

FLUIDGLASS, an adaptive glazing

Project set-up

Duration Beginn Sept. 2013 –
 End Aug. 2017 (48 Monate)

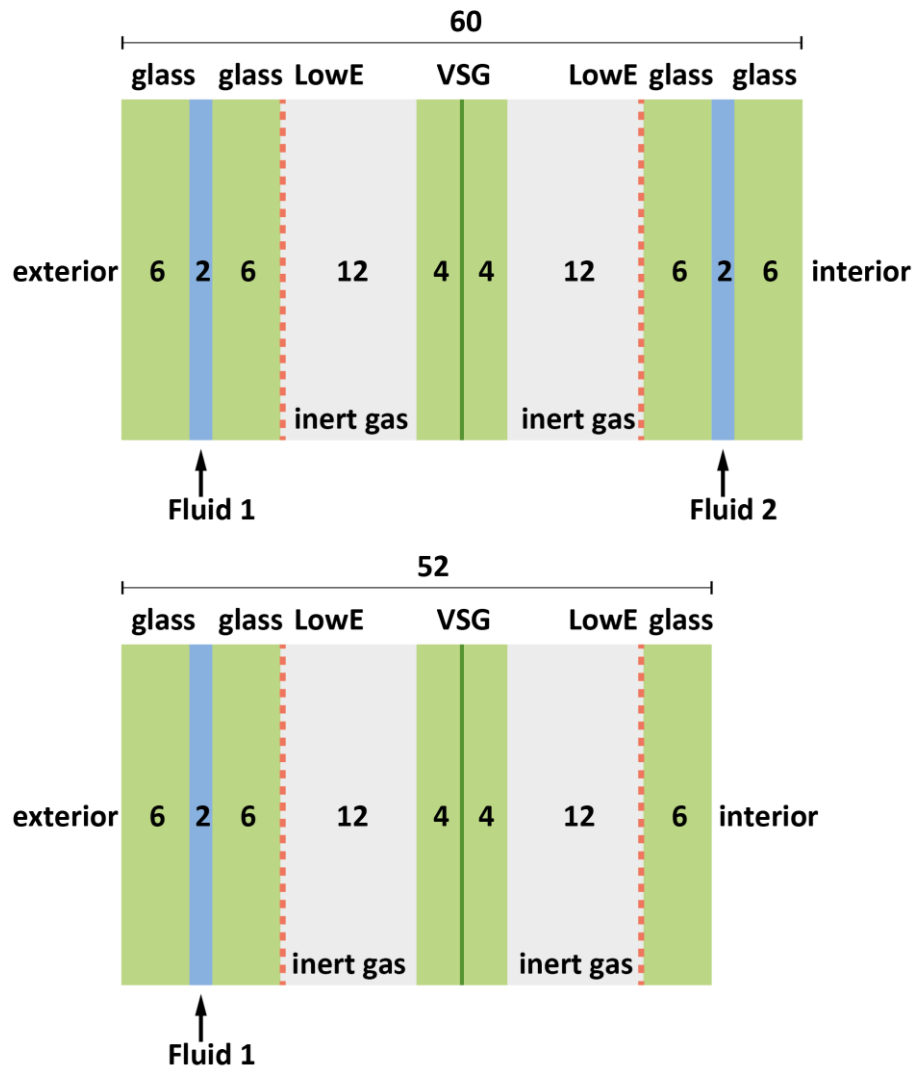
Budget € 5.1 Mio (€ 3.8 Mio funding EU)

Academic partners

LIE	University Liechtenstein
SUI	NTB, Interstaatliche Hochschule für Technik Buchs
GER	TUM, Technische Universität München
FRA	CEA-INES, Commissariat à l'Énergie Atomique et aux Énergies Alternatives
GER	Universität Stuttgart

Industrial partners

AUT	MGT – Mayer Glastechnik GmbH
SUI	GlassX AG
LIE	Hoval Aktiengesellschaft
CYP	Cyprus Research and Innovation Center Ltd
FRA	ALCOA Europe Commercial SAS
CZE	AMIRES s.r.o.



