


## Zero Emission Green Building Kirstein & Sauer

by [Alexandre Schütze](#) / 2017-06-13 19:07:13 / Allemagne / 13281 / DE

**New Construction**



**Primary energy need :**

**45** kWhpe/m<sup>2</sup>.year

(Calculation method : )

**ENERGY CONSUMPTION**

*Economical building* *Building*

< 50	<b>A</b>
51 à 90	<b>B</b>
91 à 150	<b>C</b>
151 à 230	<b>D</b>
231 à 330	<b>E</b>
331 à 450	<b>F</b>
> 450	<b>G</b>

*Energy-intensive building*

**Building Type** : Office building < 28m  
**Construction Year** : 2015  
**Delivery year** : 2015  
**Address 1 - street** : 33602 BIELEFELD, Deutschland  
**Climate zone** : [Dwb] Humid Continental Mild Summer, Dry Winter

**Net Floor Area** : 7 200 m<sup>2</sup>  
**Construction/refurbishment cost** : 10 000 000 €  
**Number of Work station** : 400 Work station  
**Cost/m2** : 1388.89 €/m<sup>2</sup>

Proposed by :



### General information

The office and commercial building was realized as a zero-emission building. On the basis of a high-quality heat protection and a very efficient system technology, the energy saving regulations (EnEV 2009) are undercut by 65%. Due to the additional use of a photovoltaic system of 180 kWp on the roofs of the building, the remaining primary energy requirement of the building is completely covered. Over the year more energy is generated than consumed! A ventilation system with heat recovery, a district heating system with a low primary energy factor and a floor heating and cooling system can be mentioned as essential technical features. These components are controlled by a sleek but cunning building automation, which ensures an optimal room climate and a low energy consumption at all times. This makes the building a perfect example of an economically successful combination of comfort, flexibility and environmental protection.

See more details about this project

<https://www.construction21.org/deutschland/articles/de/energie-gemassigte-klimazonen-gewinner-der-the-green-solutions-awards-2017-kirstein-sauer-deutschland.html>

[http://www.wannenmacher-moeller.de/Werner\\_Brock\\_Strasse\\_38.html](http://www.wannenmacher-moeller.de/Werner_Brock_Strasse_38.html)

## Data reliability

Self-declared

## Stakeholders

### Stakeholders

Function : Contractor

Kirstein und Sauer GmbH

Herr Benjamin Kirstein // Am Bach 2, 33602 Bielefeld // (0521) 96 888 10 // [info@kirstein-sauer.de](mailto:info@kirstein-sauer.de)

<http://www.kirstein-sauer.de/>

Function : Designer

Architekten Wannemacher + Möller GmbH

Herr Andreas Wannemacher // Lessingstr. 48a 33604 Bielefeld // +49 521 964340 // [info@wannemacher-moeller.de](mailto:info@wannemacher-moeller.de)

<http://www.wannemacher-moeller.de>

Function : Thermal consultancy agency

solares bauen GmbH

solares bauen GmbH Emmy-Noether-Str. 2 D-79110 Freiburg i. Br. // +49 (0)761 4 56 88 - 30 // [info \(a\) solares-bauen \(dot\) de](mailto:info(a)solares-bauen(dot)de)

<http://www.solares-bauen.de>

Energy concept, building physics and TGA planning

### Contracting method

Other methods

### Owner approach of sustainability

"Outstanding in every way" - Kirstein & Sauer is committed to developing and realizing high-quality properties for its own portfolio. In its own interest, this family-run company is particularly keen to ensure that new developments and plans are actually implemented at the required quality level. To this end, the projects are supported in the long term. From this guiding principle, the desire has been created to build a green building. On the one hand, tenants should benefit from low-cost, well-calculated ancillary costs. On the other hand, Kirstein & Sauer's own portfolio should be a zero-emission house, which should also be one of the most energy-efficient office buildings in Bielefeld in the long term.

### Architectural description

The four-storey new building is on the site of a former car house. With a consumer market on the ground floor and above-ground offices for different users, the building will contribute to the revitalization and urban development of this commercial area east of Bielefeld city center. Access to the market is on the west side of the building, in the immediate vicinity of the pitches. The office rooms are accessed via two stairwells, each of which is placed at the building corners along the Werner-Bock-Strasse. In order to maximize the marketing of the office space, flexibility, comfort and low ancillary costs were at the forefront of architectural planning. The office floor plans were arranged in such a way that up to four autonomous rental units can be created on each floor and can be converted with little effort. Prerequisite for good thermal comfort and low energy consumption is an energy-efficient building envelope. Under an optically sophisticated clinker façade, which refers to the history of the town, conceals a 24cm-thick thermal insulation. Windows have been designed with triple glazing to achieve the best possible acoustic and thermal comfort (avoiding cold surfaces). In the offices, the décor remains visible and is used as a storage medium to minimize temperature fluctuations and overheating in the summer.

