Implementing the amended EPBD needs a proper assessment of windows

The implementation of the recently amended EPBD 2018/844 offers a unique possibility for member states to focus on the renovation of their building stock in a cost optimal way.

Windows' assessment needs an urgent change when it comes to cost optimal solutions for the building envelope. Why?

The energy performance of buildings today is still mainly focused on reducing the heating need as the most important factor of energy consumption and CO2 emission. However, the trend is shifting towards more cooling need due to climate change and temperature rises. Furthermore, many national reports stress that new buildings which are better insulated and air tight have a reduced heating need but tend to overheat. **By 2050 energy consumption for cooling is expected to increase sharply between 150% to 600% globally.**[1]

[1] *1 Technology Roadmap Energy Efficient Buildings, IEA 2013*

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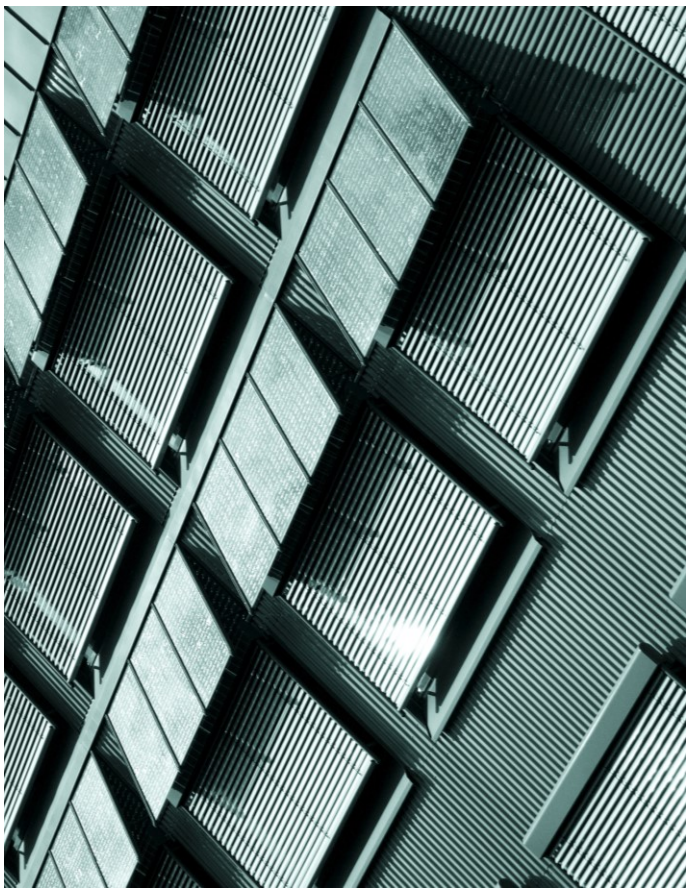
As the revised Energy Performance Buildings Directive 2018/844 is rightfully focusing on long term renovation strategies of the building stock, member states should be advised how to deal with this.



Dynamic shading on glazing can keep more than 90% of the heat outside

Climate change shifts focus from heating need to more cooling need

As climate change becomes more and more tangible, summers are getting hotter and we are all feeling the effects. In the recent summer, people everywhere in Europe were buying cheap priced fans and air-conditioning units to keep their homes cool. However, scientists warn that **hot temperatures will occur more frequently and that the use of active cooling will increase the energy consumption and CO2 emissions dramatically.** This is the opposite effect of what we want to achieve i.e. making our buildings more energy efficient.

Using the energy balance approach to assess the energy performance of windows

The assessment of the energy performance of glazed areas in the building envelope is often based on insulation properties, i.e. the thermal transmittance (U-value) of windows. The U-value alone does not include for the significant impact of solar gains. Moreover, **cost optimal calculations for performance requirements in many Member States that overlook the g-value have resulted in suboptimal outcomes**. In reality, windows are also exposed to heat gains, which can be a significant advantage in the heating season, but present a risk of overheating in summer when there is no dynamic solar shading/protection strategy used to reduce the solar factor or g-value of windows in order to avoid/minimize active cooling.

Therefore, adopting a dynamic energy balance[2] approach would give a more accurate picture of the performance of windows in their specific environments.

Because it considers solar gains from windows, the energy balance approach takes into account free solar heat during the heating season, as well as overheating prevention strategies during the cooling season. **Dynamic (moveable) shading has the advantage to be able to lower the g-value of the window** to 0.10, which means that **shading on glazed areas can keep more than 90% of the heat outside**.

2 Revising the Energy Performance of Buildings Directive: Opening up the potential of windows, Sept 2018

EPBD implementing guidelines for a proper assessment of windows with dynamic shading

Member states should consider using the energy balance[3] methodology for determining the cost optimal solutions for windows with dynamic shading.

Thanks to the use of the energy balance methodology, **shading on windows in Europe can achieve 22% energy savings and reduce 137.52 Mt/yr of CO2 emissions in buildings**[4].

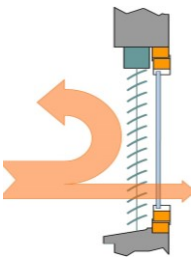
The energy balance of a window

is the **balance between the heat gains (g-value) and the heat losses (U-value) of a window**, using

- Shading as a minimum requirement to prevent overheating on southern, eastern and western oriented window façades
- Dynamic shading on glazing achieving a minimum total g-value of 0.15 to reject heat effectively from windows
- Dynamic shading with natural ventilation (night cooling by opening windows)

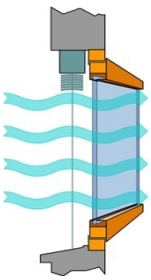
Dynamic (moveable) shading is smartly used in closed or open position to maximize the benefits of heat rejection in summer while in winter minimizing the heating needs as it permits the heat gains during daytime and to give an additional insulation layer during the night.

in summer



In closed position, solar shading keeps excessive heat outside, reducing the internal temperature and the need for active cooling.

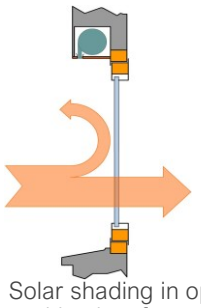
During the day



At night time solar shading in open position allows natural ventilation.

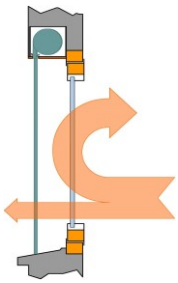
During the night

in winter



Solar shading in open position lets free solar energy in, thus less energy need for heating.

During the day



In its closed position, solar shading provides extra insulation helping to reduce heat losses.

During the night

ES-SO, the European Solar-Shading Organization, is the European umbrella of national solar shading and roller shutter trade associations based in Brussels. The shading industry employs over 500.000 people, mainly in Europe-based SME, and has annual sales approaching 50 billion euros. Its high growth potential in energy savings and comfort in buildings can provide thousands of new, green jobs, widely spread over the member states, with offering of made-to-measure, smart solar shading to local markets.

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3 Considering the energy balance corresponds to the EPBD Annex 1 where the calculation methodology shall include "the positive impact of passive heating, passive solar systems and solar protection, local solar exposure conditions and natural lighting"
4 "Cost Efficient Solar Shading Solutions in High Performance Buildings", Sonnergy Report 15/498 October 2015

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