

COMPOSITES LEADERSHIP FORUM

Lightening the Load

Delivering UK growth
through the multi-sector
application of composites

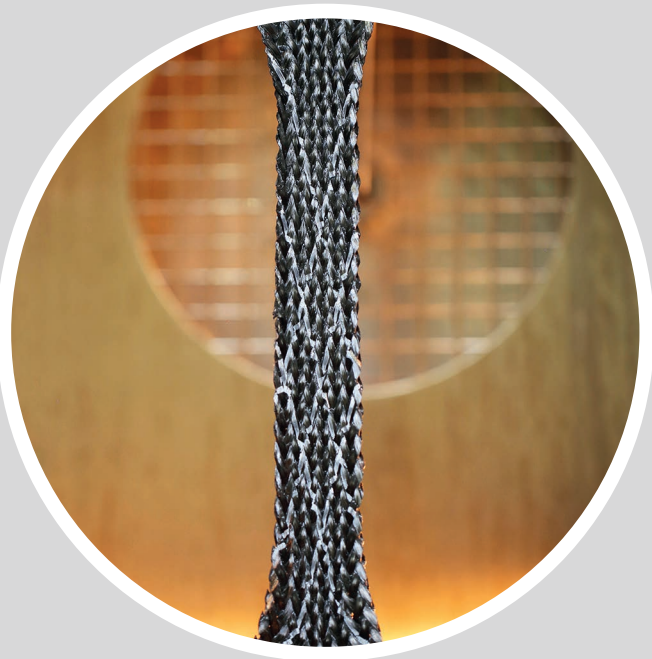


The 2016 UK
Composites Strategy

What is Composite Material?

A composite material is composed of at least two materials, combined to produce improved properties superior to those of the individual components.

This Strategy refers to fibre reinforced composites, usually with carbon, glass, aramid, polymer or natural fibres embedded in a polymer matrix. Other matrix materials can be used and composites may also contain fillers or nano-materials such as graphene. Fibre reinforced composites typically result in lighter, stronger, more durable solutions.



“..enhanced properties and performance that will result in further **lightweight, strong resistant solutions.**”

Introduction

Minister’s Introduction

“The UK has, from an early stage, been at the forefront of developing scientific research into new composite materials and technology.

We now want to lead a further drive to develop the potential of composites into new sectors. This is an important technology that has huge potential for the future of high value manufacturing in the UK. We have already seen its become widely used for products requiring strength and weight reduction in areas such as aerospace and Formula 1; now we want to see the development of its potential in the UK where there are even greater opportunities such as volume manufacturing of cars, to parts of our infrastructure and the huge oil and gas sector.

The UK already has a vibrant and competitive composites industry which is supported by a world-class National Composites Centre (part of our High Value Manufacturing Catapult). The existing composites landscape has an important role to play in supporting the wider manufacturing sector in its transition to the use of advanced materials which could transform products and their performance. I'd like to thank the Composites Leadership Forum for bringing the sector together to produce this clear strategic vision for the future development of this technology. The Government’s industrial approach strongly supports industry-led strategies and as such recognises them to be an important contribution to our overall policy of support for growth through the development and adoption of disruptive technologies.

We want to continue to work with the Composites Leadership Forum, to help us to understand how best we can support it to take forward its vision for the future. The strategy sets out a compelling case for action which will help build our competitive advantage in global manufacturing. Few industries have the realistic potential for a CAGR of 6.5%, and my Department will continue to work with the CLF to help deliver this strategic vision for the benefit of the composites industry. I wish the sector well in delivering the strategy.”

Anna Soubry MP
Minister of State for Small Business,
Industry and Enterprise



Chair’s Introduction

“It has been my privilege to Chair the Composite Leadership Forum at this exciting time and through the generation of this strategy.

It is clear to me that there is a very significant opportunity to apply composites globally to answer the demands of CO2 reduction through light and right-weighting, to produce infrastructure that will serve for tens, if not hundreds of years with minimal maintenance requirements, to build smart structures and products that will tell us about their condition, reduce manufacturing part counts and costs and so much more.

The UK has the opportunity to capture a significant share of these growing markets to sustain both existing and growing new supply chains. We have a strong academic and research base on which to build, we have the HVMC Catapult to support industry both large and small on their journey to commercial success, and an industrial base with the potential to develop. The UK has the potential to be one of the world’s leading places for research and commercial exploitation of composites materials and process, the UK Composites Strategy 2016 will assist us all to seize this challenge.”

Alison Starr
Chair, Composites Leadership Forum

“UK Industry delivering **£10bn growth** in sales of composites by **2030.**”

A Cross Sector Strategy

The 2016 UK Composites Strategy sets out the opportunity to capture a significant share of the substantial future global market for the application of composite materials. Considerable growth in the use of this material is forecast across existing composite-using sectors such as Aerospace and Defence, through rapid growth areas such as Automotive and Renewables and into the advancing user-sectors of Oil and Gas, Rail and large-scale Construction applications. The UK needs to invest in accelerating technologies, developing supply chains and growing a skilled workforce to deliver winning solutions that will capture these opportunities.

Composites Covered

This strategy primarily concerns polymer based composite materials, but considers a future which includes more extensive use of other materials such as metallic and ceramic based composites.

Composite Uses

Many items in daily use already take advantage of the enhanced material properties of composites. The UK has a significant record in the design and manufacture of many of these and further success can be built on this established capability.



CLF Background

The Composites Leadership Forum (CLF) was established with Government support as one of the recommendations of the 2009 Strategy [UK Composites Strategy 2009*]. The CLF is the ‘voice’ of the UK composites industry determining and supporting actions which will enable the continued growth necessary to capture a significant share of the global composites market.

The CLF is led by industry, with representatives providing close coordination with each sector, the UK composites supply chain, academia, Government and funders.

The NCC represents the High Value Manufacturing Catapult, and is part of the delivery infrastructure together with professional bodies and Composites UK, the trade association, to assist the industry in moving forward.