The standard Fluidglass comes with two fluid layers. In addition, the concept with one fluid layer will be studied

Outer fluid layer (Fluid 1)

- Water in chamber absorbs parts of solar radiation and heats up the fluid
- Control of transmittance by adapting color and flow rate

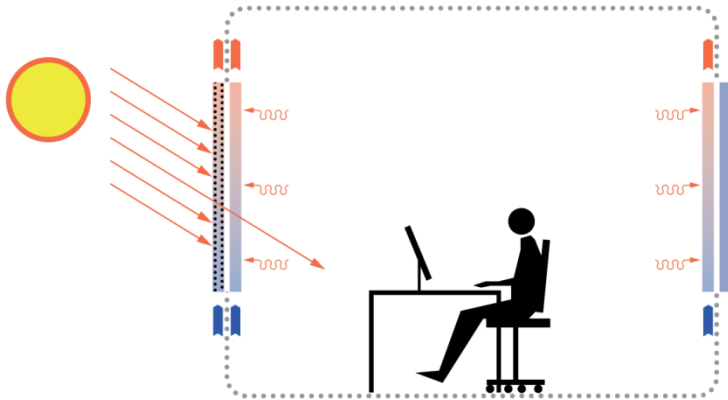
Insulation layer

- Standard inert gas filling

Inner fluid layer (Fluid 2)

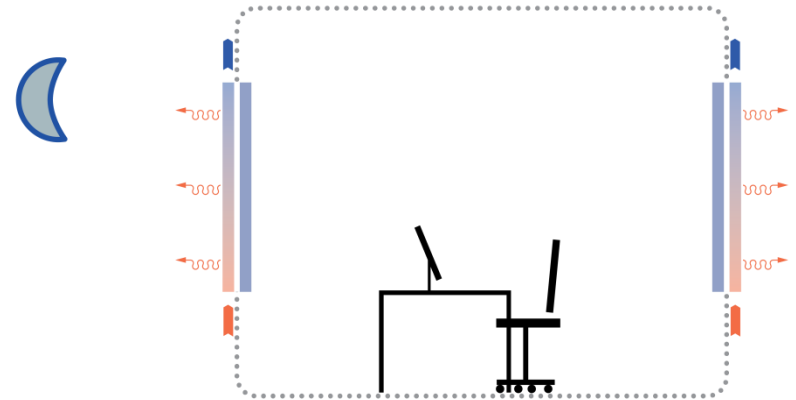
- Control of room temperature by setting temperature and flow rate

Frame with hydraulic components



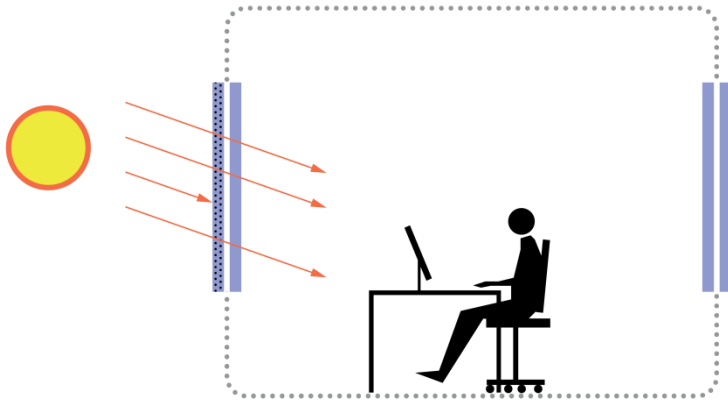
Summer case, day

- The outer fluid (Fluid 1) is darkened to minimize solar gains, yet visual transmittance is still possible
- Solar heat gains in the outer fluid can be used elsewhere in the building
- The inner fluid (Fluid 2) is circulated with cold water and operates as cooling panel



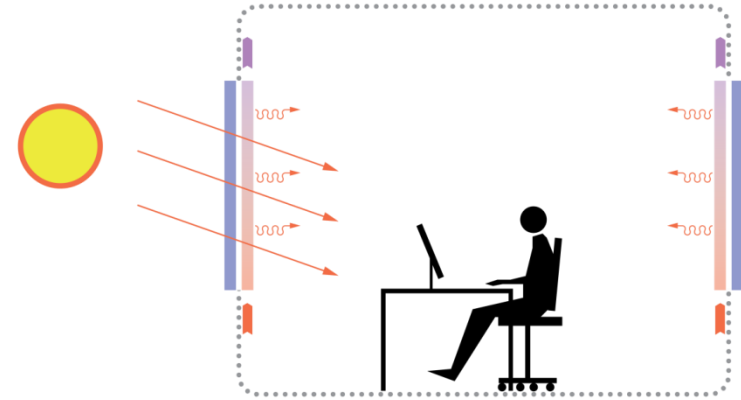
Summer case, night

- The outer fluid (Fluid 1) is darkened
- Circulating warm water in the outer fluid layer allows dissipating surplus heat collected and stored in the building during the day by radiative heat transfer
- The inner fluid (Fluid 2) can be used as a cooling panel by circulating cold water if required



