

Technical Building System

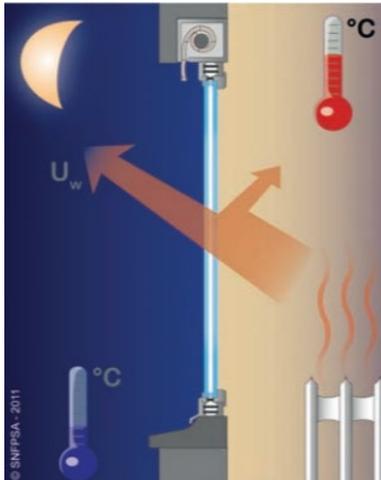
The chance to introduce Solar Shading

1. Energy Performance Buildings Directive Revision needs to optimize heating and cooling

- The **EU Renovation Wave** initiative aims to put in place one of the most ambitious ever program for the European building stock, which needs a big game changer since almost 75% of it are class D and E dwellings. Tackling the building sector greenhouse gas emissions is essential to reach climate neutrality by 2050. **To reach this goal, automated solar shading must be included within the Technical Building System (TBS) definition.**
- In view of its revision, the **Energy Performance Buildings Directive's revision (EPBD)** must decrease Europe's greenhouse gas emissions, but also to raise buildings' resilience to climate change, and making them smarter with the use of digitization and building automation control systems to enhance Europeans' health and comfort.
- Today, buildings account for about 40% of the final energy consumption in the EU, of which 80% is going to heating and cooling in residential buildings and this is for more than 70% relying on fossil fuelsⁱ. The need for cooling during summer is increasing due to climate change, causing more frequent and intense heatwavesⁱⁱ. Solar shading can protect from these heatwaves blocking heat gains.

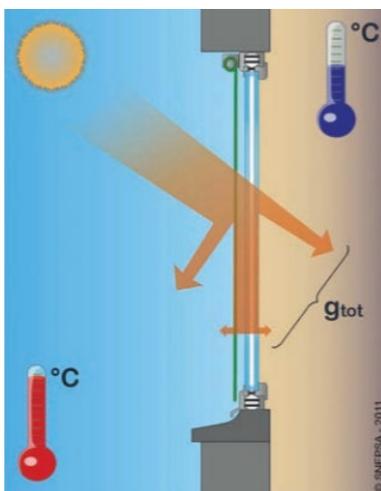
2. Solar shading a key element to save energy

- **Automated solar shading is an intelligent dynamic system that makes internal and/or external solar shading devices to operate automatically.** The solar shading device receives real-time input from sensors, such as sun, wind, temperature and combines this with pre-set data and thresholds based on the requirements from both facility managers and tenants to save energy and provide comfort. **By managing the appropriate quantity of daylight and solar gain inside buildings, automated solar shading help to reduce and optimize air conditioning during the cooling season, while decreasing heating consumption during the heating season.** Automated solar shading allows more solar gain to come into the building than fixed or solar glazing and can be considered as the most effective renewable source in the heating periods as well as for lighting.
- **In single-family house, external shutters reduce the total energy demand for heating and cooling by 38%ⁱⁱⁱ.**



PROTECTION AGAINST THE COLD IN WINTER

- Solar shading provides up to 31%^{iv} additional insulation to double glazing windows
- = By avoiding heat loss, it decreases the consumption of heating



