

Haus 2019

A zero-energy building in operation



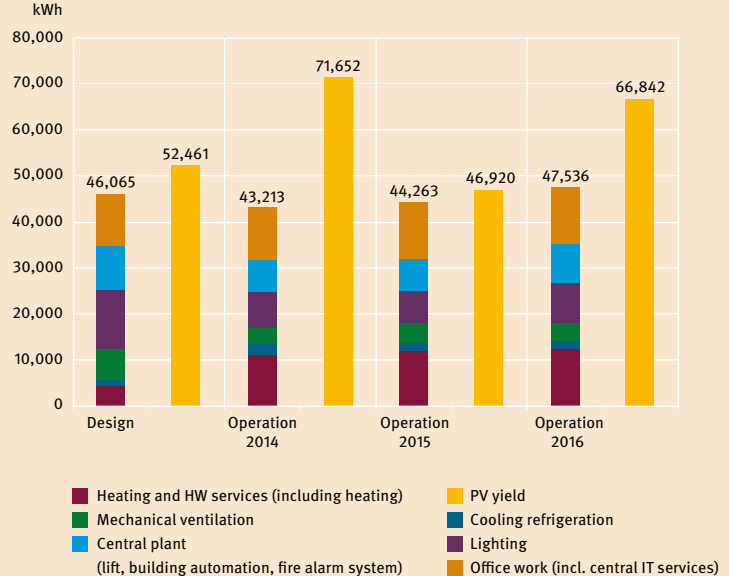
Operating results

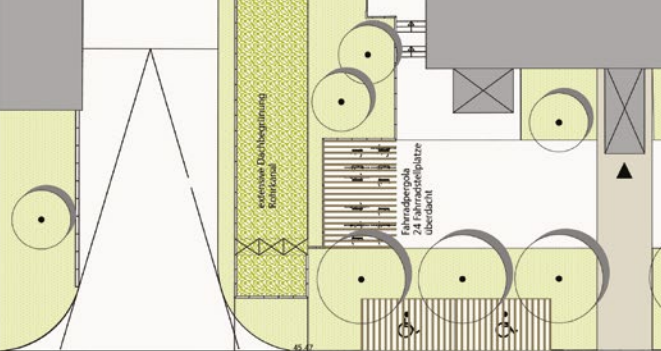
Design objective exceeded

The design objective of a net zero-energy building has to be tested in operation. About 280 data set points are evaluated in a comprehensive monitoring process, supported by a building management system. After the first few years of operation, it is clear that the yield from the photovoltaic system regularly exceeds the corresponding demand by 30–50 %. So, for example, in the third calendar year of use a demand of 47,536 kW/h was met by a yield of 66,842 kWh. About a third of the yield was used directly in the building. The rest was used around the site.

Diagram

Electrical power: planned versus actual
Calendar years 2014, 2015, 2016

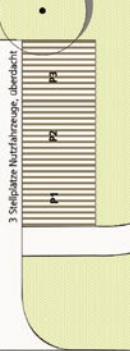
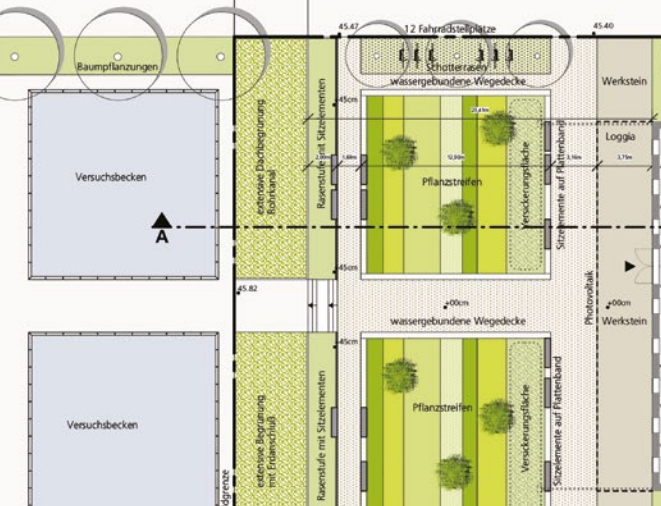




Landscaping and external works

Improvement in biodiversity of whole site

Identity-enhancing landscape design has integrated the new building into the existing context, thereby increasing the amenity value of the campus-like development. The building is oriented towards the water-bearing test basins. Two biodiverse 'planting basins' have been created as a linking element that connects to a small square under the south-facing canopy. The green roofs of the building and the cycle stands are extensively planted. The timber seating group encourages outdoor scientific discussion. The landscaping thus forms the counterpart to the typical 'percent for art' piece of artwork in the foyer.



Construction materials

Healthy room air through careful selection

The construction is based on a sustainable, modular timber system with cellulose insulation. The floors are constructed from timber cassettes, while the false ceiling on the upper floor has a gravel and calcium silicate infill to meet noise protection requirements. The entire construction is designed to enable demolition with unmixed material recycling, thus supporting the closed-loop product cycle approach. The facade panels were manufactured from heat-treated timber. The thermal treatment during the manufacturing process increases durability and minimizes maintenance costs. The composite timber windows have an aluminium skin on the weather side and triple glazing to Passivhaus standards. The electrically-operated solar and glare protection blinds are integrated behind an additional protective pane of glass. Industrial oak parquet flooring was selected for the floor finish due to its long service life.

