VOGEL HOUSE

The Vogel House is located on a steep site in a picturesque village at the foothills of the Swiss Alps, a forty-five-minute drive from Zurich, Switzerland's most populous city. The owner, a computer programmer in his forties, had specific wishes for the design that provided programmatic challenges, such as a master bedroom without windows and private outdoor spaces. Diethelm & Spillmann Architekten met, with skilled mastery, the demands posed by the sloped site, local regulations and code constraints, and the client's wish list, creating not only a Passive House but an Energy Plus House that feeds energy back into the grid.

The Zurich-based architects cleverly interpreted the local building code, which does not allow for more than two stories in new construction, in a way that permitted them to define the mezzanine as a roof with deep eaves and skylights. Their main goal was to gain height for the building to provide the client with spectacular views of the Alps and of nearby Lake Aegri. The owner had earlier fixed a camera to a balloon to determine the elevation needed to capture desired views.

The home's footprint on the land is smaller than its overall size, as the first and second floors are cantilevered over the concrete ground-level garage and basement. The elevated residence, with its private vistas through the tree canopy, evokes the dreamlike world of Italo Calvino's *Baron in the Trees* (1957), the story of a young aristocrat who lives in the upper branches of a tree. The plan layout gracefully unfolds around the owner's windowless sleeping chamber and cleverly accommodates both indoor and outdoor private spaces. While a typical Swiss home incorporates a garden at the ground level, in this case the private garden is elevated and enclosed by walls, with an open roof that accommodates tall vegetation.

The wooden building shell of the first and second floors provides an all-encompassing, warm, interior finish interrupted only by window openings affording spectacular views of the landscape from the living and study areas. The concrete core spaces that include the master and guest bedrooms are finished with refined touches, such as gilded ceilings, and curved corners.

The envelope of the Passive House starts at the concrete slab above the ground floor–level garage and storage room. Exterior stairs lead to a floating patio space with an entry door to the main house. The concrete core structurally supports two large wood beams and dissipates wind loads while also serving as a buffering heat sink. The building easily meets the strict airtightness requirements for Passive House certification, featuring Passive House–certified windows as well as a large wooden entry door that the architects say was the most expensive component of the building envelope. A larch wood blockwall panel system forms the building shell and is designed for high performance. This tight wooden box incorporates two large beams at the upper floor that cantilever fifteen feet above the ground. The beams' depths are enough to accomplish clear spans across the roof, and the resulting cavity was easy to fill with mineral-wool insulation.

Active cooling for residences is not allowed in Switzerland unless there are extraordinary circumstances. The primary means to cool the building in the

47° 4'

Mostelberg, Switzerland

Diethelm & Spillmann Architekten

2010

Certified by Minergie

OPPOSITE: **The cantilevered facade is covered in dark wood cladding with aluminum flakes to reflect the solar radiation and decrease the surface temperature.**

summer is therefore through night cooling, a simple system used in moderate, fairly dry climate zones, such as Central Europe. Windows were placed to maximize local breezes and promote cross ventilation. They are opened at night when the air cools down and closed during the day to retain the cool air. In addition, a so-called earth tube pulls in fresh ventilation through pipes that run in the ground for a set distance before they lead into the HRV. This natural means of cooling the air, used as early as the 1970s, leads to interior temperatures in summer that are about seven degrees cooler than exterior air temperatures.

The roof is covered with solar thermal collectors and solar photovoltaic paneling, providing hot water for domestic use and feeding the hot-air heating system that is sometimes needed during the coldest months. In addition, a small wood-burning stove stores about 80 percent of its energy as hot water. This unit feeds the hot-water tank on cloudy days, providing heat to the system if the solar collectors are not able to generate enough. The solar photovoltaic system provides eight kilowatts per year, exceeding the client's energy consumption. There is no gas service to the building, and most times of the year it

BELOW: **The insulated living space maintains a definitive connection with the outdoors, through a wall of windows that frames a view of the Alps in the distance.**

TOP LEFT: **The building cantilevers approximately fifteen feet in either direction over the concrete core.**

