

ES-SO Position Paper 'Solar shading is essential for low energy buildings'

Solar shading is a key element for improving the energy efficiency and daylight management of existing buildings and in optimizing the low-energy designs of new buildings. This technology is under-utilized and can provide a major impact on the reduction of energy consumption and the carbon footprint of the built environment, while at the same time improving the thermal and visual comfort of occupants. But it must be taken into account in the very early design phase of the building – or its renovation project.

New and convincing studies tracking the Earth's climate system provide strong evidence of increases in human-induced climate change with costly and undesirable consequences to societies globally. This explains why sustainability is now looked upon as an ethical responsibility. Reduction of greenhouse gas emissions however lags critically behind agreed-upon targets. Global emissions of carbon dioxide in 2010 reached an all-time high, according to authoritative sources. Meanwhile, approximately 30% of all electricity world-wide is generated in coal-fired plants, with the number growing each year. That does not help at all.

Energy prices are rising steadily but the built environment still burns away two fifths of all primary energy and emits 36% of all CO₂ in the EU. So it comes as no surprise that there is a loud call for better energy efficiency in buildings. In 2008, the European Union adopted its demanding Climate & Energy Package, committing Europe to transform itself into a highly efficient, competitive, low-carbon economy. With buildings offering the most promising potential for energy savings, the Energy Performance of Buildings Directive ('EPBD'), and in particular its stringent 2010 Recast version, is key to achieving these challenging objectives.

Energy savings of 30 to 60% can be achieved from smart, integrated and combined holistic building technologies, both for new build and for renovation. It will soon be a legal requirement in the EU member states that, from 2020 onward, all new buildings shall be 'nearly zero-energy'. But there is a huge stock of existing buildings. At the present time only 1 to 1.5% is renovated each year, a slow rate that should be brought to 3% at least, with respect for the best energy efficiency standards. In both cases, new build and renovation, more insulation of the opaque parts of the building envelope is what comes to mind first, while reducing air leaks is also important, as is proper ventilation to assure healthy indoor climate conditions. What is often overlooked however is the serious risk of overheating in summer conditions.

In most homes and commercial premises **the building envelope is the main source of energy loss - or gain**. Among its various components, windows are a static element, while weather conditions vary continuously. Yet everybody hopes - expects - to be comfortable indoors all the time. Dynamic shading is one of the essential answers to this dilemma. Shading reduces or eliminates the need for active cooling in summer conditions, by controlling the amount of solar energy entering through the windows. Properly managed solar shading allows harvesting of free, renewable solar energy in the heating season when operated by occupants and automated controls. In both seasons, it offers additional insulation to the transparent parts of the building envelope, which helps reduce heat loss in cool weather and limit heat gain in the summer. Solar shading will also manage and control daylight admittance,

reduce glare and improve visual comfort, thereby creating better indoor work environments. That's positive, as common sense tells us that people prefer natural daylight which enhances comfort and well-being. Solar shading enables large areas of glass to be used, which contributes to this effect.

Proof of the impact of solar shading is provided by lab tests, field measurements and building simulation programs like EnergyPlus or TRNSYS. ES-SO, the European Solar Shading Organization, commissioned a scientific study in 2006 which concluded that almost ten percent of the energy used in typical buildings could be saved, if only half the windows had solar shading or shutters, partly external, partly internal¹. As the market for artificial cooling – air conditioning – shows robust growth, the reduction or elimination of cooling needs and its beneficial effect on the peak load of power plants are important assets. External shading is a natural method of passive cooling and can reduce cooling needs by a large measure, as tests and measuring campaigns have abundantly shown. But internal shadings also bring many benefits, allowing better daylight control and adding extra insulation to the windows.

In support of Europe's new, enhanced EPBD directives the European Solar Shading industry, through ES-SO, has pro-actively launched **a new series of actions** to support targeted energy efficiency investments across the EU, collaborating with industry in North America and Asia. These actions include an immediate information and education campaign based on existing tools and information, while at the same time improving the technical base for more powerful future actions in support of the 2020 goals. Information and education will raise awareness of the benefits of solar shading and will vary in form, depending on building type and type of client, ranging from homeowners to building professionals. But the core science and technology are the same and apply to anyone around the world. The Solar Shading industry is globalized and offers the same wide range of materials and devices on every continent. Product suppliers deliver high-performance goods to any city, where architects and homeowners customize the selection and installation to suit regional and local needs and each building type.

To be effective, the installation of shading systems has **to be considered as soon as the first client-architect meeting takes place**. It must also be part of the building codes and included in the certification systems like BREEAM or LEED. The industry therefore organizes the researchers, educators, building professionals, and marketplace so that this technology can be forcefully and effectively implemented and that the significant additional potential benefits can be realized, to the benefit of essential national energy savings goals. Among the steps to be taken are (i) the support, expansion and adoption of CEN and ISO Standards for the optical properties and performance of solar shading materials, (ii) the promotion of the use of Simulation and Design tools based on common material databases and consistent technical algorithms, (iii) the development of new metrics and ratings for products which fairly evaluate the performance of alternative systems and designs and help quantify the technical benefits.

Solar shading can make a significant contribution to the growing global quest for nearly zero-energy buildings and deep retrofits, and therefore to the challenge to dramatically reduce energy use and the emission of greenhouse gases attributable to our building stock.

Contact ES-SO (www.es-so.eu) for more information.

¹ ESCORP-EU25, *Energy Savings and CO₂ Reduction Potential from Solar Shading*, 2006, available from www.es-so.eu