to develop a framework for skills, including understanding skill requirements and developing learning content and solutions to support skill development.
- **Digital Enhanced Battery Ubiquitous Training** (DEBUT). This project sought to re-skill, upskill and grow new skills in battery manufacturing and innovation through traditional physical training and advanced immersive digital technologies.

- **Faraday Undergraduate Summer Experience** (FUSE). This is an annual internship programme funded by the Faraday Institution, enabling undergraduate students to conduct a paid research placement in the battery sector.

The FBC has also 'indirectly' supported the skills of the battery sector. It has funded research in academia and businesses that would not otherwise have happened (as discussed under Theme 1) and supported the operations of the UKBIC (discussed under theme 3). These broader activities will have afforded individuals the opportunity to 'learn by doing' and thus increase their skills.

Survey evidence indicates that most stakeholders (72%) think the FBC has had a positive impact on skills levels in the industry since 2022. 27% of respondents think the FBC has had a significant positive impact, while 46% think a slight positive impact. Most of the remainder (19%) reported that they did not know what impact the FBC had had on skills.

However, the survey and qualitative feedback revealed that many stakeholders still perceive skills gaps as being a barrier for growth of the battery sector. 65% of survey respondents thought that there are currently fewer people than the industry needs with the relevant skills. Gaps in junior engineering roles and battery technician grades were the most highlighted.

One challenge highlighted by stakeholders of different types though was the potential risk of increasing general battery skills training without it being tied to specific jobs (e.g. a new gigafactory) in case demand for those skills does not materialise.

The activities of FBC Phase 2 would not be expected to have a direct positive impact on these wider factors, so these reflections do not highlight a failure of the FBC. However, they highlight a wider challenge facing the battery sector, which may affect the long-run benefits of FBC investment in businesses' research and innovation.

Finally, several stakeholders raised concerns about the 'broken talent pipeline' that may occur in future because of FBC no longer funding PhD students. (Under Phase 1 the Faraday Institution funded four cohorts of researchers on a four-year PhD programme, supporting 70 PhDs in total. While Phase 2 finished funding the remaining years for those cohorts that had started under Phase 1, only one new cohort was funded.) They thought this gap would be more evident in future at the point those PhD students would have been entering the labour market. This is a reflection on the design of the FBC, rather than the impact of the planned activities. Whether this proves true will depend on whether other sources of funding (e.g. from industry or UK Research and Innovation funding councils) are available for PhD students looking to conduct a PhD in battery technology to offset the absence of FBC funding. For example, during Phase 2 the Faraday Institution entered into a Memorandum of Understanding with an industry partner, who then funded 3 PhD students.

6.2 Has the FBC contributed to increasing the production capacity for batteries in the UK?

Two new UK gigafactories have been announced since the start of FBC Phase 2:

- **Agratas** is investing over £4bn in a 40GWh gigafactory in Somerset to supply Jaguar Land Rover and Tata Motors from 2026
- **AESC** is building a second gigafactory in Sunderland, with a 15.8GWh capacity, to supply Nissan.

These may act as 'anchor' investments that can help the upstream and downstream supply chain establish in the UK.

Stakeholders had varied views on the contribution the FBC played in securing these gigafactory investments in the UK. One government minister indicated that the UK reputation for battery research, as well as direct support through the Automotive Transformation Fund and policies to reduce energy costs, had a role in the decision of Agratas.

> *"It's not really just money, it's also our lead in battery research … those are the things that in the end convinced Tata to set up the factory here."* Government minister.

Other stakeholders are more circumspect and thought that the recent gigafactory announcements were likely given the existing car manufacturing of Nissan in the UK, and that the research community facilitated by the FBC probably had limited direct impact compared to other factors such as direct government funding support.

6.3 Has the FBC contributed to increasing growth in the battery-related sector?

Three sets of indicators of growth in the battery sector have been examined: investment and market value of start-ups from Dealroom, business metrics from analysis of Office for National Statistics data, and stakeholder perceptions from the evaluation survey and qualitative fieldwork. Overall, the evidence suggests that the FBC has had a positive impact on the growth of the sector, but that there are significant wider challenges facing the sector and businesses looking to scale.

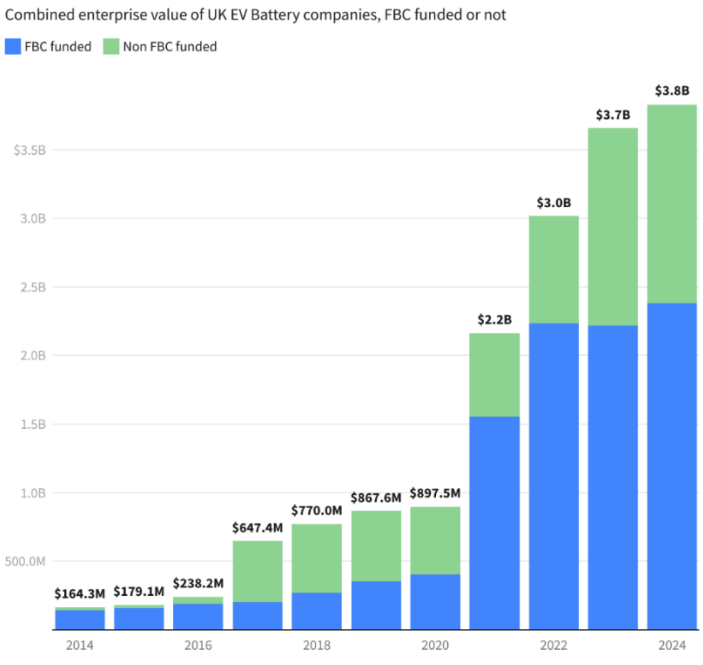
VC investment and the value of battery start-ups

Data on Venture Capital (VC) investment suggests that the UK continues to be a key player in the global battery sector. A 2024 report by Dealroom commissioned by the FBC indicates that, across 2023 and 2024, the UK was the third largest recipient of EV battery investment – receiving $1.4 billion – behind the US ($3.9bn) and Sweden ($1.4bn). Over the longer period 2018 to 2024 the UK has received the fourth largest value of VC investment in the EV battery sector, at $2.4bn (behind, the US, China and Sweden).

The combined enterprise value of UK battery companies has increased over time. Figure 11 shows an increase from around $0.8 billion in 2018 to $3 billion by 2022, and to over $3.8 billion by 2024. Within that, FBC supported companies saw an increase in their valuation from under $0.3 billion in 2018 to $2.4 billion in 2024, albeit with limited growth over 2022 to 2024. For a wider set of FBC supported companies than that shown in Figure 11, including companies in both the EV battery and related areas such as EV charging and stationary storage, the combined enterprise value increased from around $0.3 billion in 2018 to $2.4 billion in 2022 and $3.2 billion in 2024. While not all this growth in company valuation will be attributable as an outcome of FBC support (note that enterprise value of firms not supported by the FBC has also increased) there is likely to have been some positive impact.

However, despite these positive statistics, the same Dealroom report highlights that the UK appears to face challenges in scaling battery production. While the UK has received the fourth largest value of VC investment over the period 2018 to 2024, the UK only ranked sixth in terms of the combined enterprise value of VC-backed EV battery startups. This rises to fourth when gigafactories and companies valued at over $1 billion are excluded – suggesting that the UK is lacking the high-profile successes of other countries. Since the Dealroom report was published, however, Northvolt has gone bankrupt, indicating the UK is not alone in the challenges it faces in scaling up battery production.

Figure 11 Combined enterprise value of UK EV battery companies



2024 data as of July 2nd 2024. Excludes bankrupt and closed companies.

Source: Dealroom.co

Business metrics

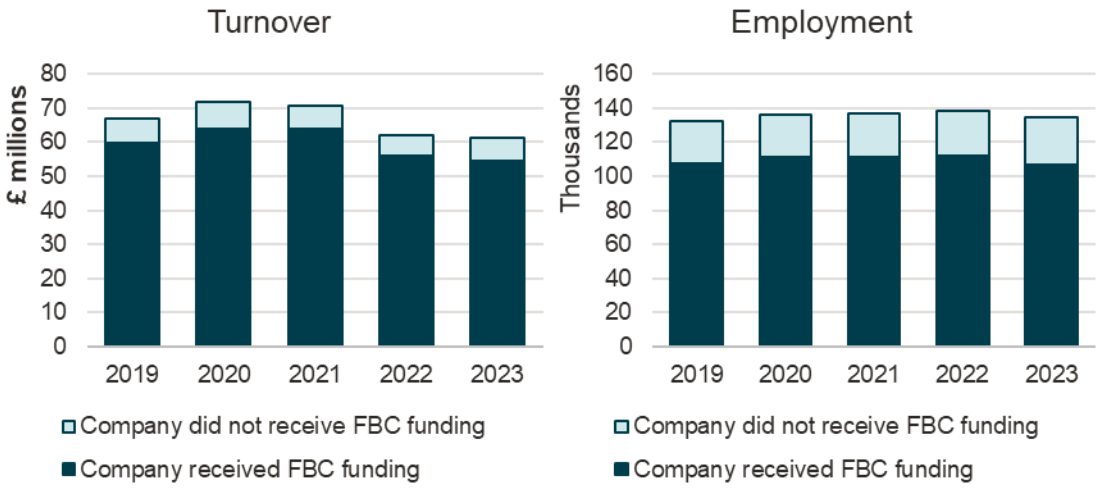
The growth of the battery sector in the UK is also examined by analysing data on businesses held by the Office for National Statistics (ONS) in the Business Structure Database (BSD).

The BSD is an annual snapshot taken of firms registered for VAT and/or PAYE tax in the UK. There is no identifier for the 'battery sector' in the BSD, as Standard Industrial Classification codes do not readily identify the sector. Instead, a proxy for the sector was constructed which included firms who had ever applied for grant funding from the FBC (under Phase 1 or 2, whether successful or not). A list of such firms provided by the FBC achieved a 93% match rate with the BSD data when linked by the ONS.

The number of firms in this proxy-sector is not constant over time, as companies become inactive and start-ups enter the sector. In 2019 there were 259 firms (of whom 140 would at some point be supported by the FBC), while by 2023 there were 317 firms (of whom 158, were supported by the FBC).

The total turnover and total employment of these firms is calculated for each year 2019 to 2023 (the latest available data) and is shown in Figure 12. The overall size of the sector, in terms of total turnover and total employment of these firms, has not changed substantially over the period. Total employment increased between 2019 and 2022, but fell again in 2023, bringing it back to a level only 1.3% higher than at the beginning of the period. In terms of turnover, across all these firms' total turnover has slightly reduced over time, experiencing an 8.4% decrease from £66.9 million in 2019 to £61.3 million in 2023. Given the number of firms in the proxy-sector increased over time, this means that average turnover and average employment has fallen over the period.