BOTTOM LEFT: **The Passive House windows in the living area are protected from overheating by a large overhang and the wooden shell that frames the exterior garden.**

RIGHT: **The concrete-block core and panelized-wood exterior shell are highlighted in the entry corridor.**

THEIR MAIN GOAL WAS TO GAIN HEIGHT *for the building to provide the client with spectacular views of the Alps and of nearby Lake Aegri. The owner had earlier fixed a camera to a balloon to determine the elevation needed to capture desired views.*

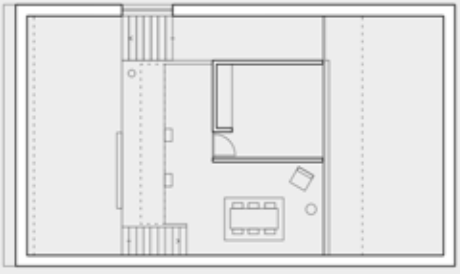
feeds energy back into the grid. As Daniel Spillmann stated in an interview with the author, "The goal [for the Vogel House] was not to celebrate the perfect Passive House....On the contrary, it was to prove that even a disadvantageous initial position may lead to a respectable sustainable house." With their design of the Energy Plus home, the architects have certainly done so with great rigor and thoughtfulness.

LEFT: **The private garden is elevated above the entry.**

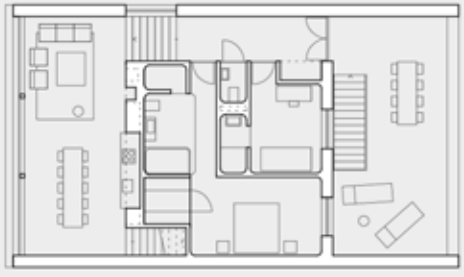
TOP RIGHT: **The home is located in the foothills of the Swiss Alps, where road conditions make the site difficult to access—so local craftsmen were employed and agricultural tractors were used to deliver materials to the site.**

BOTTOM RIGHT: **The minimalist kitchen includes an angled wall of large windows facing the Alps.**

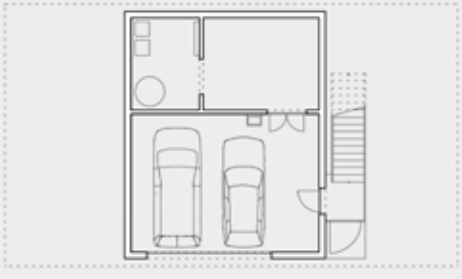
1 GARAGE
2 MECHANICAL ROOM
3 KITCHEN / LIVING ROOM
4 ELEVATED GARDEN
5 BEDROOM 1
6 BEDROOM 2
7 MASTER BEDROOM
8 OFFICE



