

# Adaptation strategies for construction and desing of administration buildings

Can current comfort criteria of summer thermal insulation and the enactment 2010/31/EU of the European Parliament about total energy efficiency of buildings in expected climate of the year 2050 be adhered to with conceivable future technical scopes?



## **Exposé – Short-form**

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An actual problem for engineers and architects is due to the fact that buildings, particularly administration buildings have to meet many requirements today. Occupants want to feel comfortable, owners or renters await an energy efficient and functional building. New laws and directives with main focus on users comfort in summer and energy efficiency need to be followed, architects and real estate markets require a building skin that is effective for marketing strategies.

A directive of the German federal government requires that all future federal buildings follow expectancy model of EN 15251 for comfort assessment for type alpha-buildings must be executed and observed. The expectancy model assumes that comfort and well-being are achieved if the room climate satisfies the expectation of the building user. With the assumption of self control of thermal comfort this comfort model says users felt comfortable with higher temperatures in summer and lower temperatures in winter. The individual control will be achieved by natural ventilation, cancelation of dress codes plus minimum one temperature regulator for 2 working places with an adjustment of +/- 2 °C and/ or an openable window for 2 work places. The assessment of thermal comfort happens by a categorization in comfort classes from I to III. For new buildings comfort class II with maximum 5% exceeding hours of the operative (feeled) temperature is defined (cp. BMVBS 2008 and EN 15251 2007). Could this be component of the EnEV in future?

By an enactment of the European Parliament of May 19th 2010 (cp. EP 2010) it was declared that all public buildings of the European Union need to fulfill low energy consumption by the end of 2018 (nearly-zero-energybuildings). All private buildings need to fulfill this standard as of the end of 2020. At least as much renewable energy should be placed on site as the respective building consumes itself (cp. *Frankfurter Rundschau, Wirtschaft* 2010). To avoid an overloading of administration buildings by renewable building techniques and to keep the costs of it low, it is reasonable to take actual comfort criteria as energy saving methods into account. For example, natural ventilation, daylight oriented work-places and/or efficient shading systems are advantageous.

The business of architects and engineers to design creative ambitious buildings is necessarily extended by the consideration and observation of actual comfort criteria with the help of passive climate control and the embedding of renewable energy. In a future architectural competition it theoretically could be possible that the nominated design does not fulfill the criteria of observed laws. Maybe there is not only the need for redesigning, but also a completely new design needs to be worked out. Because of these facts surely corresponding requirements in architectural competition announcement need to be included. Therefore, a confident handling with the basics of actual comfort criteria, building services and renewable energy is essential for future architects. A rethinking in science and teaching-methods at junior staff development and with architectural planners is needed.

European concerns need to deal more and more with trendsetting business policy. It can be assumed that European concerns normally do not choose the expensive building model with overloaded regenerative energy techniques, but equip their building with renewable energy in moderate ratio and to economize by comfort orientated measurements. In this case, an passive building user who is, in consideration of comfort, heteronomous accustomed by an fully engineered building , that thinks ahead for every climate case (of emergency) need to regress to an active user again. Therefore, it is reasonable for business policy to be supportive, for example, by the relaxation of dress codes or an explanation of an efficient handling of the building.

#### Leading science questions:

- Which currently acknowledged rule of technology works towards an optimization in planning future administrative buildings?
- How can a design process be developed that assures the synthesis of a comfort-, energy- and optimely designed administration building?
- Can building typologies be appointed or is the planning task so expansive that only a planning process can be characterized?
- Which arguments, mechanisms and tools are there to strongly adapt business policies for future administration buildings and to ease the way from a passive building user to an active one?

The goal of this work is an analysis of options for the development of a comfort-, energy- design optimized design process for sustainable future administration buildings in consideration of the expected climate in the year 2050.

In the following, optimization facilities for business policy and users behavior will be deduced under consideration of the above named analysis results and the conditions of future buildings. The building itself can be built comfort orientated and energy efficient indeed, but only the interaction of the user with the functions of the building can adjust the desired comfort (cp. Shove 2003) and/ or save energy.

F. Nicol states in his paper of the 3rd international conference "Passive and Low Energy Cooling for the Built Environment": *"This paper has tried to present comfort, not as a thing but as a process. Comfort is a goal which people find ways to achieve, not a product which the building provides. The purpose of the building should be to enable the occupants to achieve their goal, preferably by low-energy means."* (Nicol 2010)

The method is not specified in this short-form exposé. For further inquiries or a communicative exchange on scientific goals I am available by e-mail.

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## Pictures and charts:

Figure cover patch: selfmade photo, Vienna 2010