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East Midlands Investment Zone

Innovation Roadmap

October 2025

DISCLAIMER: This report was commissioned by the East Midlands Combined County Authority (EMCCA) as part of its Investment Zone programme and undertaken as independent research by the relevant universities. The findings and recommendations presented are the result of independent academic analysis and are intended to support the development of the region's Advanced Manufacturing and Clean Industries sectors. While informed by this research, EMCCA is not bound by the recommendations.

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Executive Summary

The East Midlands Combined County Authority (EMCCA) is accelerating the development of the East Midlands Investment Zone (EMIZ) to drive growth in advanced manufacturing and clean energy industries. New pilot projects have received funding for commercialising innovative research – the first step to attract future investment, create jobs, and strengthen the region’s position in high-growth industries.

Supported by local businesses and research partners including the University of Derby, University of Nottingham, and Nottingham Trent University, EMIZ will support R&D and innovation, with local infrastructure investment and tax reliefs unlocking much needed sites. It is expected to create 4,300 jobs and leverage around £380 million of private investment over the next 10 years.

The three EMCCA universities have worked with sector specialist delivery partners Midlands Aerospace Alliance, Nuclear Collaboration Ltd, East Midlands Manufacturing Network and a specialist Construction Consultant. They developed a series of innovation roadmaps that identified the areas where the East Midlands has competitive advantage in specific industry sectors. The delivery partners also identified priority innovation investment opportunities across the advanced manufacturing, propulsion, nuclear and construction sectors.

These were developed through desk-based reviews and series of workshops to consult with industry, academia and other stakeholders. An outline of the roadmap methodology is included in the report.

The roadmaps provide EMIZ with the foundation to develop local innovation clusters in four high growth areas namely: sustainable advanced manufacturing; renewable energy and green construction; nuclear; and zero emission propulsion. They also set out investment priorities that could be met through EMIZ innovation funding.

Each of the roadmaps is presented in this report along with a summary of the key sector opportunities. Full sector innovation reports are included in the annexes. These set out the specific priorities for each area but the roadmaps identified a number of common priorities.

Priority 1 – Facilities for Innovation – access to facilities that derisk innovation for industry including spaces for the development of prototypes and new manufacturing processes for spin outs, start-ups and SMEs, as well as facilities for test and validation of novel product and process technologies for firms of all sizes.

Priority 2 – Demonstration Programme – establish a green industry innovation accelerator programme to support manufacturing businesses in commercialising new product and process technologies, with a particular focus on the demonstration phase of product and process development.

Priority 3 – Technology Adoption – support for businesses to develop, adapt and adopt new technologies and processes, with a particular emphasis on digital and green technologies, to improve productivity.

Priority 4 – Skills – Align regional skills programmes with workforce needs in R&D and manufacture of new products across growth sectors, ensuring these programmes are fully integrated into the EMIZ skills framework.

Zero Emissions Propulsion

The transition to zero emissions propulsion presents an opportunity for the East Midlands to lead UK innovation in future transport.

Regional strengths include presence of major OEMs in aerospace, rail and automotive; deep-rooted capability in high-integrity, safety-critical engineering – shared with the nuclear sector; diverse, multi-sector manufacturing supply chains; leading university R&D centres; and access to adjacent Catapults.

Key technologies include gas turbines, electrification, fuel cells, hydrogen, and precision manufacturing – essential for delivering zero carbon propulsion systems.

Strategic investment is needed now in OEM and supply chain-led R&D, including propulsion demonstrators. This includes demand-driven and challenge-led programmes, SME innovation funding, and visibility of technology readiness level (TRL) 6+ opportunities. Large companies require greater support to remain globally competitive. Leveraging active national and EU R&D investments in the region will amplify impact.

Agile, responsive grants across industry, academia and Catapults will unlock greater collaboration. Cross-sector working and large-scale programmes will de-risk innovation and enable supply chain companies to support adjacent markets.

The region must optimise its infrastructure by coordinating use of existing university, Catapult and industry facilities, while identifying critical national facility gaps – such as hydrogen testing – for targeted investment.

Start-ups require appropriate capital and independent advice. Skills investment must support electrification, hydrogen and digitisation through pathways from apprenticeships to PhDs. Precision engineering and future skills programmes can be aligned to existing sector needs.

