

# Smart Photochromic Glass Films: The Evolution in Glass Performance

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## Abstract

By improving the insulation value of glazing, the glass industry contributes successfully to reduce global heating demand in the built environment. However, as temperatures are increasing and heat waves are more frequently occurring, increased insulation values of glazing also contribute to the vast growing cooling demand. Therefore, the glass industry is evolving further with smart glazing to reject solar heat entrance during summer seasons, while allowing it to heat up indoor spaces during winter seasons. This paper presents a photochromic window film with a unique combination of optical properties compared to other smart glass technologies. The film has a high visible light transmission in the transparent state (88%), showing a modulation of 48% accompanied with a change in solar heat gain coefficient from 0.87 to 0.54 upon irradiation with UV solar light. This way the film enhances both daylight- and thermal comfort as well as energy efficiency all by itself. The film is simply prepared from solution by a roll-to-roll scalable coating method. Simulation shows that the film, when integrated in a low-e coated double glazing, can save up to 35% on annual energy consumption compared to the same glazing without the film depending on the climate where it is applied. Upgrading all glazing in Europe with the smart film has the potential to save about 1200 TWh of energy use annually.

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## Keywords

Smart glass, Photochromic, Scalable, Easy applicable, Energy efficiency

## Article Information

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