CLF influences government and industry to create a balanced innovation pipeline of:

- Composite science and technology
- Skilled people at all levels
- Supply chains with the right capability, capacity and competitive proposition

CLF 2013 Industry Study

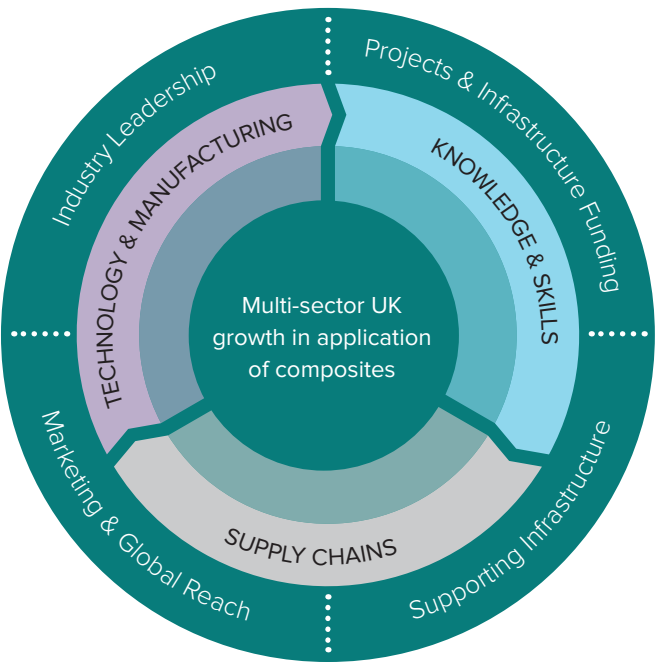
The CLF commissioned a study, supported by BIS, which reviewed composite markets globally and identified existing UK capability and opportunity [UK Composites 2013*]. The report made recommendations to assist the UK to maximise its share of global market growth, these have been developed and integrated into this Strategy.

2016 Strategy

Based on the 2013 report, the CLF committed to Government to produce an updated Composites Strategy building on the achieved outcomes from the 2009 Strategy.

Industry-wide consultation was undertaken with sectors and stakeholders’ representatives participating directly in CLF Working Groups and wider industry workshops and consultative activities. This was followed by analysis and reporting of the findings which leads to the recommendations and proposals contained in this Strategy.

‘The UK will continue to be recognised as one of the **world’s leading places** for the research and commercial exploitation of composite materials and processes.’



*Refer to the back page for further details.

Composites Opportunities

Background to UK Composites

The initial development of composites, and the advanced materials required to produce them were achieved in the UK (e.g. carbon fibre and epoxy resin) in the 1950s & 60s. Publication of the first UK Composites Strategy in 2009 provided a shared platform and determined a cross-sector plan to ensure strategic growth of the UK composites industry.

The 2009 Strategy led directly to the creation of the National Composites Centre (NCC) and the Composites supply chain R&D programme.

Since 2009, strategic Government support of the composites industry has made a substantial impact. Rate of growth and range of deployment of composites in UK aerospace applications has significantly exceeded industry forecasts of only ten years ago as a result of successful programmes of technology and supply chain development.

Subsequent work has included:

- The creation of the Composites Leadership Forum
- EPSRC funding for the Centre for Innovative Manufacturing in Composites (CIMComp)
- A UKTI funded study on the UK Composites Supply Chain
- The AMSCI funded Composites Innovation Cluster
- A doubling in size of the NCC
- EPSRC funded Industrial Doctorate Centre
- Composites Technician Trailblazer Apprenticeship



Global Position

The Global Market for composite products in 2013, across all sectors, had a value of US \$68.1bn. The overall market is expected to grow at around 6.5% CAGR over the next 7 years to about \$105.8bn in 2020. [UK Composites Market Study*]

Driven by need for the benefits of composites, such as light/right-weighting, low maintenance and significantly reduced through life costs, there is major opportunity for the application of these materials across many industry sectors.

There will be accelerating organic growth in the established composites-using sectors like Aerospace, Motorsport and Renewables, together with the emergence of substantial new markets for composites products in sectors such as Automotive, Rail, Oil and Gas etc.

“A 2013 survey of UK composites R&D funding identified **£316m** worth of projects with composite content.”

*Refer to the back page for further details.

New Technologies and Markets

The UK Opportunity

Consultation with the UK composites supply chain has shown that the UK has the opportunity to grow its current £2.3bn composite product market to £12.bn by 2030. [UK Composites Market Study*]



Percentage figures are Compound Annual Growth Rate (CAGR). The forecast figures reflect the view of UK supply chain companies in research carried out by the NCC in mid-2015.

With the right support, a **paradigm shift** will be achieved in the UK to capture the **growing global opportunities** for the application of composite materials in multiple sectors.



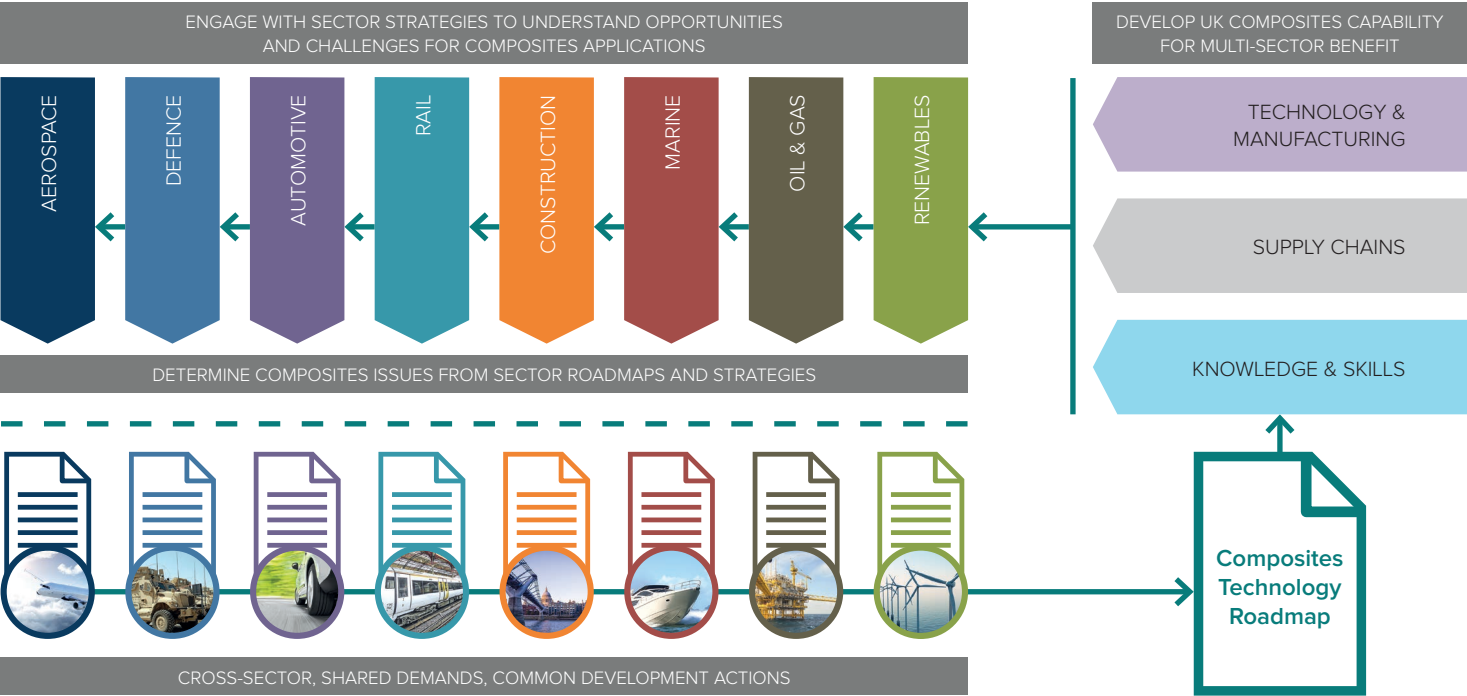
*Refer to the back page for further details.