A unified regional identity – built around high-integrity, safety-critical propulsion – can position the East Midlands as the UK's innovation leader in zero emissions propulsion.

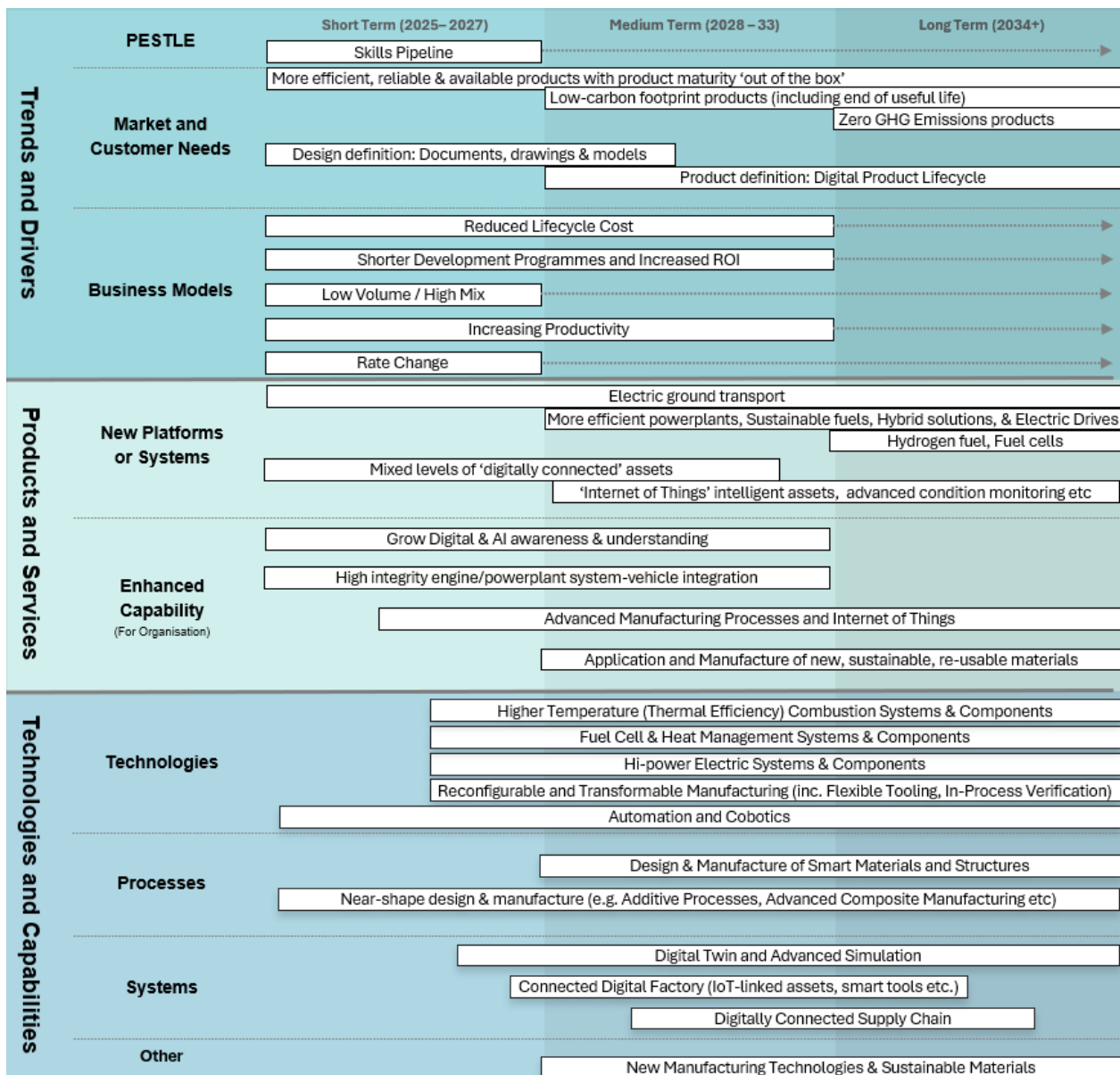
Roadmap priorities

- Invest in bottom-up manufacturing R&D tailored to SMEs, pivoting technologies, now
- Leverage national/EU funded R&D investments in region, now
- Identify specific zero carbon facilities gaps where existing regional strengths can be built on (e.g. hydrogen) for significant future investments, 1-3 years
- Support projects and facilities to create synergies across regional zero/low carbon R&D assets, 3-5 years

