

JEC Observer

2023 Press presentation

Market & Trends
2022-2027

The JEC logo is displayed in a bold, green, sans-serif font. The background of the slide features a collage of images related to transportation and technology, including a car seat, a high-speed train, an airplane, a wind turbine, and a robotic hand, all set against a white background with green and grey geometric shapes.



01

The JEC Observer by Estin&Co and JEC Group

02

Global composite materials market data

03

Trends in application sectors of composites



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About JEC Group

JEC Group is a media, events and innovation focused organization fostering the development of the composites industry and their applications in multiple sectors.

Created in the 60's, owned and piloted by key stakeholders of the composites industry, JEC is fully and entirely dedicated to the composite materials community.

JEC Group is acting as a non-profit organization, reinvesting its earnings into its missions and services, mainly:

- Organizing the leading composites event every year in Paris : **JEC World**
- Publishing the leading international magazine on composites : **JEC Composites Magazine**
- Animating the #1 digital community on the jeccomposites.com, **JEC TV** and social networks
- Promoting innovation with the **JEC Innovation Awards** and the **JEC Startup Booster**

“JEC: Connecting the World with Composites”

The JEC Observer

The annual observer of the composites industry, providing :

- Annual market data (volume/value) globally, by region, by process;
- 5-year forecast of market dynamics by regions and applications;
- Trends of the major composites application sectors impacting the industry.

Published annually by JEC and produced by Estin & Co.



About Estin & Co

Created in 1997

Specialized in strategy consulting

Assists Boards of directors, CEOs and senior executives of European, North American and Asian corporations and managers of private equity funds

Focused on growth strategies and value creation

Quantitative approach based on industry insights, analysis and modelling

Offices in Paris, London, Zurich, New York and Shanghai

Long experience in composites materials, energy, automotive, aerospace, railways, other transportation means, construction and real estate, electronics and high-tech equipment, consumer goods and leisure sports equipment

Long term collaboration with JEC

ESTIN & CO
STRATEGY CONSULTING



01

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02

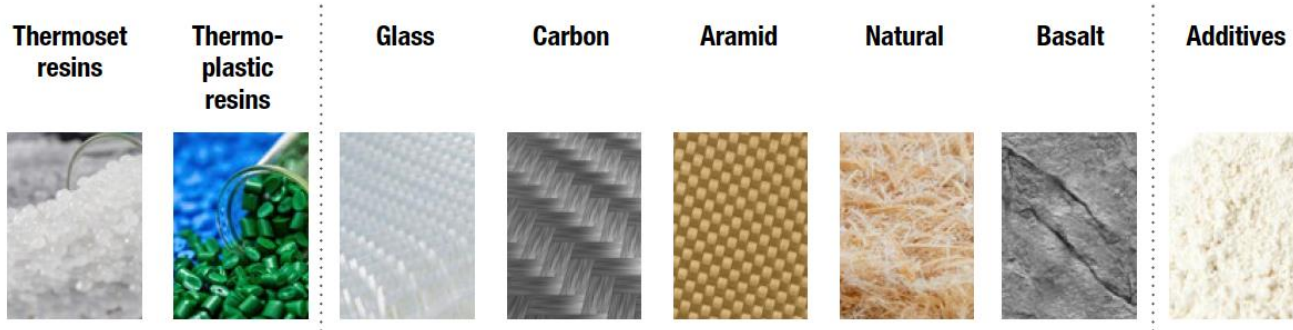
Global composite materials market data

03

Trends in application sectors of composites materials

Why Composites?

Made of resins matrices, reinforced with various fibers, and with specific additives,



Composite Materials are delivering exceptional performances and benefits over traditional materials such as steel, aluminum, wood or concrete:

- Unrivalled lightness and exceptional strength-to-weight ratio
- Resistance to corrosion, chemicals, impact, vibrations and UV rays
- Fire withstanding, thermal insulation, waterproofing
- Durability, stability and mechanical properties
- Non-magnetic, electrostatic and electromagnetic properties
- Design, shape and surfacing freedom.
- On-site, On-demand production, maintenance and repair

Why Composites?

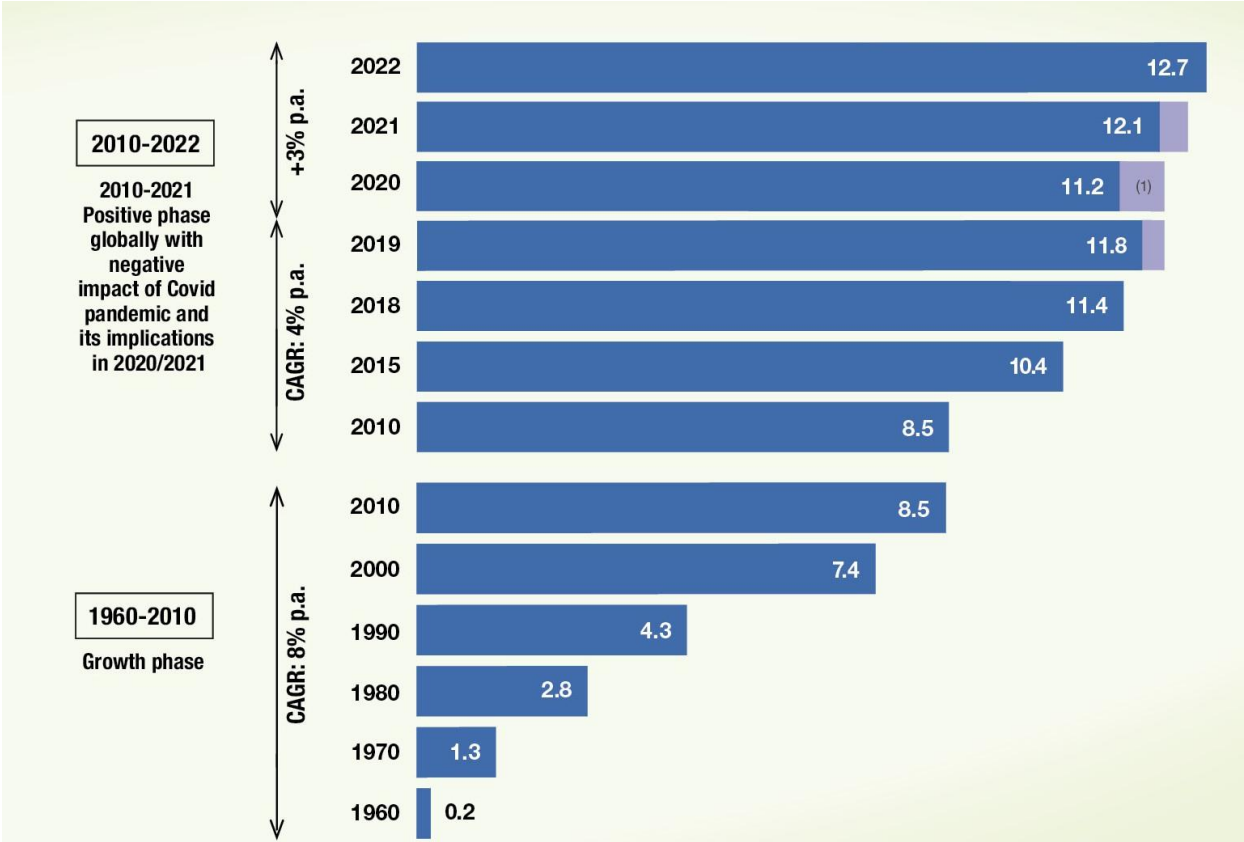
Composites are the materials of choice to decarbonate the economy and develop more sustainable solutions

