

## The EIB Group's New Building: Internal climate and environment

EIB Group East Building · Groupe BEI – Bâtiment Est



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Designed and equipped to adapt to the working methods and communication requirements of new technologies, the New Building makes use of the latest techniques in order to face up to the challenges of the future and meet the needs of the staff of tomorrow.

The particular design of the building and the use of innovative technologies provide the occupants with individual comfort meeting the latest standards of well-being and ergonomics. Natural sources of energy (light, sun, wind and rainwater) have been used to best effect to ensure the optimum integration of the building into its environment. The strictest environmental norms have been observed, well exceeding legal obligations and meeting the “high environmental quality” standard. The building has also obtained BREEAM (Building Research Establishment’s Environmental Assessment Method) environmental certification for its design.

The New Building provides its occupants with a healthy and pleasant working environment by carefully controlling the temperature in this spacious, glazed surface building.

# The climate in the New Building

The energy concept of the New Building is based on three key principles aimed at ensuring temperature control and reducing energy consumption to a minimum:

1. Winter gardens and atria acting as thermal buffers
2. Thermal activation of the building's structure
3. Powerful natural ventilation

## 1. Thermal buffers

Thanks to its VVV-shaped configuration, the building features north-facing winter gardens and south-facing atria.

### Winter gardens



Atria

### Winter gardens located on the north side (Val des Bons Malades)

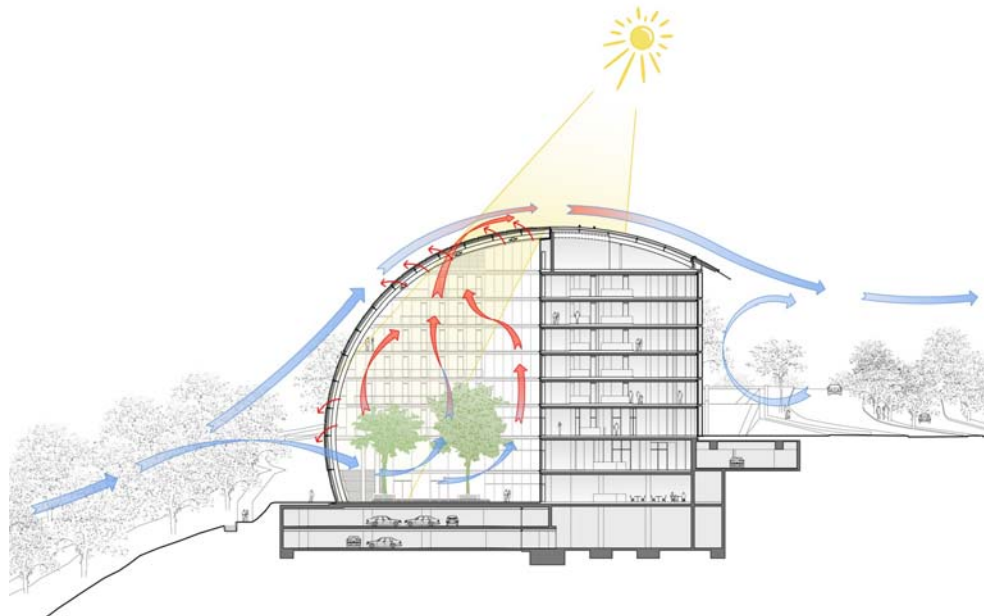
These are not heated or cooled, meaning that they act as thermal buffers: reducing the variation between the outside temperature and the desired temperature in the offices lowers the demand for heating in winter and cooling in summer.

For example, on a winter's day with an outside temperature of  $-5^{\circ}\text{C}$ , the natural temperature of the winter garden (without heating) will be  $+12^{\circ}\text{C}$ . To heat the offices to a temperature of  $21^{\circ}\text{C}$ , it is sufficient to make up the difference between the temperature in the winter gardens and that in the offices. In a traditional building it is necessary to make up the difference between the outside temperature and that in the offices.

### Atria located on the south side (boulevard Konrad Adenauer)

The atria consist of transit areas and common spaces with a moderate temperature. By means of walkways and lifts, they serve as hubs of horizontal and vertical communication between the different wings of the building. The biggest atrium houses the main entrance on level 4.