Roadmap for Zero Emissions Propulsion

Key points:

- Technology R&D at OEMs and manufacturing supply chain including large propulsion demonstrators
- Cross-sector pivoting R&D at supply chain companies
- New university and/or regional Catapult testing facilities (e.g. hydrogen), regional facilities coordination
- Mobilising established industry and research clusters and networks
- Invest in engineering and manufacturing skills from apprenticeships to PhDs



Sustainable Advanced Manufacturing

Advanced Manufacturing in the East Midlands plays a significant role in UK manufacturing and is the place to drive technology transformation, efficiency and innovation.

Regional strengths include being a significant hub for UK advanced manufacturing due to existing scale of activities, capabilities and sector clusters in aerospace, automotive, and clean energy. Supported by a robust ecosystem of business education and research, further strengths sit in food and drink, ceramics, metals and materials, rail and textiles.

Key technologies for the region align to the Big 8 Manufacturing Technologies of (1) Artificial Intelligence (AI) and Machine Learning, (2) Additive Manufacturing (3D printing), (3) Robotics and Automation, (4) Internet of Things (IoT) and Smart Factory, (5) Advanced Materials, (6) Big Data and Analytics, (7) Sustainable and Green Manufacturing, and (8) Digital Manufacturing and Simulation.

These technologies and processes, combined with government initiatives like “Made Smarter” and the push for Industry 4.0 adoption, are expected to drive the future of advanced manufacturing in the UK. Investment in research, skills development, and collaboration between industry, academia, and government will also be critical for this future.

Roadmap priorities

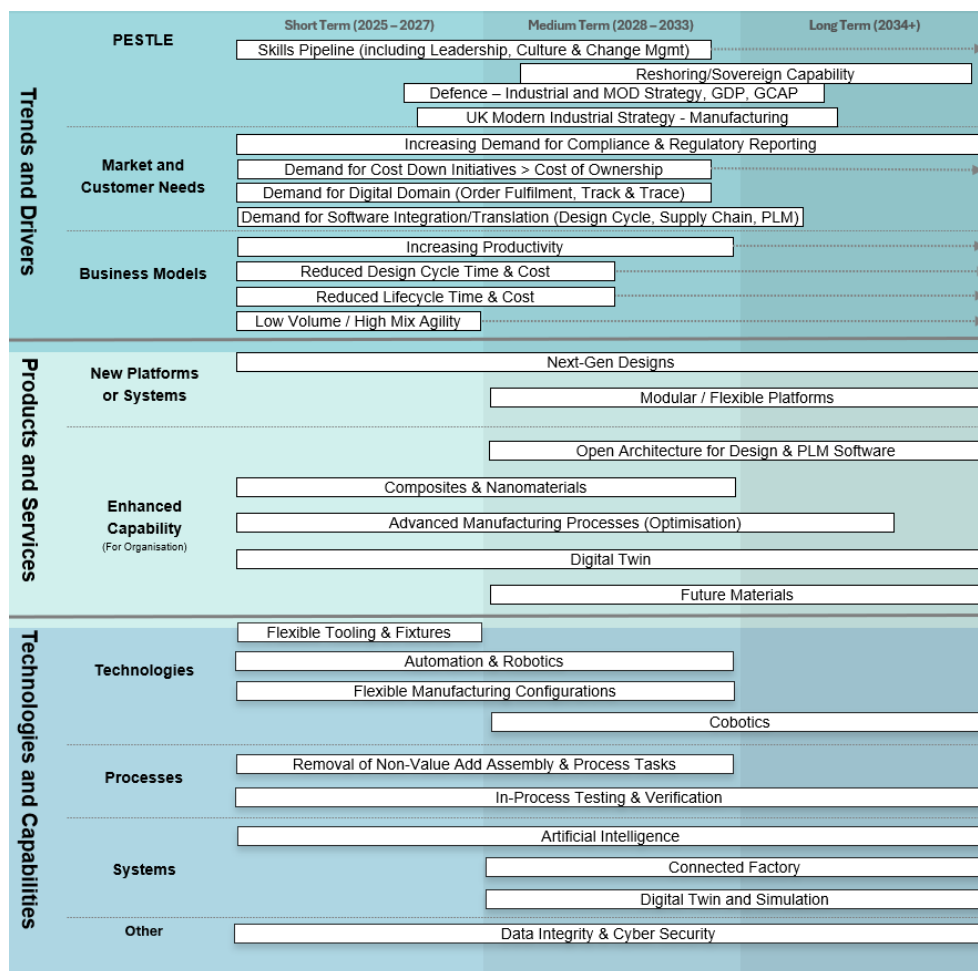
- Invest to increase Automation and Robotics adoption throughout the regional manufacturing sector, with flexible configurations, tooling and fixtures, to build in resilience and responsiveness to change.
- New business models focused on agile and shorter cycle times to increase productivity, and offset increasing cost of regulation and compliance, with low volume, high product mix production capabilities
- Enhance manufacturing capabilities in physical processes, materials and the digital domain e.g. digital and physical world connectivity.
- Invest in AI & Machine Learning to underpin & inform further process integration and optimisation, unlocking productivity gain and integration.
- Support manufacture of modular and sustainable products to meet varied customer and market requirements.
- Enable optimised manufacturing processes with less waste.
- Data integrity and cyber security are essential e.g. digitally connected supply chains and utilisation of model-based definition (MBD) as a standard. They also provide a gateway to further technology adoption.
- Regional transformation of existing supply chain to end-to-end digitally connected factories.
- Invest in bottom-up manufacturing R&D, pivoting technologies.
- Identify specific manufacturing infrastructure and facilities gaps where existing regional strengths can be built on for significant future investments, 1-3 years

