

The Consortium

Research institutions

- University of Bayreuth, Germany (Coordinator)
- Fraunhofer-Institut für Silicatforschung ISC, Germany
- Joint Research Centre - European Commission (JRC-IES), Italy
- West Pomeranian University of Technology, Poland

Companies

- Centrosolar Glas GmbH & Co. KG., Germany
- Eckart Pigments KY, Finland
- GLASSX AG, Switzerland
- InGlas Produktions GmbH, Germany
- Integrated Environmental Solutions, UK
- Isomatex SA, Belgium
- Bavarian Research Alliance (BayFOR), Germany



Project Profile

Funding programme

The European Union is supporting the HarWin consortium as part of its Seventh Framework Programme.

Call: FP7-2012-NMP-ENV-ENERGY-ICT-EeB

Topic EeB.NMP2012-5: Novel materials for smart windows conceived as affordable multifunctional systems offering enhanced energy control.

Project

HarWin (Harvesting solar energy with multifunctional glass-polymer windows)

Project duration

September 1st, 2012 – August 31st, 2015

Total costs

EUR 4.9 million (funding: EUR 3.4 million)

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HarWin

Multifunctional Glass-Polymer-Composite Windows for Energy-efficient Buildings

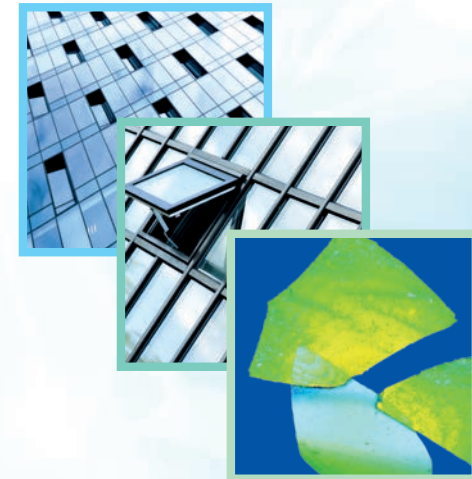


Photo: Fotolia, BayFOR, InGlas Produktions GmbH



This project receives funding from the 7th European Framework Programme

The HarWin Project

Energy and material consumption of buildings will remain a major concern for the decades to come. In all types of buildings, residential as well as commercial, the overall energy use can significantly be improved by optimizing heat accumulation and heat loss of façades and windows. New materials and systems are required not only for new but particularly for the renovation of existing buildings.

Within the FP7 Energy Efficient Buildings program (EeB) novel materials for smart windows conceived as affordable multifunctional systems offering enhanced energy control will be developed. The aims are measurable and enhanced energy control, low embodied energy and high durability, broad applicability to hot and cold climates, and observing sustainability principles. Such new windows have to offer easy installation, realistic solutions at reasonable price, adequate luminosity, light transmittance, lighter weight, glare control, thermal inertia, thermal comfort and noise reduction.



Production of laminates using an autoclave at InGlas Produktions GmbH

HarWin will achieve an increased energy efficiency of buildings by reduced material and energy consumption with the help of efficient use of new lightweight composite materials and structures for window glazing and for framing. The inhabitants' comfort will be enhanced by added functionality of the glazing without compromising the visible light transmission as well as heat and sound management properties. The newly developed materials and systems follow strictly sustainability principles.

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Project Objectives

Development of new lightweight composite materials for glazing and frames

The new glass-based materials developed within HarWin will target the reduction of thermal conductivity of laminated and coated glass panes and enable sound control and noise protection. They will combine light, heat, sound and moisture control utilizing unique laminated composite structures for glazing and new lightweight materials for the framing of windows. With the help of simulation tools, the applicability of the new structures in any types of buildings and environments will be evaluated.

Integration of solar energy harvesting components

Wavelength management of radiation from the exterior solar and interior radiant heat sources, luminescent down conversion and latent heat storage principles will be utilized for solar energy harvesting and heating as well as cooling control. Transmission, reflection and absorption of light and heat will be balanced on both sides of the window according to the requirements of comfort and reduced energy consumption.

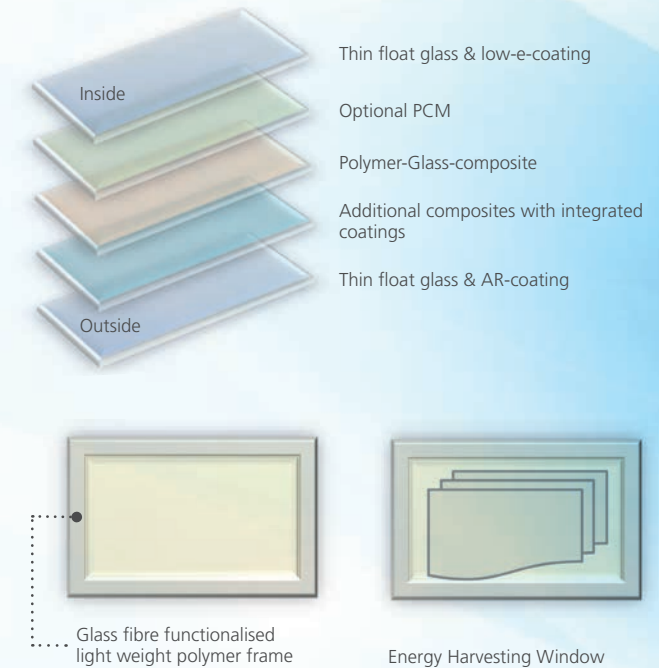
Life cycle environmental analysis of future windows

Performance of the buildings and components as well as their durability will be analyzed along with the material and component development efforts. The selection of materials, window functionality and integration of the new products into distinct buildings will be guided by the results of these analyses.



New Laminated Structures for Glazing

Schematic laminated glazing structure



Characteristics of the new windows

- Reduced weight
- Reduced energy consumption
- Reduced material usage
- Usage of recyclable materials
- Noise and heat insulation
- High strength and stability
- High transparency
- Size scalability for multi-purpose use
- Applicable to new and existing buildings