


## NEWTONPROJEKT Haus 1, Berlin Adlershof

by Laura Fernandez / ⌚ 2019-06-05 12:25:57 / Allemagne / 👁 8718 / 🇩🇪



**New Construction**

Temperate Climates  
International  
Winner  
GREEN SOLUTIONS  
AWARDS  
2019

**Primary energy need :**  
**6.68 kWhpe/m<sup>2</sup>.year**  
(Calculation method : )

**ENERGY CONSUMPTION**

*Economical building* *Building*

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

*Energy-intensive building*

**Building Type** : Collective housing < 50m

**Construction Year** : 2018

**Delivery year** : 2018

**Address 1 - street** : Abram-Joffe-Straße 10,12 12489 BERLIN, Deutschland

**Climate zone** : [Dfb] Humid Continental Mild Summer, Wet All Year

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**Net Floor Area** : 1 085 m<sup>2</sup>

**Construction/refurbishment cost** : 2 065 830 €

**Number of Dwelling** : 13 Dwelling

**Cost/m2** : 1903.99 €/m<sup>2</sup>

## General information

**NEWTONPROJEKT won the Energy & Temperate Climates Prize of the 2019 Green Solutions Awards at the Germany level + the international Energy & Temperate Climates Prize.**

The project was conceived as a flagship project for innovative sustainable district development with an assembly and a joint plus energy concept in wood construction. The three buildings have a significant reduction in CO<sub>2</sub> emissions due to their high-quality passive house construction and their energy concept. It is assumed that the KfW Efficiency House 40 Plus standard will be surpassed in practice and a negative annual energy demand will be achieved. This means that the houses generate more energy than the inhabitants consume.

House 1 completes the settlement to the north. It consists of 13 plugged apartments between 50m<sup>2</sup> and 150m<sup>2</sup>. To the street in the northeast are stairwells and adjoining rooms. In the southwest, to the courtyard side, there are the lounges and upstream conservatory. Flexibility in floor plan design was especially considered in the design process.

The mixed construction of solid reinforced concrete core and curtain-mounted wooden façade makes it possible to reduce the thickness of façades with high insulation requirements. The wooden windows have a triple glazing. The materials used on the façade are eco-friendly made of wood, the insulation made of cellulose and recyclable wood soft fiber.

### Awards

- KlimaSchutzPartner des Jahres 2015 in the category "promising and innovative plans"
- EnEff "Gebäude.2050" 1st prize in the category "Ideas for trendsetting buildings and quarters"

## Data reliability

Self-declared

## Photo credit

## Stakeholders

### Contractor

Name : Newtonprojekt GbR

Contact : Schwedter Str. 263, c/o Büro 1.0 10119, Berlin

<https://newtonprojekt.de/de>

### Construction Manager

Name : Deimel Oelschläger Architekten Partnerschaft

Contact : Wattstr.11-13,13355 Berlin, info@deo-berlin.de

<http://deo-berlin.de/>

### Stakeholders

Function : Structures calculist

Lichtenau Himburg Tebarth Bauingenieure GmbH

Bismarckstraße 78 10627 Berlin, office@LHT-Bauing.de

<http://lht-bauing.de/>

Structural design and building physics

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Function : Thermal consultancy agency

