



Case Study Building - Solarwind, Luxembourg



Building Location	Windhof, Luxembourg
Owner	In Der Laëy S.A., LU
Architect	Atelier d'Architecture Dariusz Pawlowski, Luxembourg, LU
Engineers	Boydens Engineering
Building Type	Offices
Certifications	BREEAM (very good), HQE (exceptional), DGNB (gold) & passive
Date Completed	August 2012

DESCRIPTION

Solarwind, is the spearhead of sustainable construction in Luxembourg. This building is based on a triple environmental certification, meeting the most stringent criteria in terms of sustainable development and eco-citizenship utilising the following sources of renewable energies: geothermal, biomass, solar, wind and water. It maximises the use of renewable energies (no fossil fuels are used) minimising the ecological footprint. The choice of the building envelope, solar orientation, materials and sealing were key. Renewable energy sources used: wind (urban wind turbines), solar (photovoltaic & thermal solar panels), biomass (wood pellet/shavings boiler for hot water production), geothermal energy & water (adiabatic cooling and concrete core activation). Heating and cooling of the building occurs via concrete core activation coupled with heat pumps in the winter and passive cooling in the summer. By combining geothermal energy with concrete core activation the energy consumption is optimised thus reducing maintenance costs. It is well ventilated (ID2) utilising a dual heat exchanger and adiabatic cooling utilising rainwater. The ventilation flows adapt automatically with air quality sensors that monitor the occupancy flow of the building.

The water cycle is sustainably managed: reducing consumption & harvesting rainwater (for adiabatic cooling, toilet flushing, etc.) and for the management of waste (zero bin concept, waste management flow). Reduction/regulation of operational costs via: triple glazing, artificial lighting equipped with motion detectors and brightness sensors; indoor blinds, outdoor shutters, green roof, and a green wall.

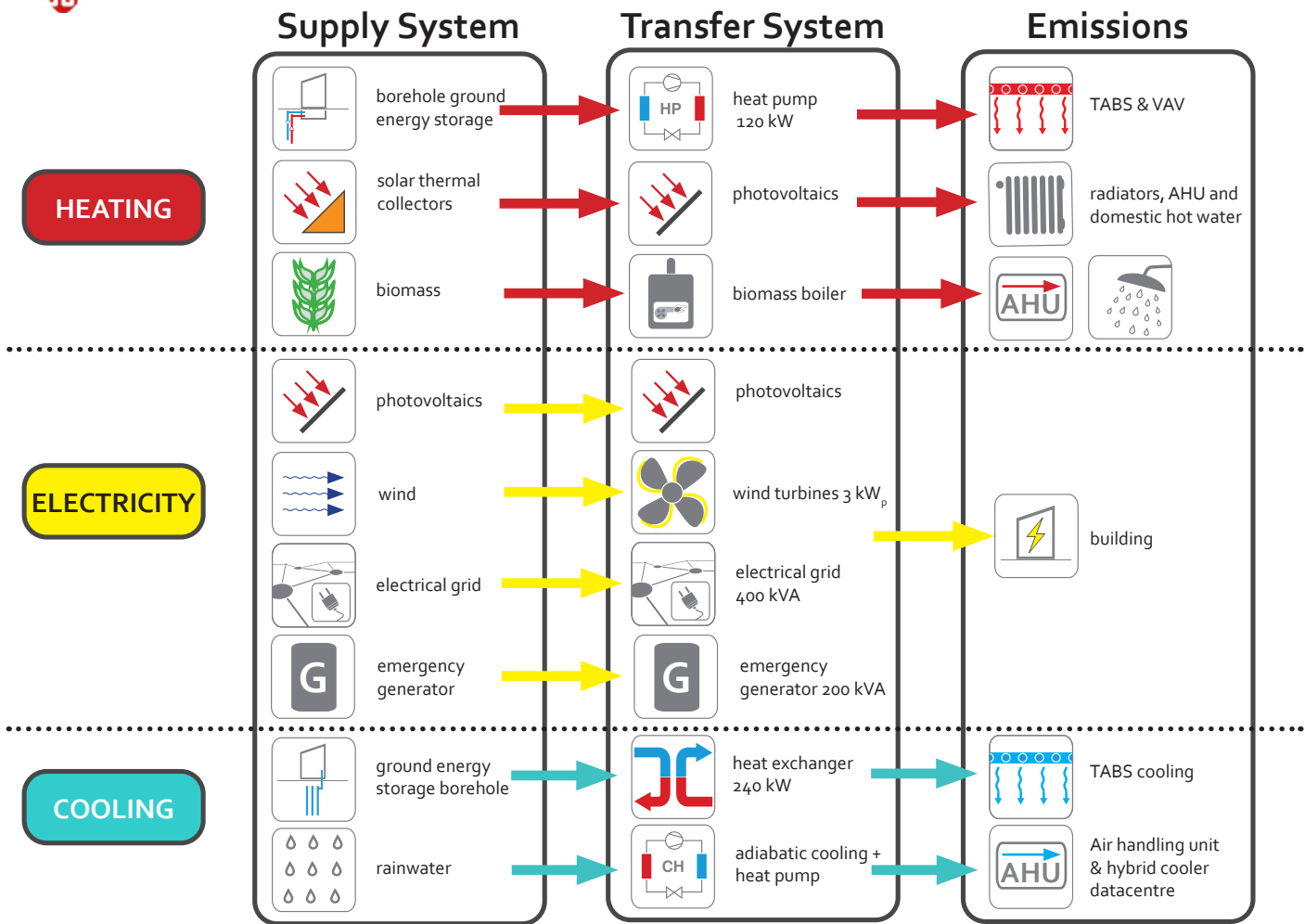
GENERAL BUILDING DATA

Number of spaces	76 zones
Number of occupants (design)	728
Net floor area	20,000 m ²
Conditioned floor area	10,000 m ² (area that is heated and/or cooled)
Type of ground source	Borehole Thermal Energy Storage (BTES)
Total annual thermal energy use	54.6 kWh/(m ² -annum)
Heating	Wood pellets/shavings boiler (domestic hot water)
Ventilation	Central
Ventilation characteristics	mechanical supply, mechanical exhaust, heat recovery
Net volume	34,000 m ³
Building envelope:floor area ratio	0.86

ENERGY EMISSION SYSTEMS

Heating	Main: TABS and chilled ceiling 5%, Secondary: Heating coils behind VAVs), floor heating, radiators
Cooling	Main: TABS and chilled ceiling 5%, Secondary: Air





SOLARWIND BUILDING FEATURES

(Symbols copyright REHVA-GEOTABS guidebook No.20)

Building construction type	heavy structure / light facade
Average U-value for opaque elements (roof, walls, floors)	0.16 W/m ² ·K
U-value of glazing	0.69 W/m ² ·K
G-value of glazing	0.31 - 0.49
Glazing area (% of facade)	24%
Air tightness level / n50 air change rates	0.31/h
Orientation of main facade	South and North
Type of shading (e.g. manual)	PVs as horiz. panels S side, E&W automated louvre
Net space heating demand (kWh/(m ² ·annum))	19.5 kWh/(m ² ·annum)
Net space cooling demand (kWh/(m ² ·annum))	35.1 kWh/(m ² ·annum)

PARTNERS
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Email: hybridgeotabs@ugent.be
www.hybridgeotabs.eu

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