fluency

attract connect elevate

Strategic Guide

Market Mapping in Composites & Advanced Materials

A Practical Framework for Industry Leaders, Investors, and Innovators

The Fluency Business Group Ltd
Dunston Innovation Centre
Chesterfield
S41 8NG

+44 1246 792003
info@fluency-group.com
www.fluency-group.com

Executive Summary: Strategic Guide to Market Mapping in Composites & Advanced Materials

Purpose of the Guide

This guide provides a practical framework for understanding and visualising the complex, fragmented landscape of composites and advanced materials. It equips decision-makers with tools to map actors, technologies, and value flows across sectors and geographies, turning opaque markets into actionable insight. Whether navigating M&A, scouting innovation, or repositioning a product portfolio, this guide helps you see the strategic terrain clearly.

Who Should Read This:

- Industry executives seeking clarity across supply chains and technology adoption.
- Investors and analysts evaluate market entry, consolidation, or innovation risk.
- OEMs and Tier 1s exploring new materials, partnerships, or regional expansion.
- Consultants and strategists working on decarbonisation, reshoring, or competitive positioning.
- Policy advisors and cluster managers aim to understand industrial dynamics and regional leverage.

Key Takeaways

- Composites markets are structurally fragmented and strategically opaque. Mapping reveals hidden dynamics.
- A step-by-step methodology enables segmentation, actor mapping, value chain positioning, and TRL overlays.
- Real-world examples from wind, marine, and thermoplastics show how mapping guides strategy and investment.
- Strategic insights include consolidation signals, innovation bottlenecks, and regional policy impacts.
- The guide highlights a consultancy offering: bespoke mapping, strategic workshops, and investment support.

The Fluency Business Group Ltd
Dunston Innovation Centre
Chesterfield
S41 8NG

+44 1246 792003
info@fluency-group.com
www.fluency-group.com

Introduction: Why Market Mapping Matters

Clarifying Complexity in Composites & Advanced Materials

Definition and Strategic Relevance

Market mapping is the structured visualisation of actors, technologies, and value flows within a given sector. In the context of composites and advanced materials, it becomes a strategic tool for decoding fragmented ecosystems, identifying leverage points, and guiding high-stakes decisions.

Unlike traditional market analysis, which often focuses on macro trends or financial metrics, market mapping reveals the operational and relational dynamics that shape real-world outcomes:

- Who controls margin and scale?
- Where are innovation bottlenecks or adoption gaps?
- Which technologies are ready but commercially stalled?
- How do regional policies reshape supply chains?

Mapping transforms scattered data into actionable insight in sectors where technical complexity meets strategic opacity, such as wind energy, marine composites, or thermoplastic adoption. It enables decision-makers to see not just what is happening, but why, and where to act.

Use Cases: From Insight to Action

Market mapping is not an academic exercise. It is a decision support tool used by leaders across the value chain:

- **Investment & Venture Strategy**
  Identify white spaces, emerging players, and technology readiness.
  >> Example: Mapping recyclers and bio-based resin startups to assess scale-up potential.
- **M&A & Consolidation Planning**

Visualise fragmentation, overlap, and strategic fit.

>> Example: Mapping Tier 2 converters sitting between raw materials manufacturers and BTP or OEM manufacturing facilities in wind blade supply chains to guide acquisition targets.

- **Product & Portfolio Strategy**

  Position offerings relative to competitors, adoption curves, and regional demand.

  >> Example: Mapping thermoplastic composite adoption across aerospace versus automotive.

- **Cluster Development & Policy Advisory**

  Support regional industrial planning and innovation funding.

  >> Example: Mapping EU composites hubs to align with Green Deal incentives.

- **Strategic Workshops & Internal Alignment**

  Use mapping to align cross-functional teams around shared market understanding.