Figure 12 Turnover and employment for battery-related businesses over time



Source: Frontier analysis of the Office for National Statistics Business Structure Database.

Notes: This work was undertaken in the Office for National Statistics Secure Research Service. Using data from ONS and other owners and does not imply the endorsement of the ONS or other data owners.

It is not possible at this stage to robustly compare the growth of firms supported by the FBC and firms not – longer term data would be required to do that, particularly when the focus of this evaluation is on the impacts of Phase 2 support. However, these data do contribute contextual evidence on the growth of the battery sector, and this evidence is consistent with other evidence that suggests barriers to scaling in the UK.

Stakeholder perspectives

Evidence from the evaluation survey indicates that **stakeholders believe the FBC has had a positive impact on the growth of the sector since 2022**. 68% of respondents reported that they thought the FBC has had a positive impact, with 19% thinking a large positive impact and 49% a small positive impact.

The survey responses also reinforce the picture of wider challenges facing businesses in the battery sector looking to scale. Perceptions of the attractiveness of the UK as a location to manufacture electric vehicles or batteries are much less positive than perceptions of the international standing of UK universities in battery-related disciplines or the quality of research output. Around half of stakeholders think that the UK is at least slightly behind most countries in its attractiveness as a location to manufacture batteries (58%) and its attractiveness as a location to manufacture electric vehicles (46%). This compares to 6% who think the UK is at least slightly behind most countries in the standing of universities in battery-related research.

This is consistent with the insights from stakeholders provided through qualitative engagement. Various stakeholders of different types agree that the FBC Phase 2 has continued to contribute to the UK moving from lab-scale prototypes to credible pilot lines, but most see a stubborn gap between those pilots and gigawatt-hour manufacturing. Stakeholders pointed to systemic issues that affect the competitiveness and attractiveness of scaling in the UK, including access to finance, access to and cost of energy, labour costs, and the availability of suitably skilled labour.

> *"I think where the UK struggles is with manufacturing... we've seen lots of discoveries and innovations made in the UK but they are commercialised typically outside of the UK." Business stakeholder.*
>
> *"Batteries are energy intensive. Grid is an issue... cost of the energy is crazy... labour costs in the UK are really high..." Business stakeholder.*
>
> *"The capital expenditure that's needed to set up new cell manufacturing in the UK for our bespoke cells isn't justifiable at this point. Again, cost of development, cost of implementation, yield, skill set… it's something that is totally lacking." Business stakeholder.*

These wider factors are not within the scope of what the FBC was seeking to address under Phase 2. However, these challenges are important to acknowledge, as they represent a barrier to the longer-term potential benefits of FBC investments in research and innovation being realised. They are not challenges unique to the battery sector, and were all highlighted in the 2025 Advanced Manufacturing Sector Plan.

Several stakeholders raised the point that the FBC has highlighted recycling as an area of interest under Phase 2. Some thought that it was not worthwhile to invest in recycling if there were limited places in the UK or Europe to process the materials and the recyclates have to be sent back to Asia. This is particularly the case for precursor cathode active materials and

cathode active materials. However, others thought that these parts of the supply chain were likely to develop after gigafactories have established in the UK.

6.4 Has the FBC contributed to the increasing application of appropriate regulations and standards?

Delivery partners commented that FBC engagement with the development of battery regulations and standards has been more limited under Phase 2 than under Phase 1, and more limited than expected at the outset of Phase 2. This was in part due to the restricted capacity of the FBC delivery team within Innovate UK and the need to prioritise other aspects of delivery, such as securing additional funding to support the UK Battery Industrialisation Centre in light of cost increases.

The Faraday Institution developed the Battery Parameter eXchange (BPX) standard. This is an open standard for physics-based lithium-ion battery models that has been developed to reduce costs and time-to-market through a common definition of modelling parameters and the reporting of experimental measurements used to validate those parameters. Engagement with automotive manufacturers throughout Phase 2 resulted in the formation of a BPX Steering group in July 2025.

7 Findings – Theme 5: Has the FBC had wider impacts?

Key Findings:

- The FBC has sought to promote equality, diversity and inclusion in the battery sector. 44% of survey respondents thought the FBC has had a positive impact on equality and inclusion in the battery sector since 2022. Excluding those who reported they did not what impact the FBC had had (39%), the proportion who thought the FBC has had a positive impact was 72%.
- It will take more time for innovations developed and supported towards commercialisation by FBC Phase 2 to be incorporated into commercially available batteries. However, **it is reasonable to believe that the technological developments that are arising from the FBC will have a positive impact on aspects of battery performance in due course**.
- There are indications that the FBC will have positive spillovers on other sectors. **Some supported businesses are already looking at applying their technology beyond the automotive sector**, into sectors such as aerospace, defence and stationary storage.

The FBC aims to support decarbonisation in the UK over the long term and support a just and fair transition to net zero by helping to anchor battery and EV supply chains in the UK to replace the existing automotive sector. However, these long-term changes could not reasonably have been expected to materialise at the point of this evaluation.

They are also dependent on many other factors. While the FBC may make a positive contribution to the anchoring of battery and EV supply chains in the UK, these are more dependent on factors outside of FBC's control. Another government policy, the Automotive Transformation Fund (ATF), is specifically aiming to support the anchoring of the EV supply chain in the UK.

This evaluation therefore touches only lightly on three aspects where some contribution to wider benefits might be expected to be observable by now:

- Has the FBC supported an improvement of Equality, Diversity and Inclusion (ED&I) in the battery sector?
- Has the FBC contributed to an improvement of battery performance?
- Has the FBC had positive impacts on the wider value chain or other adjacent sectors?

7.1 Equality, Diversity and Inclusion

There is evidence to suggest that the FBC has had a positive impact on equality and diversity.

44% of survey respondents thought that the FBC had had a positive impact on equality and diversity in the battery sector since 2022: 15% thought the FBC had had a large positive impact and 29% thought that the FBC had had a small positive impact. 12% thought the FBC had had no impact, and 5% thought the FBC had had a negative impact. A further

39% reported that they did not know what impact the FBC had had, so out of those who expressed an opinion, 72% thought that the FBC had had a positive impact).

The Faraday Institution has sought to promote ED&I. There is an ED&I Charter, and ED&I working group, with champions from each of the 10 major projects funded under FBC Phase 2 and Inclusion Ally training was provided through the major projects. The Faraday Institution also ran a positive action career development programme called THRIVE for ethnic minority researchers to provide a positive impact on career progression.

7.2 Has the Challenge contributed to an improvement of battery performance?

It will take more time for the innovations developed and supported towards commercialisation by FBC Phase 2 to feed through into the performance of commercially available batteries. However, it is reasonable to believe that the technological developments supported (discussed in Section 3.2) will ultimately have positive impacts on key performance metrics such as battery safety, battery cost, and environmental costs.

For example, Ilika (one company supported by the FBC under Phase 2) is developing a solid-state battery (SSB) technology that aims to rival lithium-ion from a performance perspective while delivering the safety benefits of SSBs. As part of their FBC supported Goliath project, Ilika has increased the capacity of their SSB cells by a factor of 1000. Key safety tests were undertaken through collaboration with the Faraday Institution SafeBatt project, and the ability to scale up key steps in the manufacturing of the Goliath battery were demonstrated with the UK Battery Industrialisation Centre.

Another FBC supported company, Altilium, during its FBC-funded CAM-EV project, managed to recover 97% of the total lithium from lithium ion phosphate cells. This looks to contribute to lowering environmental costs, by reducing the amount of mined lithium required for new cells.

7.3 Has the Challenge had positive impacts on the wider value chain or other adjacent sectors?

There are indications that the FBC will have positive spillovers on other sectors outside of batteries with automotive applications, which was the explicit sectoral focus of Phase 2.

Multiple Faraday Institution research projects focus on chemistries ideal for non-automotive use, such as LiSTAR (lithium sulfur) which is targeting aerospace applications and NEXGENNA (sodium ion) which is targeting stationary grid storage applications. Degradation, safety and recycling projects were expanded in Phase 2 to address battery applications in adjacent sectors.

The Faraday Institution has collaborated with the Aerospace Technology Institute and Warwick Manufacturing Group to understand battery opportunities in the aerospace sector

and identify potential commercial opportunities in the industry from its research projects. The Faraday Institution has also conducted a market analysis to understand the requirements to increase the attractiveness of batteries in static applications such as electricity grids. This is informing Faraday Institution research and commercialisation activities, as well as government policy makers.

One stakeholder mentioned how it was helpful that Faraday Institution events covered the wider battery industry and not just automotive applications.

> *"It wasn't just [automotive OEMs] turning up... it was boat people and trains and things you would never even think about... that was really helpful." Business respondent.*

A few supported businesses engaged in the qualitative fieldwork reported already looking at the potential for applying their technology in other sectors such as aerospace, defence and stationary storage. One reason given for the interest in defence applications, is that the military prefers UK manufacturing, even if the cost is higher, to protect against supply chains being cut off.

8 Conclusions

The evidence from across the evaluation themes indicates that the FBC is largely achieving the short-term outcomes hoped for from most of its Phase 2 activities.

The UK can be argued to be a global research power in battery related sectors – at least in terms of early TRL and academic research. 56% of survey respondents think the UK is the world leader, or at least ahead of most other countries, in terms of the standing of UK universities in battery-related disciplines. The UK share of publications in key battery topics, and the citation-weighted impact of those papers, remains high. Stakeholders qualitatively attribute much of the international reputation of the UK in battery research to the continued work of the Faraday Institution.

The FBC has continued to contribute to the development of battery technology under Phase 2. It has supported research and development work that would not otherwise have happened, and this has led to innovations and improvements in TRL across various aspects of battery technology and performance. For some start-ups and small companies, access to university labs and equipment, facilitated by FBC support, was perceived as vital.

The FBC has also helped companies commercialise their innovations in various ways, including supporting the establishment of start-ups, funding CR&D projects focused on later stage development, and improving companies' access to finance directly (e.g. investor partnerships) and indirectly (e.g. by supporting the technical validation needed to attract investors). Qualitatively several business stakeholders confirmed that FBC support was vital in helping them move from prototyping to reaching commercial performance, being ready to industrialise, or securing commercial contracts.

