

Faraday Institution Transformational Challenge: HighPerCell

Frequently Asked Questions

This document is intended to supply further information about this challenge. If we receive questions from potential applicants throughout the call period we may add them here, so please consider checking back.

Technical Details

- 1. The call document specifies that solution must have the potential to deliver 1,000Wh/kg at a pack level. Are solid-state batteries in scope for this?**

To be in scope an idea must have the potential to demonstrate a feasible pathway that can approach 1,000Wh/kg at pack level, requiring an even greater energy density at cell level. Proposals would have to demonstrate how to feasibly get to these values.

- 2. Are lithium-ion and sodium-ion batteries in scope?**

The call asks for proposals that can demonstrate a pathway to meet the technical requirements in the call document. If a submission utilises lithium- or sodium-ion batteries, it will have to detail how it would achieve an energy density approaching 1,000Wh/kg at pack level. [The Faraday Institution runs a wide range of other research programmes on lithium- and sodium-ion batteries.](#)

The ATI has several funding mechanisms available to raise the TRL of sub-system integration of Li-ion batteries for nearer-term aerospace applications such as their SME Programme and the Non-CO₂ Programme.

- 3. I would like to propose another technology that has not been mentioned – is it in scope?**

The call document defines technology themes that have been identified as in or out of scope, where the latter is either not technically feasible to realise HighPerCell's ambition or where other UK research organisations have focused funding. If your proposal is not defined as out-of-scope, but not mentioned within the in-scope theme, then we welcome submissions on that approach, methodology, technology, or concept that has the potential to meet the criteria specified in the call document. Please read the call document carefully. If you believe your solution has the potential to meet the criteria, please apply. You can contact us at HighPerCell@faraday.ac.uk with specific queries.

4. The Faraday Institution is an electrochemical research organisation, are you considering non-electrochemical solutions?

To solicit as broad a range of proposals as possible, to stand the biggest likelihood of being able to reach the proposed technical requirements and thus, have the biggest impact possible, the call is open to both electrochemical and non-electrochemical proposals that can meet the technical specification.

Sustainable aviation fuel and other combustion fuels are out of scope due to the fact they are funded under different existing mechanisms.

5. How do proposals addressing integration or sub-system design contribute to this challenge if the underlying energy storage solution form factor is not known?

Proposals looking to address integration or manufacturing challenges can propose novel ideas that are technology agnostic (e.g., structural batteries). Alternatively, submissions should state if they are willing to act as engineering consultants with selected co-creators, providing radical thinking and expertise at the sub-system engineering length scale to guide and develop the fundamental science submissions. A matching of suitable skills and relevance will be required to pair integrators with fundamental science submissions, and the challenge is open to novel ideas. Details are in the call document and about the two different tracks (see A and B in section 2 of the call document).

6. How should I demonstrate the technical viability of my proposed solution?

As stated in the call document, proposed solutions must demonstrate a plausible route to achieving the technical requirements stated. Through the course of the co-creation phase, a technology roadmap will be conceived and developed that should demonstrate how to achieve the technical specifications stated.

7. I have a suggested approach to the problem, which I believe could help identify solutions that would be in scope. However, I do not have the solution yet – should I apply?

Yes – if you have an idea that will contribute to the development of an ultra-high performance energy storage solution, please apply. As the call document states in section 2, the first phase of HighPerCell will aim to identify approaches, methodologies and concepts with the potential to make a meaningful contribution to the ultimate development of an ultra-high energy/power energy storage solution or device.

8. My idea has the potential to meet most of the criteria, but I am not sure about one of the criteria. Should I still apply?

While we anticipate that this will be a competitive process, we know that some ideas with huge potential may be at a very early stage. For example, the trade-off between energy and power would need to be resolved to deliver on all of the defined technology specifications. We are interested in those ideas that have the potential to meet the criteria, and applications from individuals with the skills to research and develop ideas further. Please apply and

provide details in your application form. Don't hesitate to contact us with any questions you may have. Please email your questions to HighPerCell@faraday.ac.uk

9. What do you mean by dual-use?

A technology that can find application in more than one sector. This may be due to similar performance requirements that allow it to translate across to an adjacent sector and provide benefit and find use with relatively little additional change.

10. You have mentioned other potential industries that may benefit from this challenge such as motorsports. Aren't the requirements from a battery very different for these applications?

The targets themselves are transformational, and we anticipate that this will map onto other known challenging use cases from different sectors as well as also open up unexpected new applications and markets. There may be sector specific metrics not captured initially within HighPerCell, but the headline targets may still be valuable for these sectors.

11. Where has the cost requirement come from? It seems too high/low?

The costs requirements consider a levelised cost of storage, allowing for a total lifetime cost that incorporates capital, maintenance and operating costs. It has been derived to compare against a future sustainable aviation fuel price. For a 1,000Wh/kg pack, this would equate to a highly ambitious \$300/kWh unit cost.

The cost requirements are of the same order as cost targets from similar research programmes/ white paper analysis. These include the ARPA-E PROPEL 1-K and Elysian programmes and this value represents an aspiration cost target. Your proposal should look to demonstrate a high-level plausible pathway to reach this cost metric.

12. Aren't the cost requirements too prohibitive/ restrictive given the technology is so early?

The cost values represent a long-term aspiration target, rather than a value that must be immediately achieved.