Multiple Sectors

Consultation took place on a wide cross sector basis and later analysis refined strategic focus to eight primary user sectors, selected on the basis of their current or potential size.

Strategy development took advantage of published Industry Sector Strategies and their individual roadmaps. This development extracted the opportunities and issues for composites from these sector roadmaps. The consultation identified and mapped issues that were of importance for each sector and then determined common needs and actions which would add value to multiple sectors.

Building on a world-class science base, the UK is uniquely positioned to pull blue-skies ideas from excellent research institutions through to successful industrial commercialisation. Cross-sector industry needs were compared with ongoing UK research to assess the alignment and application of funding towards existing industrial problems (industry pull) and to identify, progress and promote technologies that ‘leapfrog’ current solutions (technology push).



Principles

FOSTER

- The growth of composites science research and technology
- Cross sector engagement and development

ADDRESS

- The need for assurance regimes and standards enabling the take up of composites in new sectors
- The need for training capacity and facilities

DEVELOP

- Capability in life cycle assessment demonstrating financial and environmental benefits of composites
- Composites UK, the trade body, to support the sector
- Identification of shared investment opportunities within manufacturing clusters

ENSURE

- Composites industry growth is environmentally sustainable
- An evidence base is developed to support strategic action

AVOID

- Unnecessary duplication by widening understanding of opportunities

Manufacturing Clusters

This strategy seeks to optimise potential UK benefit from investment in composites by encouraging technology and knowhow exchange across sector boundaries. It uses the concept of manufacturing clusters to identify opportunities and current or potential UK composite processes and products. These may be used in several industry sectors and share distinguishing characteristics and technology requirements including; product performance, size, production technology used, cost model, supply chain and skills.

This use of manufacturing clusters sets a framework for:

- Technology transfer through cross-sector collaborative research and innovation
- Greater impact in shorter timescales from public funding
- Accelerated commercialisation, a more competitive multi-sector supply chain and increased application of composite materials

Based on manufacturing clusters, strategic action will ensure that the UK composites industry has the capability and capacity to take advantage of existing and future market opportunities:

- 1 **Deliver** UK’s strength in the **Low Volume, High Performance** manufacturing to a meet increased demand in current markets.
- 2 Support the UK’s growing research and infrastructure base to **Develop** supply chain capability in **High Volume, High Performance** manufacturing.
- 3 **Develop** the immediate market opportunities in **High Volume, Low Cost** manufacturing by **protecting** and supporting UK supply chain capability.
- 4 **Develop** the UK supply chain for **Mid Volume** manufacturing and **diversify** its capability to enable capture of longer term opportunities.
- 5 **Diversify** UK supply chain to take advantage of future opportunity in the **Low Volume, Structural** manufacturing.

The maturity of UK composites products and their associated sectors and markets gives rise to three classes of action required for Manufacturing Clusters:

DELIVER and accelerate organic growth in already established sectors using composites

DEVELOP technologies and supply chains to capture immediate market opportunities

DIVERSIFY and enable UK industry to make a paradigm shift, taking advantage of composites in advancing user sectors

Recommendations

Science and Technology

The Science and Technology base is an essential part of the innovation to commercialisation chain. It provides underpinning and new knowhow, develops new technology to solve issues and enable new and refined processes, tools etc. This must be in place to ensure the future pipeline continues to flow.

- Promote continued research into composites science.
- Increase collaboration with chemicals sector to develop new and existing materials.
- Regain capability in fibre development and manufacture.
- Facilitate sharing of materials and mechanical properties.
- Reduce time, cost risk to market through the use of validated simulation tools.

- Improve know-how in design for manufacture, assembly, performance and functionality.
- Retain and improve capability in smart structures and through life maintenance and repair.
- Improve high temperature performance and cost effectiveness.
- Improve understanding and performance for fire, smoke and toxicity.
- Ensure cross-sector technology development and transfer.
- Establish rapid funding route for short term, responsive developments.

“These overarching recommendations have been distilled from an extensive programme of work and analysis undertaken on behalf of the CLF’s Technology Working Group. [Composites Technology Roadmapping Summary 2014]

The detailed results of this work will be used by the CLF to guide the UK’s science and technology community and funding bodies to facilitate delivery of solutions to the cross-industry sector challenges within the manufacturing clusters identified in this strategy.”

Prof Peter Chivers, Chairman of the CLF Technology Working Group and CEO of the National Composites Centre.



Supply Chain

In some areas, the UK composites supply chain needs support to grow to meet demands of emerging sectors in which there are companies yet to adopt composites.

- Transition existing supply chains into composites and migrate current capability to new sectors and applications, encouraging investment in both
- Seek to build consortium and business arrangements that fulfill supply chain opportunities.
- Support the implementation of a readily accessible UK supply chain capability database
- Understand the requirements for, and develop UK supply chains in composites that will support:
 - High performance structures manufacturing
 - Emerging Mid and High Volume production
 - Large structural applications
 - Materials development and supply
 - Tooling, equipment and other services



Recommendations

Skills and Training

The forecast growth market demand will require increasing numbers of skilled and qualified people to develop, manufacture and support an ever widening range of composite products. These will be at all levels in many technologies. The current pool of people is small and as demand is increasing rapidly this has already become a major inhibitor to growth.

There is a significant lead-time to develop new people with the right skills, hence the importance of re-skilling and up-skilling those already in work with the necessary composites skills and knowledge to avoid delay. Both approaches, new entrants and re-equipping those in work, will require increased and appropriate training capability and capacity to meet demand.

- Establish and articulate future skills demand aligned to current and emerging technologies.
- Develop whole workforce training programmes from operator to researcher, including up-skilling of metals skill base and continued professional development.
- Implement competence assurance schemes to assist definition of training needs.
- Capture and convert emerging knowledge into applied learning.
- Continue work to establish cross sector composites apprentice frameworks.
- Develop capable trainers and provide facilities to meet industry demand.
- Increase awareness of the benefits of composites.

The current pool of people is small and as demand is increasing rapidly this has already become a major inhibitor to growth.



Regulations Codes and Standards

One of the major inhibitors to the uptake of composites in new sectors is that regulations, codes and standards are often inappropriate for composites. This is because they are both explicitly and implicitly based on named materials, such as steel, and do not permit consideration of composites applications despite the strengths and benefits of the materials in many cases.