pi Passau Ingenieure GmbH

Geysostr. 19 38106 Braunschweig , braunschweig@pi-gruppe.com

<http://www.passau-gmbh.de/>

Haustechnikplanung

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Function : Others

Dr. Ing. Gabriele Holst

Agricolastraße 3 10555 Berlin , holst@gestaltungsfreiraum.de

<http://www.gestaltungsfreiraum.de/>

landscape architect

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Function : Others

Büro 1.0

Schwedter Str. 263, 10119 Berlin

<https://www.buero-1-0.de/>

project management

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Function : Others

Low-E Ingenieurgesellschaft für energieeffiziente Gebäude

Prof. Dr.-Ing. Lars Kühl Am Exer 10, 38302 Wolfenbüttel

<https://low-e-ingenieure.de/>

energy consulting

## Contracting method

Off-plan

## Owner approach of sustainability

- As a construction community **NEWTONPROJEKT GbR**, we realize the three multi-family houses in passive house **standard** with plus energy since May 2016 as a multi-generational community. Floor plans were flexible and customizable in the planning phase. As builders, we make all decisions democratically. Our project fits well into the emerging new residential district of the city of science Adlershof with many companies related to energy. Through our members we maintain professional, family and other connections in the city of science and the surrounding area.
- With our concept of **feeding solar heat** as storage into the Adlershof district heating network and, if necessary, taking it back there, we are combining in an innovative way with the infrastructure and jointly shaping the climate-friendly energy future. Garden and community are very important to us. The three residential buildings are grouped around a courtyard garden, which can be shared by all residents. All rainwater is discharged into the surface under a combination of superficial infiltration and trenches.
- Adlershof Projekt GmbH plans to extend this **plus energy concept** to other future construction phases on the site in Adlershof. Housing is currently booming and many locations are being reopened. In the development of new urban neighborhoods and locations, there is an opportunity to build decentralized, energy-generating neighborhoods through **integrated development** already in the development and planning phase, to optimize self-consumption through integrated storage systems for electricity and heat, and to existing or new heating grids and facilities to use. In addition, the Newton project provides valuable preliminary work, which will be published with scientific evaluations ( **DBU project, BMWi research** ), implemented in real terms and can serve as an **example** .

## Architectural description

- **Floor plan**
- The house 1 in the Newton project consists of 13 apartments between 50m<sup>2</sup> and 150m<sup>2</sup> living space. The floor plans were planned as plugged apartments. To the side of the road in the northeast, the side rooms and staircases are designed. In the southwest to the courtyard side each apartment receives an unheated conservatory. Flexibility in floor plan design was especially considered in the design process. With the aid of a switch room, the floor plans could be reduced or enlarged and small apartments could be joined together to form a large family apartment. Thus, the development of individual solutions according to the needs of the builders has been made possible.
- **Innovative facade system**
- An important point that brings a special public perception of the project, is the facade with a PV system. Great importance was attached to the creative integration of the PV modules in the building facades. Thanks to their flat substructure, the PV modules on the south façades could be integrated flush with the cleaned surface. In addition to the development of the technical basics in the planning, the challenge lay in the implementation of the PV system on a wooden facade in coordination with fire protection, building services and contractors as well as the technical optimization of the PV system and the selection of storage for the selected energy management system of the building complex.
- **Awards**
- - KlimaSchutzPartner des Jahres 2015 in the category "promising and innovative plans"
- - EnEff "Gebäude.2050" 1st prize in the category "Ideas for trendsetting buildings and quarters"

## Energy

### Energy consumption

Primary energy need : 6,68 kWhpe/m<sup>2</sup>.year

Primary energy need for standard building : 62,08 kWhpe/m<sup>2</sup>.year

Calculation method :

Final Energy : 42,00 kWhfe/m<sup>2</sup>.year

Breakdown for energy consumption :

DHW heating 19 kWh / m<sup>2</sup>a

Heating 25 kWh / m<sup>2</sup>a

Ventilation 0,29 kWh / m<sup>2</sup>a

### More information :

With a primary energy requirement of 7 kWh / (m<sup>2</sup>. A) for house 1, the plus energy standard is thus almost completely achieved in terms of primary energy. In workshops with the builders, various energetic concepts were presented and discussed in terms of energy and economic aspects. As a result, the planning with photovoltaic was reduced to the south-oriented building facades, and implemented only on House 1.

Nevertheless, it is assumed that in practice almost a negative annual final energy demand will be achieved. A power-to-heat control also enables power to be fed into the heat supply system even if there is excess electricity from PV. A battery system allows an own power usage of more than 50%.

