

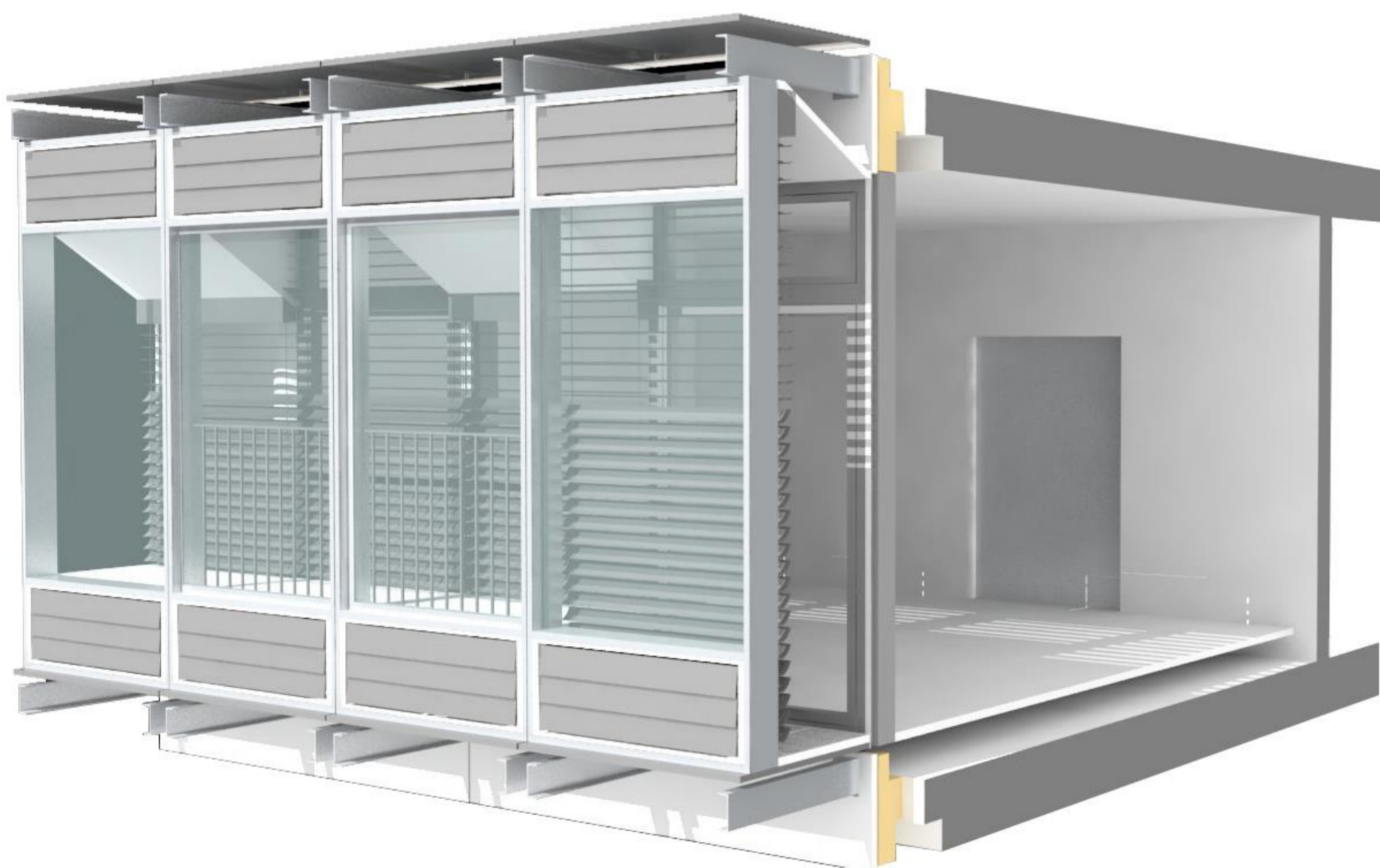
## BYPASS DOUBLE SKIN FACADE

### DOUBLE FACADE SYSTEM WITH NATURAL VENTILATION IN OPTIONAL FLOW PLATH

#### MOTIVATION

Due to the lack of sufficient design guidelines for double skin facades the energetic and acoustical aspects are often not sufficiently considered and the design is primarily driven by aesthetic perspectives. Complex thermal effects in the facade cavity often lead to losses in energy efficiency and user comfort.