The FBC also looks to have a beneficial impact on supported firms' access to finance. FBC-supported companies have raised around $500 million in venture capital investment over 2023 and 2024. Not all this funding raised will be directly attributable to the FBC, but the qualitative and survey evidence indicates that some funding recipients themselves believe that FBC support played an important role.

Where evidence of the FBC's positive impact starts to dissipate is regarding the growth of the battery sector. The FBC has undoubtedly had a positive impact in the short-term for some firms that have been directly supported. As discussed above, various businesses acknowledge FBC funding as having been instrumental in enabling them to develop their technology, access finance and grow their business. However, most stakeholders see a stubborn gap between the development of credible pilot lines and gigawatt-hour manufacturing in the UK. Growth of a physical battery supply chain in the UK is still perceived to be muted, particularly outside of recycling, and is dependent on the UK establishing gigafactories. On the positive side, there are two new gigafactories in the process of being constructed in the UK, which may act as anchor investments that help the development of the supply chain going forwards. It is not possible to quantify the role of the FBC in securing these

gigafactory investments, but some stakeholders believe the research ecosystem that the FBC has contributed to developing has played some role.

The wider context is that there are significant systemic barriers to scaling and therefore the growth of the battery industry in the UK. Challenges stakeholders mentioned include access to scale-up finance, access to and cost of energy, labour costs, the availability of skilled labour, and uncertain UK demand. This means that companies risk failing to progress or will aim to commercialise outside of the UK as they grow. These barriers are not all unique to the UK and fall outside what the FBC can directly influence. However, they do pose a risk to some of the longer-term impacts it was hoped FBC investments would contribute to (such as the growth of a physical battery supply chain in the UK) being realised.

The FBC has invested in the construction of a new Flexible Pilot Line at the UK Battery Industrialisation Centre under Phase 2. This is expected to be much more aligned with UK market demand than the existing facilities operational at UKBIC and offer a lower cost of entry to companies looking to take advantage of open access to UKBIC facilities. The new Flexible Pilot Line is expected to help companies overcome financial barriers to developing and validating their technology at scale and enable them to develop their technologies while securely retaining their intellectual property.

The FBC has helped the battery sector remain an area of focus for the government going forwards, with the battery sector highlighted in the government's 2025 Modern Industrial Strategy as a frontier industry in one of the eight key growth-driving sectors. The new Battery Innovation Programme, comprising a £452 million investment from April 2026 to March 2030, will build on the FBC going forwards.

The findings of this evaluation and those of the Phase 1 evaluation paint a consistent picture. Over the two Phases the FBC has been successful at establishing and maintaining a supportive policy framework and an international reputation for the UK academic battery community. It has supported an increase in investment in battery R&D, generated technological progress, contributed to supported companies' ability to access early-stage finance and helped companies move towards commercialisation. However, commercialisation, scale-up and growth remains a key challenge. Building on Phase 2 investments the UKBIC is expected to better help UK businesses with early-stage commercialisation going forwards. However, beyond that, turning innovation into physical supply chain growth will depend on the wider competitiveness of the UK, which is outside the control of the FBC. As policy makers and delivery partners made explicit from the outset, the FBC was a necessary but not sufficient element of a wider ecosystem required to develop a world-class intellectual and physical supply chain for batteries in the UK. This will be key for how the new Battery Innovation Programme is designed, and for whether the long-term benefits from FBC investments are realised in future.

Annex A – Methodology and data sources

This annex provides a description of the data sources used in this evaluation. The sources fall into the following broad categories:

- **Primary survey data**: gathered through a bespoke online survey, which captures the view of academics and businesses.
- **Qualitative data**: collected through in-depth interviews with key stakeholders, including delivery partners, businesses, government and sector experts. These data capture lived experiences of the FBC and stakeholders' perspective on the effectiveness and limitations of the FBC, and mechanisms through which impact has been realised.
- **Monitoring data**: collected by delivery partners and the FBC. These data provide evidence on activities delivered and metrics on outcomes for recipients of FBC support.
- **Secondary data**: from administrative and bibliometric sources, providing evidence on the growth of the UK battery industry and its academic research base.

The following sections described each of these data sources in further detail.

Survey

BMG Research conducted a primary survey to collect data on the perceptions and experiences of businesses and academics in the battery ecosystem.

Sample frame

The sample frame for the survey was provided by the FBC team and consisted of:

- 146 contacts had received funding from the Faraday Institution under Phase 2.
- 80 contacts who had received funding from Innovate UK under Phase 2.
- 7 contacts identified by the FBC team as having engaged with UKBIC.
- 204 contacts who had applied unsuccessfully for Innovate UK funding under Phase 2.
- 420 contacts who had previously applied (successfully or unsuccessfully) for Innovate UK funding under FBC Phase 1, and who are therefore assumed to be operating in the relevant battery ecosystem.
- 50 additional organisations thought to be relevant to the battery industry.

The final contact file for the final survey consisted of 835 individual contacts, after removing duplicates and 50 contacts for whom contact details were not available. Telephone numbers were available for 288 individuals, while 547 had only an email address.

517 were from businesses (62%), 263 were from academic institutions (31%), and 55 contacts where the organisation type was not known in advance.

Questionnaire

The survey collected information on respondents' awareness of the FBC, their perceptions of the UK battery environment, their perceptions of the impact of the FBC in general and, if relevant, their perceptions of the impact on their organisation of support received from the FBC under Phase 2. The full survey questionnaire is provided in Annex B.

Methodology

All individuals were initially contacted by email and invited to complete the survey online. Three reminder emails were also sent to all contacts to encourage completion.

Where telephone numbers were available, follow-up calls were made to non-respondents. These calls encouraged contacts to complete the survey online, or participations could complete the survey on the telephone call if preferred. Each contact with a telephone number was called at least eight times on different days and times. This approach aimed to maximise participation across varied schedules.

The survey fieldwork was conducted between February and April 2025.

Response rates

In total, 105 respondents completed the survey: 21 completed the survey over the phone and 84 completed the survey online.

The overall response rate to the final survey, across both methods, was 13%. A breakdown of response rates by sample type is provided in Table 1 below. The response rate was higher among those who had received funding from Innovate UK under Phase 2 (21%), and additional contacts from the Faraday Institution (26%) and lower among businesses who had only applied for funding from Innovate UK under Phase 1 (8%).

The overall response rate is lower than the overall response rate achieved by the primary surveys conducted in 2020 and 2022 to support the evaluation of the FBC Phase 1. In 2022, 112 individuals completed the survey (a response rate of 22%), and in 2020 136 who completed the survey (a response rate of 24%). However, a lower response rate to the latest survey is to be expected given the sample comprises a high proportion of contacts who have had limited direct engagement with the FBC. The response rate among those who have engaged with Phase 2 (either applying for Innovate UK grant funding, working with the Faraday Institute or the UK Battery Industrialisation Centre) is 19%, more similar (albeit still lower) than that achieved for the Phase 1 evaluation.

Table 1 Survey response rates by sample type

Primary sample type	Contacts available	Survey completes	Response rate
Innovate UK Phase 2 grant applicant	270	40	15%
Of which: Successful	73	15	21%
Of which: Unsuccessful	197	25	13%
Faraday Institution	136	35	26%
UK Battery Industrialisation Centre	4	1	25%
Innovate UK Phase 1 applicant	375	29	8%
Of which: successful	122	9	7%
Of which: unsuccessful	253	20	8%
Extra contacts	50	0	0%
Total	835	105	13%

Notes: Sample contacts are allocated to a 'primary' sample type. The main criterion is that those who applied for Innovate UK grant funding under Phase 2 are allocated to that group. Those allocated to the Innovate UK Phase 1 applicant group did not have any engagement with the FBC under Phase 2 (either through Innovate UK, the Faraday Institution or the UK Battery Industrialisation Centre).

Sample profile

Just over half (55%) of the respondents to the survey were business contacts, with the remaining 44% being academics.

Survey respondents were asked which areas their organisation or research group focuses on in relation to the design and development of batteries (multiple responses were allowed). The most common area selected was materials. The other areas were selected by between two and one in five respondents, as shown in Table 2.

Table 2 Areas of battery design and development that survey respondents' organisation or research group focus on

Area	Number selected	% selected
Materials e.g. electrode, electrolyte, separator, binder	65	62%
Cell manufacture	44	42%
Recycling	42	40%
Battery Management Systems for modules	36	34%
Thermal management of modules	32	30%

Area	Number selected	% selected
Battery Management Systems for packs	29	28%
Diagnostics	29	28%
Thermal management of packs	27	26%
Vehicle application	27	26%
Second life	24	23%
Other	15	14%

Over half (55%) of the business contacts that completed the survey described their organisation as a technology developer, focussed primarily on research and development, rather than production. Table 3 below shows the breakdown of business respondents in terms of how they would best describe their organisation's involvement in the battery supply chain.

Table 3 How business respondents describe their organisation's involvement in the battery supply chain

Description	Number selected	% selected
A technology developer, focussed primarily on research and development rather than production	32	55%
A tier two producer, selling components to tier one producers but also other firms outside the automotive industry	10	17%
A tier three producer, supplying raw materials to OEMs and tier one and two producers	5	9%
An OEM / Prime producer, that is designing, assembling and marketing vehicles to end users	3	5%
A tier one producer, supplying automotive grade systems directly to OEMs	2	3%
Other	6	10%

Survey limitations

While the survey collected a range of useful data and inputs from stakeholders, it should be noted there are some limitations to the achieved sample for this impact evaluation. Some questions were only asked of businesses as they referred to aspects such as production capacity and the characteristics of batteries being produced. A such, data from these questions are based on 58 responses or fewer. While this number is large enough to draw

conclusions at a total level, it is not sufficient to allow for sub-group analysis, for example by aspects such as company size.

Qualitative data

The evaluation incorporated in-depth interviews with stakeholders to capture their lived experiences of the FBC and perspective on the effectiveness and limitations of the FBC, and mechanisms through which impact has been realised.

Stakeholders interviewed included delivery partners, supported businesses, wider businesses in the battery and automotive sectors, government representatives, and sector experts.

An initial selection of 51 relevant stakeholders was made by the evaluation team, based on the list of organisations that had been supported by the FBC or applied to the FBC for support, and the evaluation team's wider contacts across the industry. Businesses were selected to capture a range of perspectives from businesses of different sizes and working in different technological areas. The initial selection of potential interviewees was contacted over the months of March and April 2025. Following this recruitment process, 30 stakeholders agreed to participate, and interviews were conducted with them between 26th March and 28th May 2025. The stakeholder sample consisted of:

- 10 businesses who directly engaged with the FBC.
- 8 businesses from the wider battery or automotive industry.
- 4 delivery partner organisations.
- 2 government stakeholders.
- 4 sector experts
- 2 finance experts.

