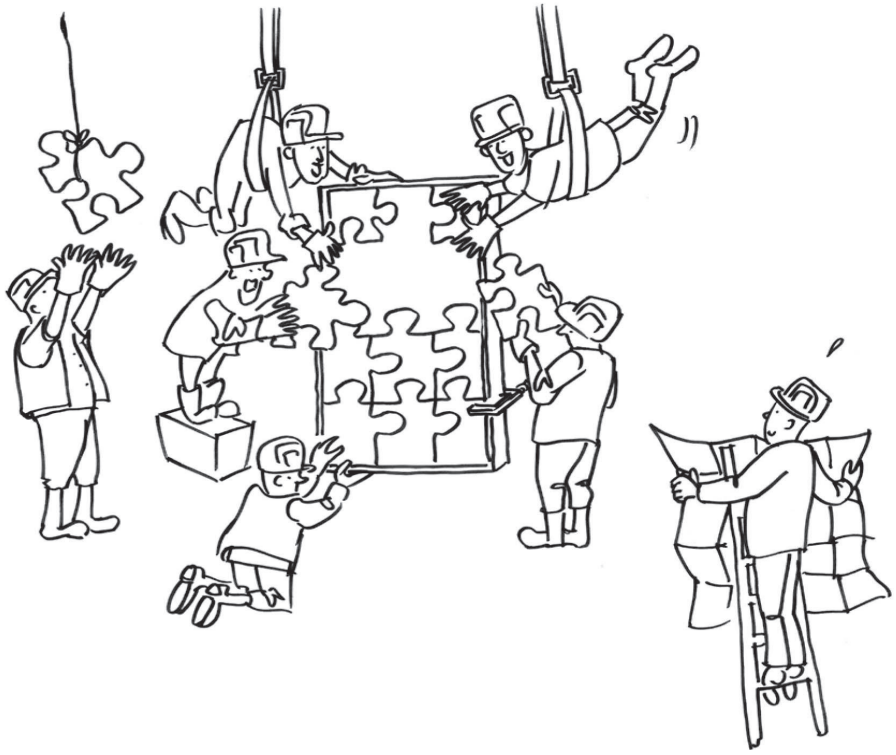
ZUMTOBEL

Press release
Dornbirn, May 2010

How do we make our buildings more intelligent and efficient?

Complexity - Simplicity - Synergy



B1 I Joining forces to generate synergies by integrating building services

In a joint project conceived by architect Stefan Behnisch, Behnisch Architekten (Stuttgart/ Munich/Boston/Los Angeles) substantial synergy effects for more sustainable building are intended to be shown.

The aim of the project is to provide substantial synergy effects through the integration of various services separate until now:

- Savings in building volume and accordingly construction costs
- Ergonomic office lighting
- Increase of the quality and flexibility of the use of offices
- Higher lighting quality at less energy consumption
- Increased user friendliness
- Better and easier maintenance

These innovations are made possible through:

- The use of facade surfaces blocking out incident daylight for photovoltaics to produce energy
- Division of lighting fixtures into room lighting integrated into the facade, and a particularly flat wide-area luminaire in the depth of the room (saves room height)
- Integration of sophisticated services into intelligent facades, accordingly simplification of the remaining building, e.g. by: decentralised air-conditioning system in the facade

By way of its LED lighting technology, its expertise with respect to daylight-based control systems, and the newly developed Ciria control point for all room functions, Zumtobel has been able to contribute vital impulses to this project.