- Lighter
- Stronger
- Smarter
- Resilient
- Resistant
- Last longer

They open up unlimited possibilities for a more sustainable world

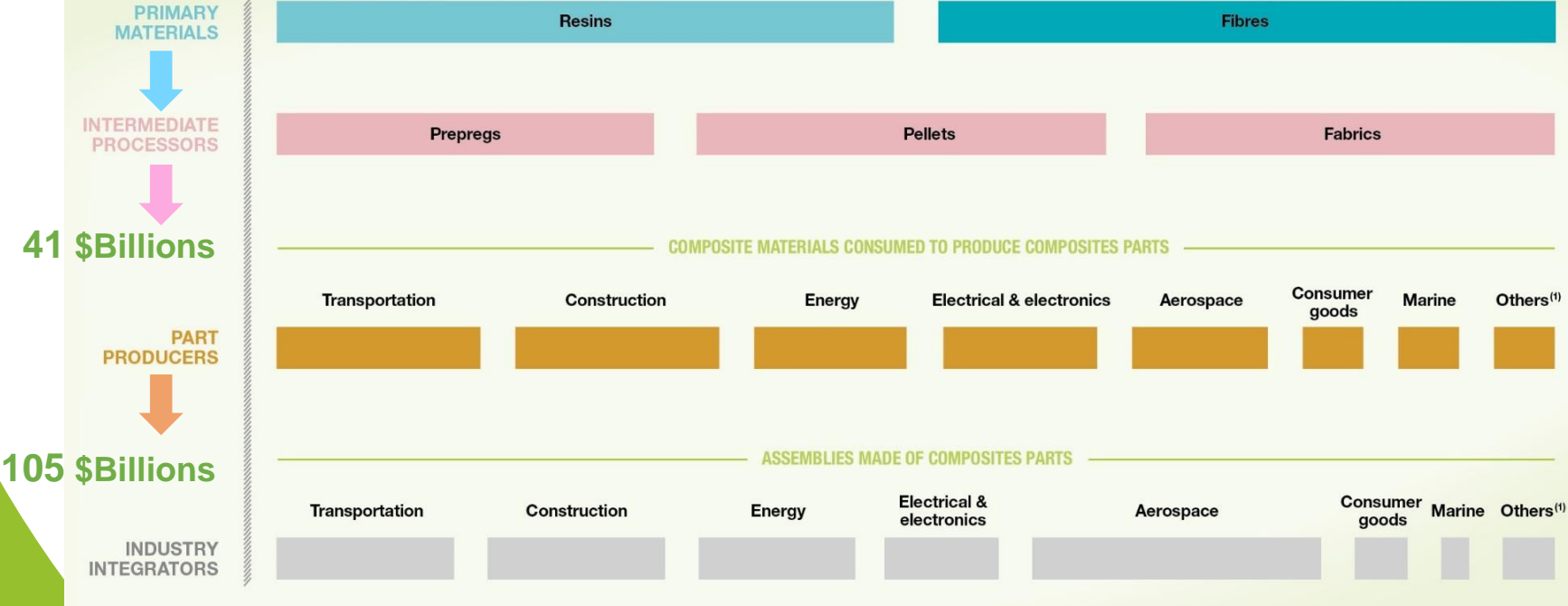


A steady growth over 60 years, with limited Covid crisis impact



Composites value chain from raw materials to composites parts

Illustrative and simplified value chain - 2022 - Orders of magnitude



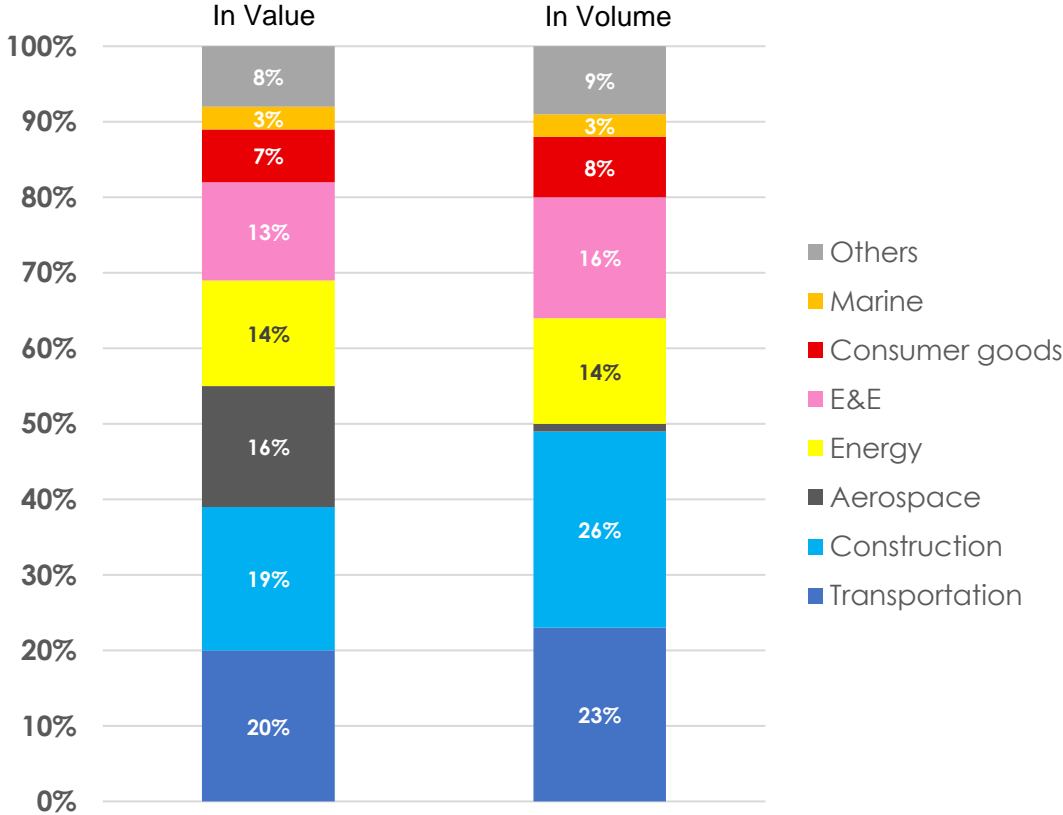
Increasing adoption of composites in major industries:

Composite Materials exceptional performances and properties have been adopted by numerous industries, especially :

- **Energy:** oil & gas, wind turbines, solar, tidal and geothermal installations
- **Electrical & Electronics:** devices, appliances, utilities, telecommunications
- **Marine:** ships, vessels, onshore & offshore equipment
- **Consumer goods:** sports & leisure, design, furniture & home equipment...
- **Transportation:** automotive, trucks, buses, trams, railways
- **Aerospace:** Aircrafts, Drones, Space launchers and Satellites
- **Construction & Infrastructures:** building, housing, civil engineering, water treatment
- **Medical:** Diagnosis, surgical and dental instruments & implants, prosthetics

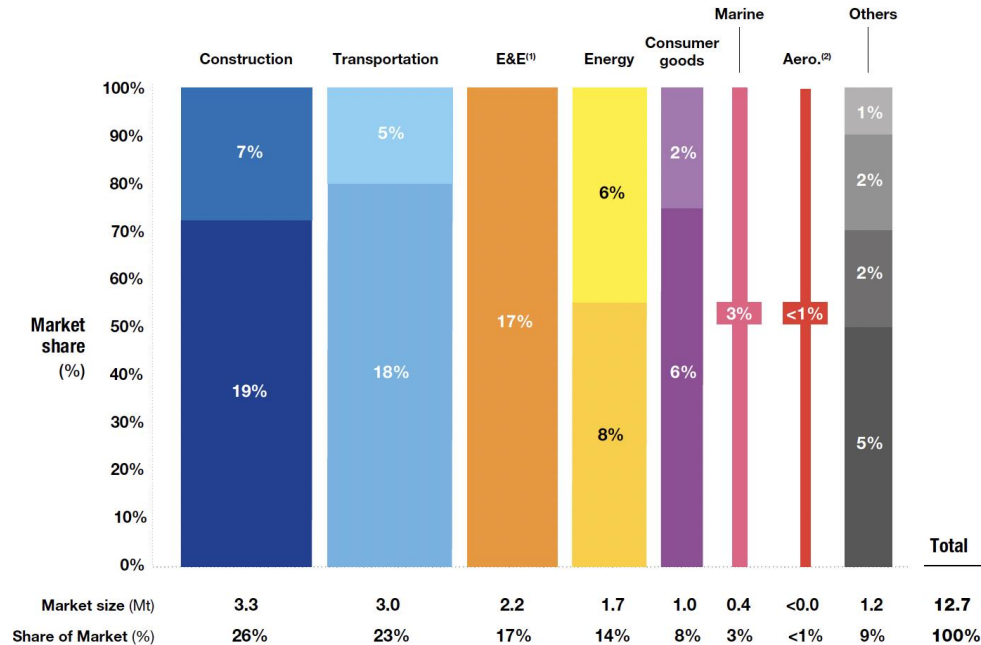
Application sectors of composites

Transportation, Construction, Aerospace and Energy are the main outlets:



Main sub-segments

Transportation, Construction, Aerospace and Energy are the main outlets:



- Other⁽³⁾
- Medical & prosthetics
- Defense & security⁽³⁾
- Equipment & machinery
- Aerospace⁽⁴⁾
- Marine⁽⁵⁾
- Design, furniture & homes
- Sports & recreation⁽⁶⁾
- Renewable energy
- Oil & gas (pipe & tank)
- Electronic & electrical⁽⁷⁾
- Railway⁽⁸⁾
- Automotive & road⁽⁹⁾
- Civil (pipe & tank)⁽¹⁰⁾
- Building & civil eng.⁽¹¹⁾

Markets of composite materials:

TOTAL WORLD

Volume ~12.7 Mt
Value⁽¹⁾ ~41 B\$

TOTAL EMEA

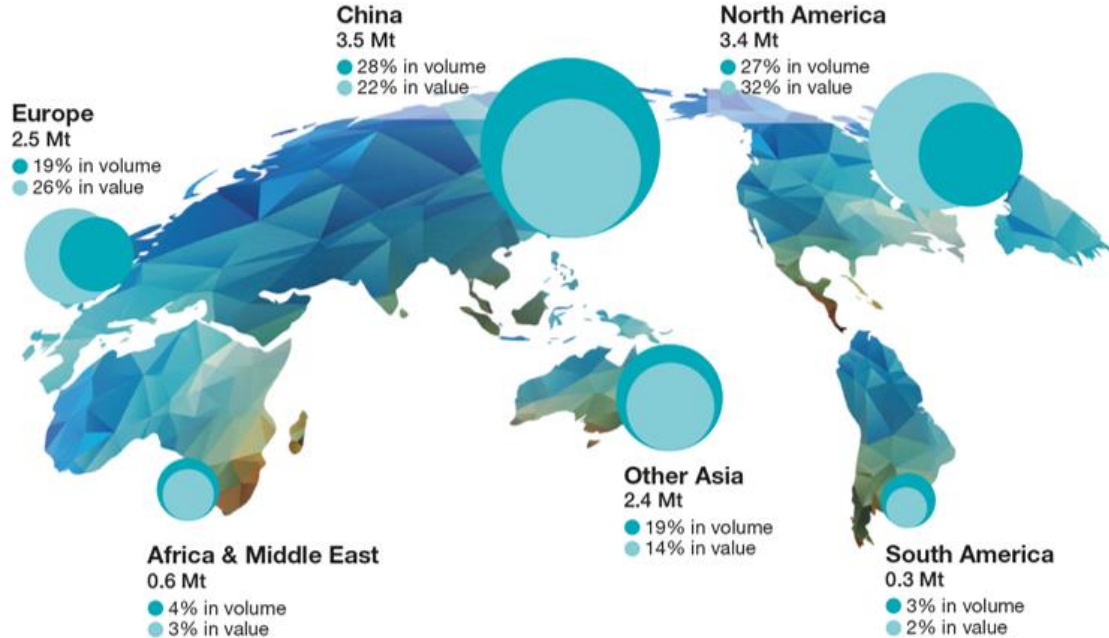
3.0 Mt
24% in volume
29% in value
Added-Value Index⁽²⁾: 121