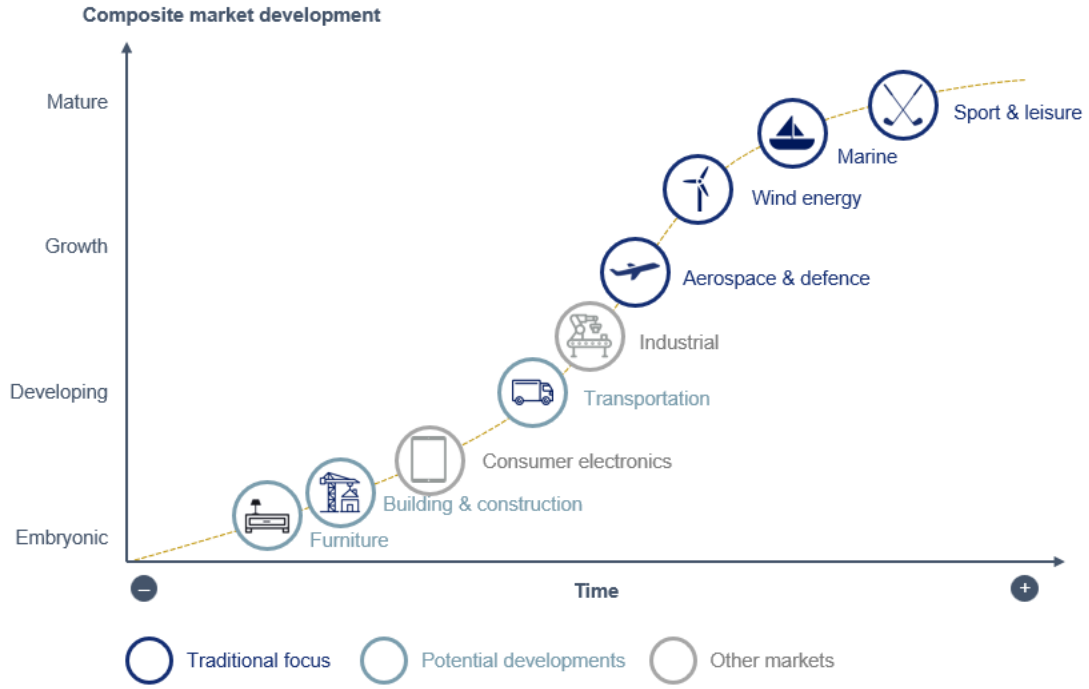

Figure 1: Application maturity vs. Potential growth unrealised to date. Mapping would deliver a visualisation of where your portfolio is and where future growth should be targeted.

Understanding Composites & Advanced Materials Markets

Navigating Fragmentation, Asymmetry, and Adoption Gaps

The composites and advanced materials landscape is not a single market but a mosaic of overlapping sectors, technologies, and regional dynamics. Before mapping can begin, it is essential to understand the structural forces that shape this complexity. This section outlines three foundational dimensions: fragmentation, asymmetry, and the tension between technical readiness and real-world adoption.

Sector Fragmentation & Cross-Sector Dynamics

Composites are used across a wide range of industries, wind energy, aerospace, marine, automotive, construction, hydrogen infrastructure, each with its own supply chain logic, certification hurdles, and performance requirements. This fragmentation creates silos in innovation, procurement, and scaling.

Key Dynamics:

- Vertical specialisation: A converter serving aerospace interiors may have no overlap with one producing wind blade shells.
- Cross-sector spillover: Technologies like thermoplastic forming or digital twins may originate in aerospace but find traction in automotive or hydrogen.
- Divergent maturity curves: Wind blades are commoditised; hydrogen tanks are emerging; marine retrofits are underdeveloped.

Strategic Implication: Mapping must account for both vertical depth and horizontal spillover, understanding not just who does what, but how technologies and actors migrate across sectors.

Regional Asymmetries & Policy Drivers

Geography plays a decisive role in shaping market structure. Regional industrial policy, trade flows, and decarbonisation mandates influence where materials are sourced, processed, and deployed.