One essential aspect of the project is the room lighting concept:

- The office areas are illuminated extensively, at a mean illuminance level of 300 lux, by luminaires integrated into the facade and a wide-area luminaire located in the depth of the room (artificial skylight).
- Additional 200 lux for the illuminance level required in the task areas are provided by table luminaires.
- Free-standing or pendant luminaires in the task area, that would divide the room into zones, are not required. This makes for a completely flexible use of the office area; second-row workstations in the depth of the room are illuminated at equal level.
- The wide-area luminaire in the depth of the room is controlled in parallel with daylight. This conveys dynamic changes of daylight in the depth of the room and counters unpleasant backlighting effects in case of strong incident sunlight.
- In further stages of extension, this wide-area luminaire can be turned into an artificial skylight that simulates daylight conditions and thus stimulates the user.
- The luminaire integrated into the facade radiates artificial light in the same direction as that from which daylight enters the room.
- The daylight at midday is reflected onto the ceiling by deflection vanes integrated into the glass panes and directed towards the depth of the room. This is supported by anti-glare and deflection shutters adjusted to follow the position of the sun, whose top side additionally reflects the daylight at midday onto the ceiling through the deflection vanes.
- The surface of these anti-glare and deflection shutters is covered with golden solar cells. Due to the position of the shutters following the position of the sun, they are always placed at an ideal angle with respect to the sun, thus reflecting light of a warmer colour into the room.

According to expectations with regard to future building management systems, the room is designed without false floor and without suspended ceiling. In the third of the room adjacent to the facade, the ceiling serves for reflecting back the incident daylight or artificial light integrated into the facade; in the central part of the room it serves for base load air-conditioning through activation of the building core structure, and in the rear third for wide-area lighting (artificial skylight).

Basically the system exhibited can be implemented immediately.

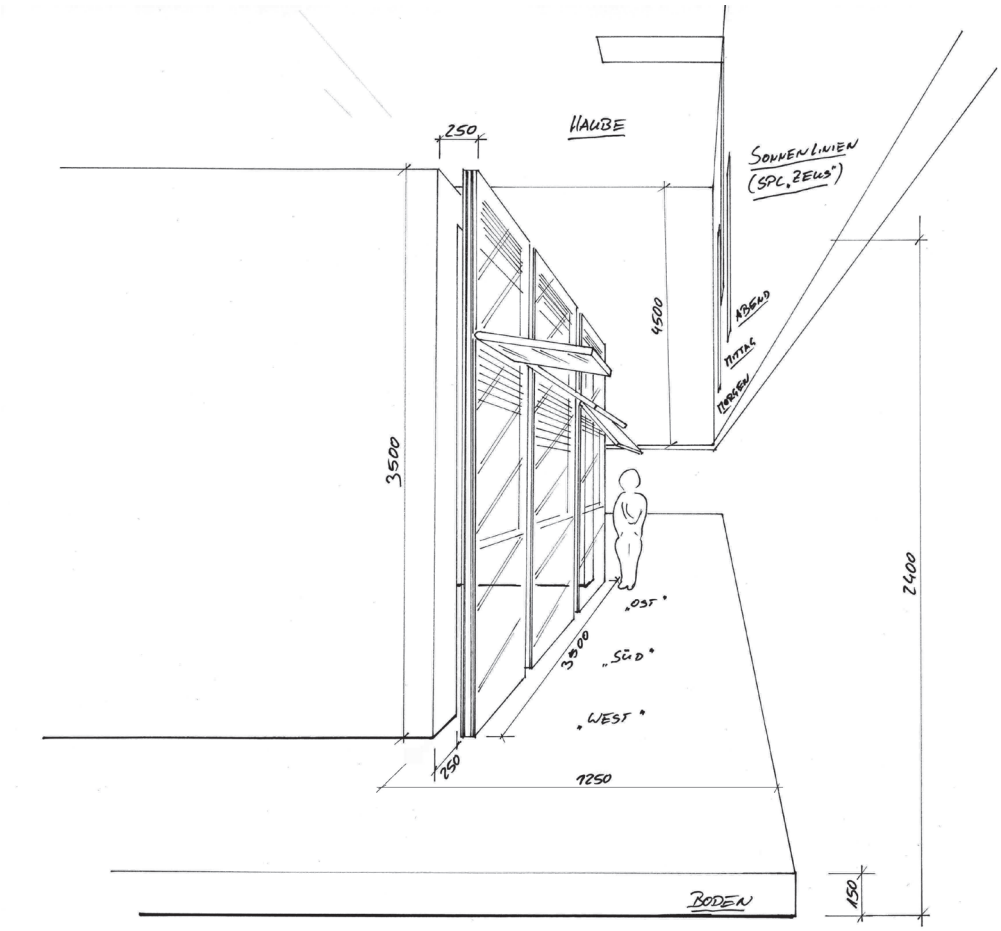
For a clearer presentation, in line with trade fair requirements, the facade has deliberately been presented in the form of abstract steles. By not using an architecturally realistic design, we wanted to avoid making the (possibly controversial) design of the facade itself the subject of discussion. Every facade grid indicated represents a facade optimised with respect to one point of the compass; one for East, one for South, one for West. Abstract „suns“ illuminate these facades in various daylight colours from different heights, thus imitating different positions of the sun. Using a Ciria control point, four different positions of the sun (winter/dark, spring/morning, summer/noon, autumn/evening) and the related positions of the anti-glare shutters can be called up. On the presentation touch screen in the wall, the respective output and consumption levels can be displayed.