## Energy

### Energy consumption

Primary energy need : 45,00 kWhpe/m<sup>2</sup>.year

Primary energy need for standard building : 126,00 kWhpe/m<sup>2</sup>.year

Calculation method :

Breakdown for energy consumption :

Final energy requirement // Primary energy demand (kWh / m<sup>2</sup>.a) - Heating: 60,2 7.3 - Lighting: 8.4 21.7 - Ventilation: 4.1 | 10.8 - Cooling: 2.1 | 5.4 -----  
----- Total: 74.8 | 45.2

More information :

To cover the primary energy requirement, a photovoltaic system of 180 kWp was installed on the roof, generating 140,000 kWh of electricity annually. This will

make the building a zero-energy house.

## Envelope performance

Envelope U-Value : 0,17 W.m<sup>-2</sup>.K<sup>-1</sup>

More information :

Opaque components: 0.165 W / m<sup>2</sup>K Windows: 0.92 W / m<sup>2</sup>K

Indicator : EN 13829 - n50 » (en 1/h-1)

## Renewables & systems

### Systems

Heating system :

- Urban network
- Low temperature floor heating

Hot water system :

- Urban network

Cooling system :

- Water chiller
- Floor cooling

Ventilation system :

- Double flow heat exchanger

Renewable systems :

- Solar photovoltaic

Renewable energy production : 100,00 %

Other information on HVAC :

The design of the technical solutions was carried out on the basis of a dynamic building simulation. The impact of an energy-efficient construction on house technology was examined and an optimal and demand-oriented use of house-technical components was made, which led to low construction costs.

The roof was occupied almost completely by a photovoltaic system with 180 kWp. The plant was installed in an east-west orientation to adapt the electricity generation to the load profile of the building and thus to be able to consume a large portion of the generated electricity in the building itself.

Solutions enhancing nature free gains :

The ventilation unit has an adiabatic evaporation cooling system that allows cooling of the supply air by up to 12 K without active cooling.

### Smart Building

BMS :

The building is controlled by a slim central building control system. In order to minimize the air volume, presence sensors are used in meeting rooms.

## Environment

### GHG emissions

GHG in use : 0,60 KgCO<sub>2</sub>/m<sup>2</sup>/year

Methodology used :

EnEV calculation (2009) + additional consideration Solar power generation

Building lifetime : 50,00 year(s)

Due to the highly efficient district heating used (combined heat and power from waste utilization), the CO<sub>2</sub> emissions are only 13kg / m<sup>2</sup> per year according to the EnEV calculation. CO<sub>2</sub> emissions are reduced to 0.6 kg / m<sup>2</sup> i, taking into account the photov

### Life Cycle Analysis

Eco-design material : The impact of building materials on the life cycle has not been investigated separately. However, the building was designed with the utmost flexibility in terms of interior construction (drywall and raised floor) and building technology, thus consistently increasing its potential useful life.

## Water management

Consumption of harvested rainwater : 2 700,00 m<sup>3</sup>

The rain water accumulated on the property is collected and used for toilet flushing in the building.

## Indoor Air quality

In order to ensure the necessary air exchange, all rental units are constantly aerated and de-aired through a central ventilation system, so that the CO<sub>2</sub> content does not rise and pollutants are dissipated. The supply air is filtered.

## Comfort

**Health & comfort :** All prerequisites for optimum comfort in the workrooms are fulfilled:

- the temperature asymmetries are minimized by triple glazing, solid construction and low-temperature surface heating.
- Generous window surfaces allow optimal daylight quality.
- A demand-oriented ventilation with heat recovery ensures the high air quality.
- The users of the building can adjust the room temperature in the work rooms separately (thermostats) and open the windows at any time.

**Acoustic comfort :** The brooks were equipped with acoustic sails. The mechanical aeration system (equipped with silencers) allows ventilation without opening the windows (no noise from the outside).

## Products

### Product

Demand-oriented, cost-efficient and ambitious energy planning

solares bauen GmbH

<http://www.solares-bauen.de/>

Product category :

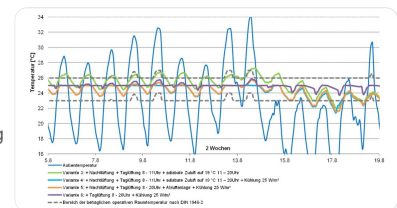
The energetic quality of the building could be achieved due to an ambitious planning, which follows the following principles:

- Cooperation of architecture and house technology. The energy concept incorporates both aspects of the building to achieve the best interaction between building envelope and technical installations.

Recommendations by TGA planners for sun protection and insulation standards enable the use of a slim house technology

- careful determination of the needs and design of the technical installations. The needs of the user are precisely examined (occupancy, comfort requirement). On the basis of dynamic thermal simulations, the size of the technical installations (eg ventilation systems, floor cooling) and their regulation are optimized.
- Application of cost-effective, market-driven solutions. When choosing the technical components, the cost-benefit ratio is always taken into account. This is always invested in the right place, be it in the technical center or on the roof!