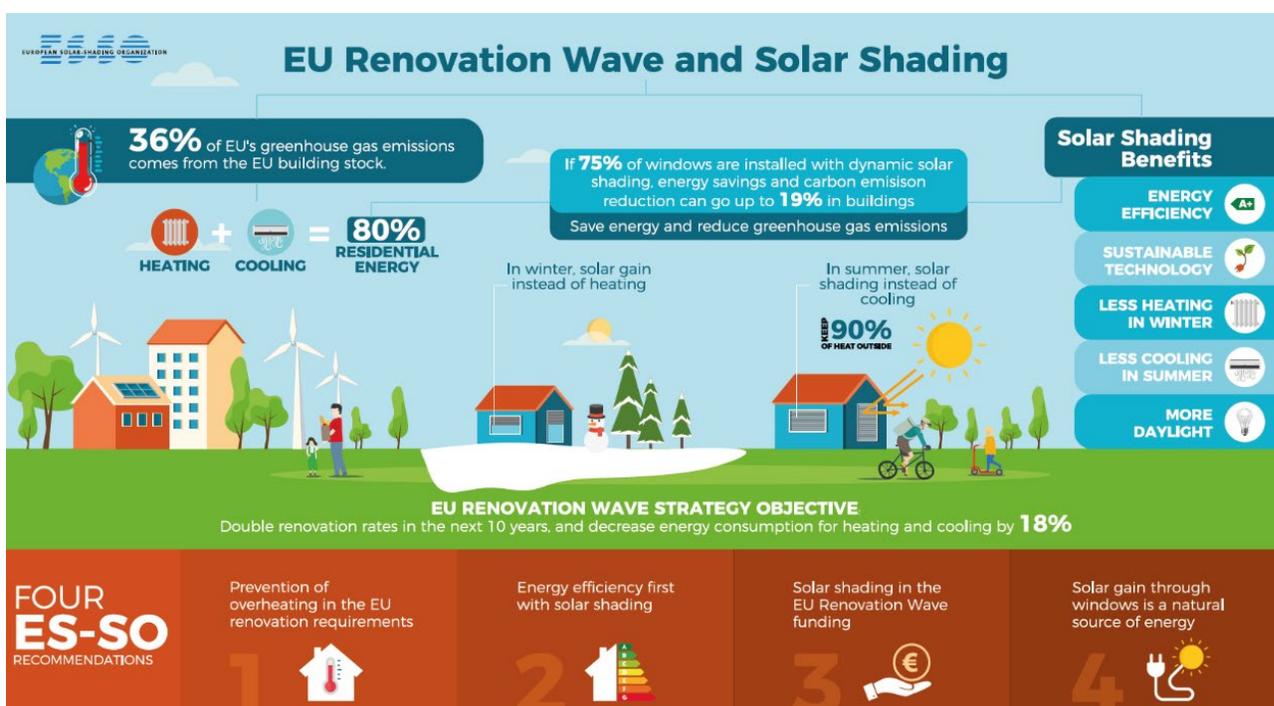
PROTECTION AGAINST OVERHEATING IN SUMMER

- Can block more than 90% of the heat outside
- Solar shading decreases by 5°C, in average, the interior temperature in summer
- In the best-case scenario, rooms with internal blinds are 8-13°C cooler^v than without blinds, while rooms with external blinds are 12-18°C cooler
- = By preventing solar gain, it optimize and reduces active cooling

- Solar shading makes it possible to manage solar irradiation in order to improve the energy performance of buildings, respecting the energy efficiency first principle, as well as the health and comfort of buildings' occupants.
- Manual solar shading is used less than 1.7 times per week when installed in offices. With automation this number increases from 40 to 50 times a week^{vi}. While people mainly operate solar shading as a result of discomfort caused by glare, automation is optimising blinds to the internal and external conditions making the best possible decision. It can save energy and provide a better comfort to building occupants, at all times. The best systems also now adapt themselves to user's habits (self-learning software).
- EU legislation, including the EPBD and Ecodesign, has put forward important provisions to optimise technical building systems but was not to include solar shading. Indeed, despite **the strong support of the European Commission and the European Parliament** solar shading was finally not included within the 2018 EPBD's revision. This revision is the opportunity to correct this and to contribute to 2050 targets.

3. Solar shading can help decarbonise the building sector

- By managing daylight and therefore solar gain, it reduces by 29% the overall energy consumption of a building and allows for naturally healthy building and occupants' wellbeing^{vii}.
- If 75% of windows are installed with automated solar shading the potential energy savings can accrue up to 19% saving in heating and cooling energy use (or 49.3 Mtoe/yr) and a carbon emissions reduction of 19% (equivalent to a saving of 117 MtCO₂/yr). If cooling would become equally important to heating the savings can add up to 22% in buildings^{viii}.
- Automated solar shading uses daylight to avoid artificial lighting. It can decrease up to 54% the use of artificial lighting in offices^{ix}.
- Automated solar shading keeps running when a building is empty. This is particularly relevant for unoccupied offices.
- Automated solar shading works with any other system: Lighting and HVAC control can be combined.
- Solar shading is a cost optimal technical building system. Indeed, dynamic solar shading is a highly cost efficient and sustainable technology with solutions generating much less carbon emissions during their production process and with energy savings reaching of about 60 times its CO₂ footprint over its 20-year lifespan^x. When automated with BACS, solar shading is more energy efficient.