The interviews were conducted online and lasted between 30 minutes and one hour. The conversations were 'semi-structured'. They were guided by a pre-written 'topic guide' specific to the type of stakeholder. These topic guides were articulated around the main themes of the evaluation: R&D in battery technology, strengthened connectivity and collaboration, development and collaboration, investment, and UK capabilities and skills. The topic guides were used to structure the interview and ensure all the relevant pieces of evidence were covered. However, they were used flexibly, and the interviewers would deviate when necessary to enable the conversation to flow or to allow unexpected areas of interest to be explored in depth. The main topic guides are provided in Annex C.

Interviews were recorded and transcribed with participant permission. A thematic framework approach was used for analysis, allowing the research team to explore and synthesise views and experiences around the main evaluation themes across stakeholders and stakeholder types. Areas of commonality and difference were identified, and the evidence from different perspectives triangulated to explore the driving factors of these.

Monitoring and impact data

Monitoring and impact data were provided by the three delivery partners of the FBC – the Faraday Institution, Innovate UK, the UK Battery Industrialisation Centre (UKBIC). This data was used to assess whether activities were delivered as planned and to add insights on the outcomes of those activities. The main sources used were:

- **Monitoring data**: data on the activities deployed by the delivery partners of the FBC.
  - UKBIC: Covers facilities utilisation, training activities developed, and number of companies supported, disaggregated by geography of the company.
  - Faraday Institution: Covers the number of research projects, industry sprints, and industry and entrepreneurial fellowships supported.
  - Programme-level monitoring: The FBC central team also compiles headline data across delivery partners, including total funding allocation and breakdown across strands.
- **Innovate UK Impact Management Framework (IMF) data**:
  - This is data is collected by Innovate UK at project completion from organisations that have received grant funding through the collaborative R&D competitions or feasibility studies. The data request information on outcomes of the funded projects, such as additional investment leveraged, patents filed, and products introduced to the market.
- **Additional ad hoc impact monitoring data**:
  - Additional impact monitoring data was shared by the FBC delivery partners where relevant. This included information on funding amounts raised by supported businesses, which was collected from supported businesses by the Faraday Institution and Innovate UK. It also included analysis of Beauhurst data on funding raised by the FBC team.

Secondary data

The evaluation used two main sources of secondary data to identify the growth the UK's academic and industry ecosystem in battery technology: bibliometric data from SciVal, and business data on turnover and employment from the Office for National Statistics.

Bibliometric data on the UK's academic standing

Data from SciVal, one of the leading global bibliometric platforms, was used to analyse trends in battery-related publications and their impact, comparing outputs from the Faraday Institution and the UK with global benchmarks.

SciVal's bibliometric data was retrieved on 1st May 2025, covering the period 2019-2025. The metrics collected were annual figures for:

- Number of publications by the Faraday Institution.
- Number of publications in four key battery technology topic clusters by the Faraday Institution, the UK, and globally.
- Field-Weighted Citation Impact (FWCI) of publications from the Faraday Institution
- Field-Weighted Citation Impact (FWCI) of publications in four key battery technology topic clusters by the Faraday Institution, the UK, and globally.

FWCI indicates how the number of citations received by a publication compares with the number of citations received by publications of the same type published in the same year and discipline.

To identify the key battery-related topic clusters publications, publications from the Faraday Institution were mapped against SciVal topic clusters. This is the thematic unit at which the platform collects bibliometric volume and impact data. The four clusters identified as 'key' represented around 70% of the Faraday Institution's publications: "*Lithium Ion Battery, Cathode, Manganese*" (29.3% of Faraday Institution publications in 2019-25), "*Battery, Battery Management System, Lithium Ion Battery*" (28.6% of publications), "*Solid Electrolyte, Lithium, Battery*" (24.8% of publications), and "*Lithium Ion Battery, Battery, Anode*" (22.8% of publications).

Data on the UK's battery sector growth

Data from the Business Structure Database (BSD) from the Office for National Statistics was used to illustrate the growth over time of a sample of companies that proxy for the battery technology sector.

The BSD is an annual firm-level dataset covering all UK firms registered for VAT and/or Pay As You Earn (PAYE). The restricted access microdata were accessed in the ONS Secure Research Service. Using data from ONS and other owners and does not imply the endorsement of the ONS or other data owners.

The dataset used, retrieved in May 2025, covers the period 2019-2023. This was the latest data available at the time.

A proxy for the battery sector was constructed which included firms who had ever applied for grant funding from the FBC (under Phase 1 or 2, whether successful or not). A list of such firms provided by the FBC achieved a 93% match rate with the BSD data when linked by the ONS.

The variables examined for each of these firms were their annual turnover and employee base.

Annex B – Primary survey questionnaire

Survey introductions

ONLINE INTRO

We are conducting a survey to support an impact evaluation of the Faraday Battery Challenge, that has been commissioned by UK Research and Innovation.

UKRI wants your help to understand the value generated by the activities and interventions supported by the FBC. We are interested in understanding your perceptions of the battery technology industry in the UK, your awareness of FBC, and your impression of the impact of FBC activities. Your insight is valuable, whether or not you have been directly supported by FBC yourself.

Your time and input will help the ongoing development and improvement of programmes like the FBC and help demonstrate their value.

The survey will take around 15 minutes to complete.

Just to confirm, your responses will be treated in the strictest confidence. BMG Research abides by the Market Research Society Code of Conduct and data protection laws at all times.

You can find out more information about our surveys and what we do with the information we collect in our Privacy Notice which is here http://www.bmgresearch.co.uk/privacy

Click **NEXT** to begin the survey.

By clicking the **NEXT** button, you agree to participate in the survey.

CATI INTRO

Good morning/afternoon/evening, my name is ……. from BMG Research, an independent research agency.

We are conducting a survey to support an impact evaluation of the Faraday Battery Challenge (FBC), that has been commissioned by UK Research and Innovation (UKRI).

UKRI wants your help to understand the value generated by the activities and interventions supported by the FBC. We are interested in understanding your perceptions of the battery technology industry in the UK, your awareness of FBC, and your impression of the impact of FBC activities. Your insight is valuable, whether or not you have been directly supported by FBC yourself.

Your time and input will help the ongoing development and improvement of programmes like the FBC and help demonstrate their value.

IF NECESSARY: The Faraday Battery Challenge is a mission-led investment programme to further develop a UK battery technology industry that is high-tech, high value and high-skill. In particular, the Challenge invests in applied research, innovation and national scale-up infrastructure that seeks to ensure that the UK will successfully prosper from the transition to electrification. The programme is delivered by Innovate UK and includes funding for the Faraday Institution, the UK Battery Industrialisation Centre (UKBIC) and a series of industry led research and development projects.

IF NECESSARY: We're looking to speak to a range of stakeholders, both businesses and academics, and those who have received funding through FBC and those who have not. We would really value your time, as your insight will help improve government support for the sector in future.

IF ASKED: The survey will take around 15 minutes to complete.

Just to confirm, your responses will be treated in the strictest confidence. BMG Research abides by the Market Research Society Code of Conduct and data protection laws at all times.

You can find out more information about our surveys and what we do with the information we collect in our Privacy Notice which is on our website.

INTERVIEWER TO DETERMINE IF RESPONDENT WANTS WEBSITE ADDRESS BEFORE PROVIDING IT OR IF IT IS TO BE SENT VIA EMAIL.

TO BE INCORPORATED INTO THE SCRIPT IF EMAIL REQUIRED.

I can give you the website address (https://www.bmgresearch.co.uk/privacy) now over the phone or by email.

Please note that this call may be monitored or recorded for training purposes.

ASK Can I confirm that you are happy to participate in the survey?

INTERVIEWER: Confirm respondent happy to proceed with the survey

✓ Informed consent provided **[TICK BOX, DO NOT ALLOW TO PROCEED WITHOUT TICKED]**

Section A: Engagement with FBC Phase 2

Base: If Ph2 IUK competition applicant from sample

SINGLE CODE

S1. We understand that you **[IF TYPE=BUSINESS:** or your organisation**]** were involved in one or more applications for funding from the Faraday Battery Challenge. Is this correct?

Code	Answer list	Scripting notes	Routing
1	Yes		
2	No	**SKIP TO S5**	

Base: Ask all with 1 project

SINGLE CODE

S2. And are you able to answer questions about work that you or your organisation undertook in relation to battery technologies following your application(s)?

Code	Answer list	Scripting notes	Routing
1	Yes		
2	No		

Base: If S2 = 2

SINGLE CODE

S4. Please can you tell me who is the best person to speak to regarding the application and the work that has been undertaken in this area following the application?

Please enter the contact details of the best person for us to speak to below

Code	Answer list	Scripting notes	Routing
1	Name	**OPEN TEXT**	
2	Email address	**OPEN TEXT**	
3	Phone number	**OPEN TEXT**	

IF S2=1 & TYPE==BUSINESS: SKIP SECTION 1.6

IF S2=1 & TYPE=ACAMDEIC: THANK AND CLOSE.

Base: If NON-FBC/FI/UKBIC

SINGLE CODE

S5. We understand you or your organisation undertake work or research in relation to the design and development of batteries. Are you able to answer questions about work that you or your organisation undertakes in this area?

Code	Answer list	Scripting notes	Routing
1	Yes		
2	No		

Base: If S5 = 2

SINGLE CODE

S6. Please can you tell me who is the best person to speak to regarding work or research related to battery technologies at your organisation?

Please enter the contact details of the best person for us to speak to below

Code	Answer list	Scripting notes	Routing
1	Name	**OPEN TEXT**	
2	Email address	**OPEN TEXT**	
3	Phone number	**OPEN TEXT**	

Base: IF NON-FBC/FI/UKBIC CONTACT

SINGLE CODE

S7. When it comes to your work or research in relation to the design and development of batteries, would you describe yourself or your organisation as a business or as an academic?

Please select one only

Code	Answer list	Scripting notes	Routing
1	Business		**FILTER TO BUSINESS FOR REST OF QUESTIONS**
2	Academic		**FILTER TO ACADEMIC FOR REST OF QUESTIONS**

Section B: Awareness of FBC

Base: All respondents

This survey will ask about the Faraday Battery Challenge (FBC). FBC is made up of various strands, including:

- Collaborative Research and Development, also known as CR&D, where applicants bid for funding for projects.
- The Faraday Institution, which awards funding to university-led consortia to deliver application-inspired research projects and supports PhD students.
- The UK Battery Industrialisation Centre, also known as UKBIC, which provides open access to manufacturing knowledge and capability.
- Support for skills development, including through The Electrification Skills Network (ESN) led by Coventry University**, a**nd the National Battery Training & Skills Academy (NBTSA) led by Newcastle University.