Roadmap for Sustainable Advanced Manufacturing

Key points:

- New business models focussed on agile & shorter cycle times to increase productivity & offset increasing compliance & regulatory burden.
- Modular & Sustainable products to meet varied customer & market requirements.
- Enhanced manufacturing capabilities in physical processes, materials & the digital domain.
- Increased automation & robotics throughout manufacturing with flexible layouts, tooling & fixtures.
- Optimised processes with less waste.
- AI & machine learning to underpin & inform further process integration and optimisation.
- Many trends and drivers will persist into the long term (indicated by dotted arrows).

Theme details in Qinesis Report dated 4 April 2025



Renewable Energy & Green Construction

The transition to net zero buildings and decarbonisation of the energy grid presents an opportunity for the East Midlands to lead UK innovation and implementation of retrofit and new build low carbon buildings, renewable energy generation and storage, and carbon capture and sequestration.

Regional strengths include being centrally located with an excellent distribution network to supply the construction industry with low carbon products, UK's largest primary aggregate producer; UK's largest inland hydrogen cluster, pioneering community energy projects; large areas of grade 4-5 land suitable for solar farms; large SME base to shorten supply chains; and leading university R&D centres.

Key technologies include energy use mapping, digital twin modelling, low carbon concrete production incorporating hydrogen and carbon capture, alternative home energy solutions including next-generation heat pumps, heat networks, infrared fabric and local smart energy systems.

These technologies align with some of the key drivers within the UKGBC, MPA UKC and CLC retrofit strategy national roadmaps to decarbonise the built environment, and energy generation and storage.

Key priorities for the East Midlands region are prioritising the development of a sustainable growth economy by focusing on low-carbon concrete and aggregate innovation, green energy generation and storage, comprehensive energy use mapping, and the adoption of advanced home heating technologies. Strategic efforts should aim to support regional SMEs, simplify supply chains, and align education and skills development with industry needs. The region should capitalise on its central location, devolved planning powers, and strong academic and industrial partnerships to drive pragmatic, high-impact innovation.

