

National Materials Innovation Strategy – Pre Tender Announcement

Background to tender

Consider almost every technological challenge facing society and materials will be at their core. To build a cleaner energy future we need materials for more efficient energy harvesting, storage and use. Likewise, health improvements for an aging population, or anti-viral coatings, cannot be achieved without major strides in our ability to tailor surfaces and add functionality to materials systems.

In view of the UK's ambitious 2050 zero carbon commitments, timing has never been more critical as we seek to deliver and exploit these next generation materials in a sustainable manner with far less reliance on the availability of critical resources.

However, it is clear that we have now reached a tipping point where the UK will struggle to achieve its net zero ambition, in the timescales in which we need to see it, without the support of a specific, clear, and standalone national strategy for materials innovation and technology translation. Critically, there is a need for a strategy that is sustained over 10-20 years, and for one to which all parties remain committed, embracing sustainable use of our available resources.

Yet the development of such a strategy also raises considerable challenges, not least because it touches on almost every manufacturing sector in the UK, as well as nascent areas yet to be uncovered. It also spans a diverse set of stakeholders whose requirements, ambitions and desired outcomes do not necessarily immediately map onto one another.

World-leading strengths

The potential around advanced materials¹ is acknowledged at the highest level in government. The recent UK Innovation Strategy laid out areas where the UK needed to build further upon its knowledge in order to become a global hub of innovation, and also singled out advanced materials and manufacturing as one of the seven key technology families that will 'transform our economy in the future'.

The expectation afforded by materials innovation also accurately reflects the world-renowned strength of UK research in material science, the highly skilled and innovative advanced materials industries in the UK, and the central role materials advances play in the drive toward achieving each of the innovation pillars. In so doing it unleashes business, people, institutions and places, and technologies.

The UK's strengths in materials research and innovation also cuts across many different industries and is not confined to any one specific silo. This is significant given the overwhelming need for effective cross-industry materials collaboration in order to drive the wider growth, efficiency and productivity of the UK economy.

Our vision

As UKRI's national institute for advanced materials research and innovation, the Henry Royce Institute is charged with addressing these challenges and stimulating innovation in advanced materials research in order to support sustainable growth and development.

¹ defined as any material (system) to which substantial 'value' is added through demanding application, processing or modification. Advanced materials can therefore range from steels and ceramics, through polymers to metal materials or functional devices. Bulk chemicals and pervasive low value bulk materials are excluded from this particular work.

Our vision is therefore to establish a national strategy for advanced materials innovation which delivers a coherency through the government, industry and advanced materials technology community that gives the UK a world-leading position in the rapidly expanding multi-billion-pound materials markets, and which substantially enhances the value of some of the largest UK-based industries.

The strategy will not only seek to grow and further develop our advanced materials industry, but ensure that it remains strongly rooted in the UK and delivers long-term benefits to society as a whole.

Objectives

The purpose of a comprehensive advanced materials innovation strategy will be manifold and will require several levels of detail, recognising the wide-ranging impact that materials innovation has.

However, the overriding high-level ambition will be to:

- stimulate innovation, applications and market opportunity in the UK and overseas aligned to societal and economic need
 - Aligned with our sustainable goals around resources
 - Cognisant of scale-up manufacturing processes consistent with the transition to net zero targets
- enable a strong foundation of capability in the UK
- grow and diversify a skilled UK workforce
- create the right social and regulatory context across diverse market sectors
- maximise benefit to the UK through international engagement

Tender

This tender will seek submissions from organisations which have the requisite capability, insight and resources to work with the UK community in order to develop such a strategy.

The strategy will be developed through a staged process as outlined below, beginning with the preferred organisation(s) undertaking a scoping study to ascertain the necessary content, activities and overarching structure to deliver the said strategy.

The output from this initial phase will be a comprehensive framework and associated project plan which will allow a strategy to be delivered within an acceptable timescale. It is expected that the strategy development will evolve from a top-down, challenge-led perspective.

The current tender is associated with Stage 1 and 2 outlined below, but it is envisaged that the successful party/parties will play a leading role in the development of the full strategy, supported by a national steering group taken from the research community once that stage is reached.

Stage 1: Strategy outline development

Commissioning of a comprehensive study to determine the most appropriate methodology for the delivery of an impactful strategy along with a clear outline of the proposed output. This must consider following aspects, although it will not just be limited to these areas:

- i. Background research requirement– to inform markets and opportunities (including emerging and enabling technologies)

- a) Consideration of previous studies which will inform both the baseline position of the UK's advanced materials capability/economic viability
- b) Government, trade body and industry sector output which inform the challenges to be addressed (note considerable industrial input into the framework consultation is essential)
- c) Obtaining clarity on the position of the UK opportunities vs overseas activities
- ii. The respective roles of higher education, public research institutes and industry
- iii. The approach taken for the necessary level of stakeholder engagement and input
- iv. Any requirement for commissioning studies around investment requirements via government/private routes
- v. The approach to considering skills retention/development
- vi. Addressing the role of regulation and societal drivers
- vii. The final reporting structure including
 - a) Top down review of market pull around sector /challenges considerations both nationally and globally for current and future markets
 - b) National capabilities, gaps and resource constraints along with relevant critical dependencies
 - c) Viable innovation opportunities
 - National and global level
 - Security of supply considerations
 - d) People and skills
 - e) National objectives for 5-20 years
 - f) Investment and policy requirements

The outline strategy will then be shared with key stakeholders prior to a major launch event in Stage 2. Feedback will then be used to update approach prior to more general announcement

Stage 2: Launch of the strategy framework – announcing the commencement of the strategy development

The successful organisation will expect to play a major support role at this event. Primarily this will be through the provision of required background presentation material for the event organisers. The event will be held in London with the aim of establishing national engagement and profile for the wider strategy initiative. The successful organisation will also be responsible for incorporating any last-minute feedback into the strategy development framework.

Stage 3: Development of the strategy

Although not guaranteed it is anticipated that the organisation responsible for producing the strategy development framework will play a leading role in the actual coordination and delivery of the ultimate strategy. Indeed, bidders will also be asked to provide an indication of what they could potentially offer in terms of the development of the overall strategy.

Development of the strategy will involve managing multiple strands of activity:

- Formation of the necessary working groups, sponsors and advocates
- Commissioning back research for markets/opportunities
- Establishing and delivering a comprehensive community engagement portfolio of events

- Commissioning an innovation investment strategy review
- Drawing together the overarching strategy report and recommendations and supporting provision of input to a comprehensive communications campaign

n.b previous work has been undertaken with the aim of developing strategic output to guide the materials community, most notably the work of the Advanced Materials Leadership Council. It is expected that the successful organisation(s) will consider this prior work as well as other national strategies published in recent years.