The output and consumption levels presented and calculated in real terms for the Frankfurt location show that the output of the photovoltaic components is higher than the lighting installation’s energy consumption, in spite of the wide-area luminaire operated at 100%. This means that there is an additional re-financing potential through excess energy that can be fed into the public network. Under current legislation, solar energy which the producer directly consumes itself is already being subsidized. Accordingly, the energy consumption costs of the lighting installation are significantly lower in spite of installed loads being higher due to the wide-area luminaire. The higher cost incurred by the photovoltaic system pay off by the savings achieved in energy consumption. Currently, the direct current produced by the photovoltaic components in the facade is converted to mains voltage via a central inverter and fed into the conventional power network. Power meters determine output and power consumption of the building itself.

Alternatively, the photovoltaic components can directly operate the wide-area luminaire in the depth of the room or even feed energy into a local DC network supplying individual

building sections. Office equipment, building management systems and decentralised air-conditioning equipment are already operated by direct current. As soon as this will also be possible for lighting, major developments are to be expected in this regard. The partners in this project intend to subsequently advertise the joint development in their respective markets. They expect competitive advantages, new applications and new products to be derived from the cooperation as well as through clarification of bridging of interfaces between building services, said bridges being demonstrated by the model exhibited.

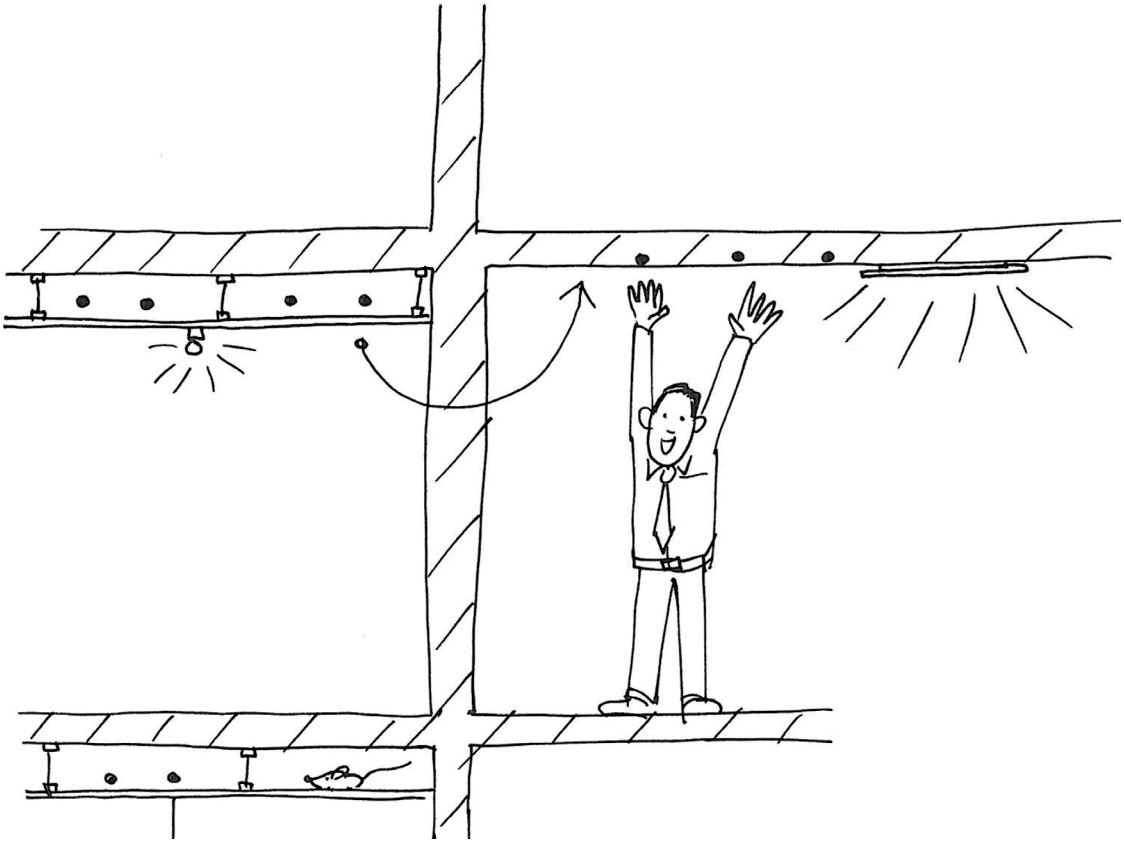
Project partners:
Behnisch Architekten, Stuttgart
Transsolar, Stuttgart
Bartenbach Lichtlabor, Innsbruck
Sunways, Constance
Okalux, Marktheidenfeld