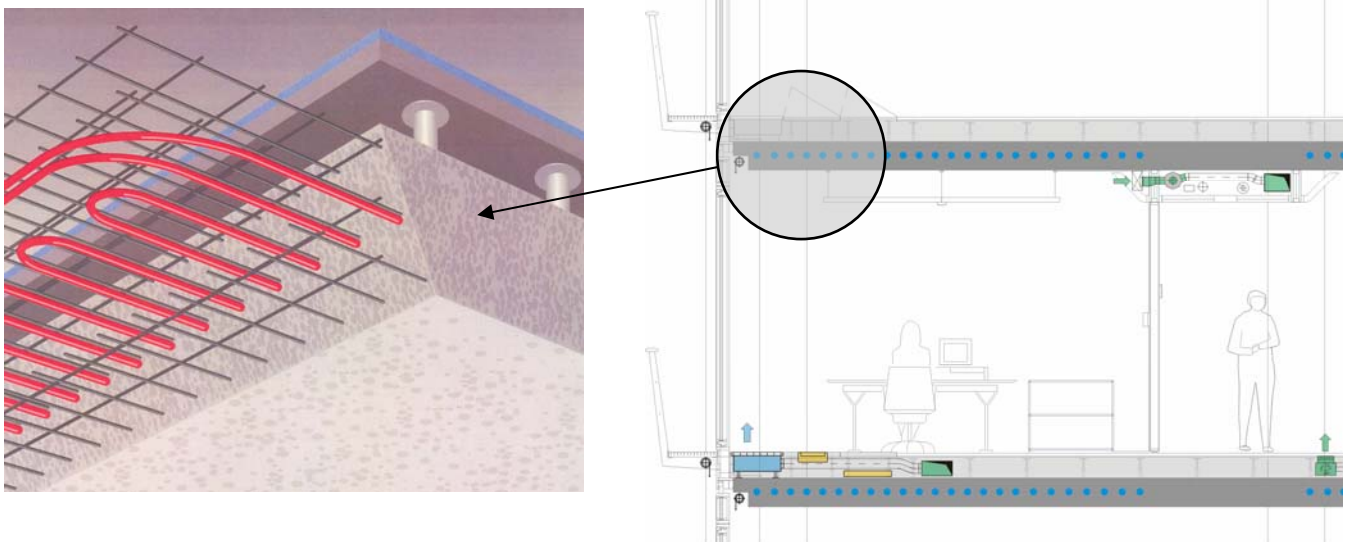
In summer and at certain times in spring and autumn, the atria and winter gardens are ventilated right through to allow the dissipation of solar energy. In winter, and during cool periods in spring and autumn, this thermal energy is used to heat the building, so reducing energy consumption.



**Natural ventilation of the atria in summer**

## 2. Thermal activation of the structure

A system of thermal activation of the building's structure has been installed: cold water pipes are set into the concrete slabs. The water chilled to 18/19°C circulating in the pipes cools the concrete structure. This system makes it possible to regulate the temperature of the building between seasons and helps to lower the building's temperature in summer, thereby allowing substantial energy savings.



**The building's thermal activation system**

## 3. Natural ventilation

On the wooded Val des Bons Malades side, some of the triangles forming the glazed shell of the building are windows that can be opened to allow external fresh air to enter the building. Similarly, on the boulevard Konrad Adenauer side, openings have been created at the top and bottom of the glazed façade to allow external air to enter and exit the building while optimising the flow of large volumes of fresh air. This inflow of external fresh air naturally refreshes and renews the internal air before being expelled. On hot nights, this air circulation is used to cool the whole building as much as possible. The windows of all offices can also be opened to create a breeze if necessary.

## Individual offices and meeting rooms

All offices have an individual control panel next to the door for operating the blinds, lighting and temperature regulation.