TOTAL ASIA

6.0 Mt
47% in volume
37% in value
Added-Value Index⁽²⁾: 78

TOTAL AMERICAS

3.7 Mt
29% in volume
34% in value
Added-Value Index⁽²⁾: 117

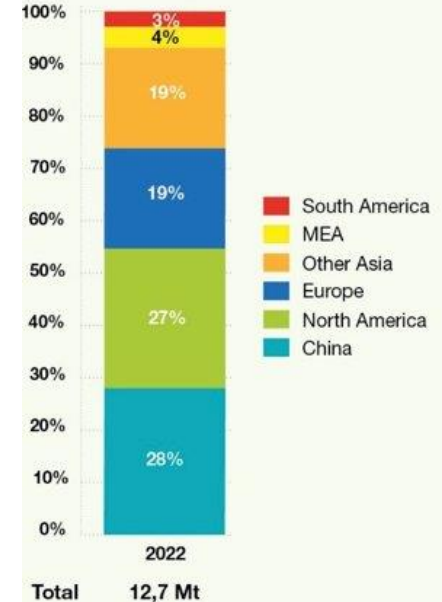


Bubble area proportional to segment volumes in Mt / Bn\$

- Volume
- Value

Composites market 2022 in Mt
Share of global market %

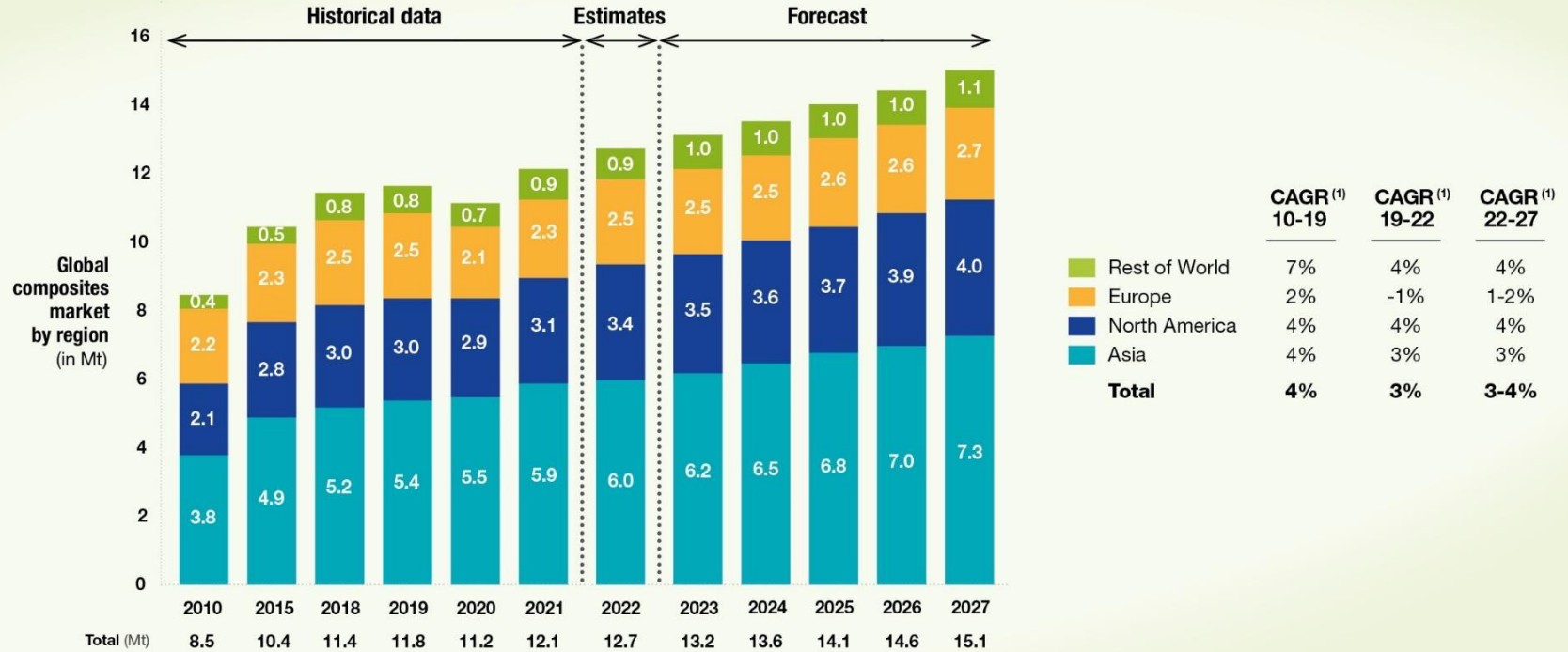
VOLUME OF COMPOSITE MATERIALS



Notes: Exchange rate EUR/USD = 0,947; (1) Value for composite materials;
(2) Ratio of % in volume to % in value.
Sources: Lucintel, Eatin & Co analyses and estimates.

Global trends by markets

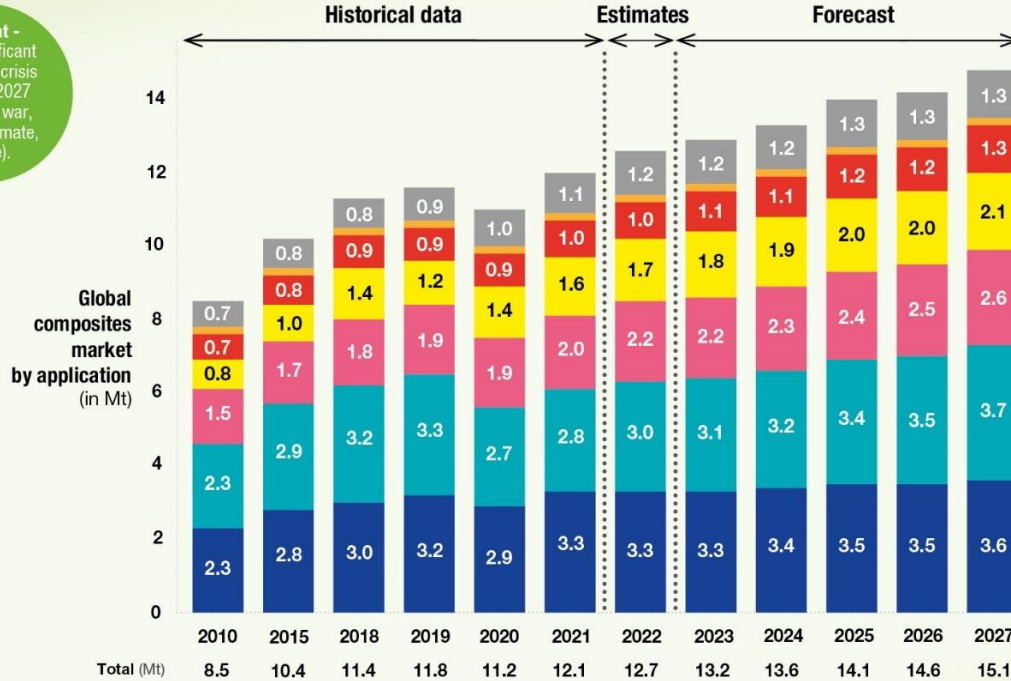
World - Perspective of applications markets of composite materials - 2010-27 - Volume



Global trends by application sectors

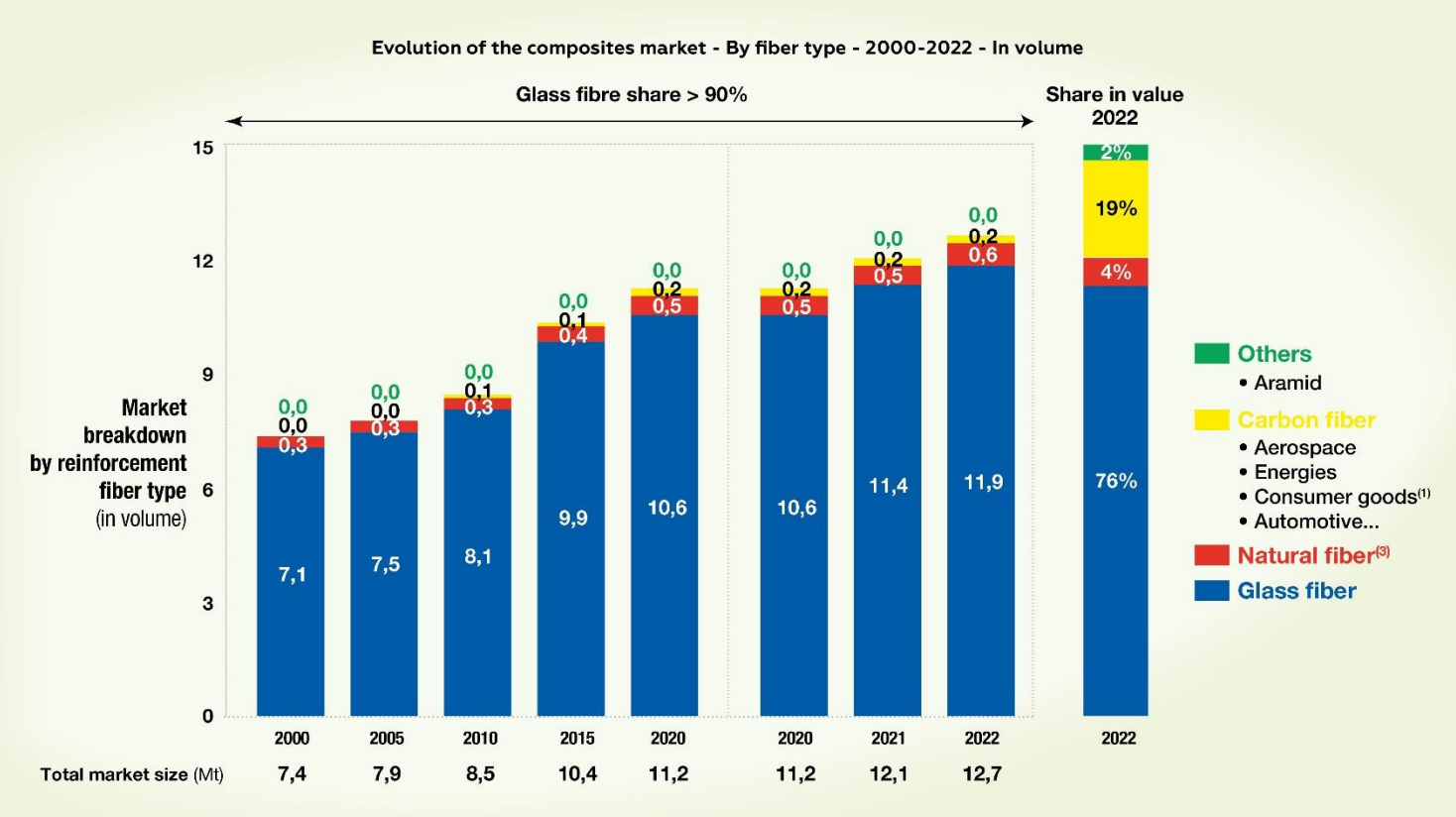
World - Perspective of applications markets of composite materials - 2010-27 - Volume

- Caveat -
If no significant economic crisis in 2023-2027 (sanitary, war, energy, climate, famine).