Base: all respondents

SINGLE CODE PER ROW

A8. Before today, were you aware of each of the below strands the Faraday Battery Challenge?

ROW

Fixed codes	Answer list	Scripting notes	Routing
1	Collaborative Research and Development (CR&D)		
2	Faraday Institution (FI)		
3	UK Battery Industrialisation Centre (UKBIC)		
4	Electrification Skills Network or the National Battery Training & Skills Academy		

COLUMN

Fixed codes	Answer list	Scripting notes	Routing
1	Yes		
2	No		

Section C: Firm/Research group characteristics

Base: IF TYPE=ACADEMIC

NUMERIC, VALIDATION – MIN 0 MAX 99,999

A0. How many people in your department work on battery related research?

Fixed codes	Answer list	Scripting notes	Routing
1	Academic staff	**NUMERIC BOX, ALLOW DK**	
2	Independent research fellows	**NUMERIC BOX, ALLOW DK**	
3	Postdoctoral research associates or research staff	**NUMERIC BOX, ALLOW DK**	
4	PHD candidates	**NUMERIC BOX, ALLOW DK**	
6	Other	**NUMERIC BOX, ALLOW DK**	

Base: IF TYPE = ACADEMIC

NUMERIC, VALIDATION – FIGURES ENTERED TO BE EQUAL OR LOWER THAN THOSE ENTERED AT A0

A0b. How many people in your department work on battery related research that is not directly funded by the Faraday Institution or the Faraday Battery Challenge?

Fixed codes	Answer list	Scripting notes	Routing
1	Academic staff	**NUMERIC BOX, ALLOW DK**	
2	Independent research fellows	**NUMERIC BOX, ALLOW DK**	
3	Postdoctoral research associates or research staff	**NUMERIC BOX, ALLOW DK**	
4	PHD candidates	**NUMERIC BOX, ALLOW DK**	
6	Other	**NUMERIC BOX, ALLOW DK**	

Base: ASK IF TYPE = BUSINESS

SINGLE CODE

A1. Which of the following best describes your organisation's involvement in the battery supply chain?

CATI: READ OUT

Fixed codes	Answer list	Scripting notes	Routing
1	An OEM / Prime producer, that is designing, assembling and marketing vehicles to end users		
2	A tier one producer, supplying automotive grade systems directly to OEMs		
3	A tier two producer, selling components to tier one producers but also other firms outside the automotive industry		
4	A tier three producer, supplying raw materials to OEMs and tier one and two producers		

5	A technology developer, focussed primarily on research and development rather than production		
6	Other (specify)	**OPEN TEXT BOX**	
7	Don't know		

Base: All respondents

MULTICODE

A2. Which of the following areas does your organisation or research group focus on in relation to the design and development of batteries? Please select to all that apply.

CATI: READ OUT, MULTICODE

Fixed codes	Answer list	Scripting notes	Routing
1	Materials e.g. electrode, electrolyte, separator, binder		
2	Cell manufacture		
3	Battery Management Systems for modules		
4	Battery Management Systems for packs		
5	Thermal management of modules		
6	Thermal management of packs		
7	Vehicle application		
8	Second life		
9	Recycling		
10	Diagnostics		
11	Other (specify)	**OPEN TEXT BOX**	

Base: IF TYPE=BUSINESS

SINGLE CODE

A3A. In which region of the world is the headquarters of your business located? If your organisation is a subsidiary, please choose the location of the ultimate parent company, that is the highest level organisation within your global corporate group.

CATI: READ OUT

Fixed codes	Answer list	Scripting notes	Routing
1	UK		
2	European Union (excluding UK)		
3	Rest of Europe (excluding EU)		
4	Middle East		
5	Asia		
6	North America		
7	South America		
8	Africa		
9	Australasia		
10	Don't know	**DO NOT READ OUT**	
11	Prefer not to say	**DO NOT READ OUT**	

Base: IF TYPE=BUSINESS

MULTICODE

A3B. And which other regions, other than the UK, is your organisation located in?

CAWI: Please select all that apply.

CATI: READ OUT, MULTICODE

Fixed codes	Answer list	Scripting notes	Routing
1	No other regions	**EXCLUSIVE**	
2	European Union (excluding UK)		
3	Rest of Europe (excluding EU)		
4	Middle East		
5	Asia		
6	North America		
7	South America		
8	Africa		
9	Australasia		

10	Don't know	**DO NOT READ OUT, EXCLUSIVE**	
11	Prefer not to say	**DO NOT READ OUT, EXCLUSIVE**	

Base: IF TYPE=BUSINESS AND A3B=2-9

NUMERIC, VALIDATION – WHOLE NUMBERS ONLY. MIN 1, MAX 99,999

A4A. How many members of staff does your organisation currently employ globally? Please think about the number of full-time equivalent employees.

If you don't know the exact number, please give an estimate.

Please answer in the box below

[_____]

Fixed codes	Answer list	Scripting notes	Routing
1	Don't know	**FIX, EXCLUSIVE**	

Base: IF A4A=DK

SINGLE CODE

A4B. Which of these bands would best describes the number of full-time equivalent employees at your organisation?

CATI: READ OUT

Fixed codes	Answer list	Scripting notes	Routing
1	1-9		
2	10-19		
3	20-49		
4	50-99		
5	100-249		
6	250-499		

7	500-999		
8	1000-4,999		
9	5,000-9,999		
10	10,000 plus		
11	Don't know		

Base: IF TYPE=BUSINESS

NUMERIC, VALIDATION – WHOLE NUMBERS ONLY. MIN 1, MAX 99,999

A5A. And how many members of staff does your organisation currently employ in the UK? Please think about the number of full-time equivalent employees.

If you don't know the exact number, please give an estimate.

Please answer in the box below

[_____]

Fixed codes	Answer list	Scripting notes	Routing
1	Don't know	**FIX, EXCLUSIVE**	

Base: IF A5A = DK

SINGLE CODE

A5B. Which of these bands would best describe the number of full-time equivalent employees at your organisation?

CATI: READ OUT

Fixed codes	Answer list	Scripting notes	Routing
1	1-9		
2	10-19		
3	20-49		
4	50-99		
5	100-249		

6	250-499		
7	500-999		
8	1000-4,999		
9	5,000-9,999		
10	10,000 plus		
11	Don't know		

Base: IF TYPE=BUSINESS AND A3B=2-9

VALIDATION – WHOLE PERCENTAGES ONLY. MIN 0%, MAX 100%

A6A. What proportion of your global employees currently work in Research and Development? By Research and Development, we mean people who work in research in lab environments as well as people who work in application, for example TRL6 and below.

If you don't know the exact proportion, please give an estimate.

Please answer in the box below

[_____]

Fixed codes	Answer list	Scripting notes	Routing
1	Don't know	**FIX, EXCLUSIVE**	

Base: IF A6A=DK

SINGLE CODE

A6B. Which of these bands would best describe the proportion of employees that currently work in Research and Development?

CATI: READ OUT

Fixed codes	Answer list	Scripting notes	Routing
1	0%		
2	1% - 10%		
3	11% - 25%		
4	26% - 50%		
5	51% - 75%		

6	76% - 99%		
7	100%		
8	Don't know		

Base: IF TYPE=BUSINESS

NUMERIC, VALIDATION – WHOLE PERCENTAGES ONLY. MIN 0%, MAX 100%

A7A. What proportion of your UK employees currently work in Research and Development?

If you don't know the exact proportion, please give an estimate.

Please answer in the box below

[_____]

Fixed codes	Answer list	Scripting notes	Routing
1	Don't know	**FIX, EXCLUSIVE**	

Base: IF A7A=DK

SINGLE CODE

A7B. Which of these bands would best describe the proportion of employees that currently work in Research and Development?

CATI: READ OUT

Fixed codes	Answer list	Scripting notes	Routing
1	0%		
2	1% - 10%		
3	11% - 25%		
4	26% - 50%		
5	51% - 75%		
6	76% - 99%		
7	100%		
8	Don't know		

Base: ASK ALL

NUMERIC

X7. How many battery-related patents have you or your organisation applied for since 2022?

Please answer in the box below

[_____]

Fixed codes	Answer list	Scripting notes	Routing
1	Don't know	**FIX, EXCLUSIVE**	

Base: IF TYPE = BUSINESS

NUMERIC

X8. How many battery-related products have you or your organisation launched to market since 2022?

Please answer in the box below

[_____]

Fixed codes	Answer list	Scripting notes	Routing
1	Don't know	**FIX, EXCLUSIVE**	

Section D: Perceptions of battery sector

READ OUT/SHOW INTRO

We now have some questions about your perceptions of the UK's battery technology industry and research and development environment. There are no right or wrong answers to these questions, we are after your opinion.

Section D1: Investment

Base: ASK ALL

SINGLE CODE PER ROW, CAROUSEL

B1. How attractive do you think the UK is as a place to invest in relation to the following types of battery technology? Please use a scale of 0 to 10, where 0 is not at all attractive and 10 is extremely attractive.

ROWS

Fixed codes	Answer list	Scripting notes	Routing
1	Battery technology overall		
2	Light duty electric vehicles, such as passenger cars and light commercial vehicles		
3	Heavy duty electric vehicles, such as buses and trucks		
4	Aerospace		
5	Off-highway		
6	Grid and behind-the-meter storage		

COLUMNS

Fixed codes	Answer list	Scripting notes	Routing
1	0 – Not at all attractive		
2	1		
3	2		
4	3		
5	4		
6	5		
7	6		
8	7		
9	8		
10	9		
11	10 – Extremely attractive		
12	Don't know		

Base: all respondents

SINGLE CODE

B2. And how do you think the attractiveness of the UK as a place to invest in battery technology overall has changed since 2022?

CATI: READ OUT AS NECESSARY

Fixed codes	Answer list	Scripting notes	Routing
1	A lot more attractive		
2	A little more attractive		
3	About the same		
4	A little less attractive		
5	A lot less attractive		
6	Don't know		

Base: ASK IF B2=1-5

OPEN

B3. Why do you say that?