Spring / Fall

- The outer fluid (Fluid 1) is slightly darkened, depending on demand
- Solar irradiation is accepted in the interior space if a heating demand exists, but transmittance is reduced if over heating is expected
- The inner fluid (Fluid 2) can be operated as heating or cooling panel if required



Winter case

- Typically, the outer fluid is not darkened to allow optimal interior day light quality
- Interior heat gains reduce the heating demand
- The inner fluid (Fluid 2) is circulated with hot water and operates as heating panel



Reduced investment costs

Fluidglass can fulfill four key functions of a facade and substitute the relevant components

- Insulation
- Shading
- Heating and cooling
- Solar thermal collector

Reduced energy demand

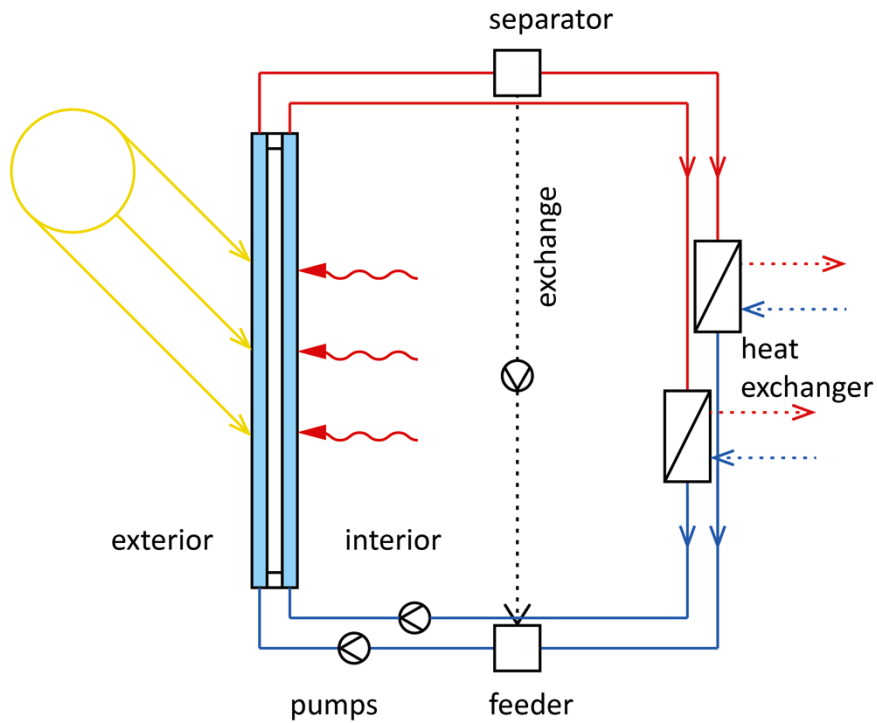
For heating, cooling and lighting, since Fluidglass can directly control and optimise the energy flows through the building envelop

Increased thermal comfort

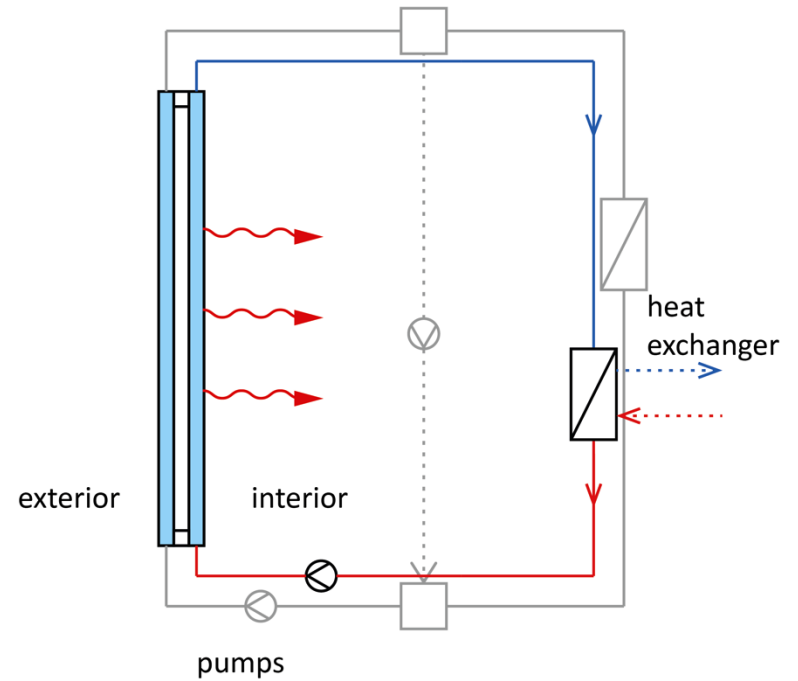
Based on dynamic control of solar transmission and comfortable surface temperatures

