Partners

UNIVERSITAET BAYREUTH (UBT)
University of Bayreuth, UBT, Germany, has an excellent reputation as a foremost academic institution with many prestigious awards. UBT is among the Top Ten of the Humboldt Foundation ranking list and in 2nd place in Germany as well as rank 40 worldwide in The Times Higher Education ranking list of 100 best "young" Universities (less than 50 years since foundation) (2013).

BOLLINGER+GROHMANN INGENGIEURE
Bollinger+Grohmann Ingenieure, Germany provides a complete range of structural design services for clients and projects worldwide. They have successfully been collaborating with numerous internationally recognized architects for years and strive to always provide the best solution through their creativity and technical excellence. The office contributes to InDeWaG with their longstanding experience in energy efficient building design, building structures, facade design, building performance and consulting for energy efficient and sustainable buildings.

ETEM BULGARIA AD (ETEM)
ETEM, Bulgaria, complements the industry participation in the project with their experience in designing façade systems which are cost effective, user friendly and ready for mass production. Their main contribution in the project will be the set up of technical requirements for the system solution and the design and production of the aluminum profiles for the facade system as well as active involvement in the business cases and market uptake.

HTCO GMBH (HTCO)
The SME HTCO, Germany, as a leading engineering company in the field of fluid flow and heat transfer simulation will be responsible for the development and optimization of the geometrical design and physical performance of the active solar multi-layered facades.

SAVIOR VENTURE CAPITAL (GMAE TRANSFORMA S.L.) (SVC)
The SME Savior Venture Capital - SVC, Spain, was founded in 2008 by an ex McKinsey engagement manager to strengthen companies' competencies in industrial processes and help disruptive technologies become business by devising sound business models.

TECHNICAL UNIVERSITY OF MADRID (UPM)
Technical University of Madrid (UPM). Spain, is a public university in Madrid area that comprises Engineering and Architecture Faculties. UPM Members hold patents related to Building Energy Management. They have developed devices and Systems to monitor and to reduce energy consumption in buildings.

CERVIGLAS S.L. (CG)
Cerviglas S.L., Spain, to complete the consortium, the SME Cerviglas will be responsible for the production and technical advice of glasses and prototypes for the InDeWaG facades. With more than 30 years' experience in the design and development of facade glass projects, the company plays a major role in the consortium, especially for technological advice and anticipating market demands.

FRAUNHOFER GESELLSCHAFT e.V. (FRAUNHOFER)
Fraunhofer Gesellschaft Ev, Germany, for testing and measuring the fluid glass facades, the large research organization Fraunhofer will provide their cutting-edge test facilities, e.g. to investigate transmittance, reflectance, energy performance, accelerated as well as outdoor exposure tests to assess the reliability of the proposed materials and of demonstrators.

ARCHITECTONIKA (ARCH)
Architectonika, Bulgaria. The architectural bureau and SME Architectonika with its focus on energy efficient building solutions contributes to the project with architectural design aspects and applications, the impact on architectural aesthetic and forms as well as daylight/artificial light aspects.

CENTRAL LABORATORY FOR SOLAR ENERGY AND NEW ENERGY SOURCES (CL SENES)
The Central Laboratory of Solar Energy and New Energy Sources (CL SENES), Bulgaria, as a research institution in Bulgaria is focused in doing primarily fundamental and applied research in the field of renewable energy sources and in particular solar energy.

InDeWaG

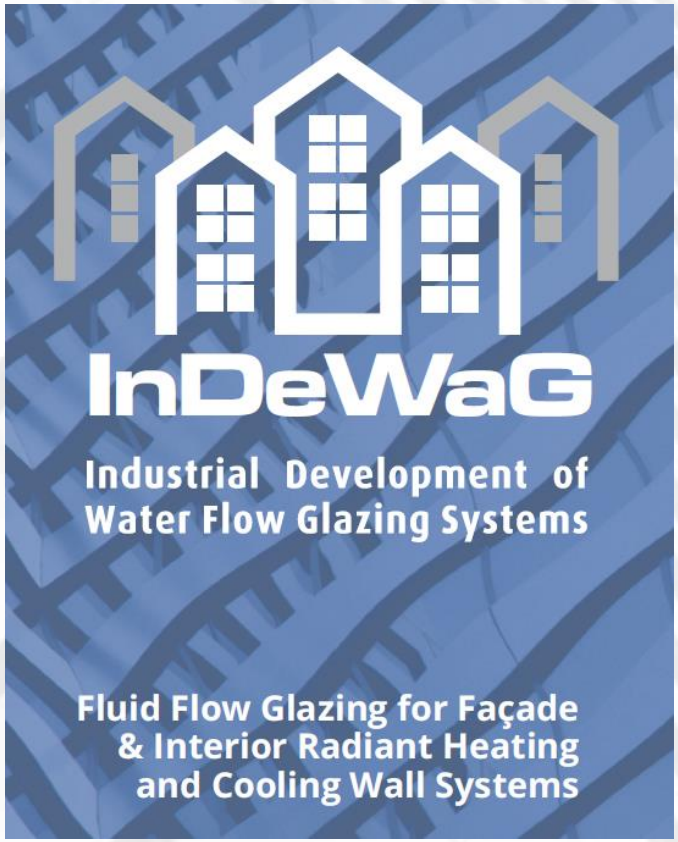
Contacts:

Prof. Dr. Dieter Brüggemann

/Project Coordinator/
e-mail: coordinator@indewag.eu

European Commission
Horizon 2020
European Union funding
for Research & Innovation

Buildings design for new highly energy performing buildings



Nearly Zero Energy Building (ZEB) performance levels will become a "must" for new buildings in Europe by the end of 2020. The goal will be reached by introduction of **new, disruptive building envelope systems** which enable significant **cost reduction for multiple types of ZEB** in different climate zones.