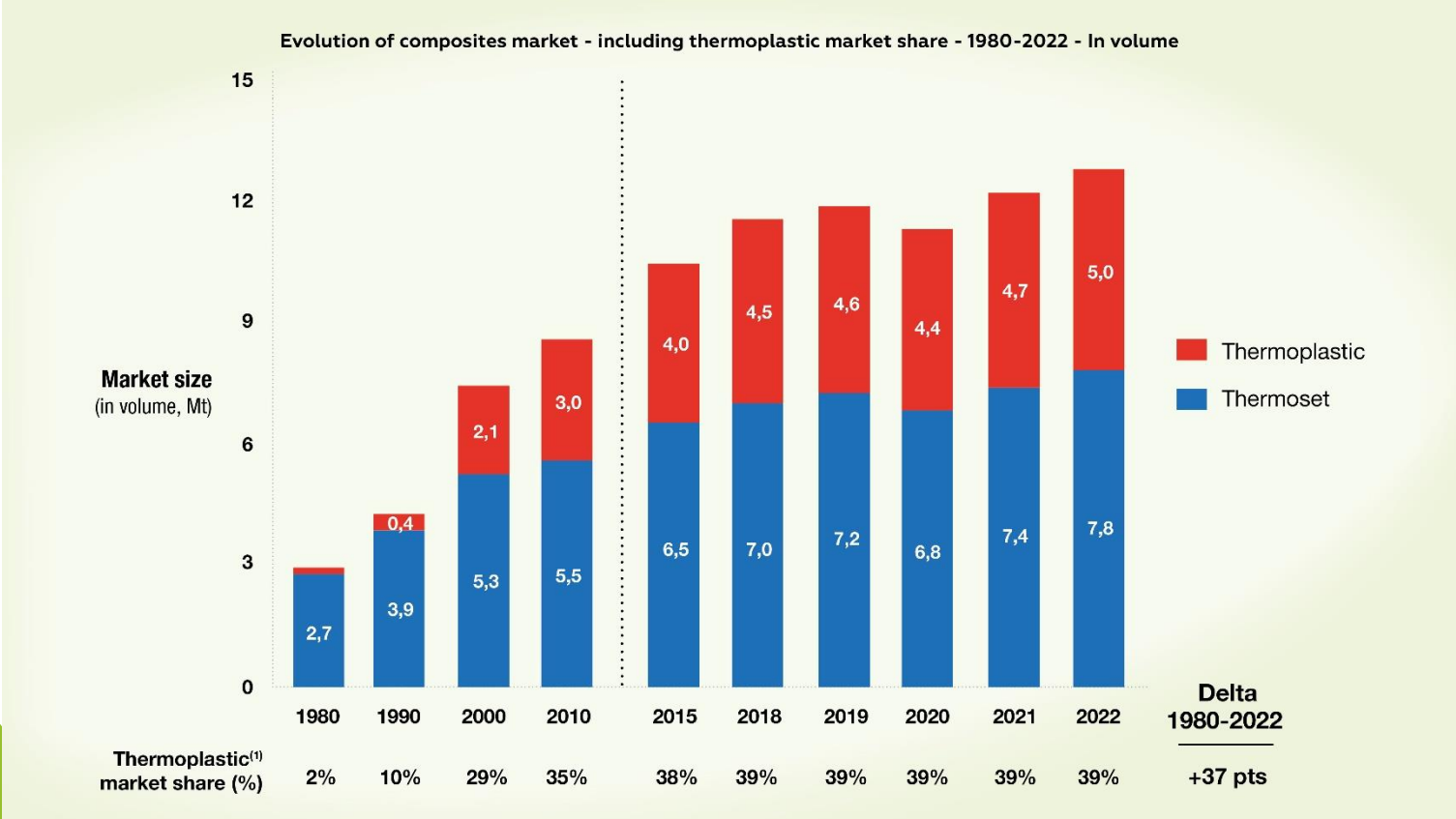


	CAGR ⁽¹⁾ 10-19	CAGR ⁽¹⁾ 19-22	CAGR ⁽¹⁾ 22-27
Others	3%	7%	3%
Aerospace	7%	-10%	6%
Marine	3%	4%	3%
Consumer goods	4%	4%	5%
Energy	4%	14%	4%
E&E	3%	5%	3%
Transportation	4%	-3%	4%
Construction	4%	0%	2%
Total	4%	3%	3-4%

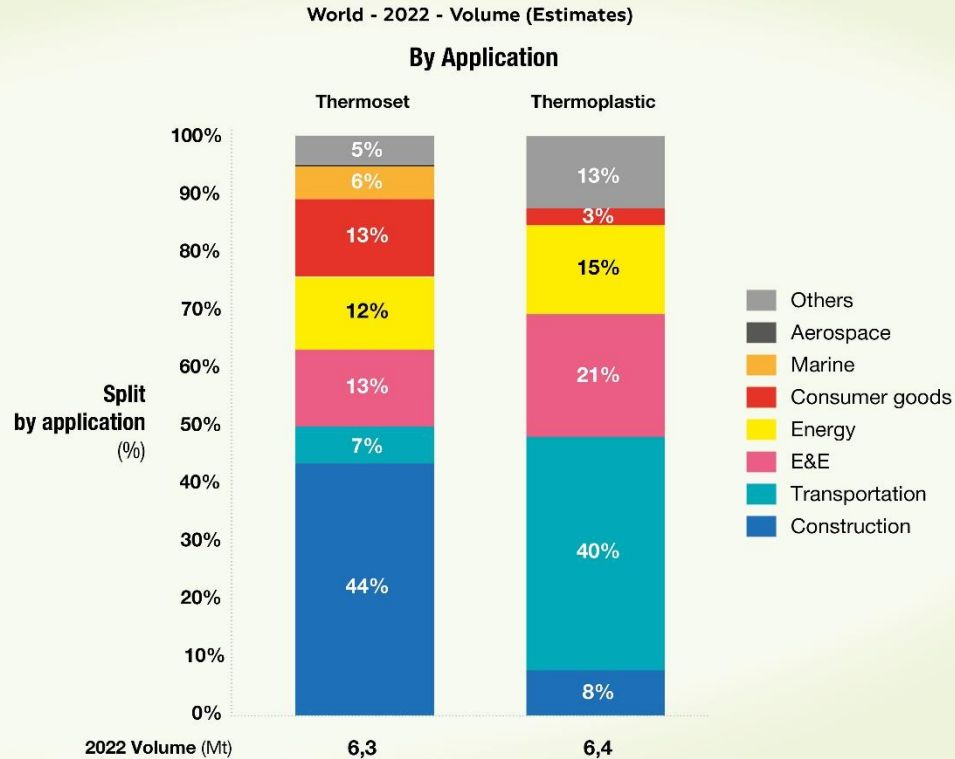
Main types of reinforcement fibers



Main types of resins matrices

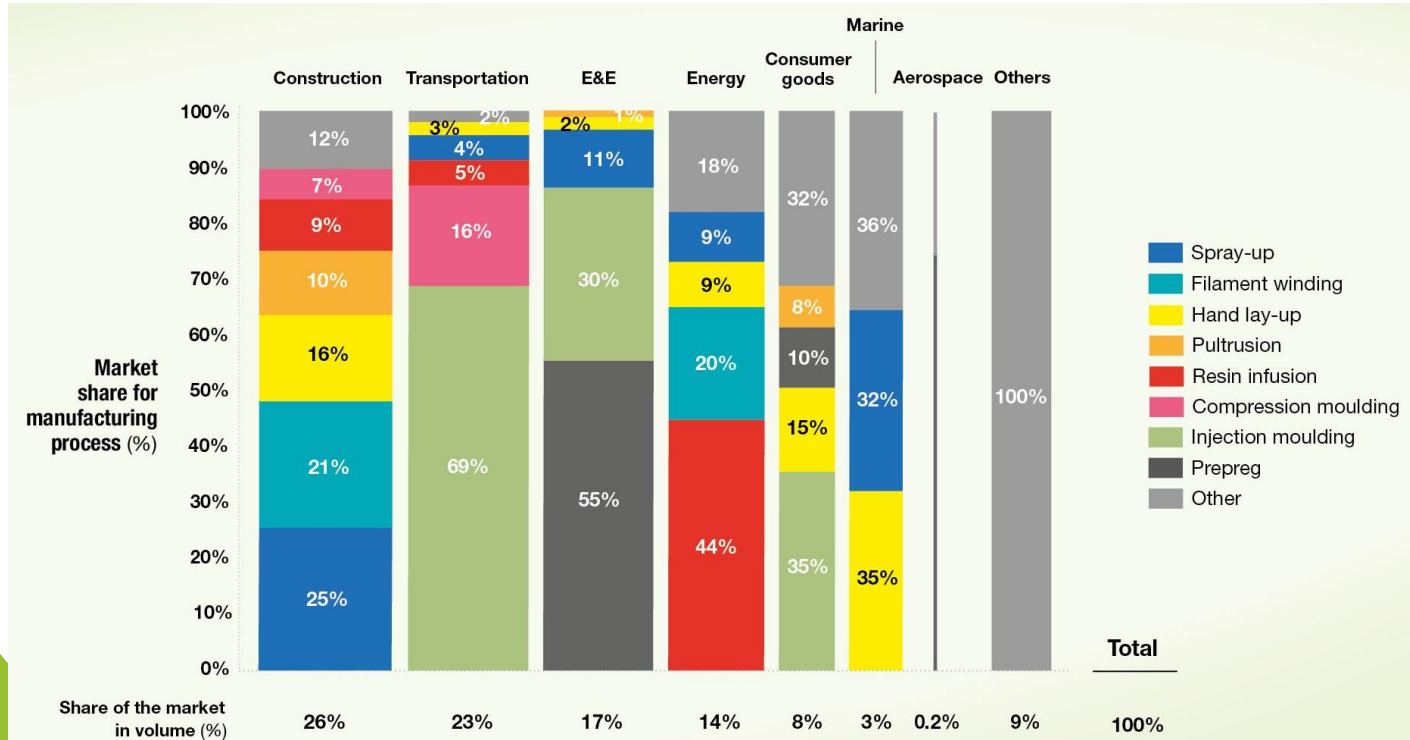


Resins matrices by application



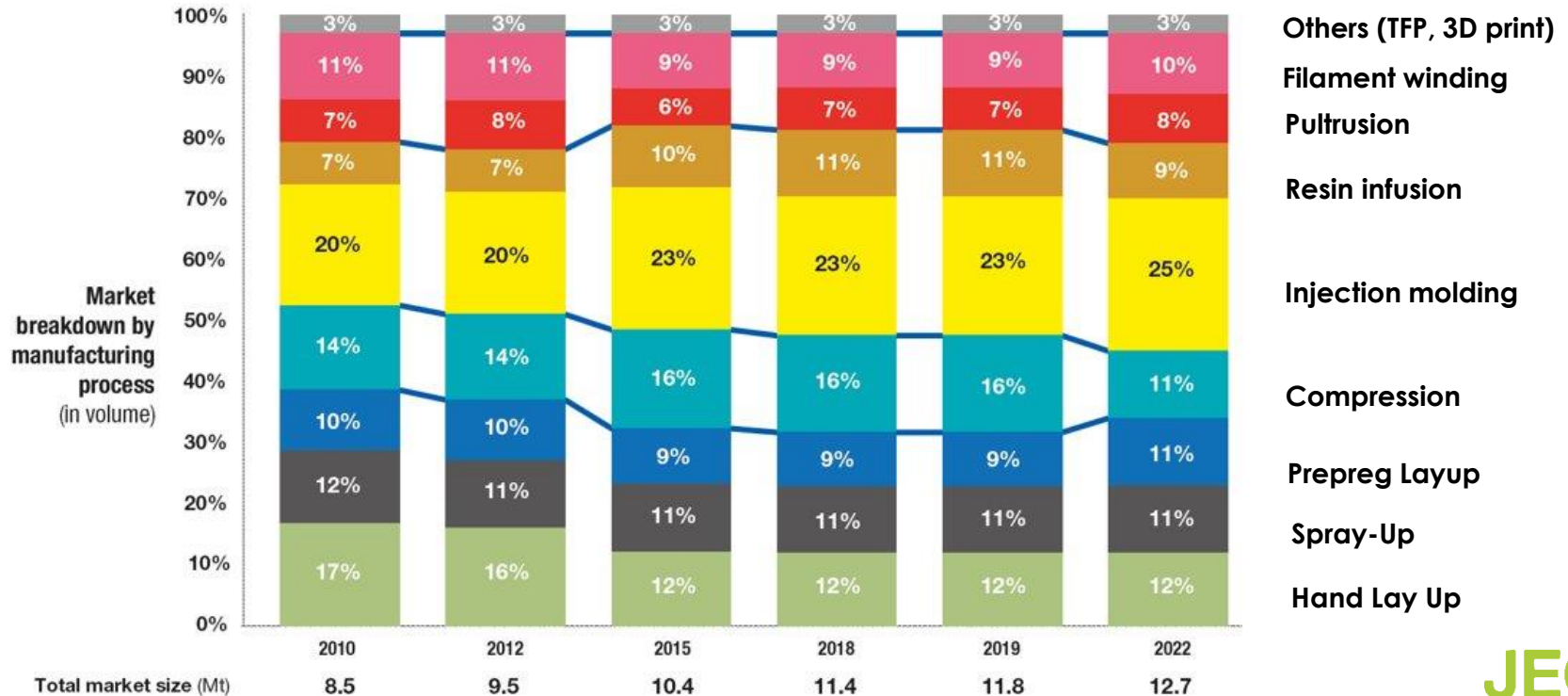
Various processes enable increased adoption

From manual processes to highly standardized/automatized manufacturing, up to 3D printing and additive manufacturing, the range of technologies matches the demand of specific applications:



Evolution of manufacturing processes

Labour intensive, less efficient manual processes slowly declining, while injection processes (injection molding, resin infusion) progressing.