This planning approach is synonymous with quality and longevity for the client.



## Costs

## Urban environment

Due to its architectural quality and its mixed use as an office building and a consumer market, the building contributes to the revitalization and urban development of the city quarter in the direct vicinity (1.5 km) from Bielefeld Central Station. The building close to the road was positioned to the urban space of the public space along the Werner-Bock-Strasse and the obligatory parking spaces of the consumer market were arranged on the side and behind the building. The delivery area of the market was largely withdrawn from the public eye and moved into the interior of the building.

## Land plot area

Land plot area : 7 600,00 m<sup>2</sup>

## Built-up area

Built-up area : 33,00 %

## Parking spaces

- 100 car parking spaces in the outdoor area - covered bicycle parking spaces

## Building Environmental Quality

### Building Environmental Quality

- Building flexibility
- indoor air quality and health
- comfort (visual, olfactive, thermal)
- water management
- energy efficiency
- renewable energies

## Contest

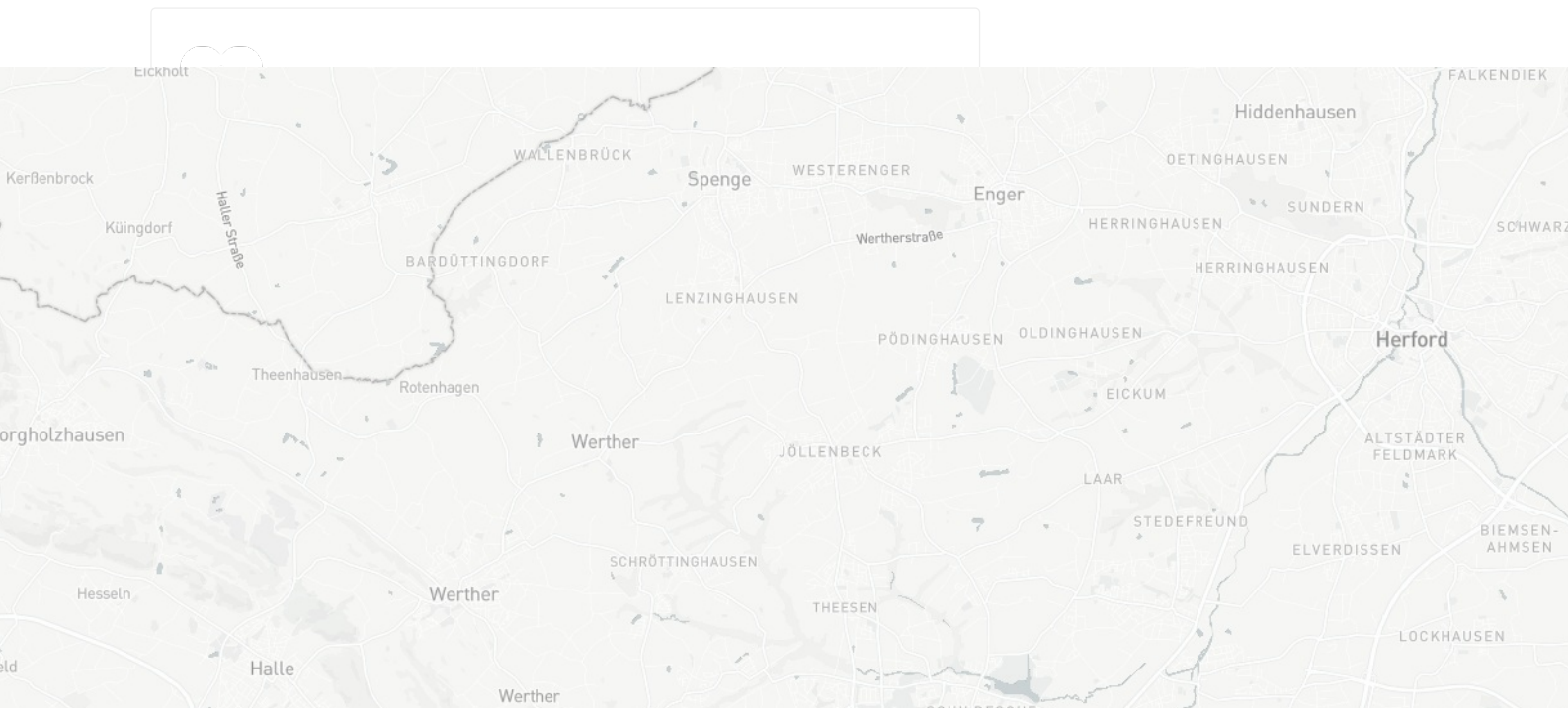
### Building candidate in the category



Energie & gemäßigtes Klima



Low Carbon





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