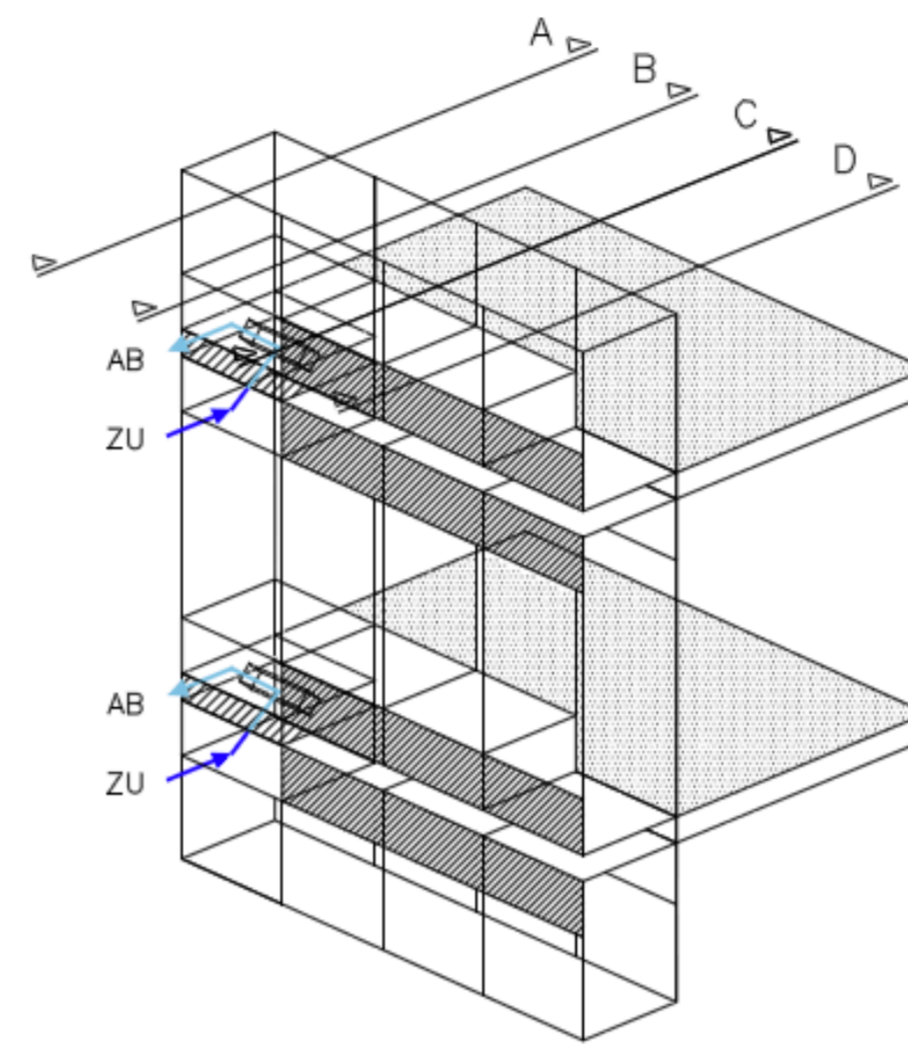
The main aim of the bypass double facade is to maintain the user comfort and to protect the interior against overheating in summer without active cooling or mechanical air ventilation. Therefore the focus of this facade are bypass air channels through which the external air will be directed into the interior without absorbing additional thermal energy in the regular facade cavity. In winter time this absorbed energy in the facade cavity will be used to reduce the demand of heating energy.