- Work with regulators and standards bodies to adapt regulations to enable use of composites.
- Establish composites materials test and database capability.
- Develop standards for key topics such as process related measurements, fire, smoke and toxicity.
- Develop non-destructive methods for thick sections and large scale manufacture.
- Implement design codes for structural applications.



Sustainability

Increasing the market penetration of composites will reduce environmental impact through weight reduction and durability, but there is a strong need to incorporate circular economy principles alongside the rapid development of composites. Research is needed to develop cost-effective, bio-based raw materials to further reduce environmental impact and de-couple prices from oil. Life cycle analysis needs to be more widely understood and more consistently applied. There is an ongoing need to develop new markets for recycle from end-of-life and process waste.

- Develop capability in life cycle assessment and costing to show the benefits of composites.
- Develop markets for recyclates with associated standards and support creation of GRP recycling supply chain.
- R&D to integrate industrial biotechnology into the supply chain and optimise value of natural fibres.
- Reduce waste and develop energy efficient manufacturing technologies.

Actions are required to produce an industry that is sustainable into the future.

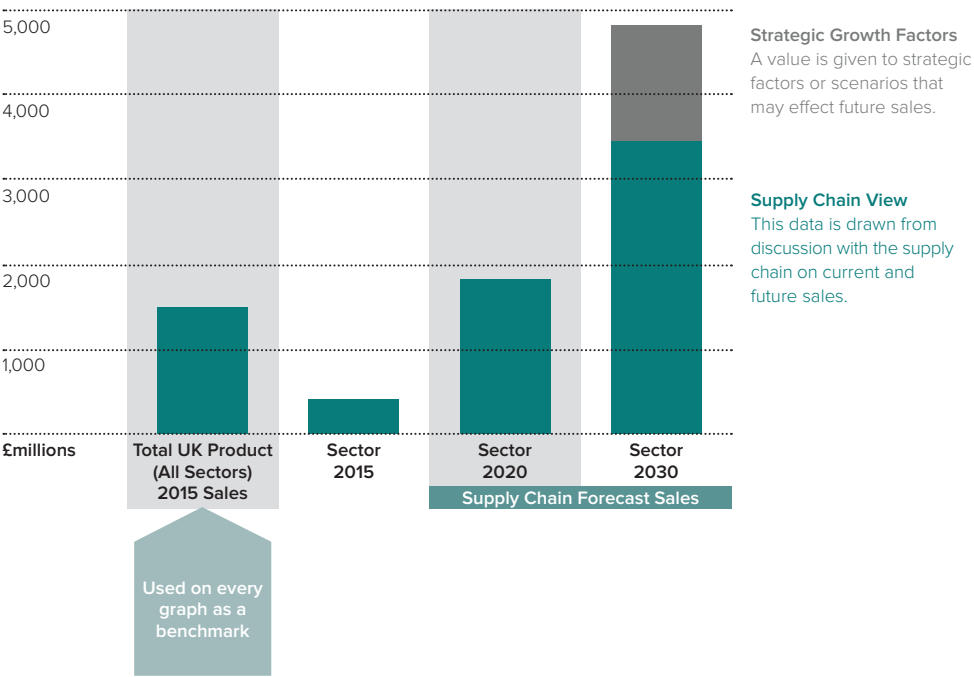
Impact of Strategic Success

Results of a study commissioned by UKTI provide an evaluation of the forecast 2020 market for UK composite components and structures as well as the potential increase in the UK market by 2030. [UK Composites Market Study*]

The numbers in the graphs that follow show the upper and lower predictions, made by the UK supply chain, for UK production of composite parts. In the 2030 data, an extra 'growth factor' is used to quantify potential future market that the supply chain is not yet aware of, or planning for.

The recommendations within this strategy aim to help the supply chain achieve and exceed the upper predictions for each sector.

Key to following sections on impact



Deliver

These industries already commonly use composites, therefore short term growth predictions are good. However there is potential risk of decline in market value by 2030 if technology and supply chain development is not supported.

Develop

Composites are finding new, or sudden growth of applications in these industries. Short term growth is predicted, but the amount of the massive longer term market that the UK captures is dependent on immediate support for UK technology and supply chain development to deliver higher volume production.

Diversify

The UK currently supplies small amounts of composites into these sectors. UK based OEMs and the supply chain may not yet recognise the market opportunity afforded by composite solutions. Promotion of the potential benefits of composites and development of the supply chain should could help deliver the longer term potential of emerging sectors to the UK.

Maintain UK Excellence

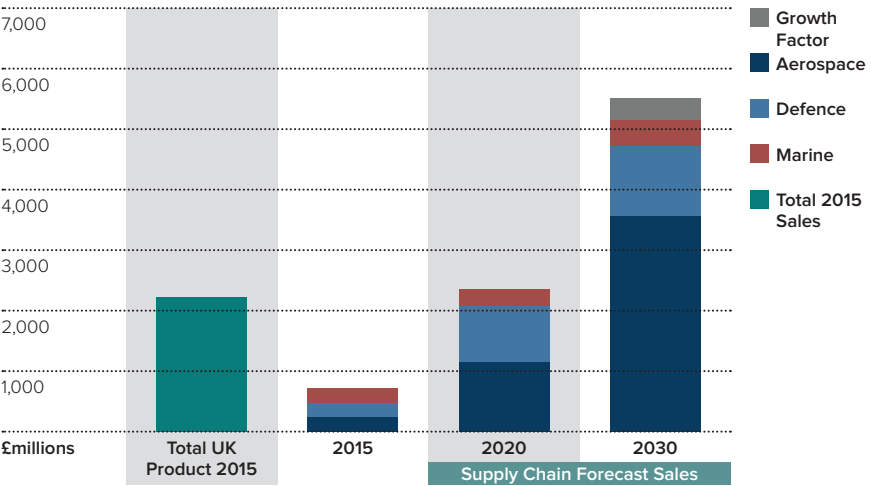
DELIVER

AEROSPACE. The UK is the world's second leading economy in a sector that has pioneered (along with Formula 1) the use of advanced polymer composites. The UK produces aero-structures and in the future fan blades, engine casings and under carriages. UK based OEMs and Tier 1s are facing competition from developed and developing nations. Achievement of upper figures will be based on UK involvement in A320 composite wing after 2019.