Examples:

- Europe: Strong policy push via the Green Deal, Fit for 55, and national cluster funding. High emphasis on recyclability and bio-based materials.
- United States: IRA incentives driving domestic wind and hydrogen buildout. Less regulatory pressure on recyclability, more focus on reshoring.
- China: Vertical integration across fibre, resin, and conversion. Aggressive scaling in wind and hydrogen, with state-backed OEMs.

Strategic Implication: Mapping must overlay regional context, not just where actors are located, but how policy shapes their behaviour and strategic options.

Technology vs. Application Adoption

In composites, technical readiness does not guarantee market traction. Many technologies reach TRL 7–9 but stall due to certification inertia, cost barriers, or lack of integrator buy-in.

Examples:

- Thermoplastic composites: Technically mature in aerospace, but slow adoption due to qualification cycles and tooling inertia.
- Bio-based resins: Promising in lab settings, but limited uptake due to cost, durability concerns, and lack of standards.
- Digital twins and simulation: Widely used in design but underutilised in retrofit or repair contexts.

Strategic Implication: Mapping must distinguish between what is technically possible and what is commercially deployed, highlighting adoption gaps and bottlenecks.

Applied Example: Wind Blades vs. Hydrogen Tanks

Let us compare two sectors to illustrate how mapping reveals strategic contrast:

Wind Blades

- Actors: Consolidated OEMs (e.g., Vestas, Siemens Gamesa), Tier 1 converters, regional clusters in Spain, Denmark, China.

- Materials: Epoxy + glass fibre, with emerging interest in thermoplastics and recyclables.
- Mapping Insight: High maturity, but pressure on recyclability and cost.
- Mapping reveals consolidation zones and retrofit potential.

Hydrogen Tanks

- Actors: Emerging OEMs, niche converters, material innovators (e.g., liner technologies, carbon fibre suppliers).
- Materials: Carbon fibre + thermoplastic liners, often with complex winding and curing processes.
- Mapping Insight: Low maturity, fragmented supply chain, strong policy tailwinds.
- Mapping reveals white space and investment signals.

Strategic Contrast: Wind blades are a mature, cost-driven market with consolidation risk; hydrogen tanks are an emerging, innovation-driven market with scaling challenges. Mapping helps stakeholders position themselves accordingly.

Market Mapping Methodology

A Practical Framework for Strategic Clarity

Market mapping is not a one-size-fits-all exercise. In composites and advanced materials, it requires a multi-dimensional approach that accounts for sector fragmentation, technology maturity, and regional asymmetries. This methodology breaks the process into five actionable layers: segmentation, actor mapping, value chain positioning, technology readiness, and geographic overlay.

Segmentation

Vertical vs. Horizontal Mapping

Segmentation defines the scope and structure of the map. It determines what you are mapping, and how.

- Vertical segmentation focuses on end-use sectors (e.g., wind energy, marine, aerospace, automotive, hydrogen). It reveals sector-specific dynamics, adoption barriers, and regulatory drivers.
- Horizontal segmentation focuses on material systems, process technologies, or product formats (e.g., prepreg, infusion, RTM, thermoplastics). It highlights cross-sector spillover and technology convergence.

Strategic Tip: Use vertical segmentation to understand demand pull; use horizontal segmentation to track technology push.

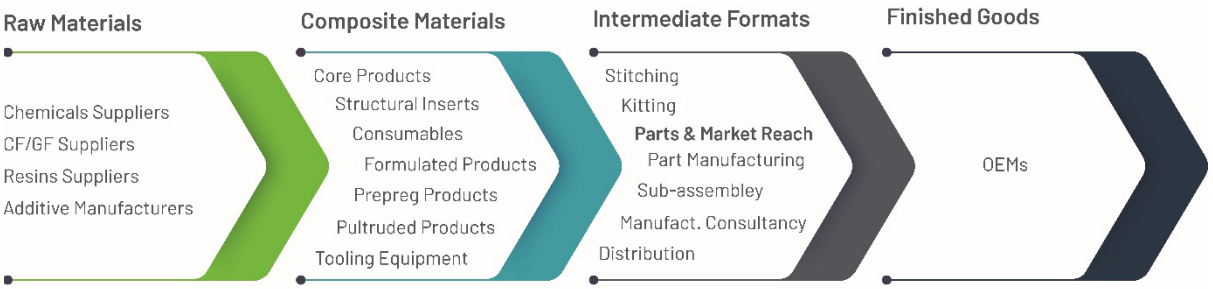

Figure 2: Horizontal Mapping example.