Components

Summer

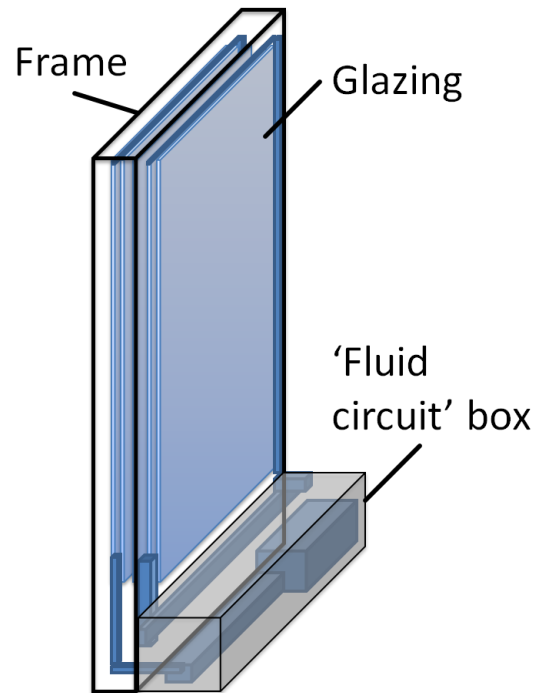


Winter

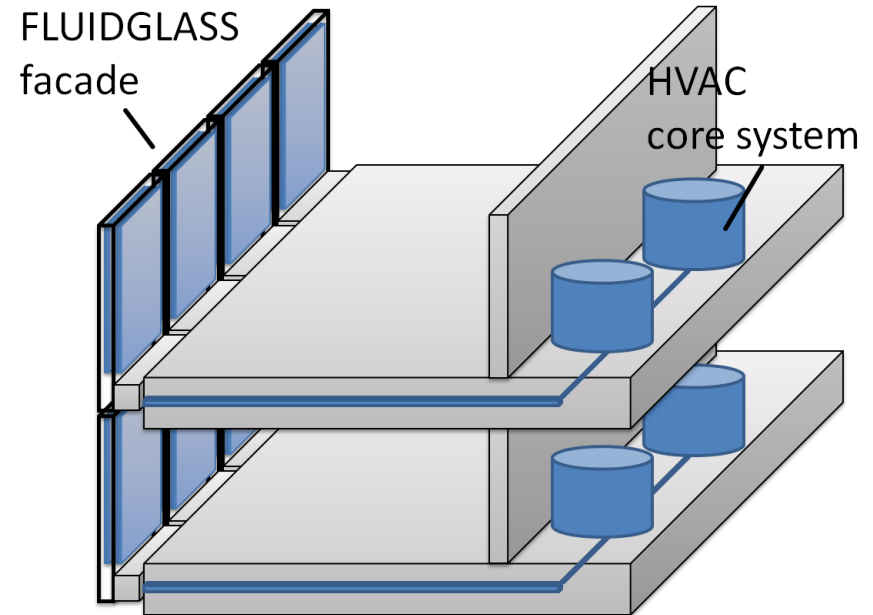


shading – solar thermal collector – cooling – heating

Façade system



Every FLUIDGLASS element comes as a prefabricated plug-in module with fully equipped closed fluid circuits. Pumps, separator and feeder are cased in the Fluid circuit box



The FLUIDGLASS system is installed like a unified curtain-wall. The connection to power supply, building management and HVAC core system is possible via bus interfaces and heat exchangers.

Separation and Colorant

- Currently, magnetic particles are used for separation
- Already low concentrations of the colorant allow considerable reduction of the solar transmittance.
- The visual transmittance is always above the solar transmittance.

Colouring

- Depending on the demand, concentration and mass low rate control the solar heat gain

Clearing

- Depending on the demand, the fluid can quickly be decoloured.



Prototype

Slight colouring



Quick colouring



Prototype

Solar test-bench



Current prototype



Merci

Foto: Heinrich Kleeberger, TUM

www.fluidglass.eu