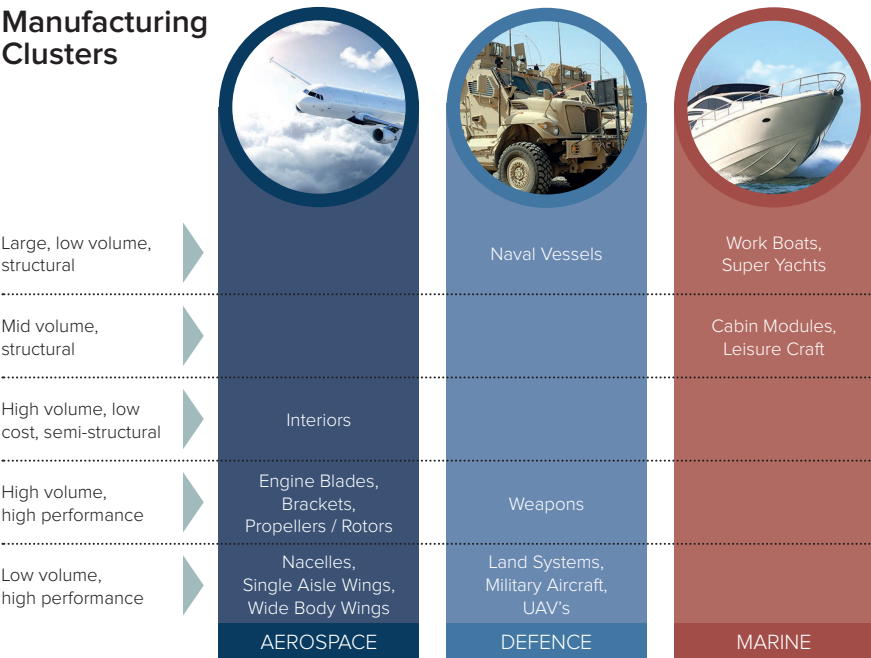
DEFENCE. The UK provides composite components into Air (e.g. A400M, Typhoon, Agusta Westland), Land (Mastiff, Ridgeback, Foxhound) and Sea (Type 45 and 26, Astute and MUFC) defence applications. The production of F35 Lightning 2 is the largest defence contract in history and the composite share of BAE's part of the contract dominates the UK defence composite figures during its build.

MARINE. UK ship building is limited to a few specialty vessels, but capability continues in naval architecture, consultancy, leisure, work boats and equipment, including life-boats, masts, gratings, railings etc. Leisure boats, life and work boats use composites and this market will increase modestly, but it is under pressure for Europe and low-cost economies and needs to be protected. The IMO's SOLAS regulations have effectively prohibited structural composites in commercial ships but changes are under discussion which could lead to a substantial increase in the use of composites.

'Deliver' Industries - Potential Value to UK



Manufacturing Clusters



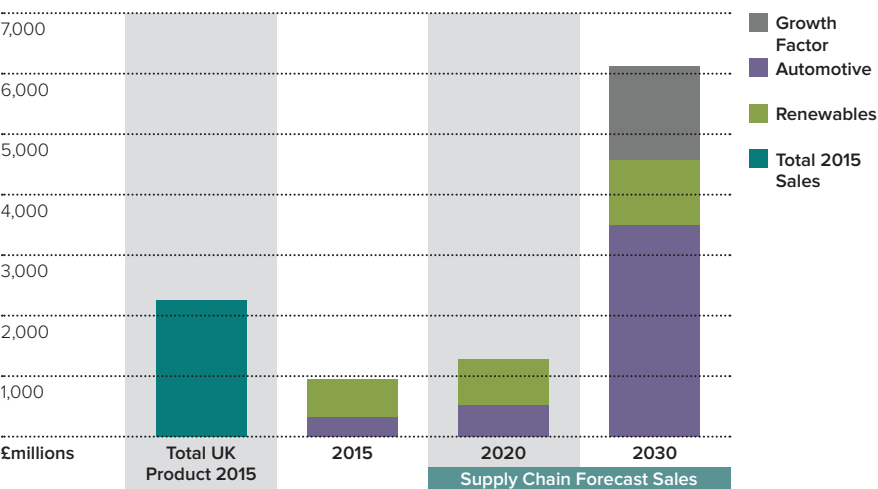
Capture immediate Growth Markets

DEVELOP

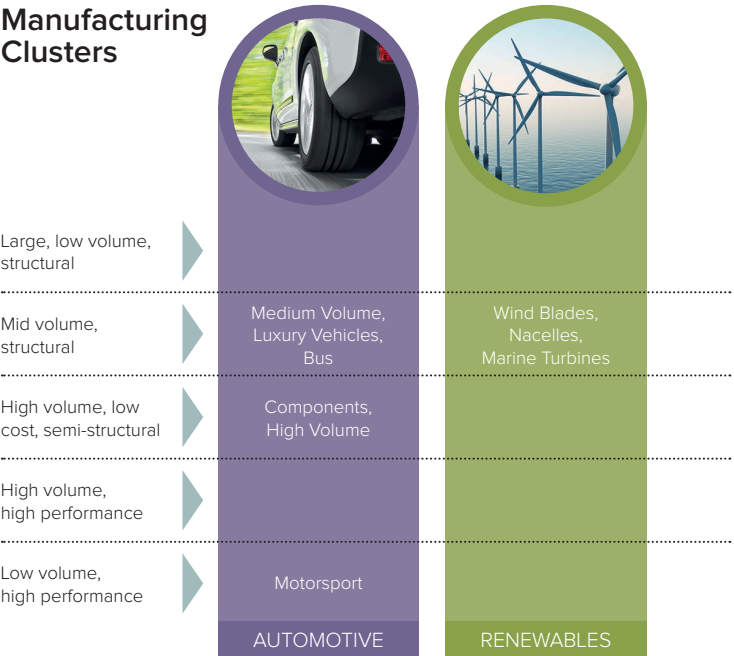
AUTOMOTIVE. The UK has significant expertise in the design and use of composites in low volume, high performance road cars and motorsport, but limited capability for higher volume production. Emissions targets are driving OEMs to challenge the global supply chain to develop lighter weight, affordable composite structures and components at higher volumes. The opportunity for UK is balanced by the risk of supply chain substitution, hence the UK supply chain needs immediate support for technology and supply chain development to provide affordable production capability across different production volume rates.

RENEWABLES. The UK is seeking to generate 15% of its power requirements from renewable sources by 2020. It has the best and most exploitable wind, tidal and wave resources in Europe. The opportunity is to ensure that offshore wind blades are made in the UK with two manufacturers having committed to date but this requires continued support to ensure it also brings onshore blade production (most imported) and production of other composite parts such as towers, nacelles etc. Wave and tidal energy device designers need to be engaged with UK composite design know-how to ensure future UK composites production.