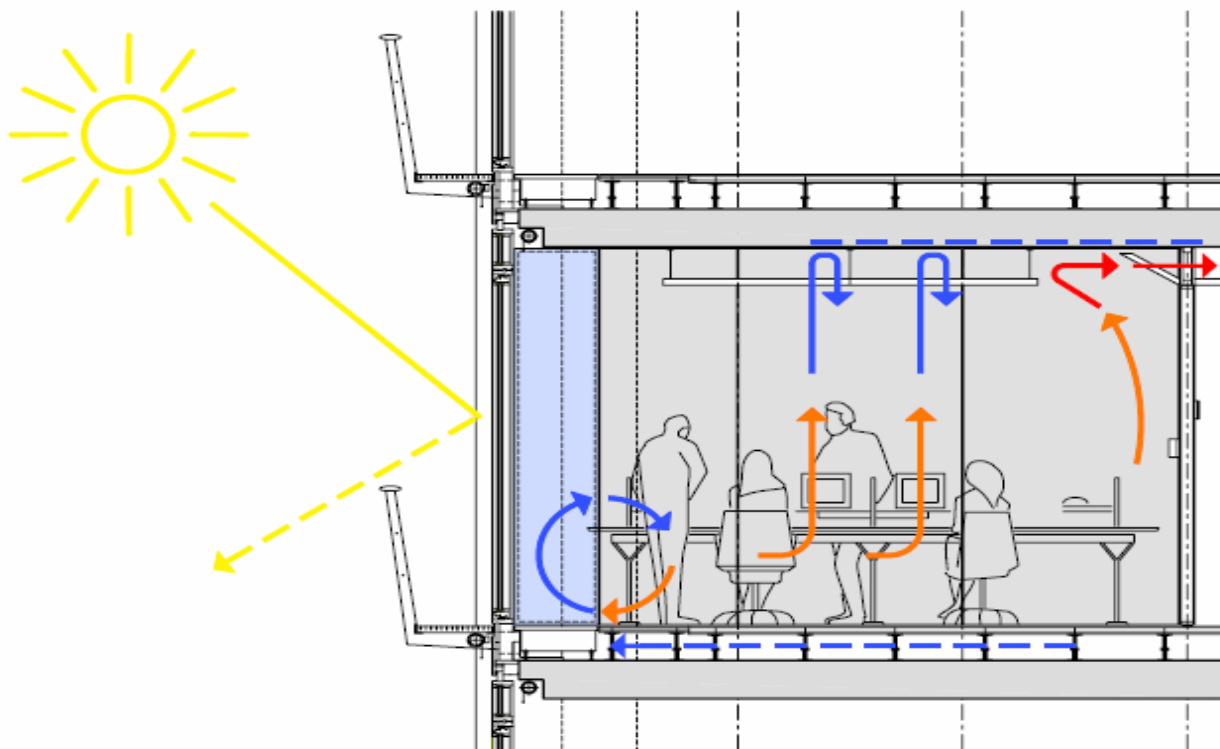
Individual comfort control panel

All offices are equipped with external blinds that will stop heat entering and a fan coil unit allowing the occupants to adjust the temperature of their office within a band of approximately  $-3^{\circ}\text{C}/+3^{\circ}\text{C}$  above or below the temperature of the air injected by the building's central ventilation system.

### Office conditions in summer

The maximum temperatures reached in Luxembourg over the last few years were taken as a basis for sizing the New Building's cooling systems. Based on these data, the temperature will not exceed  $24/25^{\circ}\text{C}$  in the most exposed offices.

To prepare for the possibility of additional cooling requirements in the future, all offices and meeting rooms have been pre-equipped with all necessary technical facilities for installing a second induction unit to counter an increase in outside temperatures if necessary.

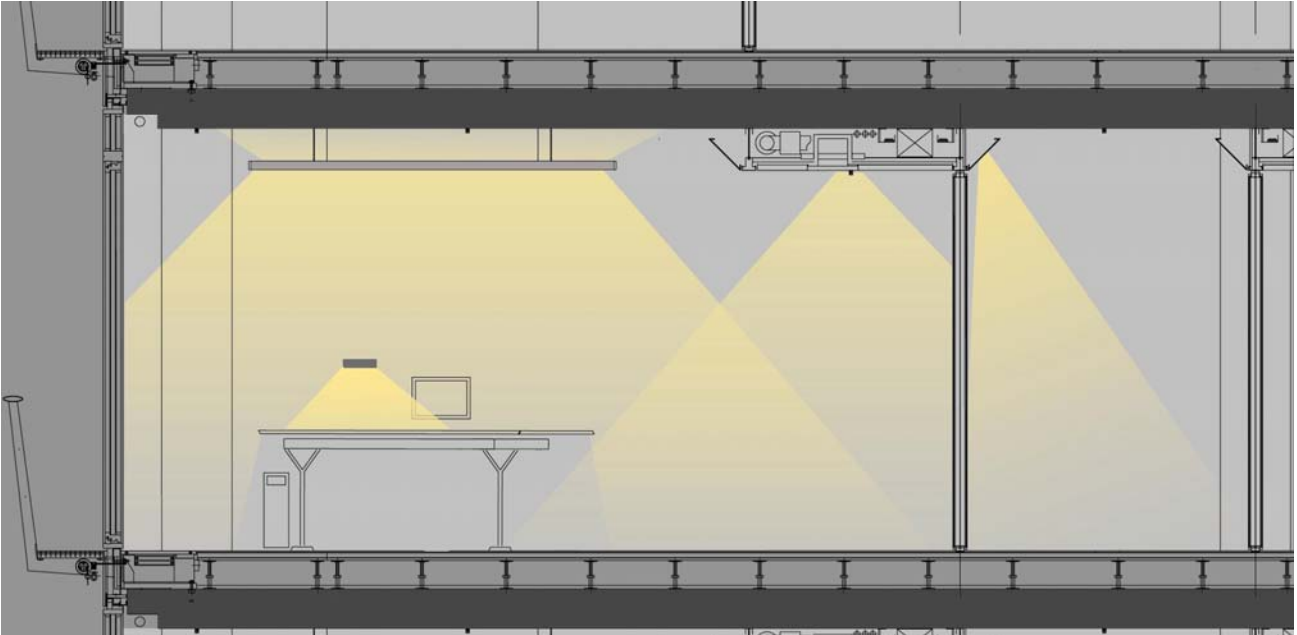


**Blue arrows:** fresh air is delivered by the central system through ducts in the false floor. The ceilings cooled by the thermal activation system also refresh the air in the room. If necessary, the occupant can adjust the office temperature by means of the individual comfort control panel. The fan coil unit makes it possible to lower the temperature by a maximum of  $3^{\circ}\text{C}$  depending on the weather conditions.