Rendering of the Bypass Double Skin Facade

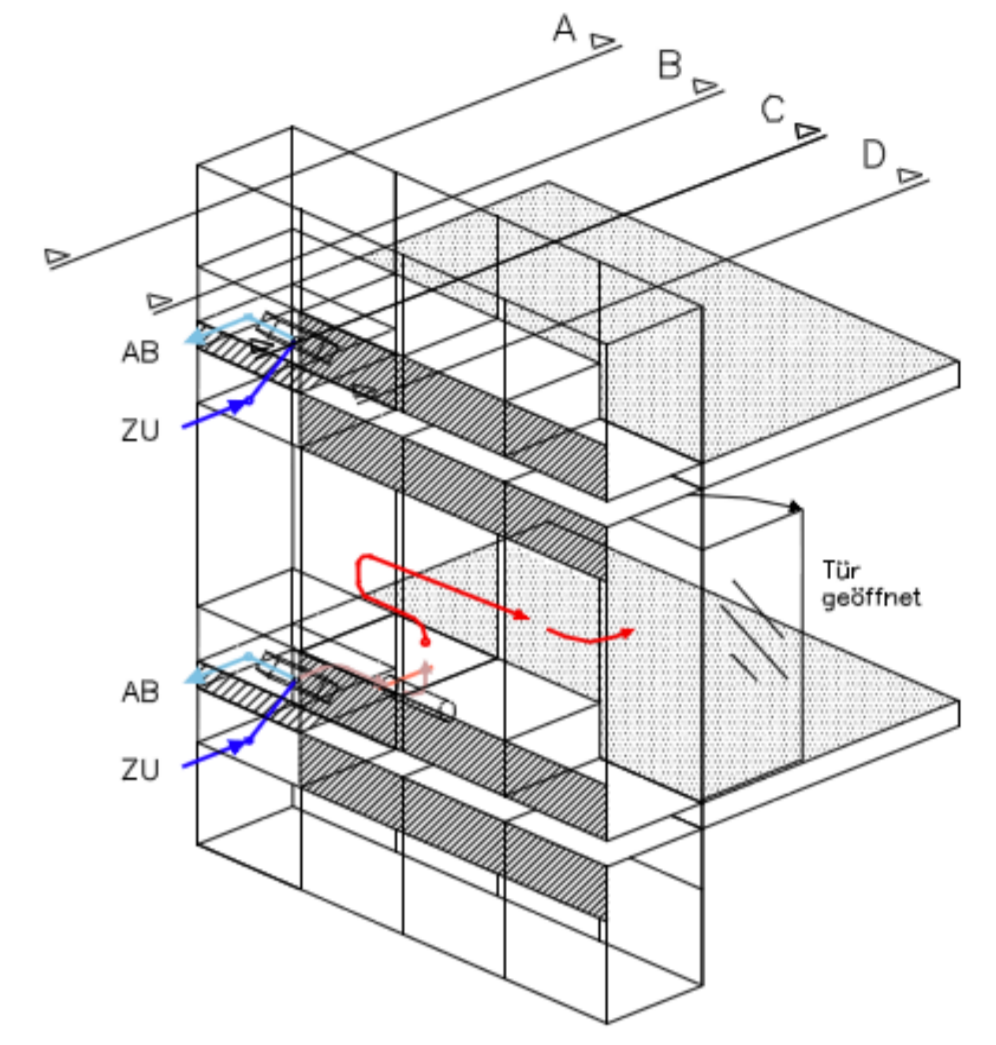
#### METHODS

The energetic conception of the facade and the dimensions of the bypass channels and all louvers is based on four climatic design cases.



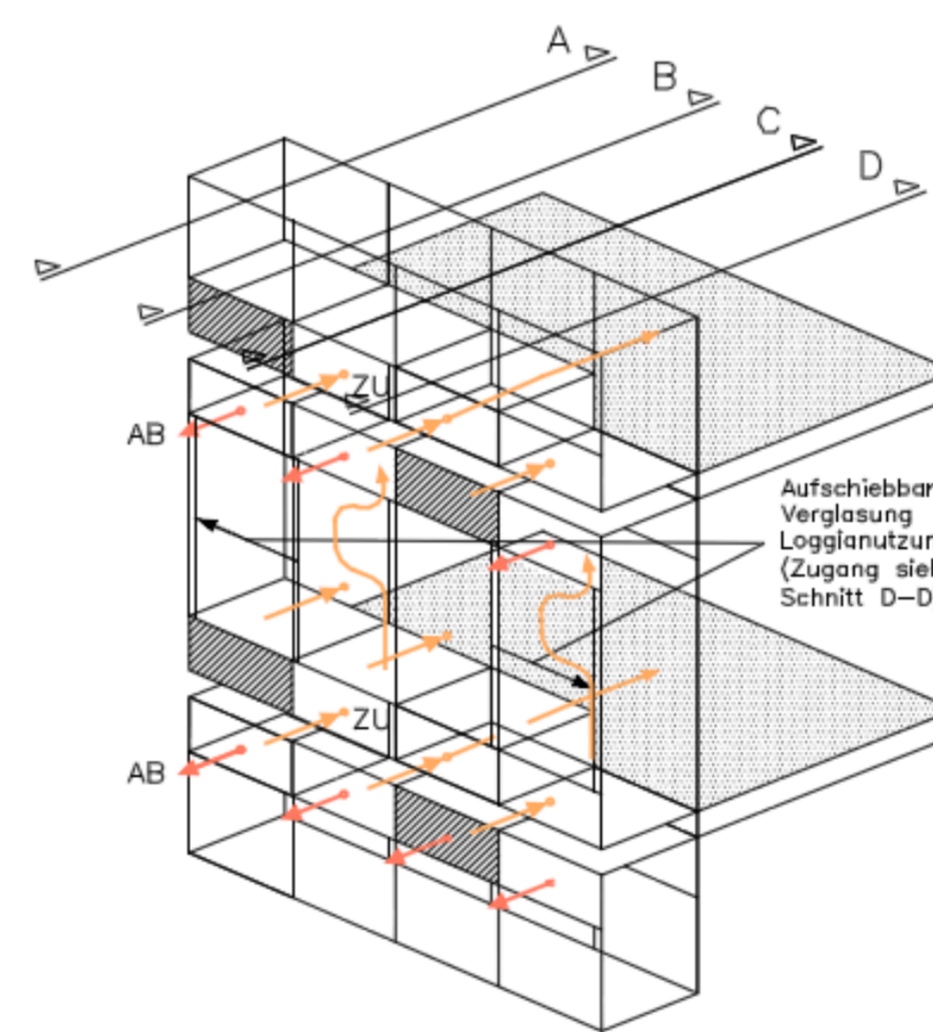
Case I - Cloudy winter day

Limitation of the air exchange rate to the hygienic required minimum to minimize heat losses. For the intelligent control of the louvers, the CO<sub>2</sub>-level of the room air is measured. A ventilation heat recovery system is used.