‘Develop’ Industries - Potential Value to UK



Manufacturing Clusters



Prepare for Future Opportunities

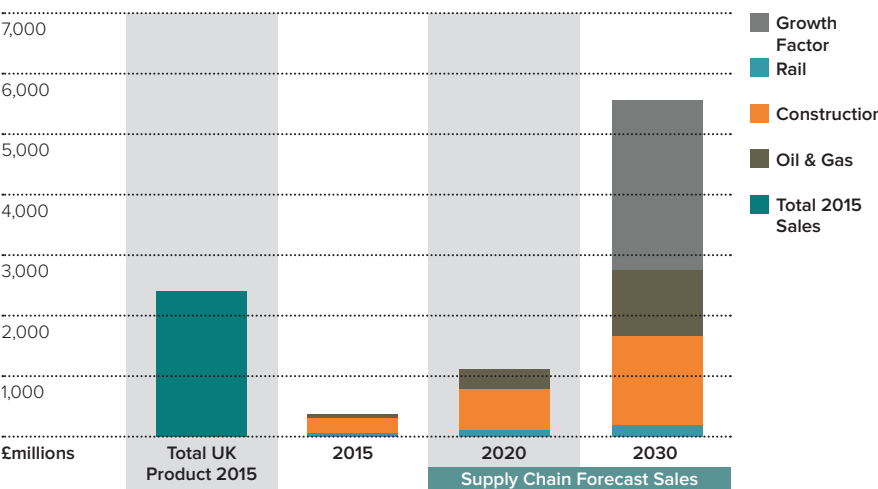
DIVERSIFY

RAIL ROLLING STOCK. The UK market is supplied by Bombardier (UK), Alstom (France), Siemens (Germany) and Hitachi (UK) will produce in the UK from 2017. The Rail Technical Strategy recognises that weight reduction could provide speed, economic and environmental benefits and large projects including Crossrail, Thameslink, HS2, HS3 and London Underground provide opportunities. Barriers such as lack of standards relating to fire smoke and toxicity and the fragmentation of industry supply chains may reduce pursuit of these opportunities.

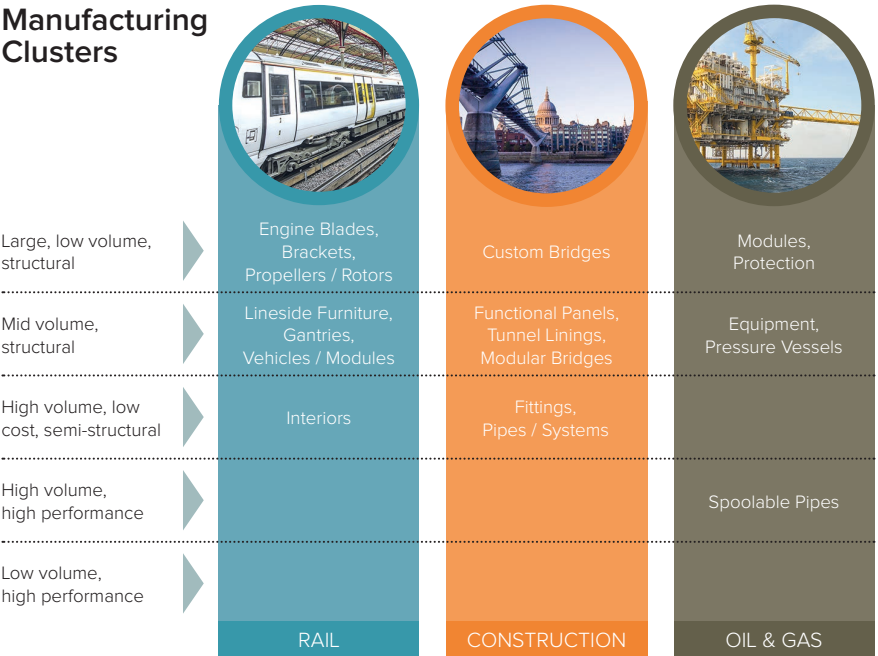
CONSTRUCTION. Likely investment of over £370bn on UK infrastructure and the challenge to deliver affordable housing present opportunities to increase the application of composites. Should major infrastructure providers (Rail, Highways, Utilities) and pre-fabricated houses widely adopt composites, the size of the market would quickly exceed the forecast figures. The sector is conservative with a focus on initial cost rather than through-life costs and lack of suitable codes, standards and design know-how are significant barriers to take-up.

OIL AND GAS. The industry use of composites in the UK has been for limited applications on rigs and the sea-bed. This may change if flexible advanced composite pipes are used for risers and jumpers. Whilst a very conservative industry, there is recognition of the need to innovate, driven in part by the extreme engineering challenges of extracting oil from deep water. The supply chain has identified a range of heavy, large structures which would be candidates for composites but it is unclear if this will materialise at current oil price levels.

‘Diversify’ Industries - Potential Value to UK



Manufacturing Clusters



Working with Partners

The CLF, through its working groups, is working with Government, funding bodies and other organisations, representing industry sectors and technologies, to develop programmes to deliver the actions identified in this strategy for the development of the UK Composites Industry.

Retain the UK’s reputation as world-class in composites innovation

The Technology Working Group includes the UK’s composite focused **Science and Technology** community and funding bodies and is working to deliver solutions to the cross-industry sector challenges within the manufacturing clusters. One example of this is work being carried out with the Chemistry Growth Partnership.

Ensure UK supply chain delivers composite product to the international market

The CLF is providing the UK’s composite **Supply Chain** with information on, and access to, future markets, and facilitating growth to deliver to these, both in the UK an overseas. Initial work is focused around the manufacturing clusters and is being taken forwards in collaboration with the Aerospace Technology Institute (ATI), the Automotive Council and Composite UK’s Construction Group.

Understand and deliver the current and future manpower required by the UK composite supply chain

The CLF’s Skills Working Group is working with industry, training providers, professional bodies, Composites UK and funding providers to understand and fulfil current and future **Skills and Training** requirements.

Deliver a UK composites industry that is sustainable into the future

The **Sustainability** Working Group is working with industry, academia and Composites UK to develop understanding, awareness and use of lifecycle analysis, recycling, waste reduction and sustainable resources.

Remove barrier to UK composite product finding new applications

The **Regulations, Codes and Standards** Working Group is working with NPL, standards bodies, professional bodies and industry to facilitate entrance of new composite product to market.



Partners

Chemistry Growth Partnership

“We are delighted to work with the UK Composites Leadership Forum on the delivery of the UK Composites Strategy. The Chemistry Growth Partnership drives the delivery of chemistry enabled innovation and growth in UK manufacturing, with a vision to achieve 50% GVA growth by 2030.

Priority themes for chemistry-enabled innovation in composites are being developed jointly with the UK CLF, through the work of the CGP Accelerating Innovation Group, and supported by the Knowledge Centre for Materials Chemistry.

