

Horizon 2020 Research and Innovation Action – InDeWaG Project

Industrial Development of Water Flow Glazing Systems



What is InDeWaG project

InDeWaG is an innovation action project, which aims to develop an exemplary building façade technology, which has a potential to minimize energy requirements and meet nZEB performance levels in a multitude of building types and in different climatic zones. It is based on the use of light weight construction principles and fully recyclable materials with low environmental impact.

Technical innovation

Industrialization of new and disruptive building technology based on variable radiant heating/cooling glazing elements for transparent façade – Water Flow Glazing (WFG), and building interior - Radiant Internal Walls (RIW). A water-flow glazing consists of two glass panes making up a chamber in which a water layer flows in a controlled way.

This innovative technology is not commercially available yet but actual weather condition testing shows promising performance results. Main advantages of WFG are acting as solar collectors, to control solar gains and to temper surrounding space, thus reducing the overall heating and cooling needs of the building.



“WFG façade elements provide maximum daylight utilization and substantially lower energy costs.”

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InDeWaG Consortium

InDeWaG project assembles a multidisciplinary consortium consisting of large industry, SMEs, research organizations and universities. The team consists of 10 project partners from three different European countries (Germany, Bulgaria and Spain). All partners are responsible for specific and common objectives. Majority group of the consortium members has successfully cooperated together in national collaborative projects and has gained significant experience from previous research and innovation projects.

InDeWaG Activities

Third International Conference for Façade Engineering Sofia, Bulgaria

November 7, 2015



For the third time ETEM has organized international conference for Façade Engineering with more than 450 participants where new ideas and concepts for modern architecture and façade engineering were shown. Arch. Dimitar Paskalev from Architectonika Studio presented the innovative capabilities of the glass façades. One of the latest technologies is the use of water in the glazing in order to reduce the sunlight and radiation. "The water circulates and leads away the solar energy. In this way the façade absorbs the radiation and turns into solar collector", explained Arch. Paskalev. In his opinion this is a great manner to achieve energy efficiency of the buildings that gives opportunities for year-round heating through buffers which store the "absorbed" energy in the hot days - the so-called zero-energy buildings. Arch. Paskalev announced the InDeWag project jointly implemented with ETEM and leading partners from Germany and Spain under the European programme for construction of industrial design of facade of glazed windows with water.



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InDeWaG at WSED Conference in Wels, Austria

February 24, 2016

A presentation of InDeWaG project was held at a conference Smart Façade Materials organized in Wels, Austria, part of World sustainable energy days (WSED). The conference provides an insight into new research results on building facades, novel insulation and smart façade materials, smart windows, active façade and energy harvesting.

InDeWaG early stage results were presented by the following speakers:

- “Reducing cooling loads in high-rise office buildings by water-flow glazing”, Belen Moreno Santamaria (& Belen Pérez-Pujazón Millán), Technical University of Madrid, Spain;
- “Solar heat gain coefficient for water flow glazings”, Juan Antonio Hernandez Ramos, Technical University of Madrid, Spain;
- “Advantages and drawbacks of using fluid flow glazing in NZEB’s, Benito Lauret Aguirregabiria, Technical University of Madrid, Spain.



Technical Workshop on Thermoactive Structures and Inertial Systems in HVAC in Buildings – “Cooling Ceilings in Nearly Zero Energy Office Buildings”

February 2016



Water-flow Glazing Ceiling

By circulating water at a temperature close to 15°C inside the chamber between the glass panes, the ceiling, in office buildings, absorbs internal heat gains. The system is capable of maintaining indoor comfort temperature, providing more stable and uniform conditions, with less energy consumption than traditional HVAC systems. Due to its moderate temperature, the system allows the integration of renewable sources.

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Article in journal *Renewable Energy*, No 92, p. 450-461, ISSN 0960-1481- Luis J. Claros-Marfil, J. Francisco Padiá, Benito Lauret, A new and inexpensive open source data acquisition and controller for solar research: Application to a water-flow glazing.

February 2016

A novel controller based on an inexpensive open source microcontroller board has been designed, built, programmed and installed in an experimental prototype water-flow window. The proposed data acquisition and control system, the code sequence steps, a model algorithm, and a comparison between the data collected by the system and a commercial data logger are presented. The advantages of using an open source board for the proposed control system are analysed and the benefits of using a control system based on a microcontroller are discussed.

Cooperation with BUILD UPON project

March 31, 2016

BUILD UPON is a 2 year European project devoted to foster the development of a long-term strategy for renovating the nation's homes and commercial buildings to high standards of energy efficiency. The project aims to empower 1 000 key stakeholders – from governments and businesses, to NGOs and householders – across 13 countries, to shape the change needed in our existing buildings.



Stakeholders



Initiatives



Dialogue



Innovation

During the meeting of the Advisory board of BUILD UPON, Veneta Novakova from ETEM presented the potential of Water flow glazing façades in the context of energy efficiency applications and innovation solutions for achieving nZEB standards.

Forthcoming InDeWag events

- **June 12-16, 2016** - Testing of Water Flow Glazing in Shallow Geothermal Systems. World Multidisciplinary Civil Engineering-Urban Planning Symposium WMCAUS, Prague;
- **June 17-18, 2016** - Emergent Behavior in WFG by means of Decentralized Control. International Conferences Mathematics Everywhere. International Centre for Mathematical Meetings, Castro Urdiales, Spain;

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- **June 22-25, 2016** – Presentation of InDeWaG project and progress. Central and Eastern European Energy Efficiency Forum (C4E Forum), Balchik, Bulgaria;
- **January 16-21, 2017** - InDeWaG will be presented at ETEM's Stand as well as a Co-Exhibitor at the European Construction Technology Platform Stand. BAU 2017 – World's leading trade fair for architecture, materials and systems, Munich, Germany.



BAU 2017

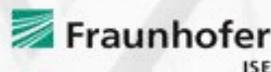
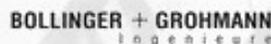
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PARTNERS



COORDINATOR

University of Bayreuth
e-mail: coordinator@indewag.eu

PROJECT INFORMATION

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