The selection of low-emission building products not only for wall paints and stains, parquet lacquer and flooring adhesive, but



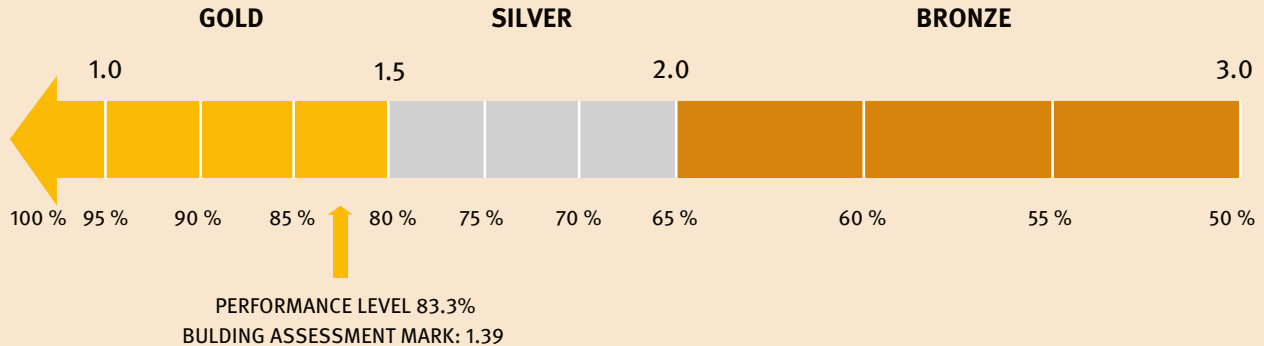
also for the engineered wood materials themselves, combined with a high level of ventilation per person – makes a massive contribution to the objective of achieving a very high indoor air quality in the building. The high quality of the air with regard to volatile organic compounds and formaldehyde was confirmed by the accompanying ambient air measurements.

Sustainable construction

Green building methods in the contested field of sustainability

The holistic assessment system for sustainable construction was used for quality assurance purposes. This involves a comprehensive consideration of the entire life cycle of the building including the environmental, economic and socio-cultural quality, as well as the technical procedural as-

pects, in a transparent, comprehensible form. As user of the building, the main focus for the Environment Agency in the project implementation were the building's environmental qualities. The gold certificate was awarded with an overall mark of 1.39.





Key project data

Brief project description

User: German Environment Agency (UBA)

Building authority: Federal Office for Building and Regional Planning

Landlord: Institute for Federal Real Estate

Architect: Braun-Kerbl-Löffler Architekten und Ingenieure

Building services engineers: Schimmel Beratende Ingenieure

Landscape design: LA.BAR Landschaftsarchitekten

Monitoring: Federal Institute for Building, Urban Affairs and Spatial Research

Construction start: October 2011

Completion: August 2013

Total cost: EUR 4.8 M (gross)

Usable area: 742 m²

Gross floor area: 1,254 m²

‘Haus 2019’ – the working title is taken from the European Buildings Directive (EPBD 2010), according to which, from 01.01.2019, all public buildings are to be constructed as nearly zero-energy buildings.

Architectural concept

A clear use of forms enables an intermeshing of the design objectives

The architectural idea is based on a clear expression of forms and the use of the renewable resource, timber. The cube was chosen as a compact built form for this environmentally sustainable pilot project and the entire design approach. The two-storey building occupies a footprint of 25 m x 25 m and was constructed with a canopy and without a basement. In addition to 30 office workplaces, two meeting rooms, changing rooms and a parent-child room were constructed for the whole site. The new barrier-free, zero-energy building fits into the structure of the existing surroundings and represents new, enhanced architectural qualities.







Energy concept

Renewable sources meet energy needs

A 70 kWp photovoltaic system mounted on the roof provides the energy necessary to operate the building. The energy contained in the water table, which is supplied via a water-water heat pump to various properties for scientific purposes, is used to heat the building. The groundwater also serves the chilled water supply. The transfer of heat or cooling takes place via sheet-type heating elements in the external walls and via sheet-type cooling elements in the internal walls.

A heat recovery unit in the ventilation plant minimizes ventilation heat losses. On the roof there is also a solar thermal system for supplying the changing rooms with hot water.





Design objective

The design objective of providing the annual energy requirement (projection: 46,000 kWh/a) entirely from renewable energy sources meets the definition of a zero-energy building. Primary energy demand is 47.0 kWh/(m²NGF-a), thus undercutting the value specified in The German energy conservation regulations (EnEV 2009) by 73 %.

German Environment Agency (UBA)

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For guided tours please register at buergerservice@uba.de.

Related link:

<http://www.umweltbundesamt.de/neubau-buerogebaeude-haus-2019-in-berlin>

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