01

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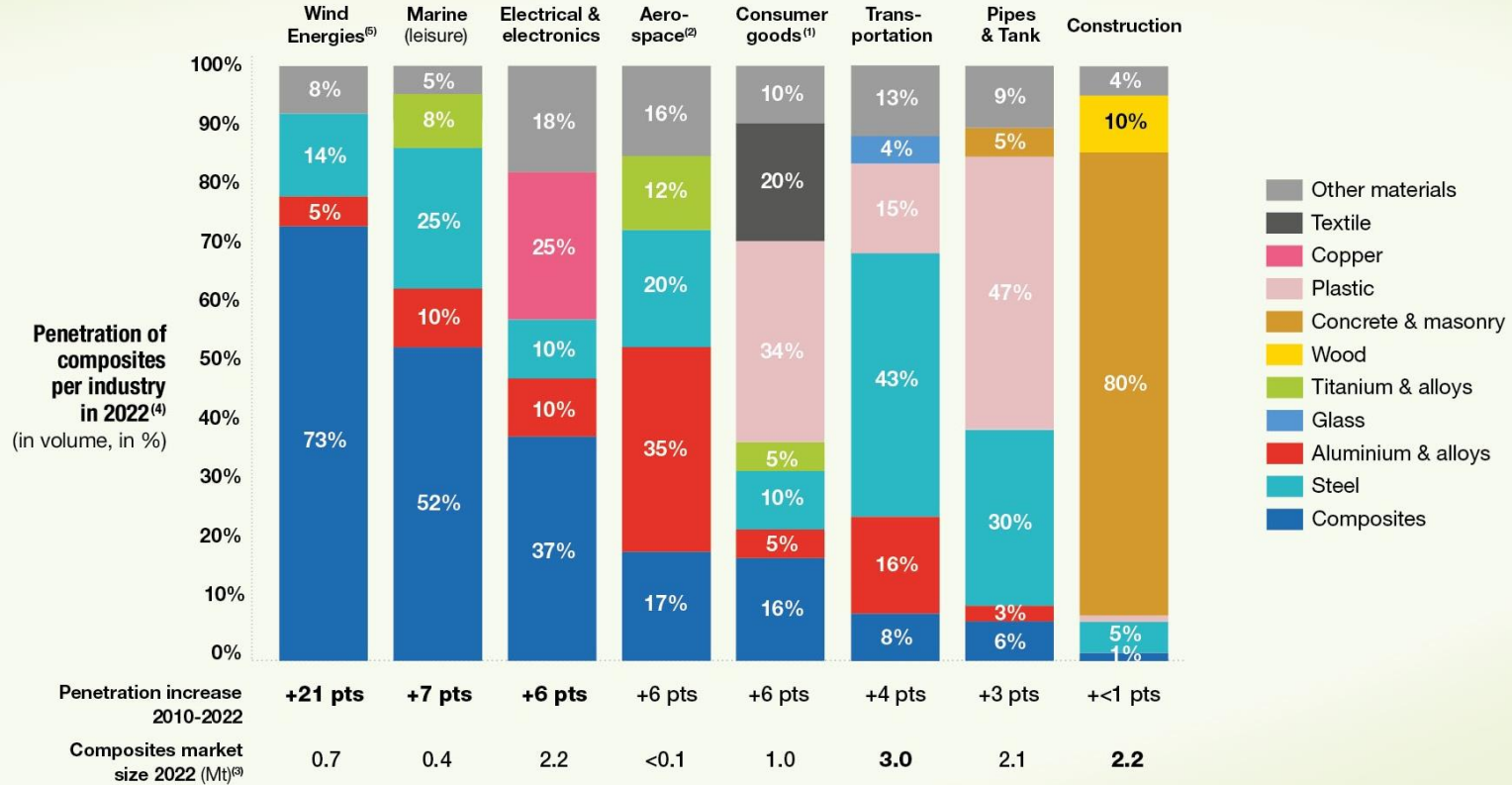
02

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03

Trends in application sectors of composites materials

Penetration of composites in several industries



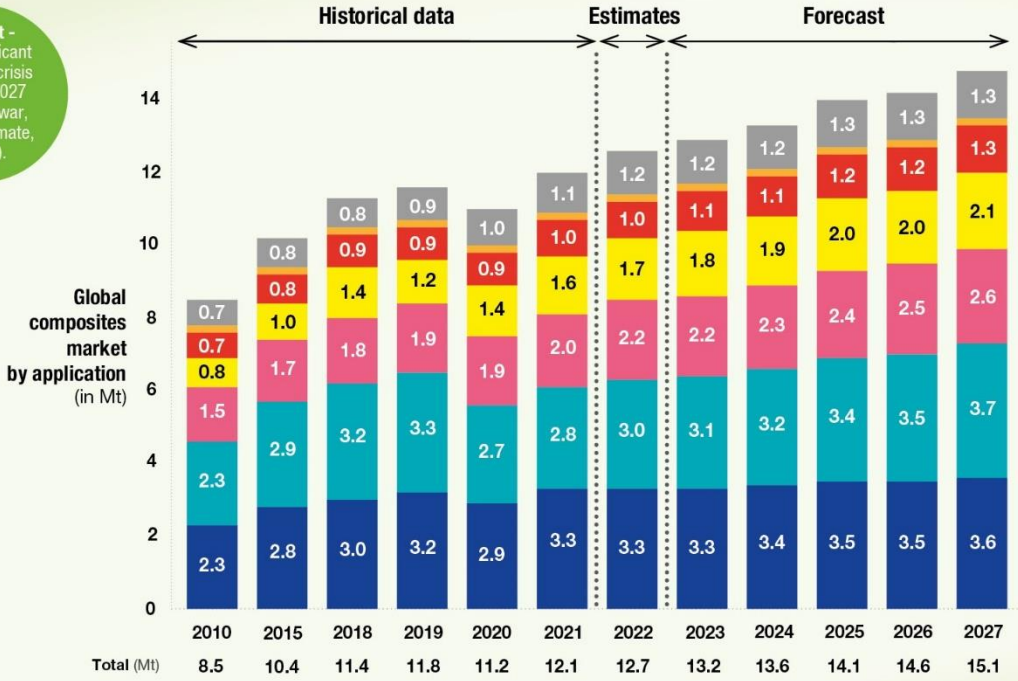
Recovery of application sectors after Covid crisis

Composites average market growth per annum 2019-2022 by application sectors (volume, average % per annum over 2019-2022)

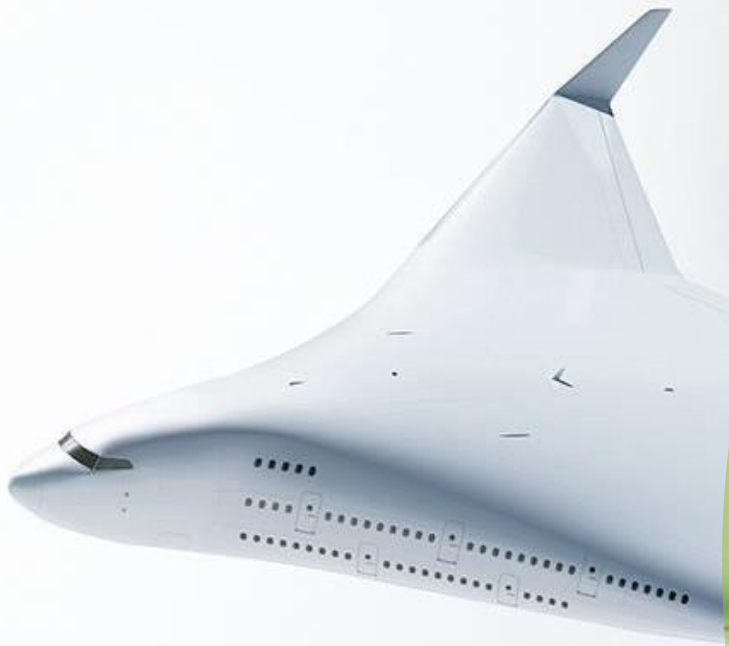
		Delta 2019-2021 (2 years)	Delta 2021-2022 (1 year)	
14%	Energy	+40%	+6%	Growth enhanced by governments regulations and subsidies on wind energy; higher oil prices driving investment in pipe & tank.
5%	Marine	+8%	+8%	Strong positive impact ("covid-free activity") and a public desire to "escape cities".
5%	E&E	+8%	+7%	Continued demand with growth concentrated in fast-growing Asian markets; limited negative impact in 2020.
4%	Consumer Goods	+4%	+7%	Development of e-commerce offset closure of physical stores, resilient activities such as cycling.
0%	Construction	+2%	-1%	Quick recovery after lockdowns, growth acceleration driven by maintenance, repair and upgrades. China downturn in 2022.
-3%	Transportation	-16%	+7%	Reduced automotive production and sales (-11% in Europe, -10% in the US, -3% in China).
-10%	Aerospace	-45%	+30%	Strong impact from lockdowns and restrictions on commercial flights, partially compensated by the resilience of military segment.

Composites market long term trends

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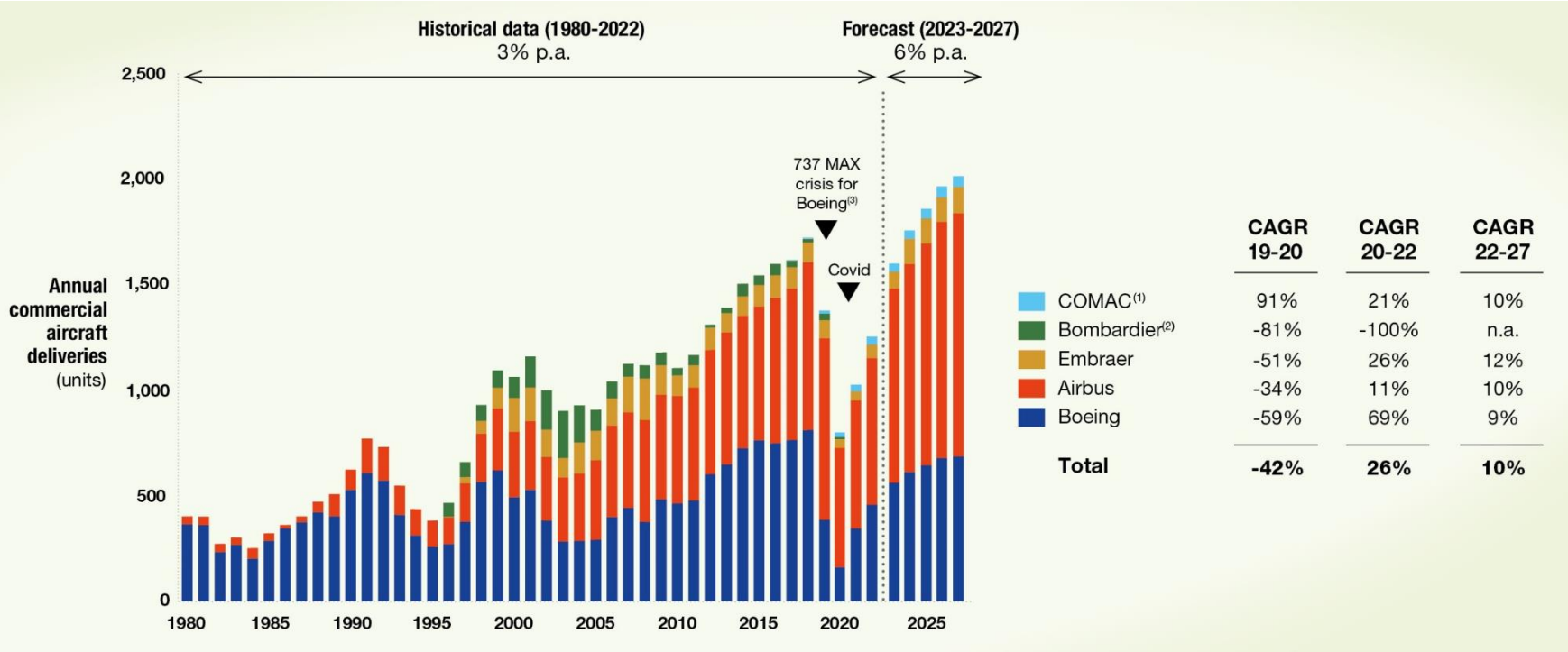
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AEROSPACE