The Knowledge Transfer network is playing a key role facilitating collaboration and collaborative funding for the cluster of relevant businesses, including both large company and SME innovators. The innovation themes, together with the companies involved, will deliver capabilities for accelerated product design, increased productivity in manufacturing, enhanced product functionality and a route to more sustainable materials.”

John Conti-Ramsden, Director of Knowledge Centre for Materials Chemistry

Aerospace Technology Institute

“Composite technology development is crucial for the delivery of legacy, incremental and future aircraft platforms. The UK has an opportunity to deliver innovative world-leading aircraft structures that will demand the development of complex, lightweight components. This will require disruptive manufacturing methods that enable rapid ramp-up at a high build rate, while also maintaining world-leading cost competitiveness.

The ATI endorses the national composites strategy, and views the publication as underpinning the strategic intent of the aerospace industry. The Composite Leadership Forum has provided an excellent platform to address the key sectorial technological needs and commercial opportunities – enabling the UK to secure current manufacture, exploit new market opportunities through innovative design and materials development, and position the UK as a leading supplier for next-generation composite components and assemblies.”

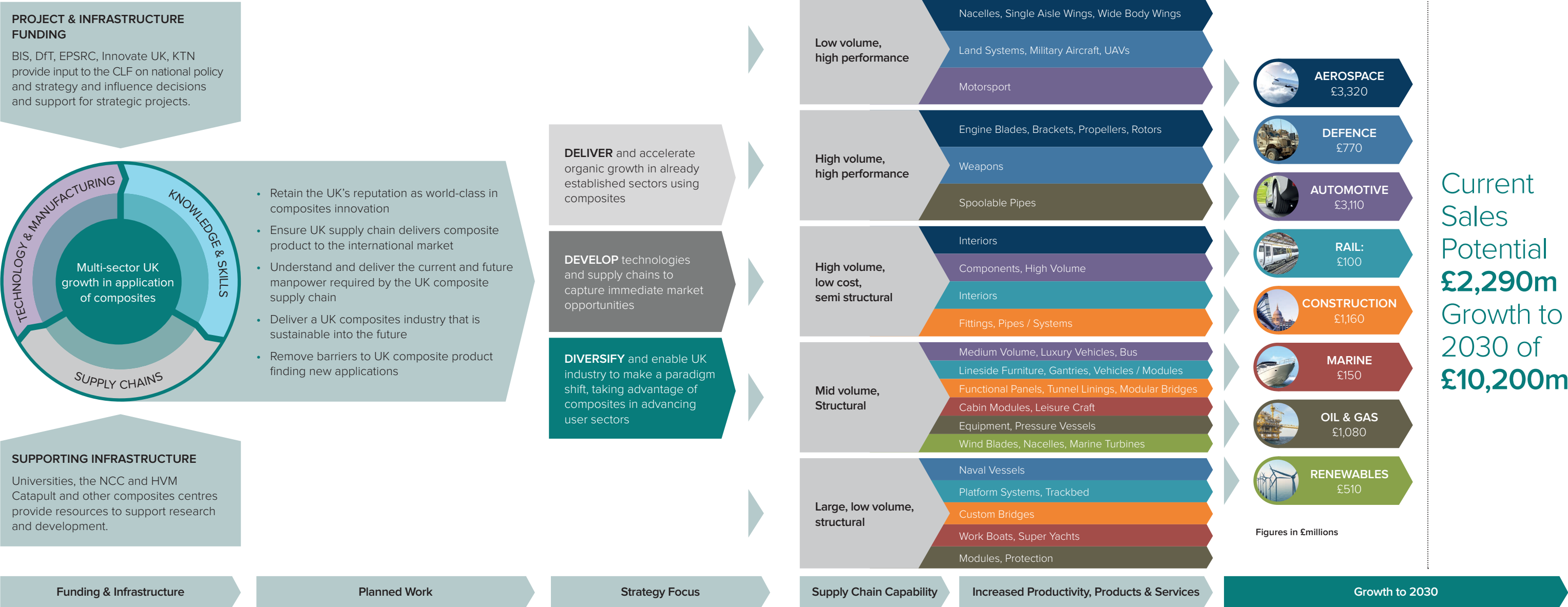
Mark Summers, Head of Technology (Manufacturing, Materials, & Structures), Aerospace Technology Institute

Automotive Council’s Manufacturing Group

“With emission regulations pushing automotive OEMs to explore options to reduce the weight of vehicles, the UK’s Automotive Council, which is driving future UK automotive strategy, has identified increased use of composite materials as one of the key potential future solutions.

The Automotive Council’s Manufacturing Group is therefore delighted to be working with the CLF to develop cost effective composite solutions for the automotive sector and then, as identified by the composite strategy’s manufacturing cluster analysis, transfer this know-how to other sectors with similar requirements. There is a very real opportunity to develop a valuable supply chain in the UK to support this.”

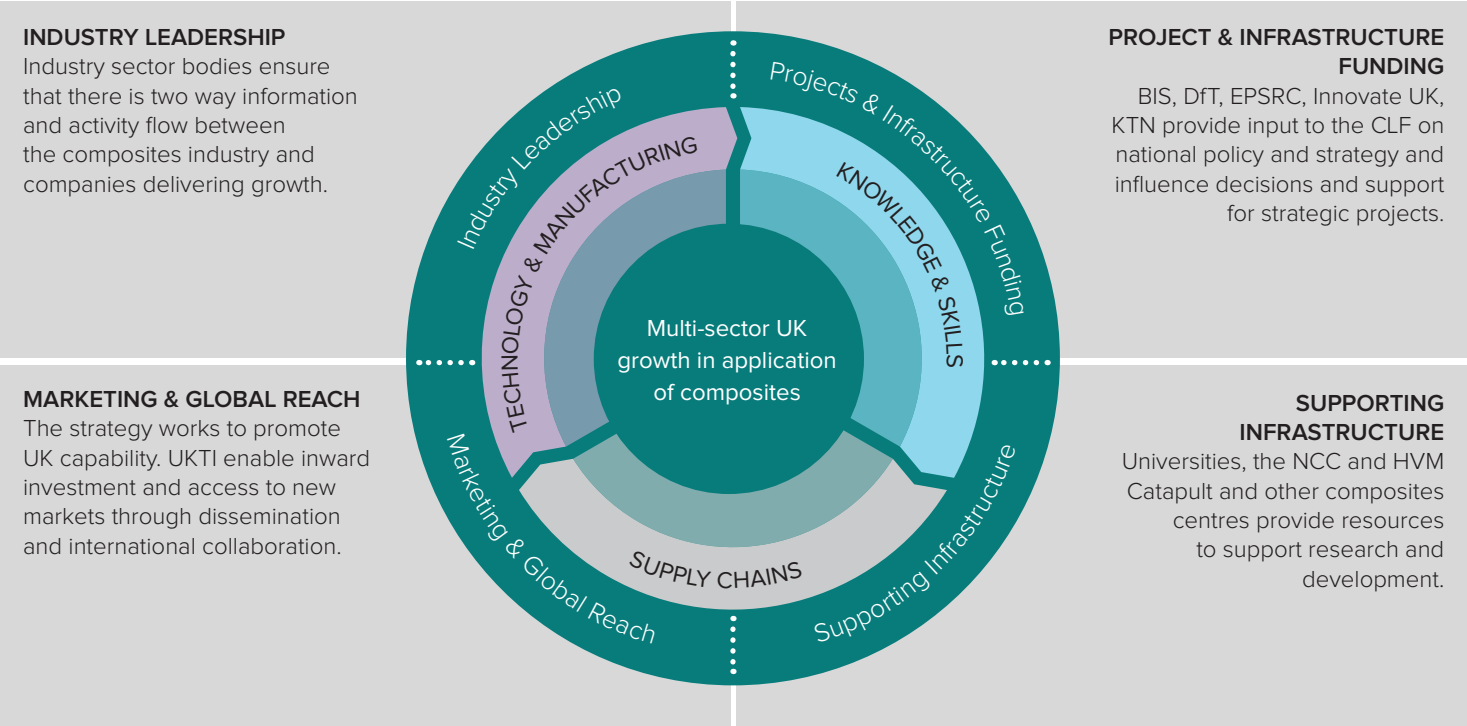
Dick Elsy, Chairman of the Automotive Council’s Manufacturing Group and CEO of the High Value Manufacturing Catapult.