The Fluency Business Group Ltd
Dunston Innovation Centre
Chesterfield
S41 8NG

+44 1246 792003
info@fluency-group.com
www.fluency-group.com

Actor Mapping

Identifying Key Players Across the Value Chain

Actor mapping reveals who operates where, and how they interact.

- Value chain roles: Raw material suppliers, converters, Tier 1 integrators, OEMs, recyclers, tech startups and R&D institutes.
- Ownership: Public versus private, family-owned versus PE-backed, state-owned versus multinational.
- Scale: Global versus regional players; niche specialists versus volume producers.
- Strategic role: Innovation leader, cost leader, integrator, disruptor, consolidator.

Mapping Logic: Position actors under their respective value chain stages, color-coded by role and annotated with strategic notes (e.g., "PE-backed consolidator", "R&D-heavy niche").

Value Chain Positioning

Margin Control and Value Capture

Not all stages of the value chain are equally profitable or strategically influential. Mapping value capture helps identify where margins concentrate, and where strategic control resides.

- Upstream: Raw materials are often commoditised, low margin, but critical for innovation.
- Midstream: Conversion and component manufacturing, where process efficiency and IP matter.
- Downstream: OEM integration and system-level certification, high strategic control but often margin-squeezed.

Strategic Insight: Mapping margin concentration helps guide M&A, partnership strategy, and pricing models.

Technology Readiness & Adoption

TRL vs. Market Traction

Many technologies in composites are technically mature but commercially stalled. Mapping TRL (Technology Readiness Level) against adoption reveals bottlenecks and strategic blind spots.

- TRL 7–9: Often achieved in lab or pilot settings.
- Market Traction: Depends on certification, cost, tooling, and OEM buy-in.
- Adoption curve: Early adopters versus laggards across sectors.

Mapping Logic: Overlay TRL scores on actor maps or value chains, and plot adoption curves by sector.

Applied Example: Thermoplastics in Aerospace

- TRL 8–9 for forming and joining processes.
- Adoption stalled due to tooling inertia, qualification cycles, and conservative OEMs.
- Mapping reveals where innovation is ready but blocked, guiding engagement and investment strategy.

Geographic Overlay

Industrial Clusters, Trade Flows, and Incentives

Geography shapes supply chains, policy incentives, and strategic options. Mapping regional overlays reveals where activity concentrates, and why.

- Clusters: Industrial zones, innovation hubs, port access, workforce density.
- Trade flows: Import/export dependencies, reshoring trends, tariff exposure.
- Policy incentives: EU Green Deal, U.S. IRA, national funding schemes.

Mapping Logic: Place actors and value chain stages on a geographic map, annotated with policy overlays and strategic notes.

Tools & Data Sources

Building Reliable Maps from Fragmented Data

Effective market mapping depends on the quality, diversity, and strategic relevance of the data behind it. In composites and advanced materials, data is often scattered across public registries, private disclosures, and informal networks. This section outlines how to source, validate, and synthesise the inputs that power actionable market maps.

Public Databases & Trade Registries

These sources offer foundational data, often fragmented, but essential for establishing baselines.

Key Resources:

- Eurostat & EU Open Data Portal: Trade flows, production volumes, employment clusters.
- WindEurope & JEC Group: Sector-specific reports, member lists, technology roadmaps.
- ECHA & REACH: Regulatory status of materials, chemical safety profiles.
- National Business Registries: Ownership structures, company filings, incorporation data.
- Patent Databases (Espacenet, WIPO): Innovation trends, technology maturity signals.

Use Case: Mapping regional clusters, identifying active players, tracking material adoption across sectors.