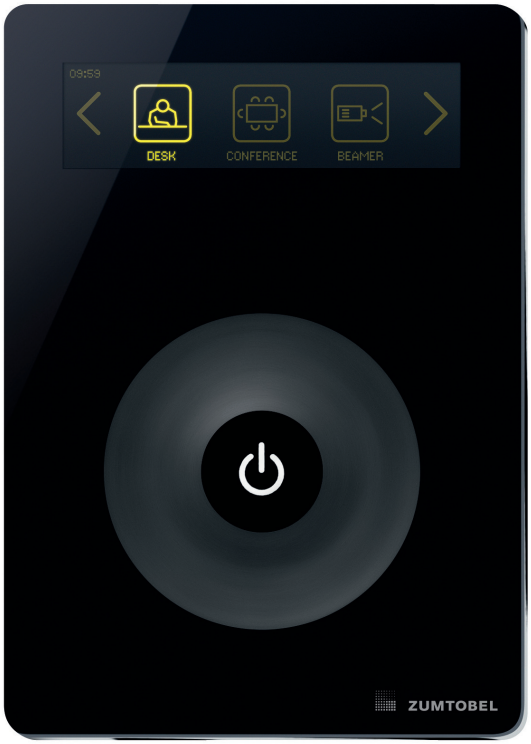
B2 I View of the demonstration model at Zumtobel‘s trade fair stand

B3 I Room lighting concept: Two components ensure appropriate ambient illuminance across the entire office area:a luminaire integrated into the façade, which radiates light indirectly via the ceiling and into the direction from which daylight is entering, and a flat wide-area luminaire („artificial skylight“) with direct distribution located in the depth of the room.

B4 I More flexibly used areas, more spacious rooms



B5 I Lower buildings thanks to omission of suspended ceilings and false floors, and consequently lower construction costs.



B6 I The Zumtobel Ciria control point: First-rate convenience: the Luxmate Ciria control point uses easily identifiable icons for optimum control of all building services within a room.

More information:

ZUMTOBEL

Zumtobel GmbH
Kerstin Schitthelm, Dipl-Ing.
PR Manager
Schweizer Straße 30
A - 6850 Dornbirn

Tel. +43 (0)5572 390 - 1484
Fax +43 (0)5572 390 - 91484
Mobil +43 (0)676 8920 3258
kerstin.schitthelm@zumtobel.com
www.zumtobel.com