



EUROPEAN SOLAR-SHADING ORGANIZATION

Energy Savings & Comfort

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solar shading

ENERGY SAVINGS & COMFORT

OBJECTIVES

ES-SO, the European Solar-Shading Organization, located in Brussels, was established in December 2004 and brings together the professional associations of the solar shading industries in the EU's 25 member states. The organization's objective is to defend, promote and support the interests of the European solar shading and roller shutter industry and to provide permanent contacts between its members and with the European authorities. ES-SO's higher objective is to realize energy savings in buildings, to reduce CO₂ emissions, to provide better indoor comfort and to develop specialized local employment in EU's member states.

Buildings are the largest energy-user in the EU. More than 40% of total primary energy goes into their construction and operation

CONTEXT

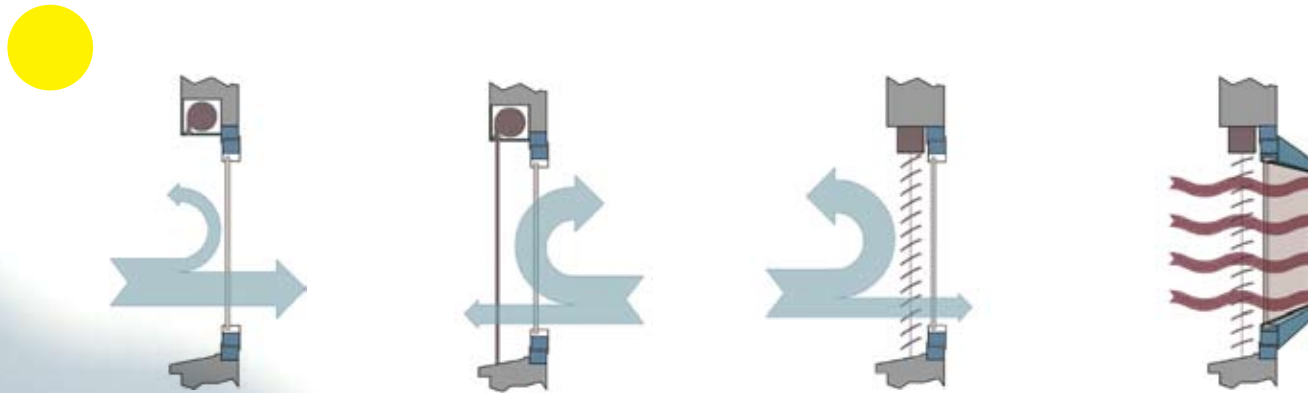
The environment, sustainability and energy are subjects that are high on the political agenda in all European countries. By 2012, the emission of greenhouse gases in Europe should be reduced by 8% below 1990 levels according to the Kyoto Protocol. Many countries are still looking for ways and means to reach this ambitious objective. Steeply rising oil prices have brought our dependence on fragile imported energy sources to renewed and acute attention. In December of 2002, the European Parliament and the Council of Ministers issued a Directive on the energy performance of buildings (EPBD). Every potential source of energy savings will have to be tapped and no opportunity can be left unattended to reach this goal. ES-SO will contribute to this goal and help safeguard the interests of future generations.

BUILDINGS

Buildings are the largest energy-user in the EU. More than 40% of total primary energy goes into their construction and operation – that is more than industry or transport. Households consume two-thirds of that total. Scientific research shows that the savings potential of the building sector by 2010 could reach almost 25%. That is about 10% of the total energy consumption, which is a massive contribution to the total energy savings objective. Since the energy crisis of the early seventies, insulation of houses and commercial buildings certainly has received more attention and has allowed substantial energy savings. But insulation alone is not sufficient. As architects like transparency and use more clear glass, the larger glazed surfaces will become the weak spots of the building, from an energy standpoint. Glass will let in the welcome passive solar energy in the heating season, to the benefit of the energy balance, but it tends to lead to excessive overheating in the summer. The answer often is the installation of a costly and energy-consuming air conditioning unit. The stormy growth of air conditioning systems in the energy consumption pattern is indeed a source of major concern: it is often a solution to a problem that could – and should – have been avoided or contained in the first place.

SOLAR SHADING

The sun certainly is the most powerful potential source of renewable energy. Therefore, we should use this enormous stockpile of free solar energy as much as possible. But we will need to control the energy impact on the building by using solar shading devices. The sketches below illustrate the various scenarios: summer and winter, day and night. They are valid for all European countries and for all different climate zones.



[Situation 1]

in winter during the day:

intelligent solar blinds will let free solar energy in, which means less energy for heating. The drawing represents an external roller blind in the 'up' position. The glass will reflect part of the solar energy, but most of it will be let in.

[Situation 2]

in winter during cool nights:

solar blinds help prevent heat losses by providing extra insulation. That translates into less energy for heating. The drawing represents an external roller blind in the 'down' position. The fabric of the blind will act as an extra insulation against heat losses to the outside.