Limitations: Often lagging, inconsistent across countries, and lacking strategic interpretation.

Private Sources & Proprietary Frameworks

These sources provide strategic depth, often harder to access, but richer in insight.

Key Inputs:

- Investor Presentations & Analyst Reports: Strategic positioning, M&A signals, and margin breakdowns.
- Trade Show Exhibitor Lists: Real-time actor visibility, technology showcases, and partnership signals.
- Industry Interviews & Expert Panels: Qualitative insight into bottlenecks, adoption barriers, and strategic intent.
- Internal Benchmarks & Client Engagements: Confidential mappings, performance metrics, and scenario models.

Use Case: Identifying consolidation zones, white space opportunities, and innovation bottlenecks.

Limitations: Access-dependent, often anecdotal, requires synthesis and validation.

Proprietary Frameworks & Strategic Synthesis

This is where consultancy value is created, by transforming raw data into structured insight.

Your Toolkit might Include:

- Actor Role Taxonomy: Categorising players by strategic function (e.g., integrator, disruptor, consolidator).
- TRL–Adoption Overlay: Mapping technical readiness against commercial traction.
- Margin Flow Models: Visualising value capture across the chain.
- Scenario Tables: Modelling impact of policy shifts, technology breakthroughs, or M&A moves.
- Visual Templates: Actor maps, segmentation matrices, regional overlays.

Use Case: Delivering bespoke maps, guiding workshops, supporting investment decisions.

Limitations: Requires ongoing refinement, sector-specific calibration, and client adaptation.

Applied Market Mapping Examples

Turning Frameworks into Sector-Specific Insight

This section demonstrates how the market mapping methodology translates into real-world strategic analysis. Each example applies the full mapping stack, segmentation, actor identification, value chain positioning, TRL overlays, and geographic context, to reveal actionable insights in key sectors.

Wind Blade Supply Chain Analysis

Sector Context:

Wind energy is a mature but rapidly evolving sector, with increasing pressure on cost, recyclability, and regional content. Blades are the most material-intensive component, and their supply chain reflects both consolidation and innovation bottlenecks.

Mapping Highlights:

- Segmentation: Vertical focus on wind blades; horizontal mapping of resin systems (epoxy, thermoplastics), fibre & core types, and manufacturing processes.
- Actors:
    - OEMs: Siemens Gamesa, Vestas, Nordex, Goldwind.
    - Tier 1 converters: TPI Composites, LM Wind Power.
    - Material suppliers: Huntsman, Olin, OC, Gurit, TechStorm, Aerovac.
    - Material Converters: InCom, VestFib, Gurit, 3A, Metyx, Saertex.
    - Recyclers: Emerging players with limited scale.
- Value Chain Positioning:
    - High margin in blade design and tooling.
    - Low margin in raw materials.
    - Strategic control concentrated in OEMs and Tier 1s.
- Technology Readiness:
    - Thermoplastics at TRL 7–8, limited adoption.
    - Recyclability solutions in pilot phase.

- Geographic Overlay:
    - Clusters in Spain, Denmark, China.
    - IRA incentives driving U.S. reshoring.

Strategic Insight:

Mapping reveals consolidation zones, retrofit potential, road to market unlockers, with converters associated with poor margins, and white space in recycling infrastructure, guiding M&A, partnership, and innovation strategy.

Figure 3: NA Wind Manufacturing Mapping

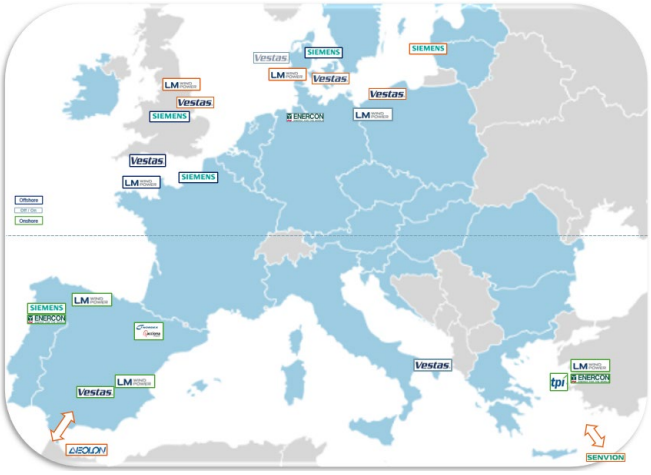

Figure 4: Europe Wind Manufacturing Mapping

Marine Composites Fragmentation & Retrofit Potential

Sector Context:

The marine sector is structurally fragmented, with thousands of small shipyards, limited standardisation, and a slow-moving retrofit market. Composites are widely used in hulls, decks, and interiors, but supply chains are regionally siloed.

Mapping Highlights:

Segmentation: Vertical focus on small craft, commercial vessels, and naval retrofits; horizontal mapping of polyester, vinylester, and epoxy systems.

- Actors:
  - OEMs: Beneteau, Groupe Bénéteau, Nauta, Damen.
  - Converters: Regional SMEs in France, Spain, Poland, Turkey, Italy.
- Material suppliers: Polynt, AOC, Diab, Resintex, Gazechim.
  - R&D clusters.
- Value Chain Positioning:
  - Low margin in raw materials.
  - High fragmentation in conversion.
  - Retrofit market underdeveloped.
- Technology Readiness:
  - Bio-based resins at TRL 6–7.
  - Digital twin retrofit tools at TRL 8 but low uptake.
- Geographic Overlay:
  - Dense clusters in Spain (Galicia, Valencia), Italy (Genova), Turkey, and France (Brittany, Pays de la Loire).
  - EU funding is available for retrofit and decarbonisation.

Strategic Insight:

Mapping reveals white space in aftermarket services, potential for regional consolidation, and opportunities to align with EU retrofit incentives.

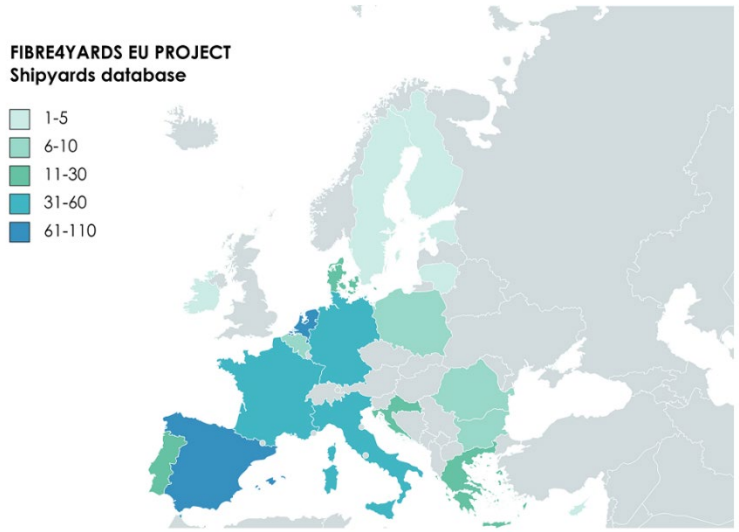

Figure 5: Shipyards to which the survey is sent (MapChart 2023).

Source: Composite materials, technologies, and manufacturing: current scenario of European Union shipyards // SHIPS AND OFFSHORE STRUCTURES // June 2023

Thermoplastic Adoption Across Sectors

Sector Context:

Thermoplastic composites offer recyclability, faster cycle times, and automation potential, but adoption varies widely across sectors due to cost, tooling, and certification inertia.

Mapping Highlights:

- Segmentation: Horizontal focus on thermoplastic forming methods (press forming, overmoulding, welding); vertical mapping across aerospace, automotive, and hydrogen.
- Actors:
    - Aerospace: Daher, Collins Aerospace, Toray Advanced Composites.
    - Automotive: Faurecia, Plastic Omnium, Teijin.
    - Hydrogen: Hexagon Purus, Plastic Omnium New Energies.
- Value Chain Positioning:
    - High margin in tooling and IP.
    - OEMs cautious due to qualification cycles.
    - Startups driving innovation but lack scale.
- Technology Readiness:
    - TRL 8–9 across forming processes.