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Aerospace markets disruptions

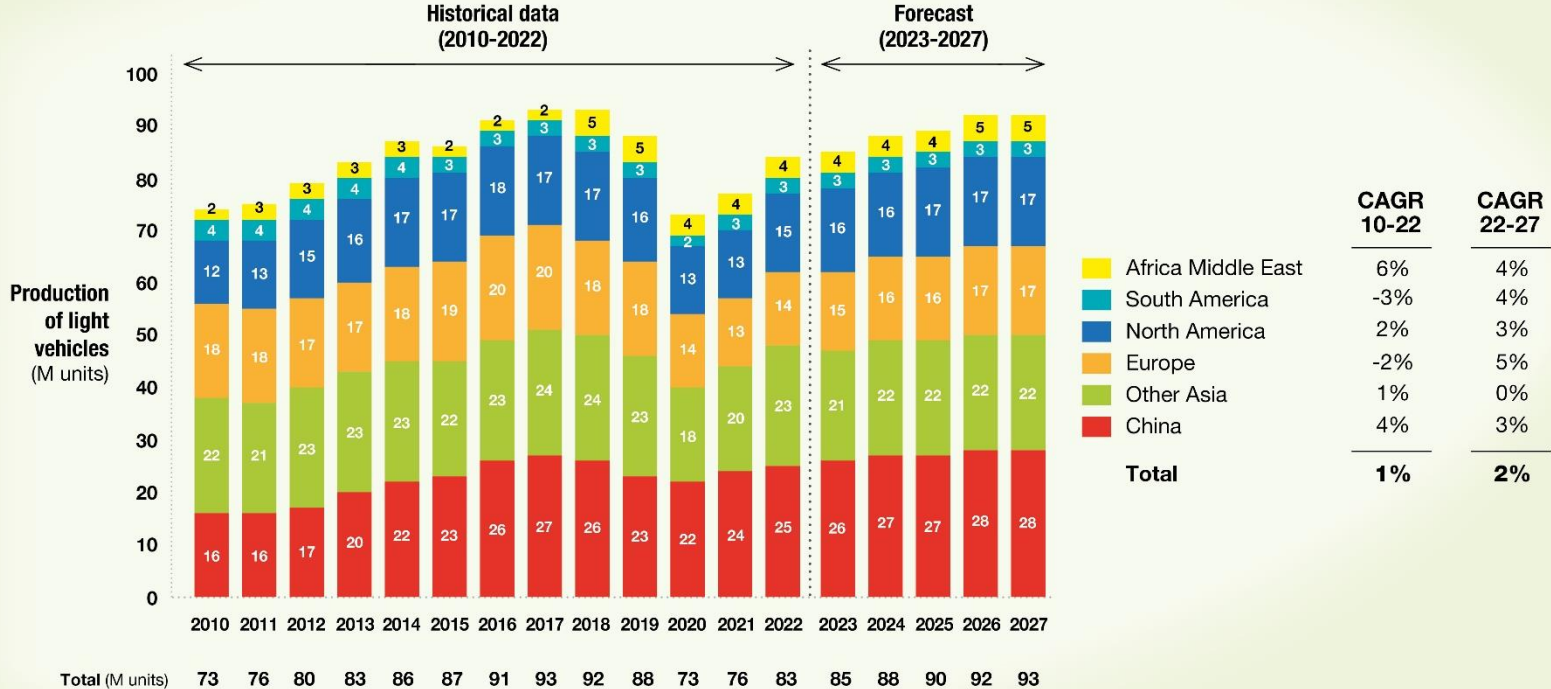




TRANSPORTATION

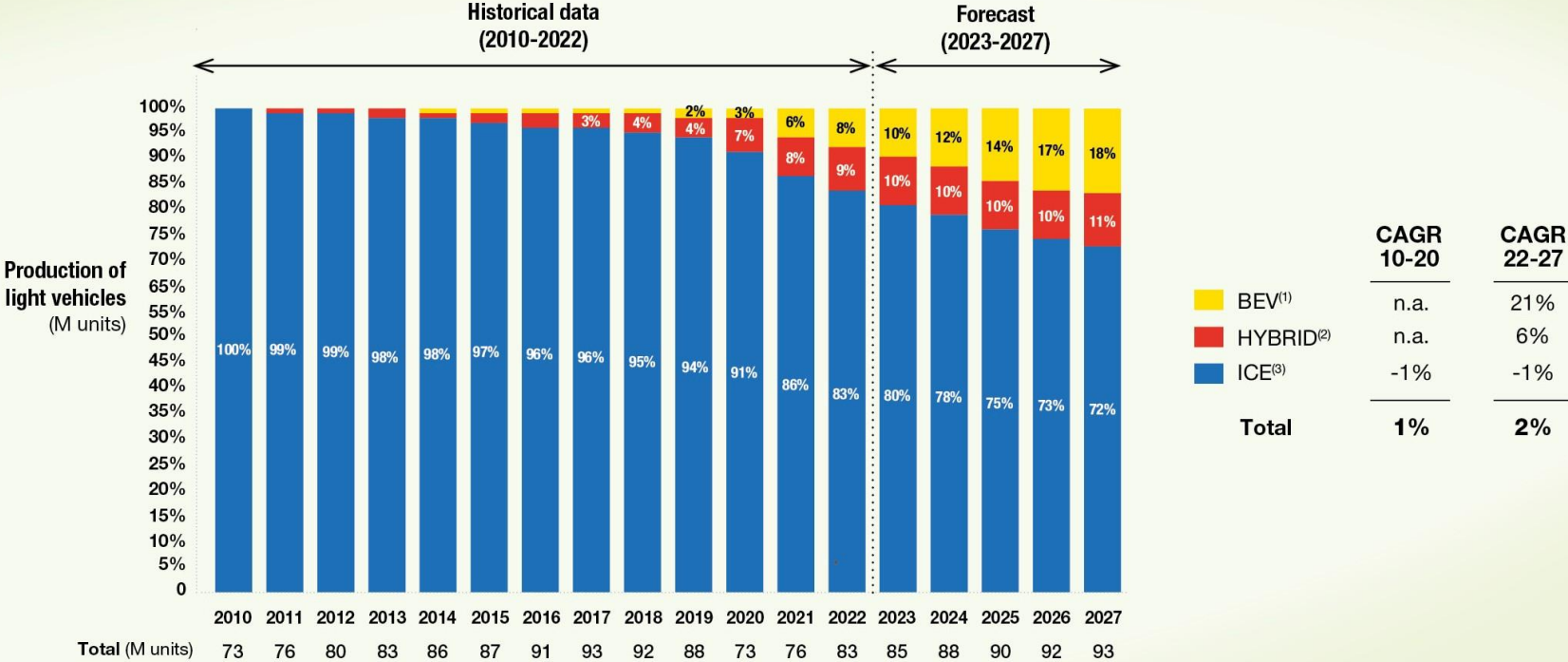
Automotive: recovery should take until around 2027

