Global markets and technologies for smart glass

The global market for smart glass was valued at $5.6 billion in 2023 and is expected to grow at a compound annual growth rate (CAGR) of 11.7% to reach $10.8 billion by the end of 2029.

Smart glass, also called switchable glass, is a type of chromogenic material that can change its optical properties to become opaque or tinted in response to various signal types. It can be classified as either active or passive (Table 1). Active smart glass requires electricity to change its properties. Examples of active smart glass technologies include

- **Electrochromic glass**, which consists of electrochromic materials and conductive coatings fitted between two sheets of glass. Electricity causes ions to move between the layers, altering the optical properties.
- **Suspended particle device glass**, which uses rod-like particles suspended in a liquid or film between two layers of glass. Electricity causes the orientation of the particles to vary, thereby regulating the amount of light transmitted.
- **Polymer-dispersed liquid crystal glass**, which uses liquid crystal molecules dispersed in a polymer between two layers of glass. Electricity causes the orientation of the molecules to vary, thereby regulating the amount of light transmitted.

Passive smart glass relies on inherent properties to respond to external stimuli without requiring electricity. Examples of passive smart glass technologies include

- **Photochromic glass**, which contains molecules that darken when exposed to ultraviolet radiation.
- **Thermochromic glass**, which contains materials that change opacity when exposed to heat.

Table 1. Basic comparison of different smart glass technologies

Type	Control mechanism	Common applications	Response speed
Electrochromic	Electric	Office partitions, windows, automotive, residential	Slow (up to several minutes)
Suspended particle devices	Electric	Automotive, aircraft, luxury buildings, skylights	Fast
Polymer-dispersed liquid crystals	Electric	Privacy windows, office partitions	Instant
Photochromic	Sunlight exposure	Exterior building windows, eyewear	Slow (seconds to minutes)
Thermochromic	Temperature sensitive	Building windows, greenhouses, skylights	Slow changes in temperature

Table 2. Global market for smart glass, by end-use industry, through 2029 ($ millions)

End-use industry	2023	2024	2029	CAGR % (2024–2029)
Construction	2,955.4	3,312.7	6,200.5	13.4
Automotive and aircraft	1,861.6	2,036.7	3,371.1	10.6
Electronics	355.0	376.9	533.5	7.2
Power generation	280.6	300.7	443.3	8.1
Others*	166.5	181.9	234.2	5.2
Total**	5,619.0	6,209.0	10,782.5	11.7

*Other segments include consumer products and medical devices.
** Totals in this report's tables might not match exactly because of rounding.

Smart glass finds significant application in the construction industry for purposes such as creating partitions and improving energy efficiency (Table 2). But it is also gaining ground in the automotive sector for use as sunroofs and windows. The electronics industry is exploring the use of smart glass, too, to enable dynamic electronic display features, such as light adjustment and privacy options. Meanwhile, the power generation industry is investigating smart glass integrated with photovoltaic technology to help reduce energy needs for lighting and cooling.

As of 2023, Europe accounted for the highest market share of smart glass (38.7%), followed by North America (30.4%) and Asia-Pacific (21.1%). The European market's interest in smart glass is mostly due to strict government regulations toward energy-efficient buildings.

About the author

BCC Publishing Staff provides comprehensive analyses of global market sizing, forecasting, and industry intelligence, covering markets where advances in science and technology are improving the quality, standard, and sustainability of businesses, economies, and lives. Contact the staff at Helia.Jalili@bccresearch.com.

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