    - Adoption curve steep in automotive, flat in aerospace.
- Geographic Overlay:
    - Automotive clusters in Germany, France.
    - Aerospace R&D in UK, Netherlands.
    - Hydrogen scaling in Norway, Spain.

Strategic Insights & Scenarios

From Market Maps to Strategic Moves

Once the market has been mapped— actors, technologies, value flows, and geographies, the next step is interpretation. This section distils key patterns observed across composites and advanced materials into strategic insights, and models plausible scenarios that decision-makers can use to anticipate change, mitigate risk, and seize opportunity.

Consolidation Trends & Innovation Bottlenecks

Consolidation Signals

Mapping reveals where market saturation, margin pressure, or strategic overlap make consolidation overdue.

- Tier 1 converters in wind: High overlap, cost pressure, and OEM dependency suggest M&A or vertical integration.
- Marine SMEs: Fragmented converter landscape in Spain, Poland, and France points to regional roll-up potential.
- Tooling and automation providers: In thermoplastics, IP-heavy players may consolidate to scale across sectors.

Innovation Bottlenecks

Mapping TRL vs. adoption exposes where technologies stall, not due to technical failure, but due to systemic inertia.

- Thermoplastics in aerospace: TRL 8–9 but blocked by certification cycles and tooling inertia.
- Bio-based resins: Technically viable, but under-adopted due to cost, durability concerns, and lack of standards.
- Digital retrofit tools: Mature in simulation, but poorly integrated into marine aftermarket workflows.

Strategic Implication:

Mapping helps identify where to invest, partner, or intervene, whether to accelerate adoption, support consolidation, or avoid stranded innovation.

Reshoring & Decarbonisation Impacts

Reshoring Dynamics

Policy incentives (e.g., IRA, EU Green Deal) and geopolitical shifts are driving regionalisation of supply chains.

- Wind blade production: U.S. OEMs reshoring to qualify for IRA credits; EU pushing for local content – with North Africa options (show casing EU vs EMEA strategic options).
- Hydrogen tanks: Scaling in Spain, Norway, and Germany with national funding and cluster support.
- Thermoplastic forming: Tooling and automation increasingly localised to reduce lead times and IP leakage.

Decarbonisation Pressures

Mapping reveals where sustainability mandates are reshaping material choices, process technologies, and end-of-life strategies.

- Recyclability: Thermoplastics gaining traction in wind and automotive; epoxy systems under scrutiny with downcycling options available but still excessive cost of conversion.
- Bio-based inputs: Emerging in marine and construction, but adoption uneven – questions around ethicality of the solution within the global food availability question.
- Lifecycle modelling: OEMs demanding full traceability and carbon accounting, pushing upstream actors to adapt – limiting, to a certain level, globalisation of supply chain.

Strategic Implication:

Mapping helps anticipate where policy will shift margins, where local clusters will gain strategic weight, and where sustainability will become a competitive differentiator.

- Use Case:

  Quick visual scan of where to act, invest, or monitor.

  Scenario Table: "If–Then" Strategic Modelling.

Trigger Event	Strategic Impact	Recommended Action
EU mandates recyclability in wind	Material positioning required towards EoL.	Invest in thermoplastic conversion tech or recycled raw material integration
OEM consolidates Tier 1 suppliers	Midstream actors face margin squeeze	Position for acquisition or vertical move
Hydrogen scaling accelerates in Spain	Demand spike for tank-grade carbon fibre	Secure supply contracts or JV
Bio-based resin gains certification	Opening B2C market in marine & sport goods.	Develop pilot projects with shipyards and corporations
TRL 9 tech fails to gain traction	Innovation stranded, investor risk	Build integrator partnerships or exit

Help your strategic model options understand uncertainty, guiding investment, partnership, and portfolio decisions.