Roadmap priorities

- Development of research clusters between academia and industry (KTPs/PhDs), feasibility studies, funded trials and demonstrator projects
- Create and support industrial research cluster for low carbon concrete development. Aim to lead the market, leveraging hydrogen and carbon capture technologies
- Engage feasibility studies for green energy generation (PV/H2/AD), allied with storage solutions, on ex-power station and low-grade agricultural land sites
- Build a comprehensive digital twin of energy use across residential and non-residential buildings using EST and IES data to guide regional retrofitting strategy
- Research barriers to adoption for Alternative Home Energy Solutions. Develop pilot schemes leading into regional manufacturing and training pipelines
- Investigate viability and develop East Midlands as a UK recycling hub for rare earth metals and critical materials, focussing on batteries, PV panels and e-waste

Roadmap for Renewable Energy & Green Construction

Key points:

- Clearly defined purpose for the East Midlands as a region that innovative industries can focus on collaboratively.
- Broad support needed across whole region for RE and GC, not just tech cluster solutions in the Investment Zones.
- Shorter, simplified supply chains to make better use of our SME workforce and increase procurement engagement.
- Better alignment between what industry needs and what government policy and the education system is delivering.
- Greater consistency with more predictable, long-term decision making.

Greater consistency with more predictable, long-term decision making.					
		Short Term (2025 – 2027)	Medium Term (2028 – 2033)	Long Term (2034+)	
Trends and Drivers	PESTLE				
		1	Define a strategy for delivering a Sustainable Growth Economy for the East Midlands		
		1	Deliver clear, consistent messaging to industry and the public – 10 year plan?		
	Market and Customer Needs	4	Ensure funding is fully aligned with training, resource availability, regulations and assessment software		
		6	Ensure education more aligned to regional industry and business needs		
		8	Focus on public awareness and encourage engagement – use Citizens Assemblies approach		
		5	Our Universities to work collaboratively across teaching and research and show leadership		
	Business Models	2	Focus initially on our current capabilities	Develop an equitable approach that benefits our regional SMEs	
		2	Shortening of supply chains to reduce costs, travel times, relocation expenses, carbon ...		
		3	Grow confidence levels in government initiatives and funding programmes		
2		Reduce dependency on vertically integrated business models.			
Products and Services	New Platforms or Systems	2	Create a Supply Chain Database, especially for our construction sector SMEs, to regionalise procurement		
		11	Develop a templated 'kit of parts' approach to OffSite Housing that can be replicated by multiple SMEs		
		5	Develop a set of regional housing archetypes to standardise our approach to retrofitting		
		8	Support public advice centres that educate homeowners to carry out their own retrofits (NEP)		
		12	Research alternative domestic heating solutions	Trial Infrared Fabric technology for retrofit - NexGen	
		11	Focus on practical, scalable MMC solutions rather than chasing 100% Net Zero ideals (PDA)		
	Enhanced Capability (For Organisation)	16	Low carbon cement and aggregate KTPs	Partner with BGS, MPA and others to develop research cluster	
		16	Develop net zero concrete with Green energy generation (EM Hydrogen) and carbon capture (Peak Cluster)		
		14	Make full use of our energy USP in our electricity distribution hubs to encourage all storage technologies		
		18	Don't exclude sectors outside our EMIZ remit (Lab Grown Food) or our Combined Authority boundaries		
Technologies and Capabilities	Technologies	17	Build up a reputation for the EM as a recycling hub by developing a research programme around renewable energy manufacturing requirements and the potential benefits of recycled materials.		
		9	Utilise data from Energy Use Mapping project for developing a more informed approach to retrofit		
		12	Develop sustainable housing solutions around advanced exhaust air heat pump technologies - NIBE		
		14	Build off UoN's multi-energy vector heat and power network research to promote community energy developments		
	Processes	16	Develop the market in Carbon Capture by supporting our low carbon aggregate and concrete industry		
		3	Alternative finance mechanisms to govt. through Green Bonds, Impact Investment companies, etc.		
		10	Use regional legislation to allow net zero off grid housing in the Green Belt		
		10	Privatise assessment of developers' sustainability claims prior to planning applications being accepted		
	Systems	1	Build out from our distribution hub reputation to include EM manufactured products		
		7	University based Design School for creating and assessing retrofit designs and fire remediation in HRBs		
9		EST property data + IES energy use data for LAEP. Feed back to NESO for regional energy strategy			
Other	5	Research and develop vocational courses, placements and apprenticeships aligned to business needs			
	6	Start by addressing the Level 3 / 4 demand. Deliver this from NTUs Mansfield Hub as a national prototype.			

Nuclear

The transition to more sustainable nuclear power generation presents an opportunity for the East Midlands to lead UK innovation and technology investment across the nuclear sector.