Current Sales Potential **£2,290m** Growth to 2030 of **£10,200m**

Delivery

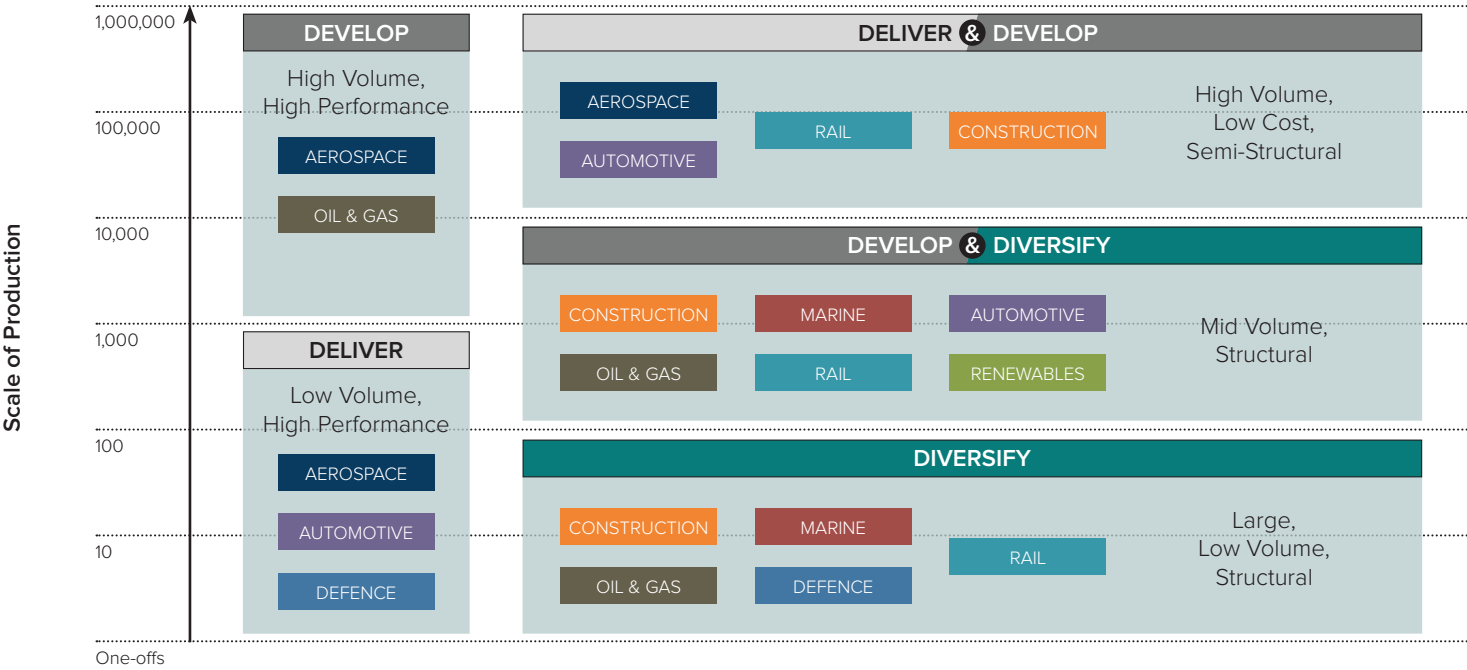
The CLF has worked closely with government, industries and their sector bodies, academic, professional institutions, business support, and trade organisations, consulting widely to ensure support for this multi-sector strategy. This inclusive approach will be continued, including further partners as required to deliver the strategy.



Delivery of strategy will be driven through the following CLF Groups:

WORKING GROUPS	• Technology; Skills	CLUSTER GROUPS	• High Value Composites
	• Sustainability		• Affordable Composites
	• Regulations, Codes and Standards		• Large Low Volume Composites

The CLF will drive delivery to support the UK Composites Industry to achieve or exceed the growth potential described in this strategic approach.



Technology transfer and increased opportunities for the use of composites across a range of industry sectors is enabled by the identification of manufacturing clusters with common and shared requirements. The clusters will also optimise the benefit achieved from support provided to the composites industry from public funding and commercial investment.

The objectives to 'Develop', 'Deliver' and 'Diversify' shape the type of support and necessary timescales to deliver the opportunities identified by the UK supply chain. They reflect the relative maturity of composites take-up in sectors such as aerospace and the potential for significant growth in advancing markets.

The CLF will work with Partners to deliver the **UK Composites Strategy** and to develop the capability and capacity of the UK Composites Supply chain to maximise UK capture of a **growing global composite market**.

References and Web Links

Page	Reference and Web Link
5	UK Composites Strategy 2009 https://compositesuk.co.uk/system/files/documents/UK%20Composites%20Strategy_0.pdf
5	UK Composites 2013 https://compositesuk.co.uk/system/files/documents/CLF%20UK%20Composites%20Study%202013%20Summary.pdf
6, 7, 14	UK Composites Market Study This report will be available after the formal launch of the strategy.

Image Credits

Page	Credit
2	Warwick Manufacturing Group
10	Airbus
11	RNLI
12	NCC
13	Atkins Ltd (top image)
13	EcoTechnilin Ltd (centre image)
18	FAR UK

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