

Continuous energy supply is essential for the flat glass industry

This paper intends to inform policymakers on the necessity of continuous supply of energy, in particular natural gas and electricity, for the proper functioning and safety of flat glass manufacturing installations.

The glass industry is singular in this respect as glass melting installations must be maintained 'hot' and cannot stop, without serious and lasting damage to industrial assets.

In the context of insecurity over energy supplies, Glass for Europe calls on authorities to make sure that their contingency plans prioritize, among others, the 24 / 7 supply of both natural gas and electricity to flat glass manufacturing installations in their countries.

What are the energy sources used in flat glass manufacturing?

Flat glass making is a **high-temperature continuous production process** (see description of the float process). The temperature inside the melting furnace, normally between 1500 and 1600°C, must be maintained throughout the furnace's lifetime of 16 to 20 years, thanks to a high influx of energy.

Gas is the predominant source of energy used for flat glass manufacturing after the industry mainly ceased to use fuel oil to reduce CO₂ emissions¹. It is estimated that the flat glass manufacturing industry uses yearly 61.000 TJ of natural gas in its European installations, which roughly corresponds to 0.4% of the EU's gross inland consumption².

The **second source of energy is electricity**, which accounts for around 25% of the energy consumption³. It is used to heat the furnace as a complement to natural gas, by way of electric boosters. It is also used further down the manufacturing line to control the atmosphere in the float bath, to manage temperatures throughout the annealing process and to operate machines.

While the industry is looking into novel manufacturing technologies to reduce its use of fossil fuels, greater use of electricity is one of the options explored. Natural gas remains indispensable in the short / middle term.

Glass for Europe is the trade association for Europe's flat glass sector. Flat glass is the material that goes into a variety of end products, primarily in windows and facades for buildings, windscreens and windows for automotive and transport as well as solar energy equipment, furniture and appliances. Glass for Europe brings together multinational firms and thousands of SMEs across Europe, to represent the entire building glass value-chain. It is composed of flat glass manufacturers, AGC Glass Europe, Guardian, NSG-Group and Saint-Gobain Glass Industry, and works in association with national partners gathering building glass processors all over Europe.

¹ Gas accounts for around 75% of the energy used in flat glass manufacturing.

² Source: European Commission, 2012, Glass BREF – Description of glass melting technologies.

³ Source: Glass for Europe estimates and ratio based on an EU 2020 gross inland consumption of natural gas of 15.000.000 TJ (Source: Eurostat).

³ Source: European Commission, 2012, Glass BREF – Description of glass melting technologies.



Why is continuous and instantaneous supply of energy needed?

The uninterrupted supply of energy is needed to keep the flat glass furnace at the required temperature.

The temperature is particularly high, i.e. normally between 1500 and 1600°C, to ensure the quality of glass produced. Most importantly, **the temperature stability is essential to avoid stress and premature ageing of the installation.** Changes in temperature generate stress on the refractory bricks, which constitute the shell of the melting furnace, and thus increase risk of industrial hazards.

Flat glass manufacturing installations are so sensitive to changes in temperatures that **the calorific power of gas supply is often monitored on-site** to adjust influx of energy to the installation's needs.

What can happen in case of disruptions to energy supply?

Most flat glass installations usually **do not or have very little alternative fuel back-up** due to stringent permitting conditions and very low likelihood of need. The industry in Europe has been able to rely so far on instantaneous and continuous energy supplies.

In the event of prolonged disruptions of gas supply, installations will have no other option than **to bring the furnace to a complete cold.** This takes several days when influx of energy is still needed for a gradual stop and cooling of the installation.

Such a move **irreversibly damages the installation** hence it is a last-resort scenario. A furnace turned to cold would require several tens of millions of euros investments for a furnace rebuild, which would take several months to complete before a restart can be envisaged.

Should multiple glass installations be impacted and be in need of rebuild at the same time, for example if Europe was to face a widespread gas shortage, taking into consideration the availability of refractories and specialized companies providing the services, restoration of the industry could require many years.

Float glass manufacturing process

Float glass manufacturing is one of the highest temperature industrial processes. Both sand and recycled glass need to be heated up to 1600°C to form a ribbon of molten glass. The molten glass then floats on a bath of melted tin to guarantee planarity and control thickness. It is then gradually cooled down before cutting and storage.

An average float glass installation in Europe produces 650 tonnes of glass a day in furnaces of over 60-meter-long, 25-meter-wide and 12-meter-high. A float glass furnace can hold around 2000 tonnes of molten glass.

Float glass installations are meant to produce 24 hours a day, 7 days a week for periods of 16 to 20 years.