From Insight to Action: Partnering with Fluency Exchange

Market mapping delivers clarity. Turning that clarity into competitive advantage requires informed interpretation and decisive strategy. Fluency Exchange supports organisations operating within composites and advanced materials to move from analysis to execution through tailored consultancy services.

Bespoke Market Mapping

Fluency Exchange develops custom maps aligned to each client's sector, geography, and objectives. These maps bring together actor identification, technology overlays, margin flow analysis, and regional clustering to reveal where opportunities exist and how to act on them.

Strategic Workshops and Investment Support

Workshops transform mapping into meaningful decisions. Fluency Exchange facilitates sessions for executive teams, boards, and investors to interpret findings, explore scenarios, and align strategic priorities.

Services include:

- Due diligence mapping for acquisitions or partnerships.
- Strategic positioning for product launches or regional expansion.
- Scenario planning understanding evolving policy, technology, or market conditions.

Why Work with Fluency Exchange

Operating at the intersection of market insight and strategic growth, Fluency Exchange combines deep industry knowledge with a structured analytical approach. The team has supported OEMs, Tier suppliers, investors, and regional clusters to anticipate change, identify leverage points, and strengthen competitive positioning across the global advanced materials landscape.

Visit www.fluency-group.com for further information, to explore how Fluency Exchange can support your strategic goals, or to discuss a tailored mapping engagement.

The Fluency Business Group Ltd
Dunston Innovation Centre
Chesterfield
S41 8NG

+44 1246 792003
info@fluency-group.com
www.fluency-group.com

Appendices & Resources

Supporting Clarity, Credibility, and Continued Exploration

This section provides supporting materials to help readers interpret the guide, explore data sources, and engage with your consultancy's tools. It is designed for both technical and strategic audiences, from engineers and analysts to executives and investors.

Glossary of Terms

Key Concepts Used Throughout the Guide

Glossary of Terms

Term	Definition
Market Mapping	Strategic visualisation of actors, technologies, and value flows in a sector.
TRL (Technology Readiness Level)	A scale from 1 to 9 indicating the maturity of technology, from concept to deployment.
OEM (Original Equipment Manufacturer)	A company that assembles final products using components from suppliers.
Tier 1 Supplier	A direct supplier to OEMs, often responsible for systems integration.
Converter	A company that transforms raw materials into composite parts or intermediates.
Actor Map	A visual representation of companies or institutions across the value chain.

Term	Definition
Sankey Diagram	A flow diagram showing volume or value distribution across stages.
Adoption Curve	A graph showing how quickly technology is embraced across sectors or regions.
White Space	An unmet need or opportunity zone in the market where few or no actors operate.
Consolidation Zone	A segment of the market where overlapping actors suggest potential M&A activity.
Reshoring	The strategic relocation of manufacturing or sourcing back to domestic or regional markets.

List of Referenced Databases & Sources

Public, Private, and Sector-Specific Resources Used in This Guide

Public Databases & Registries

- Eurostat – Trade flows, production volumes, employment clusters.
- EU Open Data Portal – Sectoral datasets and policy metrics.
- WindEurope – Industry reports, member lists, technology roadmaps.
- JEC Group – Composites market intelligence and event data.
- ECHA / REACH – Chemical safety profiles and regulatory status.
- Espacenet – Patent search and innovation tracking.
- WIPO – Global patent filings and technology trends.
- National business registries (e.g. Infoempresa, Societe.com) – Ownership and company filings.

Private & Sector-Specific Inputs

- Investor presentations from stock listed companies.

- Analyst reports from McKinsey, Roland Berger, and BloombergNEF on composites and energy sources.
- Trade show exhibitor lists from JEC World, WindEurope Annual Event, METS Trade, CAMX and similar.
- Interviews and insights from industry panels (e.g., WindEurope workshops, JEC webinars).
- Internal benchmarks and synthesis frameworks developed through consultancy engagements.