**Orange and red arrows:** the warm stale air is extracted from the room by forced mechanical ventilation.

## Office lighting

To save energy on lighting requirements, the general office lighting is restricted to 300 lux; only working areas are lit to the ergonomic standard of 500 lux by desk lamps. This reduces the building's energy consumption considerably.

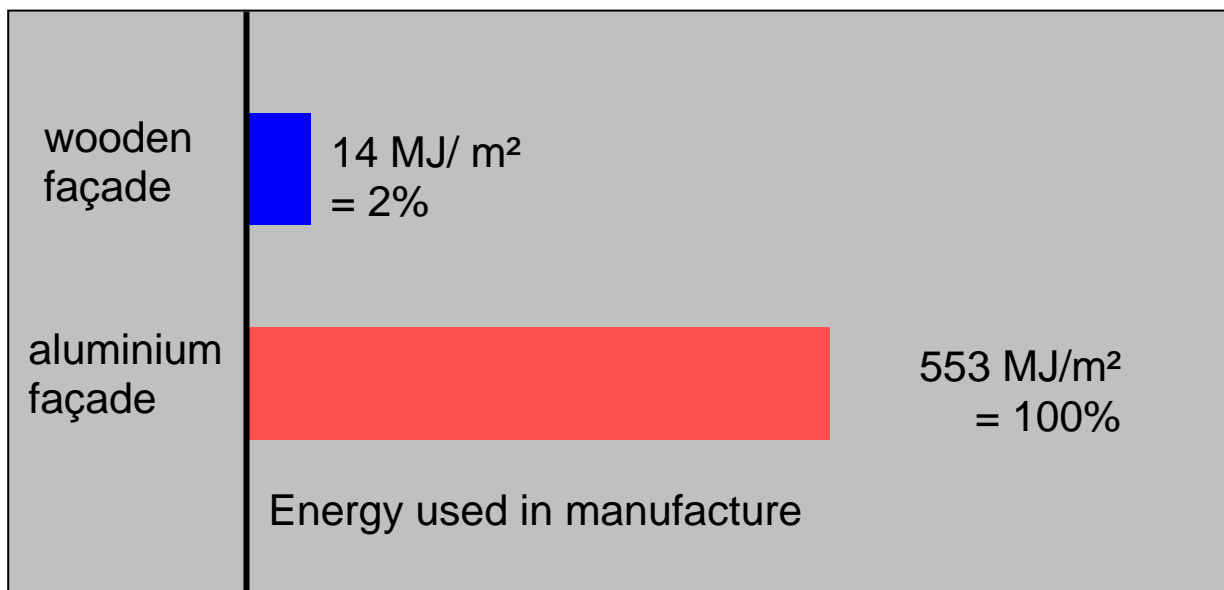


## Energy consumption

Simulations made when designing the building showed that its energy consumption would be lower than the standards for the most recently constructed buildings in Luxembourg.

The construction materials were selected in accordance with the energy requirement of their manufacture. Materials requiring the least energy were given preference.

For example, the internal façade frames, covering a surface area of 11 000 m<sup>2</sup>, were built in certified wood rather than aluminium (whose manufacture would have required far higher energy consumption).



Primary energy consumption for manufacture of office façade frames

## Environmental certification

From the environmental point of view the Bank opted for BREEAM (Building Research Establishment's Environmental Assessment Method) certification, with the environmental concept of the building being awarded a "very good" rating. An important first, this certification, which was recommended by the OECD, had to be adapted to Luxembourg law. Thus the EIB's new office complex will be the first building to obtain environmental certification in Luxembourg. It will also be the only building in mainland Europe to be awarded BESPOKE BREEAM certification.

The majority of construction materials were chosen for their small environmental footprint. The wood used, even on the construction site, is all FSC (Forest Stewardship Council) or PEFC (Programme for the Endorsement of Forest Certification) certified. The office floors are covered with new-generation fitted carpets, and all other surfaces (walls and ceilings) are designed so as to make optimum use of daylight and enhance luminosity.

In conclusion, the New Building will present all the qualities of a modern, environmentally friendly, light and flexible building ensuring a healthy and well-controlled ambience. Respect for the environment and the well-being of the occupants is one of the priorities of this ambitious project.

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