CATI: PROBE

Please answer in the box below

[_____]

Section D2: Market readiness and support

Base: all respondents

SINGLE CODE PER ROW, RANDOMISE ROWS, CAROUSEL

B6.

CATI: I'm now going to read out some elements of battery technology development and support. For each, please can you tell me how you think the UK is currently performing in comparison to other countries?

CAWI: We have listed below some elements of battery technology development and support. For each, how you think the UK is currently performing in comparison to other countries?

CATI: READ OUT FULL SCALE ON FIRST ROW, READ OUT STATEMENTS IN FULL

ROWS

Fixed codes	Answer list	Scripting notes	Routing

1	Government financial support for battery developments, including tax incentives		
2	Regulatory support for battery developments		
3	Investment in research and development in battery technology		
4	The volume of research and development projects taking place		
5	Quality of research output		
6	Standing of UK universities in battery-related disciplines		
7	Development of the battery supply chain		
8	Attractiveness of the UK as a location to manufacture batteries		
9	Attractiveness of the UK as a location to manufacture electric vehicles		

COLUMNS

Fixed codes	Answer list	Scripting notes	Routing
1	UK is the world leader		
2	UK is ahead of most countries		
3	UK is ahead of some countries, but behind the world leaders		
4	UK is slightly behind most countries		
5	UK is a long way behind most counties		
6	Don't know		

Base: ASK ALL

SINGLE CODE PER ROW

B6b. For each of the elements listed below, could you please indicate how you believe the UK's performance has changed since 2022?

ROWS

Fixed codes	Answer list	Scripting notes	Routing
1	Government financial support for battery developments, including tax incentives		
2	Regulatory support for battery developments		

3	Investment in research and development in battery technology		
4	The volume of research and development projects taking place		
5	Quality of research output		
6	Standing of UK universities in battery-related disciplines		
7	Development of the battery supply chain		
8	Attractiveness of the UK as a location to manufacture batteries		
9	Attractiveness of the UK as a location to manufacture electric vehicles		

COLUMNS

Fixed codes	Answer list	Scripting notes	Routing
1	Improved a lot		
2	Improved a little		
3	Remained about the same		
4	Worsened a little		
5	Worsened a lot		
6	Don't know		

Base: ASK ALL

SINGLE CODE

B7. Overall, how would you rate the UK's current reputation as a centre for innovation in battery technology?

CATI: READ OUT

Fixed codes	Answer list	Scripting notes	Routing
1	UK is the world leader		
2	UK is ahead of most countries		
3	UK is ahead of some countries, but behind the world leaders		
4	UK is slightly behind most countries		
5	UK is a long way behind most counties		

6	Don't know		

Section D3: Collaboration

Base: all respondents

SINGLE CODE

C22. How do you think collaboration on research and development concerning batteries has changed since 2022?

Please think about collaboration between academia and industry, and also within academia, such as cross-institutional and cross-departmental. Please think about collaboration that you are aware of outside your organisation or research group as well as the collaborations of your own organisation or research group.

CATI: READ OUT

Fixed codes	Answer list	Scripting notes	Routing
1	Collaboration has increased significantly		
2	Collaboration has increased slightly		
3	Levels of collaboration have not changed		
4	Collaboration has decreased slightly		
5	Collaboration has decreased significantly		
6	Don't know		

Section D4: Skills and recruitment

Base: IF TYPE=BUSINESS

SINGLE CODE

E1. Which of the following best describes the skill levels of your existing staff involved with your battery projects?

CATI: READ OUT

Fixed codes	Answer list	Scripting notes	Routing
1	All of our current staff have the necessary skills for the projects to be successful		
2	Most of our current staff have the skills needed for our project to be successful		
3	Some of our current staff have the skills needed for our projects to be successful		
4	Only a few of our current staff have the skills needed for our projects to be successful		
5	None of our current staff have the skills needed for our projects to be successful		
6	Don't know		
7	Prefer not to say		

Base: all respondents

SINGLE CODE

E2. [IF TYPE=BUSINESS:] And which of the following best describes your experience of the level of skills in the industry as a whole? **[IF TYPE =ACADEMIC]:** Which of the following best describes your perceptions of the level of skills in the battery industry?

CATI: READ OUT

Fixed codes	Answer list	Scripting notes	Routing
1	There are significantly more people with the relevant skills than the industry currently needs		
2	There are slightly more people with the relevant skills than the industry currently needs		

3	There are about the same of amount of people with the relevant skills as the industry currently needs		
4	There are slightly fewer people with the relevant skills than the industry currently needs		
5	There are significantly fewer people with the relevant skills than the industry currently needs		
6	Don't know		
7	Prefer not to say		

Base: IF E2=4 OR 5

MULTICODE

E3. What levels of skills do you think are currently lacking? Please select all that apply.

CATI: READ OUT

Fixed codes	Answer list	Scripting notes	Routing
1	PhD candidates		
2	Postdoctoral research associates or research staff		
3	Independent research fellows		
4	Academic staff		
5	Technician grades		
6	Engineer grades		
7	Other (specify)	**OPEN TEXT BOX**	
8	Don't know	**EXCLUSIVE**	

Base: IF E2=4 OR 5

MULTICODE

E3b. In what areas do you think people with relevant skills are currently lacking? Please select all that apply.

CATI: READ OUT

Fixed codes	Answer list	Scripting notes	Routing
1	Research and development		
2	Manufacturing		
3	Safety		
4	Recycling/recovery		
5	Maintenance		
6	Teaching/training		
7	Other (please specify)	**OPEN TEXT BOX**	
8	Don't know	**EXCLUSIVE**	

Base: ASK ALL

SINGLE CODE

E4. How do you think the availability of people in industry with the relevant skills has changed since 2022?

CATI: READ OUT

Fixed codes	Answer list	Scripting notes	Routing
1	Improved significantly		
2	Improved slightly		
3	Not changed		
4	Worsened slightly		
5	Worsened significantly		
6	Don't know	**EXCLUSIVE**	

Section D5: Impact of FBC

Base: all respondents

SINGLE CODE PER ROW, RANDOMISE ROWS, CAROUSEL

X1. For each of the below, what impact, if any, do you think the Faraday Battery Challenge (including the Faraday Institution and UKBIC) has had since 2022?

CATI: READ OUT FULL SCALE ON FIRST ROW, READ OUT STATEMENTS IN FULL

ROWS

Fixed codes	Answer list	Scripting notes	Routing
1	The attractiveness of the UK as a place to invest in battery technology		
2	UK reputation as a centre for research and innovation in battery technology		
3	The pace of technological development in the battery sector		
4	The commercial readiness of battery technology		
5	The growth of the UK battery sector		
6	Access to finance in the UK battery sector		
7	Equality and diversity in the battery sector		

COLUMNS

Fixed codes	Answer list	Scripting notes	Routing
1	A large positive impact		
2	A small positive impact		
3	No impact		
4	A small negative impact		
5	A large negative impact		
6	Don't know		

Base: all respondents

SINGLE CODE

C23. How much do you think the FBC has impacted collaboration in research and development concerning battery technology since 2022?

CATI: READ OUT

Fixed codes	Answer list	Scripting notes	Routing
1	The FBC has increased collaboration significantly		
2	The FBC has increased collaboration slightly		
3	The FBC has not impacted collaboration		
4	The FBC has decreased collaboration slightly		

5	The FBC has decreased collaboration significantly		
6	Don't know		

Base: all respondents

SINGLE CODE

E5A. What impact, if any, do you think the FBC has had since 2022 on skills levels in the industry?

CATI: READ OUT

Fixed codes	Answer list	Scripting notes	Routing
1	A significant positive impact		
2	A slight positive impact		
3	No impact at all		
4	A slight negative impact		
5	A significant negative impact		
6	Don't know		
7	Prefer not to say		

Section E: Questions for Phase 2 Applicants and supported individuals (CR&D/ Investor Partnership applicants / FI main projects)

Base: applicants with more than 1 application or project

SINGLE CODE. FROM SAMPLE – SHOW PHASE 2 IUK PROJECT APPLICATION TITLES AND/OR FI MAIN PROJECT TITLES FOR EACH RESPONDENT

C1. For the next few questions, we'd like you to think about one specific project that was funded by the Faraday Battery Challenge or that you applied for funding for. For which project or application are you best able to answer questions?

Fixed codes	Answer list	Scripting notes	Routing
1	**[PROJECT NAME FROM SAMPLE]**	**PIPE PROJECT NAMES FROM SAMPLE**	
2	**[PROJECT NAME FROM SAMPLE]**		
3	**[PROJECT NAME FROM SAMPLE]**		

4	**[PROJECT NAME FROM SAMPLE]**		
5	**[PROJECT NAME FROM SAMPLE]**		
6	**[PROJECT NAME FROM SAMPLE]**		
7	**[PROJECT NAME FROM SAMPLE]**		
8	**[PROJECT NAME FROM SAMPLE]**		
9	**[PROJECT NAME FROM SAMPLE]**		
10	**[PROJECT NAME FROM SAMPLE]**		

SCRIPTING NOTE – CLASSIFY RESPONDENT AS PH2 IUK APPLICANT OR FI MAIN PROJECT DEPENDING ON PROJECT SELECTED AT C1 [FROM SAMPLE INFO] THEN ROUTE ACCORDINGLY FOR QUESTIONS IN THIS SECTION

Base: applicants with one application or project only

C2.

IF **PH2 IUK COMPETITION APPLICANT**: We would now like to ask some questions about your project **[PROJECT NAME – PIPE FROM SAMPLE FILE]** that you applied for funding from the Faraday Battery Challenge.

IF FI MAIN PROJECT: We would now like to ask some questions about your project **[PROJECT NAME – PIPE FROM SAMPLE FILE]** that was supported by the Faraday Institution.

SCRIPTING NOTE – CLASSIFY RESPONDENT AS PH2 IUK APPLICANT OR FI MAIN PROJECT DEPENDING ON PROJECT SHOWN AT C2 [FROM SAMPLE INFO] THEN ROUTE ACCORDINGLY FOR QUESTIONS IN THIS SECTION

Base: Ph2 IUK competition applicant

SINGLE CODE, PIPE PROJECT NAME FROM C1 OR C2 AND PROJECT STATUS FROM DATABASE

S3. Was the application for funding for **[PROJECT NAME] [OUTCOME]**?

Fixed codes	Answer list	Scripting notes	Routing
1	Yes		
2	No	**IF S2=2 CHANGE OUTCOME FROM SAMPLE, E.G. IF OUTCOME IS 1 (SUCCESSFUL) AND RESPONDENT SAYS 'No' AT S3, RECODE AS**	

		UNSUCCESSFUL AND VICE VERSA.	

