

Inside the glass transition, with ASSOVETRO

ASSOVETRO outlines the ecological transition of the Italian glass industry – detailing emissions, energy use and decarbonisation strategies. Through Green Fuels, carbon capture and supportive policy frameworks, the association identifies both the investments and the infrastructure that's required to align the sector with climate targets while safeguarding competitiveness.

CONNECTIVITY DRIVING THE ECOLOGICAL TRANSITION IN MANUFACTURING

The ecological transition of the Italian glass industry represents one of the most complex and strategic industrial transformations currently underway in Europe. According to Assovetro, the national glass sector remains a cornerstone of both the Italian and European manufacturing landscape, combining high production capacity, strong international positioning and a deeply rooted commitment to innovation, energy efficiency and circular economy principles.

In 2022, the Italian glass industry generated EUR 27 billion in turnover, employed 28,800 highly specialised workers and achieved an estimated social impact of EUR





9.6 billion. Environmental performance already plays a central role, with an average recycling rate of approximately 80 percent and a collection rate exceeding 90 percent. Through glass recycling alone, the sector saves an estimated 414 million cubic metres of gas annually, underlining its strategic contribution to resource efficiency and emissions reduction.

EMISSIONS, ENERGY USE AND THE CURRENT BASELINE

A detailed analysis of sector emissions shows that total greenhouse gas emissions reached 3.74 million tonnes of CO₂ equivalent in 2022. The majority of these emissions fall under Scope 1, deriving from fossil fuel combustion in glass-melting furnaces and from intrinsic chemical reactions during vitrification, particularly the decomposition of soda and limestone. Scope 2 emissions account for roughly one quarter of the total and are linked to electricity consumption across production facilities.

Energy consumption patterns reflect the structural character-

istics of the sector. Natural gas remains the dominant energy input, accounting for approximately 81 percent of total energy use, primarily to fuel fusion processes. Electricity, representing the remaining 19 percent, is mainly employed in downstream processing, automation and to support furnace efficiency. Consumption is geographically concentrated in northern regions, where industrial glass districts are historically located.

DECARBONISATION PATHWAYS AND STRATEGIC OPTIONS

Under a Business-as-Usual scenario, sector emissions would decline only marginally by 2050, stabilising at approximately 3.67 million tonnes of CO₂ equivalent due to increased production volumes. This trajectory is incompatible with the Paris Agreement and net-zero objectives, making targeted intervention unavoidable.





Assovetro identifies two primary decarbonisation strategies for the sector: the Green Fuels strategy and the Carbon Capture and Storage (CCS) strategy, supported by a dedicated pathway for glass transformers. Both approaches rely on a flexible combination of seven key levers: energy efficiency improvements, increased electrification, green fuels such as hydrogen and biomethane, higher use of recycled glass (cullet), precalcined raw materials, CCS and renewable energy sourcing. No single lever is sufficient on its own; only an integrated mix can deliver the required emissions reductions.

The Green Fuels strategy focuses on replacing fossil fuels with biomethane and hydrogen, reserving CCS for residual emissions that cannot be eliminated otherwise. By contrast, the CCS strategy continues to rely on natural gas while deploying large-scale carbon capture from 2035 onward to abate both process and combustion emissions. Both strategies foresee a substantial increase in electricity demand, particularly for hydrogen production via electrolysis, plac-

ing significant pressure on national energy infrastructure.

COSTS, INVESTMENTS AND ENABLING CONDITIONS

The economic dimension of the transition is substantial. Total investments required by 2050 are estimated at EUR 4.23 billion for the Green Fuels strategy and EUR 5.39 billion for the CCS strategy, with CCS requiring approximately 26 percent higher capital expenditure due to the construction of large carbon capture facilities. Operational costs diverge even more sharply: while CCS entails higher upfront investment, Green Fuels leads to significantly higher long-term operating expenses driven by the recurring cost of green hydrogen procurement.

Assovetro highlights that the success of the transition depends heavily on factors external to glass manufacturers. These include the availability and affordability of decarbonised energy carriers, the development of electricity, hydrogen and CO₂ transport infrastructures and a stable regulatory framework, particularly regarding

the EU Emissions Trading System. Without coordinated public investment, regulatory reform and targeted financial support, the sector risks losing competitiveness while being unable to maintain current production levels.

To address these challenges, Assovetro proposes a comprehensive policy framework combining investment incentives, operational cost support, accelerated infrastructure development, EU ETS reform and stronger trade defence mechanisms. Only through such an integrated approach, the association argues, can the Italian glass industry achieve climate neutrality whilst preserving its industrial base and strategic autonomy within Europe's manufacturing ecosystem. ■



ASSOVETRO

Via Barberini, 67
00187 Roma (RM) - ITALY
Tel.: +39 06 4871130
assovetro@assovetro.it

www.assovetro.it