## Envelope performance

### More information :

Exterior wall wood 0,118 W / m<sup>2</sup>K

Flat roof 0.094 W / m<sup>2</sup>K

Window 0.80 W / m<sup>2</sup>K

Building Compactness Coefficient : 5 133,00

Indicator : n50

Air Tightness Value : 0,60

## Renewables & systems

### Systems

#### Heating system :

- Urban network
- Combined Heat and Power
- Aerotherm Heater
- Solar thermal

#### Hot water system :

- Urban network
- Solar Thermal

#### Cooling system :

- No cooling system

#### Ventilation system :

- Nocturnal Over ventilation
- Double flow heat exchanger

#### Renewable systems :

- Solar photovoltaic
- Solar Thermal
- Other, specify

Renewable energy production : 85,00 %

#### Other information on HVAC :

Decentralized water heating

To further reduce energy consumption, legionella-free hot water stations have been installed in each apartment. As a result, the temperature of the central hot water preparation is lower and the energy losses are minimized.

Ventilation system with heat recovery

The decentralized ventilation systems with heat recovery provide the apartments with heat. Their controlled ventilation provides more than 80% heat recovery from the exhaust air. Additional radiators are only necessary in bathrooms. The supply and supply air is realized via the facades

heat supply

The heat is supplied by the in-house solar thermal system. The excess hot water is fed into the district heating network of the Blockheizkraftwerks-Träger- und Betreibergesellschaft mbH Berlin (AGFW certified 2013 in accordance with FW-309 with  $f_p = 0.24$ ) as part of a pilot project with return connection through the integration of a bidirectional heat transfer station. A power-to-heat control also enables power to be fed into the heat supply system even if there is excess electricity from PV. The Energy Concept as Plus Energy The multi-family house incorporating the district heating network is unique in this form.

Use of a photovoltaic system

The two neighboring buildings form an energy network with house 1. On the roofs of houses 1 + 3, as well as on the facade of house 1, there are PV modules, on house 2 solar thermal. The energy gained from the PV system is distributed to all apartments via an internal network.

The performance is counted in the proof and simplified divided equally among all three houses. The present report assumes a grid feed-in of 79,000 kWh / a with a calculated total electricity requirement of 74,000 kWh / a. In the context of the following EnEV verification, it is assumed that approx. 68,000 kWh / a will be used.

## GHG emissions

GHG in use : 2,87 KgCO<sub>2</sub>/m<sup>2</sup>/year

Methodology used :

EnEV calculation (2016)

Thanks to its high-quality and environmentally friendly construction, especially the façade, as well as its modern and efficient energy concept, the building has a reduction in CO<sub>2</sub> emissions. With a value of 2.87 kg / (m<sup>2</sup>a), the CO<sub>2</sub> emissions are 40%

## Life Cycle Analysis

Eco-design material :

Use of renewable raw materials The use of renewable and environmentally friendly raw materials has been implemented in the building envelope. The curtain wall is clad with an internal OSB panel and an externally recyclable soft-wood fiberboard and filled with cellulose. The windows are made of wood and with triple glazing. Dismantling and separation The curtain walls are wooden stud walls with recyclable wood fiber boards. The connection to the supporting structure takes place by means of mechanical measures that enable the dismantling of the elements.

## Water management

The paved surfaces in the outer space are planned as drainable coverings and are designed as far as possible with wide joints. All rainwater is discharged into the subsurface in a combination of superficial infiltration and trenches. The open construction allows the gravel areas to be used as infiltration areas for the paved paths. The coverings are made in unbound construction, drainable material with wide joints is provided. As bedding is a sand / grit mixture, for the base courses planned a mineral mixture.

## Indoor Air quality

The ventilation system allows the house to be completely heated with air. The passive house has a high **level of comfort through the ventilation system** , the constant exchange with fresh air. The apartments are all equipped with a simple regulation for the ventilation system (room thermostats and air quality sensors) and a Nachheizregister equipped for individual control.