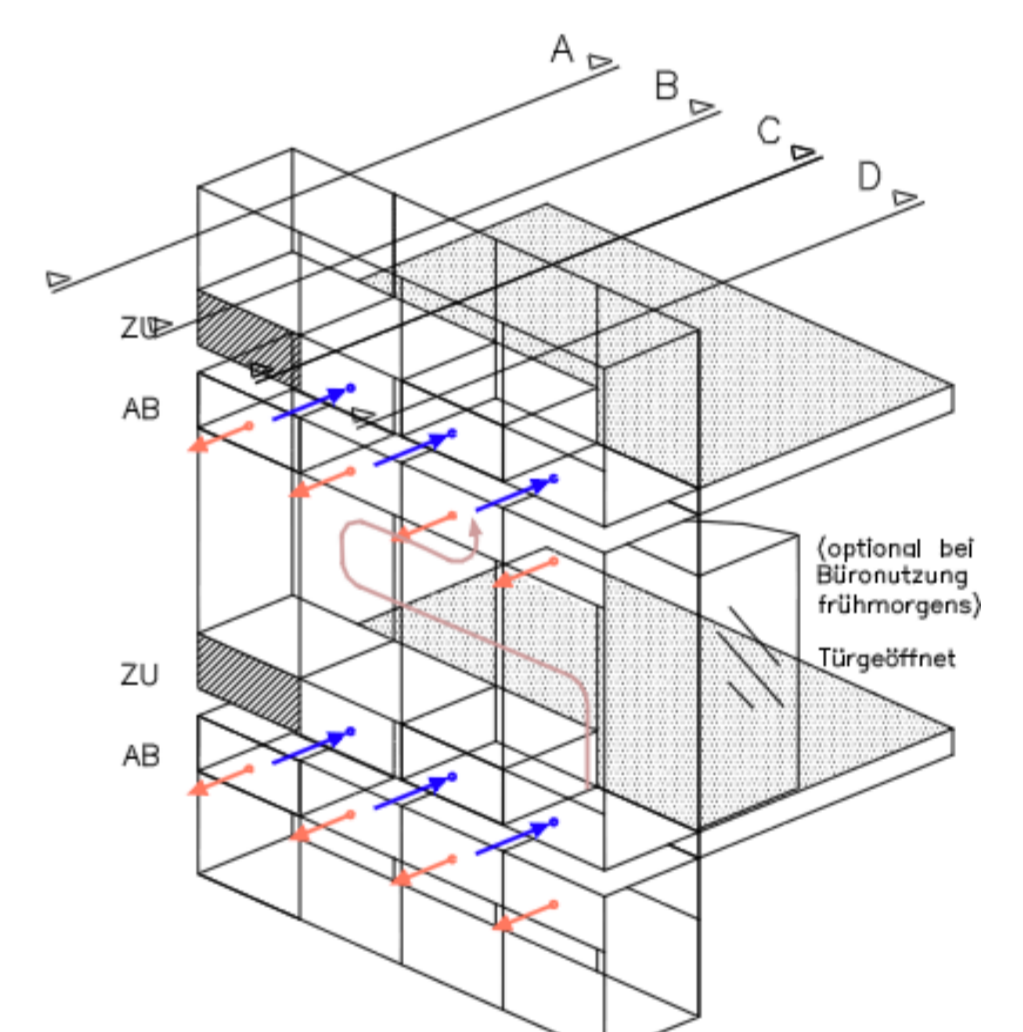
Case II - Sunny winter day

The inlet air is preheated by the heat recovery system. Then the inlet air is directed through the facade cavity to gain additional thermal energy before it reaches the opening to the interior.



Case III - Hot summer day

Limitation of the air exchange rate to the hygienic required minimum to reduce heat gains in summer. The inlet air flows is directed through the bypass channel directly to the interior to avoid additional heating in the cavity.



Case IV - Summer night cooling

Maximize the heat convection from inside to outside. The air exchange rate is limited by air velocities which may occur damages during the night or by user comfort (draught) during the morning

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Funding: Bundesministerium für Wirtschaft  
und Energie (BMWi), Forschung für  
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