SECOND FLOOR

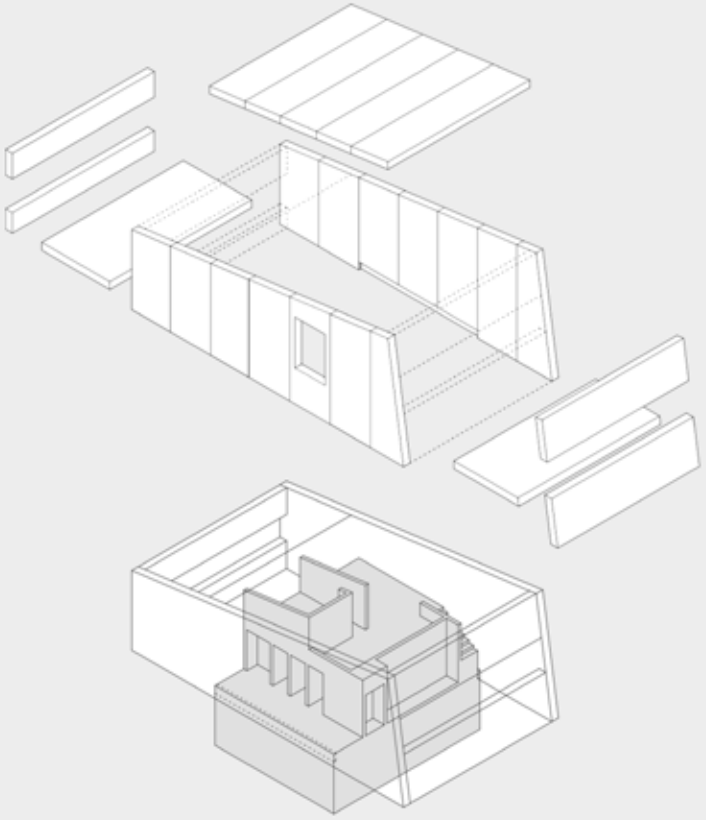


FIRST FLOOR



GROUND FLOOR

BELOW: **Diagram showing the concrete-block core and panelized-wood exterior**



VOGEL HOUSE

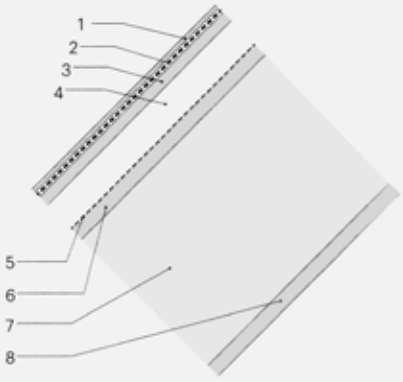
Diethelm & Spillmann Architekten

OPPOSITE: A concrete block makes up the house's core, with an insulated wooden shell forming the exterior roof, walls, and cantilevered floor.

Project location	Mostelberg, Switzerland
Climate zone	alpine foothills
Heating degree days	7560°F-days/yr (4200 K·days/yr)
Cooling degree days	n/a
Treated-floor area	2131 ft² (198 m²)
Airtightness	0.58 ACH at 50 Pa
Number of blower-door tests	1
Primary energy demand	8.7 kbtu/ft²·yr (27.4 kWh/m²·yr)
Wall R-value and U-value	R-51.6, U = 0.019 btu/ft²·hr·°F (0.110W/m²·K)
Roof R-value and U-value	R-63.1, U = 0.016 btu/ft²·hr·°F (0.090W/m²·K)
Floor R-value and U-value	R-47.3, U = 0.021 btu/ft²·hr·°F (0.120W/m²·K)
Window U-value (installed)	0.14 btu/ft²·hr·°F (0.77W/m²·K)
Space-heating demand	7.23 kbtu/ft²·yr (22.8 kWh/m²·yr)
Space-cooling demand	0.0 kbtu/ft²·yr (0.0 kWh/m²·yr)
Heating-equipment type	solar hot water with wood backup
Heating-equipment efficiency	0.75 HSPF; 0.75 COP
Cooling-equipment type	none
Cooling-equipment efficiency	n/a
Hot-water-equipment type	SHW with electric backup
Hot-water-equipment efficiency	0.9 Energy Factor; 0.9 COP
Ventilation-system type	HRV
Ventilation-system efficiency	73%
Renewable-energy systems	solar hot water; 8kW PV

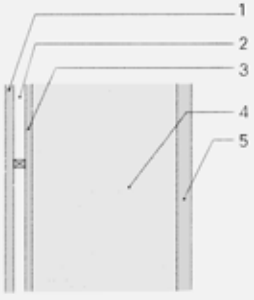
ROOF R-63.1

1 10 mm double-bitumen sheeting
2 15 mm fireproof board
3 27 mm boarding
4 80 mm battens/air space
5 3 mm waterproofing membrane
6 35 mm block-wood plate
7 420 mm insulation
8 35 mm larch block-wood plate



WALL R-51.6

1 19 mm painted spruce cladding
2 30 mm battens/air space
3 16 mm boarding
4 340 mm wood structure and insulation at cavity
5 35 mm larch block-wood plate



FIRST FLOOR R-47.3

1 250 mm concrete slab
2 280 mm insulation
3 35 mm larch block-wood plate