Transportation - Production of light vehicles (1) - 2010-2027

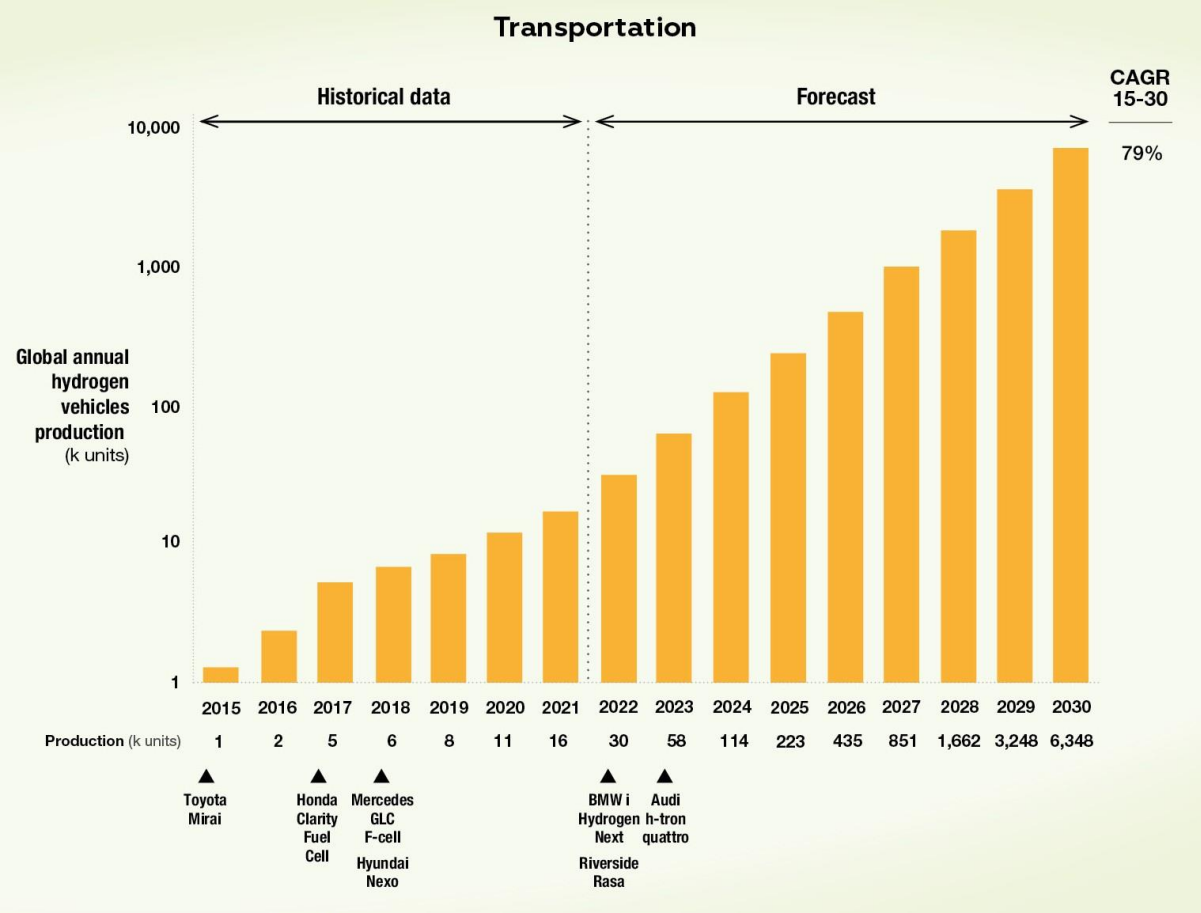


Automotive: production of electric vehicle by 2027

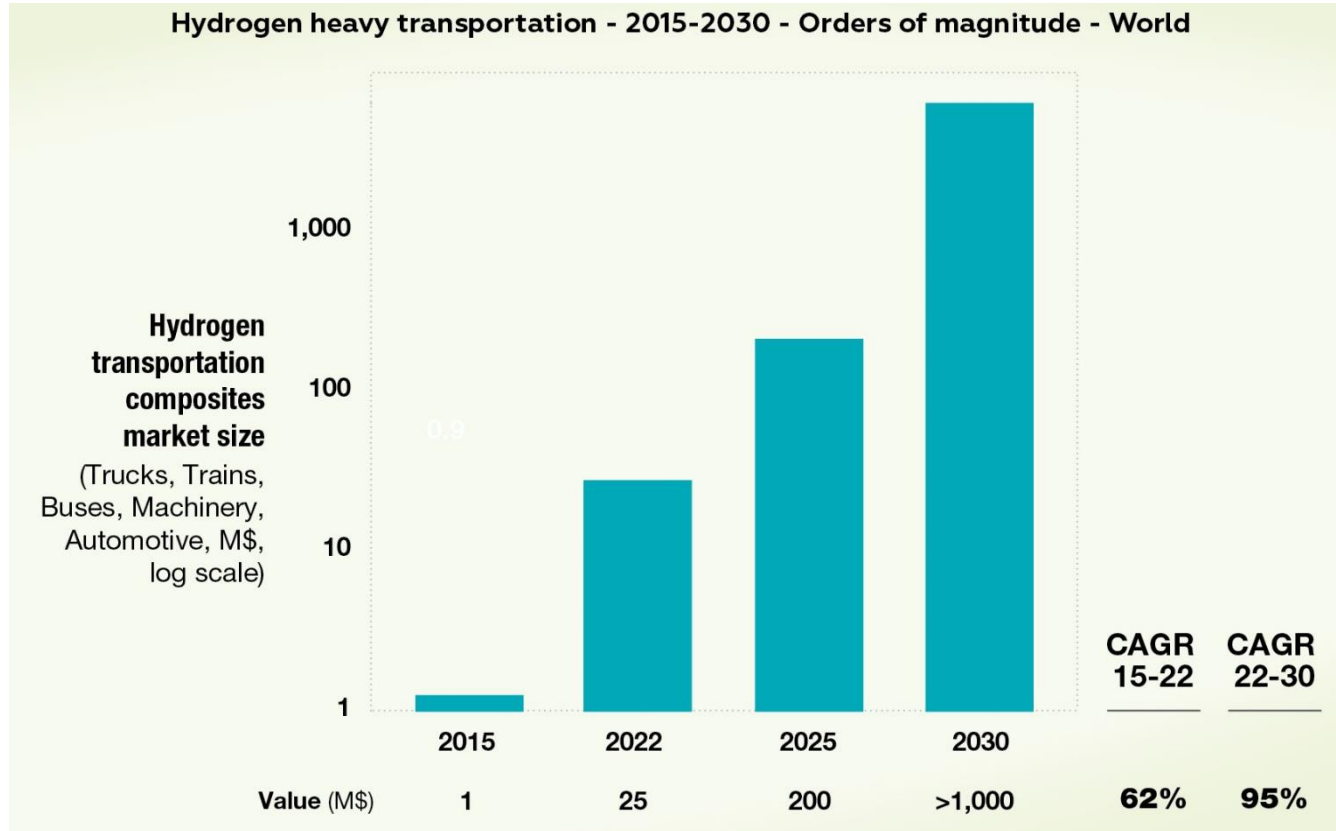
Transportation - World - Mix of new passenger cars (2010-2027)



Automotive: production of hydrogen cars



Transportation: fast-growing segment for hydrogen

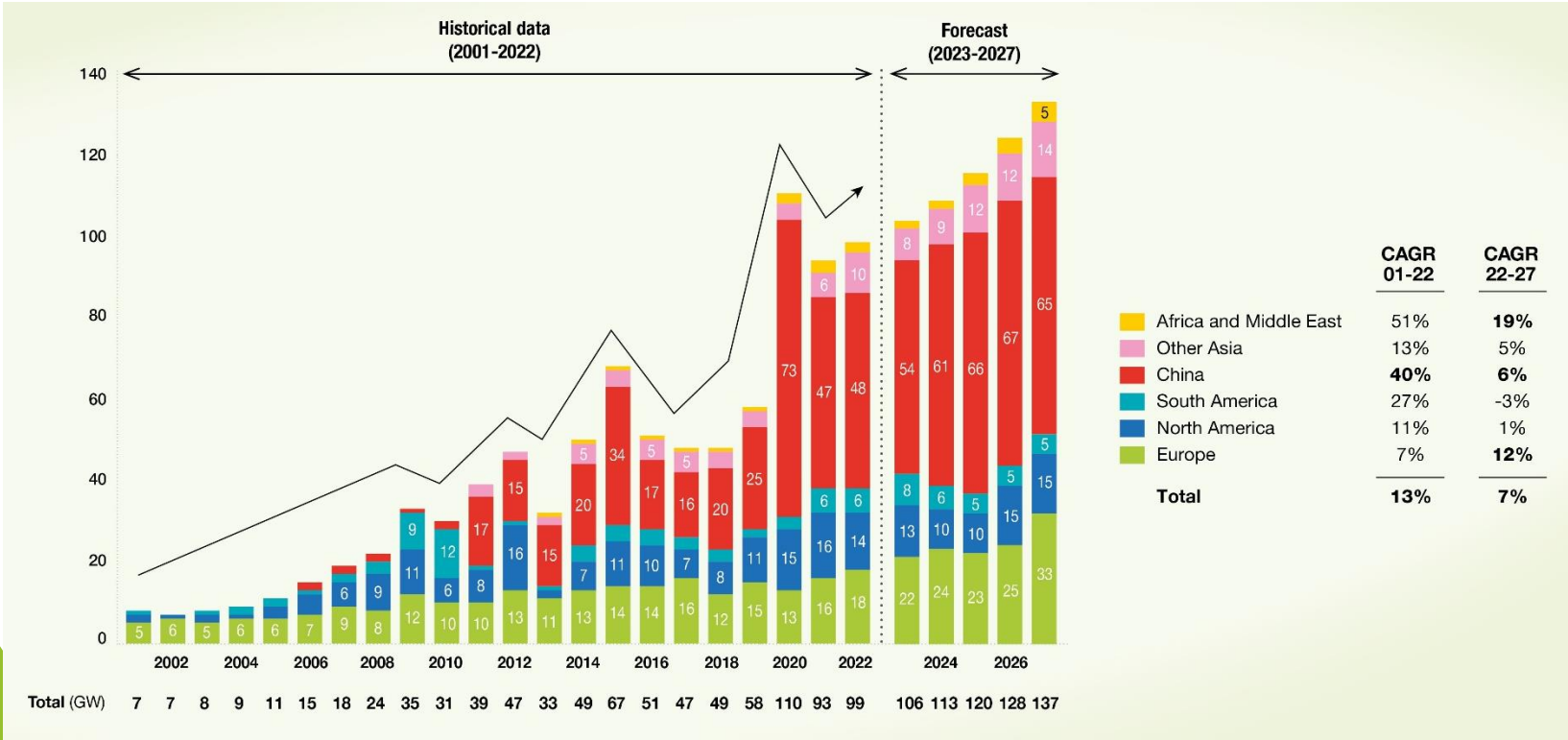




ENERGY

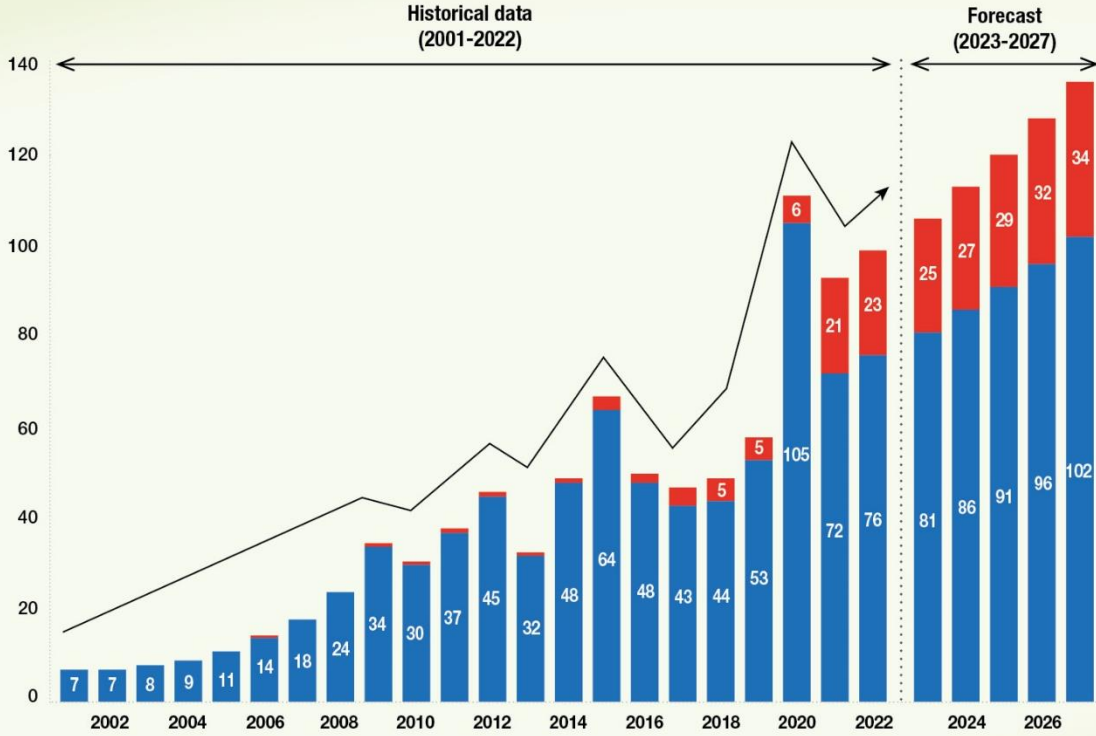
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Wind energy: growth driven by China and EMEA



Wind energy: offshore to accelerate the growth

Wind energy - Global new wind energy installations by type (GW) - 2001-2027



	CAGR 01-22	CAGR 22-27
Offshore	44%	8%
Onshore	12%	6%
Total	13%	7%

Total (GW) 7 7 8 9 11 15 18 24 35 31 39 47 33 49 67 51 47 49 58 110 93 99 106 113 120 128 137