Regional strengths include a well-established nuclear cluster, with a strong network of businesses, suppliers, and research institutions. There is a strong presence of high-tech engineering and advanced manufacturing companies, including key suppliers for the nuclear sector, including precision engineering and materials science. This is supported by a strong R&D ecosystem, including academic institutions contributing to advancements in nuclear science, engineering, and materials. The sector has a highly skilled workforce with expertise in engineering, manufacturing, and nuclear technology, supported by local universities and training programs. Located centrally in the UK, there are excellent transport links to key nuclear sites, facilitating supply chain logistics and access to key markets.

Key technologies include Electron Beam Welding (EBW), involving the adoption over manual conventional welding technologies to give speed, quality and environmental benefits. Hot Isostatic Pressing (HIP) will improve properties and in service performance and to compress timescales. Artificial Intelligence in modelling, component monitoring and data analysis. Robotics & UAVs enable remote use in beyond line of sight, semi-autonomous, fully autonomous environments. Digital technologies include simulation, modelling and monitoring. Finally, there is need for development of next generation materials and joining/coating of dissimilar materials.

Other national opportunities for technology deployment include major programmes such as STEP, funded through UKAEA, focused on scaling up fusion energy and delivering it at pace. Another industry led programme is the Rolls-Royce SMR. This is UK's first domestic nuclear technology in more than 20 years. Aimed at providing a solution to a global energy dilemma through development of small modular reactors producing enough stable, affordable, emission-free energy to power a million homes for at least 60 years.