# Comfort

## Health & comfort :

**Comfort through conservatory** A special focus in terms of comfort was the unheated winter garden in the south facade. This serves as an energy buffer and as a living space extension. The floor-to-ceiling windows of the outer conservatory facade can be generously opened as a folding system in the wooden stud wall. The integration of the winter gardens in house 1 has positive effects on the annual heating requirement and the thermal comfort. **Thermal comfort** The exterior walls are thermally comfortable with triple glazing. The apartment partitions and ceilings were made of reinforced concrete and allow to store heat. **exterior shutters** As part of the research, the shading system of the conservatory facade was developed in various variants and discussed with the users. The result was an outdoor venetian blind, which allows both shading, glare protection and privacy and can be operated electronically. **Exterior quality** The design of semi-private semi-communal green spaces in multi-storey housing promotes our social cohesion and provides space for a variety of activities. The three residential buildings connect a common garden, which is designed as a social meeting place for the residents. **Accessibility** The house was designed barrier-free and adapted individually with the residents. There were floor level showers in the bathrooms.

## Acoustic comfort :

The **wood construction** allows a high level of comfort in the acoustics of the rooms.

## Products

### Product

The PV modules asola VITRUM®

asola Technologies GmbH

kundenservice@solarcarporte.de

<https://www.solarcarporte.de/asola-technologies-gmbh>

#### Product category :


asola manufactures the solar composite glass element "asola VITRUM Super" both in standard sizes and for custom applications according to the "Technical Guidelines for the Use of Suspended Glazing" (TRLV and TRPV). Depending on the type of façade, façade grid and building height, solar laminated glass elements can be integrated as cold façades or as warm façades in both existing and new buildings.

Solar cell technology: Monocrystalline

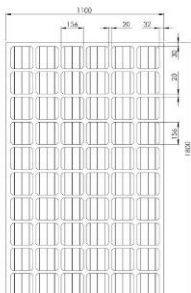
Rated power PMPP: 150 Wp

Module efficiency at STC: 13.9%  
 Rated voltage UMPP: 19.80 V


Technical Data VITRUM® Super



Exemplary option

Nennleistung Basic Power	WP	350		
Anwendung Application		Residenz Residence		
Maße Breite Module width	mm	1100 x 1600 x 10*		
Gewicht Weight	kg	43		
Glaskonfiguration Glass configuration	mm	4.0 EGG + 4.0 TVG** 4.0 tempered glass + 4.0 tempered glass**		
Glas-Oberfläche Surface of the glass		klar, gelblich, anioniert clear, yellowish, anionized		
Farben Colors		verschiedenartig various		
Transparenz Transparency	%	36		
Anschlusstechnik Connection technology		kundenspezifisch customer-specific		
Solar Zelle Solar cell		polykristallin polycrystalline		
Normen & Zulassung Certification		DNV-IB008 ab2		

\* max. measurements 3,55m x 2,15m  
 \*\* according to static standards



Die Solarmodule werden nach allen technischen Regeln gemäß der bekannten PV-Normen (IEC 61215 und 61730-1/-2) gefertigt. Stand 07/2013. Alle Abstände können, technische Änderungen vorbehalten. Alle Angaben ohne Gewähr.  
 The solar elements are manufactured according to all technical guidelines, known from PV-standard rules of IEC 61215 and 61730-1/-2. Version 07/2013. Valid for all measurements ±2mm. Subject to technical alterations. No liability is assumed for particulars.

Warranty under current German construction contract procedures | 10-year guarantee on material & manufacturing defects (product warranty) | 2-year limited guarantee on 10% of the power rating | 20-year limited guarantee on 80% of the power rating.