InDeWaG aims at technical innovation which will bring to industrial ripeness a facade and interior wall system based on **radiant heating and cooling glass surfaces made from fluid flow glazing (FFG),** which harvests solar energy for various use at large scale.

www.indewag.eu

InDeWaG Scope

The concept of nearly Zero Energy Buildings (nZEB), which produce as much energy as it uses over the course of a year, evolved from research to real implementation. By the end of 2020, net zero energy buildings will be obligatory for European countries. The progress in construction technologies, renewable energy systems and academic research, make nZEB more and more feasible. Ensuring better quality of the microclimate and living conditions in a building is a result of the demand for economic-effective solutions to reach the energy costs reduction. The function of buildings is defined by their design, their function and the specific climate conditions of the location. One of the possibilities to achieved nZEB is the introduction of innovative building envelope systems. InDeWaG is introduced as a solution for this issue regarding cost reduction and industrial development of Water Flow Glazing (WFG) Façade components.

Objectives of InDeWaG

Cost efficient solar energy harvesting

The main objective of InDeWaG is to develop an industrial technology for fabrication of affordable general-purpose Fluid Flow Glazing (FFG) façade elements, which give maximum daylight utilization and maximum interior comfort at energy consumption level of nZEB. In addition, also interior radiant elements will be developed.

The industrial development of this innovative façade technology is the main goal of InDeWaG consortium, enabling an important step forward towards achieving nZEB standards. The cost reduction goal and nZEB performance will be achieved by combining Fluid Flow Glazing façade (FFG) and PV-installation, which minimize the energy costs for heating, ventilation and air conditioning (HVAC).

For these purposes will be developed

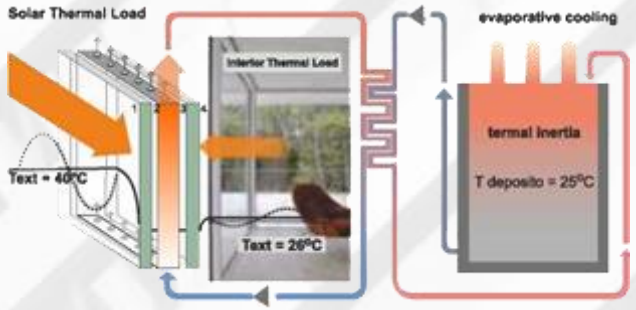
- multiple types of nZEB in different climate zones;
- a simulation tool for early stage planning of buildings which use these innovative glazing building envelope and elements.

The project aims at technical innovation, introducing a new building envelope system which has at least 15% building cost reduction potential and could be brought to industrial ripeness.

The industrial development of this façade technology is the main objective and the ambition of InDeWaG project.

InDeWaG Activities

InDeWaG is currently in the initial phase. For active development of the project targets the activity development is distributed into nine Work Packages - Fluid simulation for building envelope and interior, Energy management at building and district level, Materials and components for FFG, Construction & production, Demonstrators, Life Circle Analysis, Cost & market analysis, Dissemination and exploitation, business plan and Coordination & management.



Principle of Fluid Flow Glazing as actively controllable radiant cooling and heating element (Source: Intelliglas, 2014)

Approach

The unique approach of InDeWaG consists of enabling maximum use of daily sunshine by a transparent glass façade and at the same time meeting nZEB requirements. The core element to achieve is a "triple glazing element" in which a fluid (water-glycol mixture) is circulated in one of the partitions.

FFG Application in nZEB strategies

❖ Façade application

FFG could be used as facade elements and interior partitions (walls and ceilings) and could fully substitute existing façades. Façade characteristics (g-factor, U-value) may be actively controlled to achieve best energy performance of the façade.

❖ Heating, ventilation, air-conditioning (HVAC)

FFG is an important part of a building's HVAC system as a radiant heating/cooling element. The costs related to the standard HVAC system could be 100% covered if the common partition walls are replaced by FFG. Because of the high absorption of IR radiation by these façade elements, the peak loads of the conventional cooling system may be significantly reduced - up to 30% less installed nominal cooling power -without usage of any mechanical solar protection (e.g. blinds). The amount of energy absorbed (renewable solar summer excess) may be used directly for domestic hot water (DHW) and to improve the performance of the heat pump.

❖ Renewable energy sources

FFG façade elements function as transparent low temperature solar collectors. The efficiency of FFG is relatively lower (below 40%) in comparison to the conventional solar collectors. This is mainly due to the facade orientation and vertical installation.

❖ Illumination

One of the advantages of the FFG façade elements is the improved natural illumination of interior spaces. Due to this the artificial lighting is rarely used and this leads to cost reduction. The achieved energy savings help to meet nZEB requirements.