Section E1: Would project have otherwise gone ahead?

Base: ask all who applied for CR&D / investor partnership and FI main projects

SINGLE CODE

C5.

IF OUTCOME=SUCCESSFUL: If your application for funding had been declined, would you have taken the project forward in any form?

IF OUTCOME=UNSUCCESSFUL: After your application for funding was declined, did you take the project forward in any form?

IF FI MAIN PROJECT: If your project had not been funded by the Faraday Institution, would you have taken the research forward in any form?

Fixed codes	Answer list	Scripting notes	Routing
1	Yes		
2	No	**ROUTE TO C9**	
3	Don't know		
4	Prefer not to say		

Base: IF C5=1

MULTICODE

C6.

IF OUTCOME=SUCCESSFUL: If your application for funding had been declined, would the project have gone ahead…

IF OUTCOME=UNSUCCESSFUL: Did the project go ahead…

IF FI MAIN PROJECT: If your project had not been funded by the Faraday Institution, would you have taken the research forward in any form?

CAWI: Please select all that apply.

CATI: READ OUT, MULTICODE

Fixed codes	Answer list	Scripting notes	Routing
1	Unchanged		
2	At a later date		
3	In a different country		
4	At a reduced scale of investment		
5	With reduced scope (e.g. met fewer objectives)		
6	Over a longer timescale		
7	Don't know	**DO NOT READ OUT** **EXCLUSIVE**	
8	Prefer not to say	**DO NOT READ OUT** **EXCLUSIVE**	

Section E2: Change in TRL and MRL for supported and unsupported projects

Base: IF IUK PH2 APPLICANT AND OUTCOME = SUCCESSFUL OR [OUTCOME = UNSUCCESSFUL AND C5=1 (UNSUCCESSFUL BUT PROJECT WENT AHEAD)] OR FI MAIN PROJECT

SINGLE CODE

C11. At the start of your engagement with the **[PH2 IUK APPLICANT =** FBC**; FI MAIN PROJECT =** Faraday Institution**]** on this project, what stage of development was the technology at?

CATI: READ OUT

Fixed codes	Answer list	Scripting notes	Routing
1	Developing basic principles or formulating the concept (TRL 1 or TRL 2)		
2	Developing the proof of concept or testing in laboratory conditions (TRL 3 and TRL 4)		
3	Being validated or tested in a real but controlled environment (TRL 5 and TRL 6)		
4	Being tested and scaled in an operational environment (TRL 7)		
5	Don't know		

Base: IF IUK PH2 APPLICANT AND OUTCOME = SUCCESSFUL OR [OUTCOME = UNSUCCESSFUL AND C5=1 (UNSUCCESSFUL BUT PROJECT WENT AHEAD)] OR FI MAIN PROJECT

SINGLE CODE

C12. What stage of development has the technology now reached?

CATI: READ OUT

Fixed codes	Answer list	Scripting notes	Routing
1	Developing basic principles or formulating the concept (TRL 1 or TRL 2)		
2	Developing the proof of concept or testing in laboratory conditions (TRL 3 and TRL 4)		
3	Being validated or tested in a real but controlled environment (TRL 5 and TRL 6)		
4	Being tested and scaled in an operational environment (TRL 7)		
5	Fully commercialised and brought to market (TRL 8 and TRL 9)		
6	Don't know		

Base: IF IUK PH2 APPLICANT AND OUTCOME = SUCCESSFUL OR FI MAIN PROJECT

SINGLE CODE

C13. Which of the following best describes the impact you think engagement with the **[PH2 IUK APPLICANT =** FBC**; FI MAIN PROJECT =** Faraday Institution**]** has had on development of the technology?

CATI: READ OUT

Fixed codes	Answer list	Scripting notes	Routing
1	Helped us reach a later stage of development than we would have done otherwise		
2	Allowed us to reach the same stage of development, but more quickly that we could have done otherwise		
3	Helped us both reach a later stage of development and get there more quickly that we would have done otherwise		

4	Not had any effect on the development of this technology		
5	Slowed down or inhibited the development of this technology		
6	Don't know		
7	Prefer not to say		

Base: IF IUK PH2 APPLICANT AND OUTCOME=UNSUCCESSFUL AND C5=1 (UNSUCCESSFUL BUT PROJECT WENT AHEAD)

SINGLE CODE

C14. What stage of development do you think the technology would now be at if you had been successful in your FBC funding application?

CATI: READ OUT

Fixed codes	Answer list	Scripting notes	Routing
1	Developing basic principles or formulating the concept (TRL 1 or TRL 2)		
2	Developing the proof of concept or testing in laboratory conditions: (TRL 3 and TRL 4)		
3	Being validated or tested in a real but controlled environment (TRL 5 and TRL 6)		
4	Being tested and scaled in an operational environment (TRL 7)		
5	Fully commercialised and brought to market (TRL 8 and TRL 9)		
6	Don't know		

Base: IF IUK PH2 APPLICANT AND OUTCOME = SUCCESSFUL OR [OUTCOME = UNSUCCESSFUL AND C5=1 (UNSUCCESSFUL BUT PROJECT WENT AHEAD)] OR FI MAIN PROJECT

SINGLE CODE

C11b. At the start of your engagement with the **[PH2 IUK APPLICANT =** FBC**; FI MAIN PROJECT =** Faraday Institution**]** on this project, what stage of manufacturing readiness was the technology at?

CATI: READ OUT

Fixed codes	Answer list	Scripting notes	Routing
1	Manufacturing concepts identified or manufacturing proof of concept developed (MRL 1, 2 or 3)		
2	Capability to produce the technology in a laboratory environment (MRL 4)		
3	Capability to produce prototype components, prototype subsystem or prototype system in a production relevant environment (MRL 5 or 6)		
4	Capability to produce components, subsystem or system in a production representative environment or pilot line capability demonstrated (MRL 7 or 8)		
5	Low-rate production or full-rate production demonstrated (MRL 9 or 10)		
6	Don't know		

Base: IF IUK PH2 APPLICANT AND OUTCOME = SUCCESSFUL OR [OUTCOME = UNSUCCESSFUL AND C5=1 (UNSUCCESSFUL BUT PROJECT WENT AHEAD)] OR FI MAIN PROJECT

SINGLE CODE

C12b. What stage of manufacturing readiness has the technology now reached?

CATI: READ OUT

Fixed codes	Answer list	Scripting notes	Routing
1	Manufacturing concepts identified or manufacturing proof of concept developed (MRL 1, 2 or 3)		
2	Capability to produce the technology in a laboratory environment (MRL 4)		
3	Capability to produce prototype components, prototype subsystem or prototype system in a production relevant environment (MRL 5 or 6)		
4	Capability to produce components, subsystem or system in a production representative environment or pilot line capability demonstrated (MRL 7 or 8)		

5	Low-rate production or full-rate production demonstrated (MRL 9 or 10)		
6	Don't know		

Base: IF IUK PH2 APPLICANT AND OUTCOME = SUCCESSFUL OR FI MAIN PROJECT

SINGLE CODE

C13b. Which of the following best describes the impact you think engagement with the **[PH2 IUK APPLICANT =** FBC; **FI MAIN PROJECT =** Faraday Institution**]** has had on manufacturing readiness of the technology?

CATI: READ OUT

Fixed codes	Answer list	Scripting notes	Routing
1	Helped us reach a later stage of development than we would have done otherwise		
2	Allowed us to reach the same stage of development, but more quickly that we could have done otherwise		
3	Helped us both reach a later stage of development and get there more quickly that we would have done otherwise		
4	Not had any effect on the development of this technology		
5	Slowed down or inhibited the development of this technology		
6	Don't know		
7	Prefer not to say		

Base: IF IUK PH2 APPLICANT AND OUTCOME=UNSUCCESSFUL AND C5=1 (UNSUCCESSFUL BUT PROJECT WENT AHEAD)

SINGLE CODE

C14b. What stage of market readiness do you think the technology would now be at if you had been successful in your FBC funding application?

CATI: READ OUT

Fixed codes	Answer list	Scripting notes	Routing
1	Manufacturing concepts identified or manufacturing proof of concept developed (MRL 1, 2 or 3)		
2	Capability to produce the technology in a laboratory environment (MRL 4)		
3	Capability to produce prototype components, prototype subsystem or prototype system in a production relevant environment (MRL 5 or 6)		
4	Capability to produce components, subsystem or system in a production representative environment or pilot line capability demonstrated (MRL 7 or 8)		
5	Low-rate production or full-rate production demonstrated (MRL 9 or 10)		
6	Don't know		

Section E3: Other impacts

Base: ALL WHO HAVE RECEIVED SUPPORT

SINGLE CODE PER ROW, RANDOMISE ROWS, CAROUSEL

X3. Considering all the support you have received from the Faraday Battery Challenge or the Faraday Institution since 2022, for each of the below, what impact, if any, do you think this support has had on your **[IF ACADEMIC:** department or organisation, **IF BUSINESS:** business**]**?

CATI: READ OUT FULL SCALE ON FIRST ROW, READ OUT STATEMENTS IN FULL

ROWS

Fixed codes	Answer list	Scripting notes	Routing
1	Number of industry collaborations		
2	Number of academic collaborations		
3	Number of international collaborations		
4	Number of patents applied for		
5	Number of products launched to market		
6	Follow-on R&D funding or grants		

7	Training of early career researchers		
8	Advancement of scientific knowledge		

COLUMNS

Fixed codes	Answer list	Scripting notes	Routing
1	A large positive impact		
2	A small positive impact		
3	No impact		
4	A small negative impact		
5	A large negative impact		
6	Don't know		
7	Not applicable		

Section F: UKBIC

Base: ASK THOSE AWARE OF UKBIC A8_STATEMENT C=1

SINGLE CODE

S5. You previously mentioned you were aware of the UK Battery Industrialisation Centre. Has your organisation had any interaction with the UK Battery Industrialisation Centre? This could include conversations about opportunities to use the centre, even if your organisation didn't actually go on to use the centre.

Fixed codes	Answer list	Scripting notes	Routing
1	Yes		
2	No		

Base: IF BUSINESS AND S5=2

MULTICODE

F1A. Why has your organisation not interacted with UKBIC?