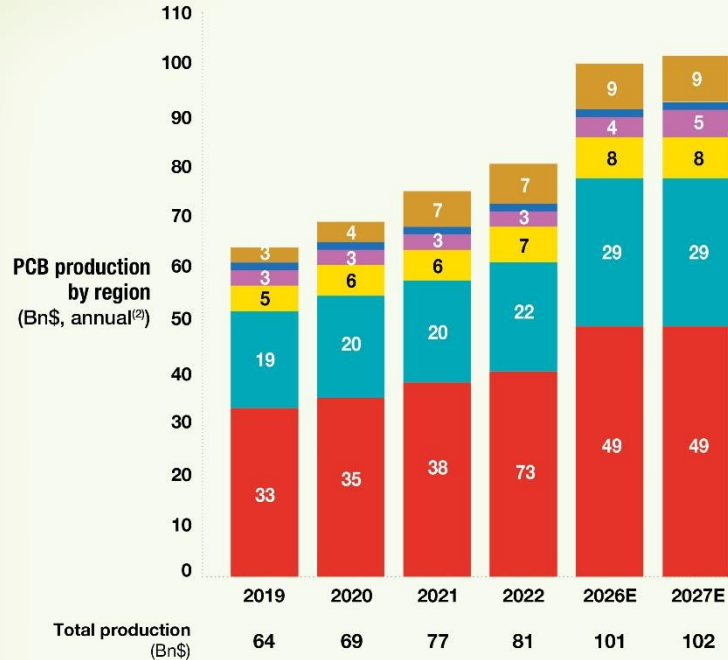


E&E

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E&E: growth should be driven by Asian countries

E&E - PCB Market by region - 2019-2026E - In value



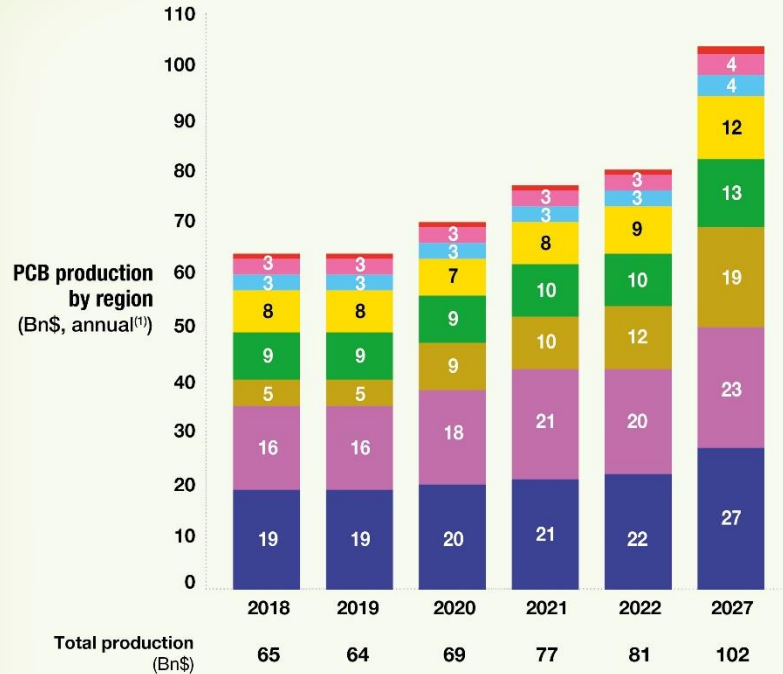
- **Global printed circuit board market had 6% growth from 2019 to 2022**, led by the increased demand of semiconductor packages and computing related equipment due to the expansion of remote services from the impact of Covid-19.

- **The electronic companies are moving from other regions to Asia** due to lower cost, and well-established electronic infrastructure. Consequently, Asia is expected to hold ~80% of the growth to 2026.

	CAGR 19-20	CAGR 20-21	CAGR 21-26
Rest of World	40%	79%	6%
Europe	-12%	12%	2%
North America	5%	5%	4%
Japan	9%	8%	5%
Other Asia ⁽¹⁾	7%	3%	7%
China	7%	9%	5%
Total	8%	11%	6%

E&E: PCB market with growth forecast

E&E - PCB Market by segment - 2018-2027 - In value



• **Global printed circuit board market has had 8% growth coming out of the pandemic and is predicted to grow at 5% to 2027.**

• **This growth is driven by Communication and IC Substrate⁽²⁾ segments which are forecast to grow in response to smart city initiatives and increasingly compressed personal devices such as wearables.** These segments hold 24% and 32% of the market growth respectively.

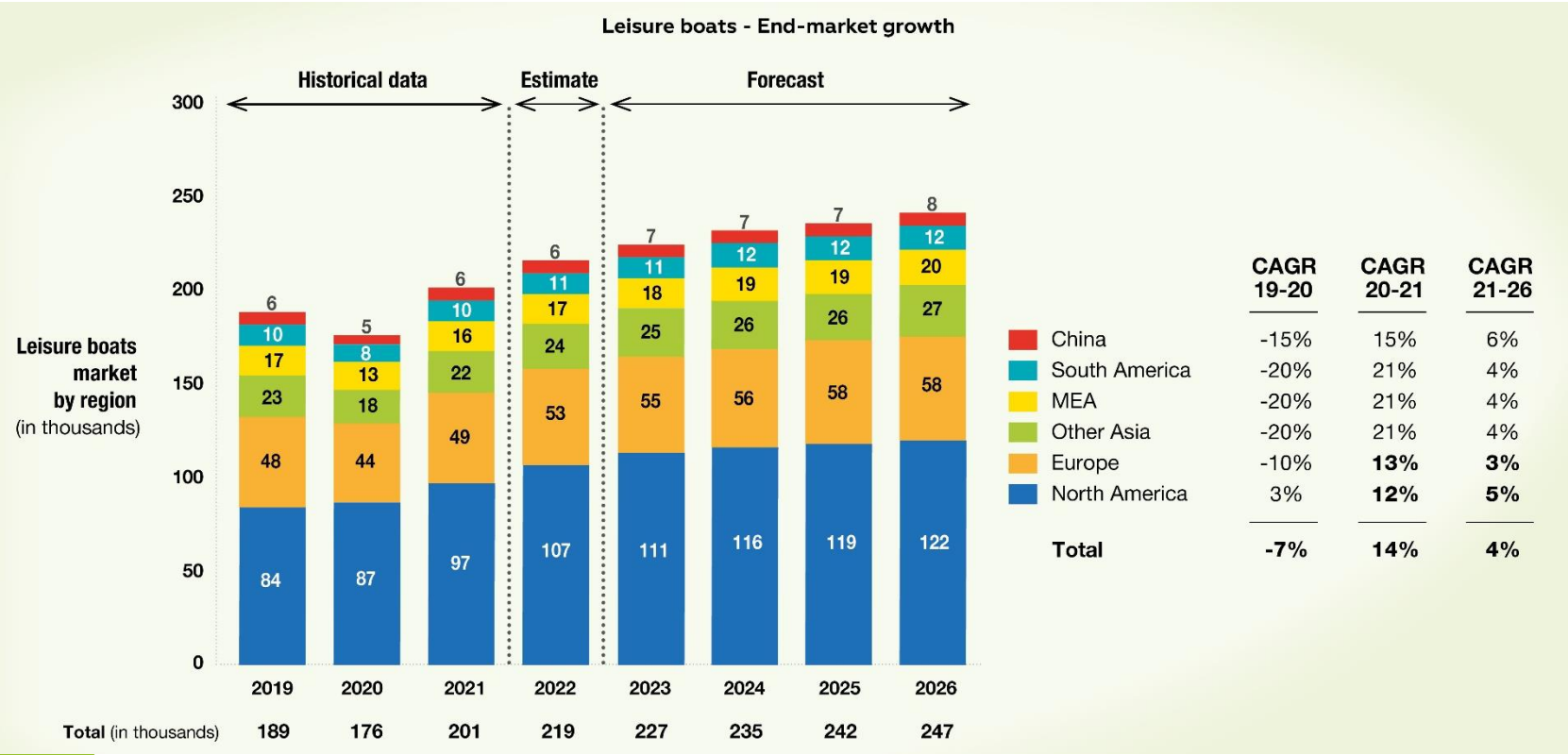
	CAGR 18-20	CAGR 20-22	CAGR 22-27
Medical	4%	2%	3%
Aviation	4%	2%	2%
Industrial	-7%	9%	3%
Automotive	-9%	14%	6%
Consumer	-2%	7%	5%
IC Substrates ⁽²⁾	32%	19%	9%
Computer	5%	5%	3%
Communication	1%	5%	4%
Total	3%	8%	5%



MARINE

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Marine: Leisure boats market rebounded quickly





SPORTS

Sports equipment: pandemic had positive impacts

Worldwide sales estimates (Bn\$) 2018-2022 - Work in progress

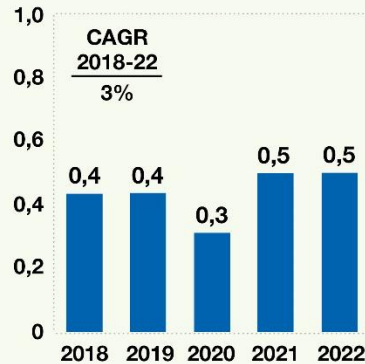
Canoes & Kayaks⁽¹⁾



Slow underlying growth (~3%) with boom during 2 years of covid

- Slowing for a few weeks then boom as people chose local activity holidays
- Paddling was, by default, a socially distanced activity.

Skis and Snowboards



Greatly impeded year in 2020 due to flight restrictions and resort closures

- Contraction of market in 2020.
- 2021 was the busiest year on record, however many were novice skiers who rent rather than buy.

Bicycles⁽²⁾



Underlying growth of 5-10% with C-19 acting as a catalyst

- Initial slowing for first few weeks of pandemic (March-April 2020) followed by boom.
- Bottleneck with component supply and manufacturer capacity.



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WILLING TO KNOW MORE

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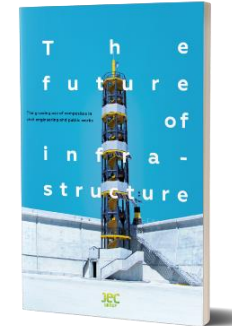
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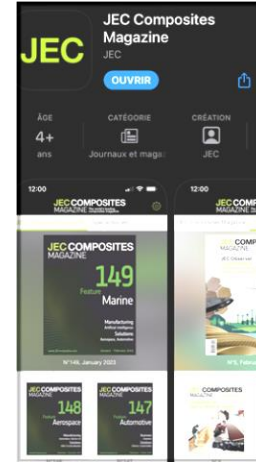


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WEB TV The video channel of the composites industry

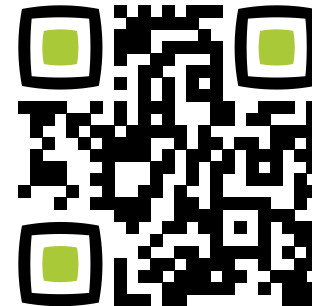


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