13. How has the scope been derived?

The ambition for HighPerCell, and the Transformation Challenges, represent a thoughtful re-positioning of the Faraday Institution beyond automotive technologies and a way to broaden the reach of the Faraday Institution's impact. The scope and technical specifications have been derived from numerous sources, including ongoing and close engagement with the ATI, and 1:1 consultations with stakeholders across the cell, manufacturing, research and aerospace value chain. This also included joint workshops (both virtual and face-to-face) to determine aerospace sector needs. Moreover, the scope has built upon previous Faraday Institution insights and sector analysis, specifically around opportunities in regional, urban air mobility and space applications, which included a [Faraday Insight publication](#). Lastly, there has been discussion with the team that conceived the ARPA-E PROPEL 1-K programme, with insights from that programme being translated where appropriate.

14. How does this call fit in with other aerospace activity going on in the UK, such as the ATI roadmaps and their funding?

The ATI have funding streams that are aimed predominantly at TRL4-6 at vehicle/ system level. However, where areas of technology development have a direct application to aerospace, the ATI can fund research in these areas and technologies as well. The co-creation phase is for early TRL innovations and ideas, with higher TRL activities, such as collaborative R&D and demonstrators, having alternative funding.

The Faraday Institution's ongoing engagement with the ATI helped inform the HighPerCell scope, aligning the scope to commercially attractive end-user requirements. It is anticipated that the future outputs of HighPerCell may be at an appropriate maturity to be eligible for higher TRL funding from the ATI.

15. What are the timescales to commercial adoption for this programme?

The HighPerCell Challenge represents a stepwise increase in battery performance targets. Any transformational technology emerging from HighPerCell would be targeting generation after next applications, with entry-into-service around 2045/2050, thus requiring the underlying cell technology to demonstrate a TRL6 maturity in the latter half of the 2030s.

16. How and who will be assessing the submitted proposals?

There will be an internal group of assessors within the Faraday Institution, from a diverse range of technical and commercial backgrounds, who will initially screen the submitted proposals. A technical advisory group will be established that contains representation from academia and industry, and where additional expertise is required, they will be utilised. Where additional clarification is required, the HighPerCell team would reach out in the first instance to the proposal submitter.

17. Isn't this just a copy-cat of ARPA-E Propel 1K?

Whilst there are similarities between the high-level targets and aspirations of this and PROPEL 1-K, the HighPerCell Challenge looks to target sectors of high UK economic impact, that are highly innovative and where robust manufacturing and supply chains exist, such that any future developments stand a greater likelihood of remaining and growing in the UK.

The HighPerCell Challenge is open to UK applicants and will look to leverage the wealth of domestic researchers and innovators to establish their ideas and provide the best chance of tackling and solving this challenge. Moreover, the PROPEL programme looks to address some US-based opportunities around maritime and rail.

18. Why primary focus on Aerospace and not Defence, Maritime, Rail, Heavy Transport, and Motorsport?

The primary focus is on the civil aerospace sector, which represents a hard-to-decarbonise sector that could utilise batteries across a range of applications and where the cumulative demand of batteries required across all uses-cases (including eVTOL and other Advanced Air Mobility applications) results in a multi-gigawatt demand.

Battery requirements in the aerospace sector represent a step change in performance given the weight reductions needed relative to current generation batteries. Each of the other sectors listed will also require innovations to decarbonise - and there may be overlap with HighPerCell performance targets that other sectors could leverage in the future.

Administrative Details

19. I am unable to join the webinar – will it be recorded and available after the event?

Yes – please register for the webinar and you will be emailed the presentation and a link of the recording the day after the event. The link to a recording of the event will also be added to the Faraday Institution website.

20. I am someone with pack design and integration experience. I want to submit a proposal for an idea as a Research Consultant, but I am also open to being an Engineering Consultant and helping where necessary. I can only click on one option on Flexigrant. What do I do in this case?

If you would like to apply for both tracks of this co-creation phase, please submit two separate applications. This will ensure the proposals go to the correct assessors and are judged separately on the strength of the applications.

21. I have read the call document and FAQs and watched the webinar, but I still have more questions, how can I get them answered?

Please email your questions to HighPerCell@faraday.ac.uk

22. Will successful participants in the co-creation and planning stage be guaranteed a place on the larger research projects to be undertaken from 2026?

The intention of the co-creation and planning phase is to develop a 3-year research project (call to open in Q4 2026). It's likely that some participants from the co-creation stage will be involved in the larger research projects, however, it is not guaranteed. Future projects will not be restricted to just participants of the co-creation and planning phase.

23. I am interested in this project but not sure whether I will be able to commit with my other work commitments. Can I register my interest without committing to participate?

If you have expertise that you think could be useful to the challenge, we would like to hear from you. The application form is intentionally short – please apply and feel free to explain your circumstances on the form. There will be a phase of team building, skills matching and project development with successful research consultants that will necessarily include consideration of the time that individuals have available. Some consultants may contribute only a handful of days of work; others considerably more. Our expectation is that a maximum of around 30 days of time will be used per submission during the initial co-creation phase. Please feel free to specify in your application any restrictions on how/when you might be able to work.

24. Can companies / individuals / teams / employees / academics / engineers / scientists apply?

Yes. This project has been designed to be open to all who may have relevant expertise. Work in the co-creation and planning phase will be part-time and temporary and agreed in the

consulting contract. Subject to your own employment restrictions and meeting standard requirements, we expect most consultants to be in other employment while working with us during the co-creation and planning phase.