[Situation 3]

in summer during the day:

solar shading will help keep the excessive heat out, which means no – or less – air conditioning will be needed. That translates into energy savings on the cooling load. The drawing represents an external venetian blind in the 'down' position. Up to 90% of the incoming solar energy can be stopped before it hits the glass.

[Situation 4]

in summer during the night:

when natural nightly ventilation is applied, the building can be cooled down during the night. That translates into less energy consumption when the building is air conditioned. The drawing represents an open window, which allows a night flush of the building's structure.

In summer during the day, solar shading will help keep the excessive heat out, which means no – or less – air conditioning will be needed.

VISUAL COMFORT AND SAFETY AT WORK

There are more areas where solar shading leads to better indoor comfort and to substantial energy savings: daylighting and glare reduction. Daylight control through all kinds of solar shades allows the maximum use of free daylight and can reduce the cost of artificial, electric light by up to 70%. Glare reduction will improve working conditions in offices, reduce sick leave and increase productivity. This will be to the benefit of compliance with EU Directive 89/654 on health and safety at work.

BENEFITS OF SOLAR SHADING IN ALL TYPES OF BUILDINGS

Solar shading and roller shutters, therefore, contribute to a higher degree of indoor comfort and offer distinct advantages in these areas:

- Solar heat control and energy savings on air conditioning, while maintaining free solar heat gain in winter
- Optimum use of natural, free daylight resulting in savings on electricity for lighting
- Avoiding glare and annoying reflections, thereby improving working conditions as imposed by many regulations in the area of work safety
- Lowering thermal transmittance through the transparent parts of the building envelope: insulating in winter and sun protection in summer.

In all cases, the efficiency is maximized when the blinds are motorized and automated, so that they will act also when the building is not occupied.

MEASURING SOLAR EFFICIENCY OF SOLAR SHADING SYSTEMS

How effective a solar shading device will be in stopping solar heat and regulating light is determined by its physical properties and can be measured. European standards, in particular EN 410 and EN 13363, as well as software programs developed in European projects, like WINDAT and REVIS, enable us to quantify the efficiency of sun shading systems. Summarizing the main results, we can state that solar shading can reduce up to 90% of the solar energy entering the building, that the interior temperature can be reduced by up to 9°C so that overheating can be avoided, whereas shutters can lower thermal transmittance by as much as 25%. Optimizing daylight in office buildings can reduce the consumption of electricity by up to 70% during business hours while productivity can be increased substantially with proper daylighting techniques. This shows abundantly that solar shading systems can cut down on the energy use in three areas at the same time: heating, cooling and lighting, especially when the solar shading systems are automatically controlled.

HOW MUCH ENERGY SAVINGS? HOW MUCH CO₂ REDUCTION ?

The solar shading industry can make a substantial contribution toward reaching the energy savings objectives of the European Union, as expressed by the EPBD. A properly installed and automated solar shading system can reduce the cooling load by 20 to 40%, depending, naturally, upon the surface of the glazing and the orientation of the façade. In one laboratory test, energy savings of 28% on the cooling load were found. Considering that cooling costs extra primary energy, a large potential of CO₂ savings can be expected. Extrapolation of a survey in a major EU country has shown that a reduction of at least 10 to 15 million tons of CO₂ could be achieved if roller shutters were used for the improvement of thermal insulation in private houses in the EU. And that is just one single measure. ES-SO is ready and able to launch a study to quantify the potential CO₂ reduction from other measures, such as solar blinds, as a result of savings in the area of air conditioning and artificial light, and for the area covering all 25 EU countries.

THE CONTRIBUTION THAT THE EUROPEAN SOLAR-SHADING ORGANIZATION ES-SO INTENDS TO DEMONSTRATE

The contribution of the solar shading industry to energy savings and to responsible, sustainable building practices has been addressed by scientific studies in many places (Fraunhofer Institut in Germany, UCL in Belgium, Lund University in Sweden, Berkeley Laboratory in Berkeley, CA, USA, Carnegie Mellon University in Pittsburg, USA, TU Delft in the Netherlands, etc. . .). However, the benefits of solar shading may not have been brought sufficiently to the attention of the European authorities and most certainly need further investigation. If cutting back on energy use is a true commitment in the EU, and no source of energy savings can be disregarded, then solar shading should get the attention it deserves and ES-SO has set itself the objective to achieve this. The contribution to greater indoor comfort will also lead to safer working conditions and improved productivity of all types of workers, thereby enhancing Europe's competitive edge. Finally, it should be noted that the manufacture of solar shading devices is very labor-intensive as it is practically always made-to-measure. That leads to a large number of small, local companies adding up to a sizeable number of jobs that will not easily be re-located, because of the need to ensure local service for exact measurements, installation and maintenance. Large scale use of solar shading devices, for newly built as well as retrofit projects in the residential and non-residential markets, will lead to substantial energy savings, to a considerable reduction in CO₂-emissions as well as to a sizeable job potential in the EU25.