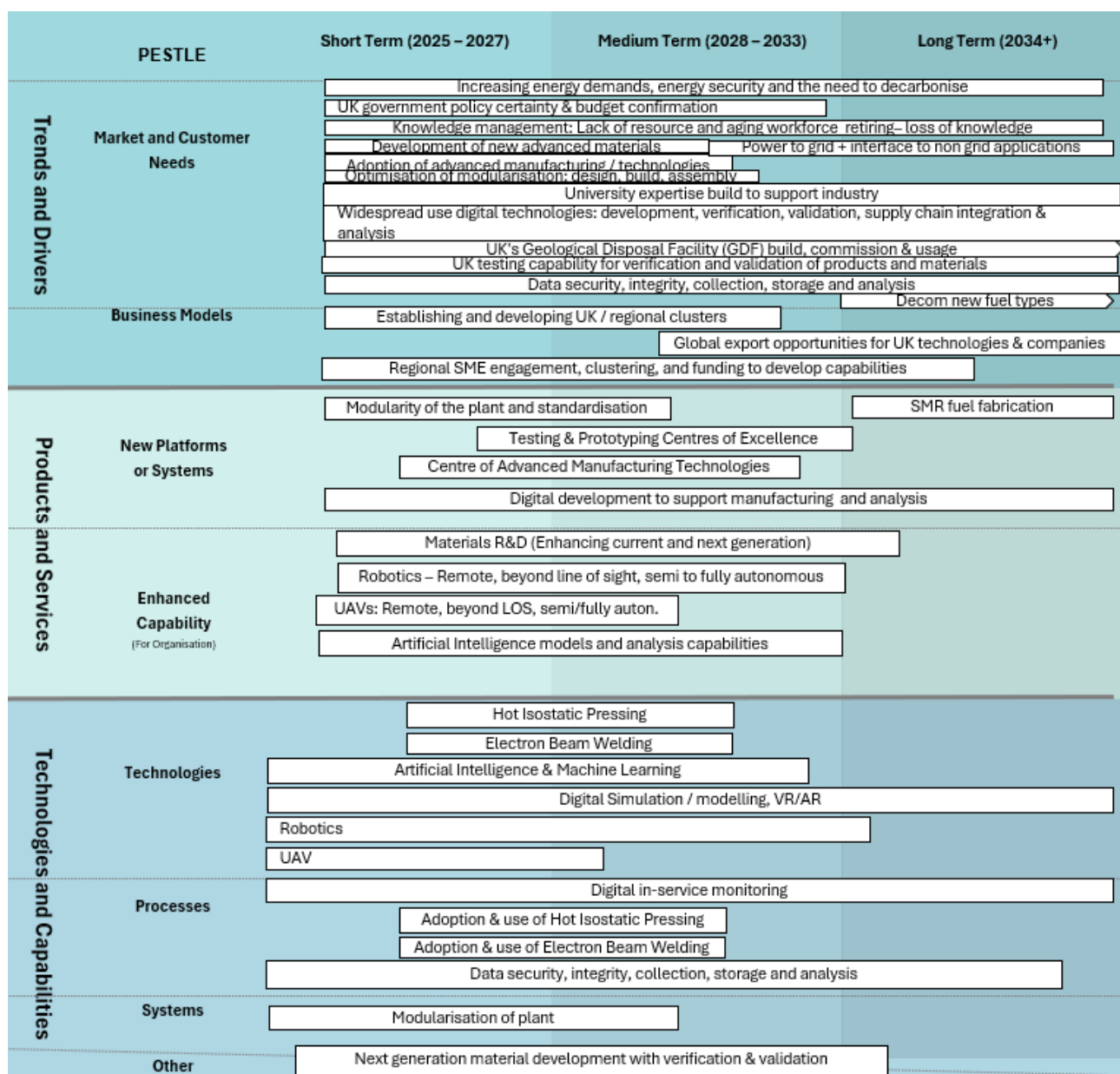
Roadmap priorities

- In region capability (Centres of Excellence) for HIP and EBW, which would be shared across the nuclear themes
- Testing facilities and prototyping centre in the region to support verification and validation activities
- Engagement and development of the regional supply chain
- Building University expertise to support technologies and realise tech advancements
- Module fabrication – traceability, quality standards and assurance
- Next generation materials development and testing
- Robotics & UAV: Remote, beyond line of sight, semi-autonomous, fully autonomous
- Artificial Intelligence (AI) strategy, process development, models & analysis

Roadmap for Nuclear

Key points:

- Shared technological requirements across the five nuclear themes of HIP, EBW, Digital and AI.
- Modularisation: Standardisation, manufacturing / fabrication, traceability, quality standards and assurance
- Verification and validation testing for materials and components
- Need for quick development and verification of next generation materials
- SME / Supply Chain engagement, supporting and clustering



Methodology

Activity to develop the innovation roadmaps in this report was co-ordinated by the University of Nottingham. The delivery partners aligned to the innovation areas were:

- Nuclear – Nuclear Collaborations Ltd
- Propulsion – Midlands Aerospace Alliance
- Construction – Nottingham Trent University
- Advanced Manufacturing – Qinesis on behalf of the East Midlands Manufacturing Network

For each sector a desk review of existing national technology roadmaps was undertaken along with work to identify key regional capabilities. This allowed the team to develop a clear picture of national and sector priorities. Work was then undertaken with a wide range of stakeholders to identify potential workshop participants. A common road mapping approach was agreed between the delivery partners to ensure consistency of output while maintaining agility to respond to the needs of the individual sectors. This included sections on trends and drivers – the external conditions driving need for innovation; products and services – the opportunities for innovation to create economic activity by addressing these drivers and; technology and capabilities – the resources and expertise needed to deliver these products and services.

Workshops were held during February and March 2025. In total there were 170 attendees of which 70 were from industry, 50 from academic institutions and 40 from sector networks and public sector organisations. At the workshops sessions were run to identify key technology areas for the region; gap analysis of supply chain and R&D capability; and develop initial ideas for how to support increased innovation to support these sectors.

Following the workshops work was undertaken to produce an East Midlands sector technology roadmap that set out the priorities for each sector and could be used to inform future innovation investment via EMIZ programme and other sources of funding. These were tested with participants and iterated with feedback from sector experts to produce the final roadmaps included in this report. Further details of the workshop outputs and findings were summarised in a report which is included in the annex.

Annex

This section provides links to the supporting materials which were created as outputs from the partner workshops, and which informed the development of this report. See above Methodology section for more information.

The information was collated during each workshop by the respective delivery partners. It was verified through further consultation with those that attended the workshops. Opportunity was also provided to those who were not able to attend the workshop but expressed interest in contributing to the development of the technology roadmap for their sector.

The individual sector reports can be accessed from the following links:

- [Sustainable Advanced Manufacturing report](#)
- [Zero Emissions Propulsion report](#)
- [Renewable Energy and Green Construction report](#)
- [Nuclear report](#)