asola Technologies GmbH  
Kornstraße 20 • Straße 23  
D-99099 Erfurt

Fon: +49 361 241 425-0  
Fax: +49 361 241 425-90

www.asola-tech.de  
info@asola-tech.de

## Energy concept LoW-E

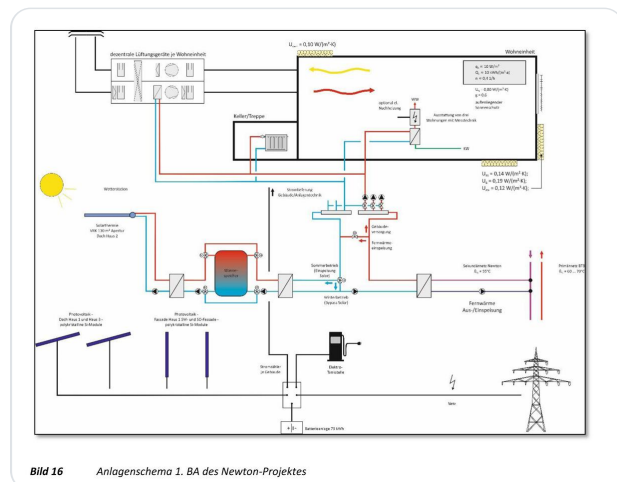
Low-E Ingenieurgesellschaft für  
 energieeffiziente Gebäude

Prof. Dr.-Ing. Lars Kühl, Am Exer 10, 38302  
 Wolfenbüttel

<https://low-e-ingenieure.de/>

Product category :

Low-E engineering company was involved in the project from the beginning as part of the integrative planning process.



As part of the planning phase, various approaches to care were developed and compared with one another. In addition to centralized solutions, decentralized solutions should also be considered. By integrating all those involved in planning, as well as the client and the user, all the levels of requirements for the execution and operation of the buildings are to be included in the planning.

As part of the concept development for the energy supply of the "Solar Plus Energy" development in Berlin Adlershof, a total of 6 different variants with regard to the provision of heat and electricity are being examined in the preliminary planning phase. The passive house standard of the buildings with the corresponding U-values and a maximum annual heating requirement of 15 kWh / (m<sup>2</sup>a) is set in all variants.

Further simulation tools were used for the development of control strategies as well as for the investigation of room concepts, climate buffers and different temperature zones within a dwelling.

## LTS aeration and deaeration device TSL-150

Lufttechnik Schmeißer GmbH

info@lts-berlin.de

<http://www.lufttechnik-schmeisser.de/>

Product category :

Suitable for a nominal flow rate of 50-130m<sup>3</sup> / h, the TSL-150 air handling unit offers a space-saving solution for housing as well as smaller family homes. The device is designed as a wall & ceiling device and disappears thanks to its size, in every small technical room.

**Lufttechnik Schmeißer GmbH**  
Luftung · Frischluftheizung · Wärmepumpe  
 Tel.: 030 / 912 075 400 Fax: 030 / 912 075 499

**LTS Be- und Entlüftungsgerät TSL-150**

**Maßzeichnung 1: TSL-150**  
**Unser Know-how für Sie:**  
 Volumenstrombalance = Gleichheit der Massenströme von Außenluft und Fortluft bei stufenlos einstellbaren Luftmengen und sich ändernden Betriebsbedingungen (unterschiedliches Kanalnetz, verschmutzte Filter, Windverhältnisse...)  
**Abtauautomatik** = bei gleichem Massenstrom von Außenluft und Fortluft ohne Zusatzenergie, d.h. ohne vorgeschalteten Erdwärmetauscher (Luft oder Wasser) und / oder elektrisches Vorheizregister  
**Technische Daten**  

Nennvolumenstrom stufenlos max.	m <sup>3</sup> /h	150
Empfohlene externe Pressung max.	Pa	100
Elektrischer Anschluss	V AC	230
Leistungsaufnahme max.	W	70
Stromaufnahme max.	A	0,54
EC-Radialventilator	Typ	2x G3G120BB1902
Leistungsaufnahme je Ventilator	W	35
Stromaufnahme je Ventilator	A	0,27
Filter Außen- / Abluft	Typ	F7 / F5
Gegenstromwärmetauscher	Typ	GS 25 / 350
Kondensatanschluss	mm	Ø 30
Abmessungen (B x H x T)	mm	ca 693 x 754 x 292
Gewicht	kg	ca. 25
Energiekennwert Passivhaus bei 91... 114 m <sup>3</sup> /h u. 100 Pa externen Druck	White <sup>®</sup>	0,31