CATI: DO NOT READ OUT, CODE

Fixed codes	Answer list	Scripting notes	Routing

1	We plan to interact with UKBIC in the near future		
2	We do not need any support with scaling up		
3	We do not plan to invest in battery manufacturing in the UK		
4	We have our own facilities for development and validation or are using another facility		
5	We have the skills required in house		
6	It is not relevant to what we do		
7	Other (please specify)	**OPEN TEXT BOX**	
8	Don't know	**EXCLUSIVE**	
9	Prefer not to say	**EXCLUSIVE**	

Base: ASK IF HAVE HAD SOME INTERACTION WITH UKBIC S5=1

SINGLE CODE

F5. Have you used any of UKBIC facilities to date?

Fixed codes	Answer list	Scripting notes	Routing
1	Yes		
2	No		
3	Prefer not to say		

Base: ASK IF HAD INTERACTION S5=1 BUT NOT USED UKBIC FROM SAMPLE

MULTICODE

F6. Why has your organisation not used UKBIC facilities?

CAWI: Please select all that apply

CATI: DO NOT READ OUT, CODE

Fixed codes	Answer list	Scripting notes	Routing
1	We plan to use the Centre in the near future		
2	The price is too high		

3	We do not need any support with scaling up		
4	We do not plan to invest in battery manufacturing in the UK		
5	We did not pass the financial and technical due diligence		
6	We have been in talks with UKBIC, but have not yet come to an agreement		
7	We have our own facilities for development and validation or are using another facility		
8	We have the skills required in house		
9	It is not relevant to what we do		
10	Other (please specify)		
11	Don't know	**EXCLUSIVE**	
12	Prefer not to say	**EXCLUSIVE**	

Base: IF USED UKBIC FROM SAMPLE OR F5=1

SINGLE CODE, READ OUT

DX13. Which of the following best describes how your engagement with UKBIC has impacted your organisation's progress in developing more advanced battery systems or components?

CATI: READ OUT

Fixed codes	Answer list	Scripting notes	Routing
1	Helped us reach a later stage of development than we would have done otherwise		
2	Allowed us to reach the same stage of development, but more quickly that we could have done otherwise		
3	Helped us both reach a later stage of development and get there more quickly that we would have done otherwise		
4	Not had any effect on the development of this technology		
5	Slowed down or inhibited the development of this technology		
6	Don't know		
7	Prefer not to say		

Section G: Close

Base: all respondents

SINGLE CODE

F1. Thinking about any and all of the interactions you have had with the Faraday Battery Challenge to date, how satisfied or dissatisfied have you been with the interaction(s)?

Fixed codes	Answer list	Scripting notes	Routing
1	Very satisfied		
2	Fairly satisfied		
3	Neither satisfied not dissatisfied		
4	Fairly dissatisfied		
5	Very dissatisfied		
6	Don't know		
7	Prefer not to say		

Base: all respondents

OPEN

X2. Do you have any other remarks about the impacts of the Faraday Institution, UKBIC or the Faraday Battery Challenge have had on you, **[IF TYPE=BUSINESS:** your business; **IF TYPE=ACADEMIC:** your department**]**, the battery industry or the battery research environment in the UK?

Please answer in the box below

[_____]

Fixed codes	Answer list	Scripting notes	Routing
1	No further remarks	**FIX, EXCLUSIVE**	

Annex C – Qualitative fieldwork topic guides

Academic stakeholders

R&D investment and innovation

- To what extent do you think FBC has made a difference to the development of battery technology in the UK, over the past 3 years in particular?
- Has FBC changed the amount or nature of the research you/your department have been able to conduct?

- To what extent do you think that the FI/FBC investments have led to follow on research in the battery sector?

- How, if at all, have FI/FBC activities affected the transition of battery innovations from early to mid-stage R&D, and from mid-stage R&D to late-stage development?
- What barriers remain in developing and scaling battery technologies?

- How, if at all, do you think the UK academic standing in global battery research has changed over the past few years? What makes you think that?
- Is that in any way attributable to FBC? If so, how/why.

Connectivity and collaboration

- What impact do you think that the FI/FBC have had on collaboration - between academic institutions or between academics and industry?
- Do you think your own collaboration has changed significantly over the past few years, and if so how/why?

Skills

- To what extent do you think FI/FBC funding or activities changed the skills base of the battery sector – either in academia or industry?
- Where do you see the most pressing skills shortages for the sector?
- What, if any, impact has FI/FBC had on workforce diversity in the battery sector? How/why has this impact occurred?

UK capabilities

- [If time] To what extent is the UK an attractive location for investment in battery development?
- How and why has that changed in recent years (since 2022)?
- [If aware of FBC] Do you think FBC has had any impact on that, and if so why/how?

- [If relevant] To what extent is the UK an attractive location for battery production?
- How and why has that changed in recent years (since 2022)?
- [If aware of FBC] Do you think FBC has had any impact on that, and if so why/how?

Close

- Are there any other impacts of FI / FBC that we haven't touched on that you would like to raise?

Business stakeholders

Development and commercialisation

If relevant:

- What impacts do you think that [mentioned FBC funding/engagement] had on your technology or your business?
- **How/why** did the FBC support/engagement have these impacts?
- (Could prompt, for example:
  - Would you have taken forward the research without FBC support? Why or why not?
  - Impacts on the technological readiness or manufacturing readiness.
  - Impacts on the speed or success of commercialisation.
  - Impacts on your ability to access further finance.

- To what extent has the FBC support you received led to an improvement in the performance, cost, or sustainability of electric battery technology?
  - What impacts might this have on other parts of the value chain or other sectors (e.g. transport or energy storage)

UK capabilities

- To what extent do you think the UK an attractive location for investment in battery development?
- Do you think FBC has had any impact on that over the past couple of years, and if so why/how?

- To what extent do you think the UK an attractive location for battery production?
- Do you think FBC has had any impact on that over the past couple of years, and if so why/how?

- What do you see as the current challenges in advancing new battery technologies to commercial viability in the UK?
- How have these changed at all over time? Do you think FBC has had any impact on any of these challenges over the past couple of years?

- [For OEMs] How has the FBC contributed to bringing new electric battery products to market?
- What barriers remain in bringing electric battery products to market?
- Has the FBC attempted to address these barriers? If so, in which ways has it been successful or fallen short?

Connectivity and Collaboration

- [If relevant] How, if at all, did your [FBC engagement] change the extent or nature of your collaborations with academic institutions or other businesses?

- To what extent do you think there is productive collaboration across the battery value chain? For example, between UK academia and businesses in the development of battery technology?
  - How has this changed in recent years?
  - Do you think FBC has had any impact on the extent or nature of collaboration?

- Do you think the policy community understands the importance of battery value chains and what is needed for the industry to be successful in the UK?
  - To what extent can this be attributed to FBC?

Skills

- What skills gaps, if any, do you see in the battery sector and supporting value chains?
  - Has this changed over time?
- [If relevant] To what extent does your company have access to sufficient workers with the necessary skills for battery-related roles?
  - Has this changed over time?
- [If aware of FBC] Has FBC had any impact on these skills gaps?

R&D investment and innovation

- [If time] What is your perception of the quality, quantity, breadth, and relevance of battery research in the UK? Where do you think the UK sits internationally?
- [If time] To what extent, if at all, is the UK's battery research standing relevant to your business?
  - Does it influence any of your decisions? e.g. your own R&D, the location of your activities?
  - How, if at all, has that changed over time/in recent years?

Close

- Are there any other impacts of FBC that we haven't touched on that you would like to raise?

Government and sector experts

Skills

- In your view, how does the availability of skilled workers currently align with industry demand in the battery sector and wider value chains?
- Where do you see the most pressing skills shortages? (sector / skill level / geography)

- How, if at all, has that changed over the past couple of years?
- How, if at all, do you think FBC has affected the skills base of the battery sector?
- (Probe for impacts on awareness of skills needs, collaboration between industry and training institutions to ensure alignment between training and sector demands, as well as upskilling support)

- To what extent do you think the availability of suitably skilled workers in the UK affects the attractiveness of the UK as location for investment in battery development or production?

UK capabilities

- Do you consider that the perception of the UK's electric battery sector has changed in the last three years? (Prompt: in terms of competitiveness, scientific quality, breadth, depth)
  - What role do you think support from the FBC has played in this change?

- How, if at all, have FI/FBC activities affected the transition of battery innovations from early to mid-stage R&D, and from mid-stage R&D to late-stage development?
  - What barriers remain in developing and scaling battery technologies? (Could prompt for: access to finance, access to skills, competitiveness of cost base...)
  - Has the FBC attempted to address these barriers? If so, in which ways has it been successful or fallen short?

- To what extent do you think the UK is an attractive location for investment in battery development?
  - Do you think FBC has had any impact on that, and if so why/how?

- To what extent do you think the UK an attractive location for battery production?
  - Do you think FBC has had any impact on that, and if so why/how?

- How do you consider the support provided by FBC, or the impacts of that support, to have affected other sub-sectors within the wider battery value chain (such as recycling, chemicals, energy, and transport)?

- How do you consider the support provided by FBC, or the impacts of that support, to have affected other sectors of the economy?

Access to finance Increased rate of development and commercialisation

- How would you characterise the environment for investment in battery technology in the UK?
- What are the challenges facing businesses in the battery sector in the UK looking for investment?
- To what extent, if at all, has the FBC had any impact on businesses ease of accessing finance?

- Has support by FBC changed businesses' ability to access private finance? How/why?
- Has FBC activity changed access to finance in the sector more generally? How/why?

- How does access to finance in the UK compare with access internationally?
  - What are the implications of this? (e.g. on growth or firm location decisions)

Connectivity and Collaboration

- To what extent do you think there is productive collaboration across the battery value chain? For example, between UK academia and businesses in the development and commercialisation of battery technology?
  - How has this changed in recent years?
  - Do you think FBC has had any impact on the extent or nature of collaboration?

- Do you think the policy community understands the importance of battery value chains and what is needed for the industry to be successful in the UK?
  - To what extent can this be attributed to FBC?

- To what extent has the FBC helped improve coordination among the different areas of government and with the industry? How has it done this?
- In which areas is coordination still lacking for the successful development of the electric battery sector in the UK?
  - Has the FBC attempted to address these areas of poor coordination? If so, where has FBC had more or less success?

- To what extent has the FBC contributed to the development and adoption of battery regulations and standards over the past couple of years?
- What regulatory gaps remain that can hinder the development of the electric battery sector?
  - Has the FBC attempted to address these regulatory gaps? If so, in which ways has it been successful or fallen short?

- How well has FBC aligned with broader UK industrial and net-zero policy goals?
- How well does FBC align with or support other policy initiatives (e.g. ATF)?
- Where do you see gaps between the program's intended objectives and its actual impact?