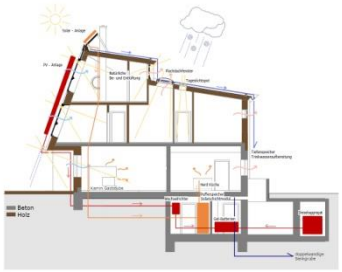
AT_Hirschwang_Naturfreundehaus Knofeleben

Image 01: Exterior view - south-east ©Jörg Seiler	**Image 02:** Interior view of bedrooms©Jörg Seiler	**Image 03:** Section Energy System ©baukult
		

Building Specifications

Address	Schneeberg/Knofeleben 2652 Hirschwang, Austria
Building Category	Other
Year of Construction	2012
Special Qualities	self-sufficient
Location	47° northern latitude, 16° eastern longitude Isolated position with no grid connection available, long and snowy winters, built in the water protection area of Vienna, 1,250 m above sea level on the Gahns – a plateau at the foothills of the Schneeberg.
Climate	Dfb (Temperate climate snow, fully humid, warm summer (monthly mean temperature always under 22 °C, at least four month with a monthly mean temperature above 10 °C)

Vent. Cooling Site Design Elements (Solar Site Design and Wind Exposure Design, Evaporative Effects from Plants or Water)

Solar Site Design by open meadow on the south side, not to support Ventilative Cooling but passive solar gains
Wind protected from the prevailing north-easterly winds by the forest, generally afforested alpine region

Vent. Cooling Architectural Design Elements (Form, Morphology, Envelope, Construction&Material)

Form: Freestanding compact three storeys high to the south, two storeys high to the north side, sheltered from the wind
To ensure maximum passive solar gains the building is oriented towards the south which is covered by a strip of windows and ceiling-high window slots.
Morphology: Access on the ground floor from the east, restaurant orientated to the south. Kitchen, sanitary areas and storages oriented to the north. A centrally positioned staircase accesses the upper floor with north and south orientated rooms. Sanitary facilities are grouped in the middle. Roof floor with only south orientated rooms. Flat roof windows provide the bathrooms with zenith light which will provide three times as much light as horizontal light sources on overcast days. Even the windowless corridors receive natural light through sun tunnels.
Envelope: Highly-insulated building envelope. The roof of slate-gray zinc sheeting forms a durable shell and guards against the rain. South façade: 70°pitch: 50m² PV elements, 14 m² thermal solar collectors; 28 roof windows for passive solar gains; high standard of air-tightness, pent roof to capture rain and melt water for drinking and service water purposes
Construction: The ground floor and the sloping south facade are timber frame constructions, while the top and roof floors are solid wood constructions with cross-laminated timber. Highly insulated, prefabricated units were used wherever possible. Most surfaces are untreated wood which gives a good sorption capacity, the limited amount of concrete walls area acts as thermal heat storage.

Vent. Cooling Technical Components (Airflow Guiding Components, Airflow Enhancing Components, Passive Cooling Components)

Airflow Guiding Components: Windows are used as ventilation openings and can be opened automatically.
Airflow Enhancing Components: The roof window in the stairwell can be opened. The stairwell acts as an atrium and the ventilation is driven by the resulting stack effect. The dome light in the washroom can be electrically adjusted to facilitate cross ventilation, due to a lack of electricity these openings remain closed.

Actuators, Sensors and Control Strategies

Control Strategies: The Central Indoor Environmental Control by WindowMaster® is used in the sleeping area.
(For demonstration purpose one roof window is equipped and pre-wired with that technology, but is currently not in use)

Building Energy Systems (Heating, Ventilation, Cooling, Electricity)

Heating: A wood stove in the kitchen with a heat output of 25 kWh is used for cooking and to cover the basic space heating and hot water demand. Another wood-fired oven with a heat output of 14 kW can provide additional room heat, if needed. 15 m² of solar thermal collectors provide most of the hot water. Hot water is stored in two buffer tanks with a capacity of 1,500 litres each. Both potable and service water is collected using the 8° inclined roof. It is then filtered and cleaned using coal- and UV-filter systems. Afterwards it is stored in a cistern with a capacity of 50m³.
Ventilation: In addition to the natural ventilation system, a mechanical ventilation system with heat recovery is installed.
Electricity: A Photovoltaic system with a total output of 9.15 kWp is installed in the 70°tilted south façade. The inclination ensures snow-free PV-Panels and therefore electricity production in winter. The large glazed façade area reduces the need for artificial lighting. To cover peak power requirements on busy weekends, a diesel generator is available. Highly-efficient LED lights complete the ambitious energy concept.

Building Ownership and Building Facility Management Structures

Real Estate Owner: City of Vienna; Building Owner: Naturfreunde Österreich (Austrian Friends of Nature)
Architect: Regina Lettner, baukult

Aknowledgements

Naturfreundehaus Knofeleben got awarded with the Austrian ecolabel 2012.

Lower Austrian price for timber construction 2012.

The island position of the lodge and the lack of electricity pose additional demand on the long term usage of technology. (i.e. use of fans)

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