**Luftseitige Anschlüsse:**

AU / LM	Außen-LuftA	DN125
ZU	Zuluft	DN125
AB	Abluft	DN125
FO	Fortluft	DN125

**Montage:**  
 abtiefend Wandmontage, Zu- und Abluft oben, Resonanzöffnung vom Legende (Dachmontage, Zu- und Abluft seitlich, Resonanzöffnung unten)

Stand: 21.08.13

Lüftung · Frischluftheizung · Wärmepumpe · Lüftung · Frischluftheizung · Wärmepumpe · Lüftung · Frischluftheizung · Wärmepumpe · Lüftung

## Wooden facade with integrated PV modules

Deimel Oelschläger Architekten  
Partnerschaft

info@deo-berlin.de

<http://www.deo-berlin.de>

Product category :

In the southwest and southeast façade the wall construction was reduced to include the PV modules. In order to meet the technical and fire safety requirements, an external cement board was installed. The technical basis was developed by means of an expert opinion.

Great emphasis was placed on the creative integration of the PV modules in the building facades.

The PV modules form a level with the cleaned surface and are largely integrated in the façade level.

**SÜDWEST HOLZFASSADE MIT PV**

**Detail 2**  
 Südwest Außenfassade  
 PV Modul - Laibung Faltfenster

**AUFBAU**

<p>1 PV Modul Glas-Glas</p> <p>2 PV Klemme</p> <p>3 Alu Paneele 2,5 mm</p> <p>4 Aquapanel 12,5 mm</p> <p>5 mineralisches Putzsystem</p>	<p>6 Holzweichfaserplatte</p> <p>7 Zellulose</p> <p>8 OSB Platte</p> <p>9 Gipskartonplatten x2 Holzweichfaserplatte</p> <p>10 Holzfenster Falanlage 2-fach Verglasung</p>
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## Winter garden as a climate buffer

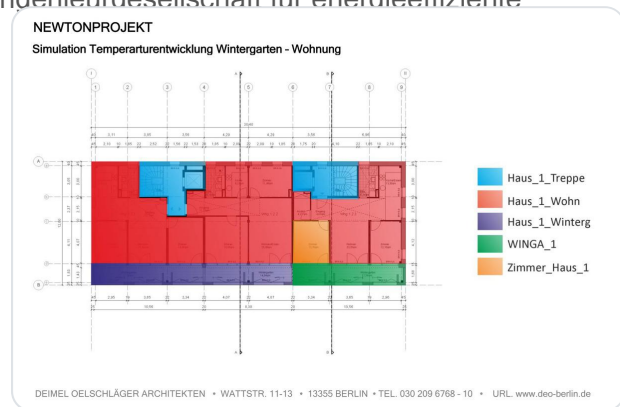
Deimel Oelschläger Architekten und Low-E Ingenieuregesellschaft für energieeffiziente Gebäude

info@deo-berlin.de

<http://www.deo-berlin.de>

Product category :

The winter gardens are being developed as so-called "additional rooms". Due to the solar radiation and the outflow of heat from the building, it is assumed that the rooms are frost-free even during the winter period and can therefore be used most of the year. Energetically, they can be considered as buffer spaces. The thermal behavior and the resulting operating room temperatures are investigated by a thermal simulation.



In particular, the influence of conservatories on the annual heating demand is the subject of the investigation. In terms of construction, the conservatories should be designed with 2-fold WSV glazing with a U-value of  $1.1 \text{ W} / (\text{m}^2\text{K})$ .

This version as a double EnEV façade is the result of a study on the cost optimization of the facades in relation to the requirement for frost-free and energy buffer. The conservatories should be run unheated.