4. Policy recommendations - Solar shading in Technical Building System

- It is important to **include an Article about climate resilience within the EPBD, including prevention of the overheating risk**, caused by climate change, as **part of the minimum energy performance standard**.
- It is **crucial to use solar shading in new and renovated buildings to prevent overheating, respecting the energy efficiency first principle**.
- **The ‘energy balance’ approach**, which takes into account both energy losses (related to heat loss) as well as energy gains (from passive capture of solar irradiance on buildings and building elements) when calculating the energy performance of a building or a building element of the building envelope, **has a more realistic evaluation of expectable energy savings. Smart solar shading optimises strongly energy balance of windows**.
- **Blinds, meaning solar shading devices, are already considered as part of the system in the norm EN 15232**, under the name: Motorized operation of blinds with automatic control. Therefore, it is an european solution available.
- **Solar shading must be included in the list of TBS functions as such:**

Amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency

To amend

Article 2, Directive 2018/ 844 /EU (a) point 3 is to be amended by the following:

‘3. **“technical building system”** means technical equipment for **solar shading**, space heating, space cooling, ventilation, domestic hot water, built-in lighting, building automation and control, on-site electricity generation, or a combination thereof, including those systems using energy from renewable sources, of a building or building unit;’

Justification

Global warming cause more and more overheating in buildings. It does occur more intensely and during longer period all over Europe. Windows need to be protected from natural heat first. Solar shading is a technical building system applied on windows that keeps out 90% of the heat, provided by solar radiation entering the building through windows. Solar shading is therefore a perfect use of the energy efficiency first principle as the best way to cool a building is to prevent heat from entering it at first.

Solar shading control is included in the Smart Readiness Indicator technical report service catalogue – part DE - dynamic building envelope with a positive impact on energy savings, health and well- being.

Solar shading control is included in the pr ISO 52016-3 (EPBD) Standard of energy needs for heating and cooling and internal temperatures - calculation of dynamic building elements.

ES-SO is a not-for-profit organization to Belgian Law (ES-SO) established in Brussels. It is the umbrella organization of the professional solar shading associations in the European member states. Dynamic solar shading is a low carbon emission technology designed and manufactured in Europe. The industry consists of thousands of small to medium-sized companies, employing more than 450,000 people across the Member States and generating annual sales of over € 22 billion.

www.es-so.com – info@es-so.com

eu.bac is the European Building Automation and Controls Association. It represents the major European manufacturers of products and systems for home and building automation. Its vision is a world where energy efficient, sustainable, healthy and comfortable buildings are achieved through the optimal application of home and building controls, automation systems and services. eu.bac has founded the European Association of Energy Services Companies (eu.esco) for promoting Energy Performance Contracting as the economically sustainable solution for improving the energy performance of existing buildings using the guaranteed energy savings to pay for the installation.

For more information, please visit www.eubac.org

ⁱ https://ec.europa.eu/energy/topics/energy-efficiency/heating-and-cooling_en?redir=1

ⁱⁱ EA, O. (2018). The Future of Cooling; Opportunities for energy-efficient air conditioning. International Energy Agency and Organisation for Economic Co-operation and Development.

ⁱⁱⁱ Passive cooling measures for single-family houses, REHVA, 2015

^{iv} ES-SO, Solar shading for low energy and healthy buildings, Edition 2, February 2018

^v BBSA and London South Bank University study, 2016-2018. These measures were made in October 2016 in London

^{vi} ESTIA Study, global lighting performance, Switzerland, 2014, http://www.es-so.com/images/downloads/Downloads%20publications/ESTIA_Study_English_ver_3_0.pdf

^{vii} Onix project, Barcelona

^{viii} Dynamic shading solutions for energy efficient buildings, by Sonnergy 2015

^{ix} Serge Ferrari, Philips Lighting, Somfy, onix building, study in france (Lille) about the real energy savings in a real private office building, 2016. <http://www.syndicat-eclairage.com/wp-content/uploads/2016/10/SyndEclairage-Livre-blanc-ONIXPhilips->

^x Dynamic shading solutions for energy efficient buildings, Sonnergy Study, 2015

Dynamic solar shading and its footprint, Würzburg Schweinfurt Institute Germany, page 8 “A new vision on solar shading”

^{xi} Commission Recommendation (EU) 2019/1019 of 7 June 2019 on building modernisation