Research project "High Tech Low-EEEx Energy Efficiency Berlin Adlershof 2020"

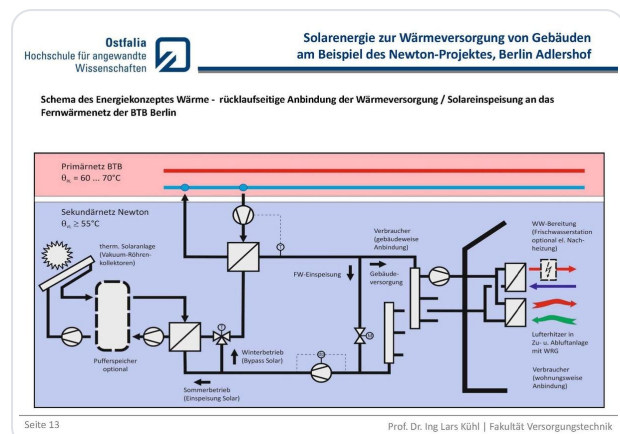
BTB Berlin und TU Dresden

clemens.felsmann@tu-dresden.de

<https://tu-dresden.de/>

Product category :

Three investors are currently involved in the innovative "Living on Campus" pilot project: two large Berlin housing associations and one subassembly. All have installed solar thermal systems on the roofs of their buildings. The quarter is located not far away from the cogeneration plant Adlershof. The BTB's modern cogeneration plant is powered by natural gas and feeds the heat, which is generated by 90% in cogeneration, into a network that goes far beyond Adlershof, which also supplies the newly connected residential district.



The TU Dresden scientifically accompanies the pilot project "Niedertemperaturnetz" over two heating periods and evaluates the results.

Common research contents of the NEWTONPROJEKTS with the BTB are:

- Utilization of renewable energies via utility grids during off-peak hours
- Organization and operation of "intelligent house stations" for the storage and withdrawal of heat in the internal and public supply network.

- Development of strategies for the organization of dynamic heat extraction costs / feed-in tariffs as a function of temperature / exergy level and load level in the grid (summer / winter, outside temperature level) .Heat in the internal and public supply network

## Costs

### Construction and exploitation costs

Renewable energy systems cost : 129 690,00 €

Total cost of the building : 2 832 513 €

Additional information on costs :

Total construction costs net: KG 200-700 (n.DIN 276)

## Urban environment

With their coordinated facades and color concept, the three four-storey buildings form a **uniformly designed ensemble** in the new residential area in Adlershof. The shared **green courtyard** contributes to the improvement of the **environmental microclimate** and the partial facade and **green** roofs.

## Land plot area

Land plot area : 2 874,00 m<sup>2</sup>

## Built-up area

Built-up area : 40,80 %

## Parking spaces

An underground car park with 17 parking spaces is equipped for electromobility. 110 bicycle parking spaces are located in the basement and in the yard.

## Building Environmental Quality

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## Building Environmental Quality

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

### Contest

## Reasons for participating in the competition(s)

### ECOLOGICAL CONCEPT

- ✓ Fulfillment of the **plus-energy standard**, the planning of the building technology takes place under application of a **KfW-Effizienzhaus 40 Plus** standard and fulfills the Plus package. It is assumed that in practice, almost a **negative annual final energy** requirement is achieved.
- ✓ Reduction of **CO2 emissions**
- ✓ Implementation of **renewable resources** implemented in the building envelope.
- ✓ Use of a **photovoltaic system** and **battery storage**. The battery system allows the use of more than **50%** electric current.
- ✓ The heat is supplied by the in-house **solar thermal system**. Surpluses are fed into the district heating network. ✓ **Decentralized water heating** to further reduce energy consumption.
- ✓ **Rainwater** infiltration. All rainwater is in a combination of superficial infiltration and trenches.

### ECONOMIC CONCEPT

- ✓ **Low operating costs** due to the high and future-oriented construction quality of the project.
- ✓ **Resource** optimization in the planning phase. The facade elements could be carried out non-supporting due to the Schottenbauweise in order to reduce their overall strength.
- ✓ The future **adaptability of** the apartments was considered in the floor plan design.

### Architecture / DESIGN

- ✓ Development of **individual solutions** according to the needs of the clients.
- ✓ **Innovative façade system** through the integration of PV modules in the façade.

### PROCESS QUALITY

- ✓ **Integrative planning approach implemented** together with builders, 3 architects' **offices**

and specialist engineers and integrated into a research project of the DBU.

## Building candidate in the category



Energie & gemäßigtes Klima

