

European Energy Service Award 2019

Energy Performance Contracting Studentensiedlung Ludwig Frank

E1 Energiemanagement GmbH



Description

Background | Initial Situation

This project of Studierendenwerk Mannheim includes 8 halls of residence with 370 apartments for 776 students (former military buildings from the 1930s to 1960s). Some buildings have been upgraded approximately 10 to 15 years ago regarding building insulation. Technically the buildings were all in need of major renewal works. Mandatory part of the project was the complete energetic renovation of one building. After renovation the building should be newly insulated according to the actual German low energy consumption standard (KfW Standard 100).

Solution | Measures

The solution was a complete energetic renovation of 1 building with 43 student apartments to energy efficiency standard KfW 70 (30% less energy consumption than actual standard for new buildings/EnEV).

The works comprised amongst side works

- » wall insulation 20 cm WLS 034 including perimeter insulation
- » renewal of windows (triple glazing, $U_{w} = 0.95 \text{ W/m}^2\text{K}$) and entrance doors including adjusting works as well as mounting sun shading systems
- » ceiling insulation of basement (8 to 10 cm WLG 035)
- » upgrade of roof insulation / insulation of top storey ceiling (8 to 10 cm WLG 035)
- » mounting new lightning protection system
- » installation of 2 central air handling units and related duct works to provide controlled fresh air for all rooms
- » upgrade fire protection measures



Old facade (left), new facade (right) / E1

Renovation of technical systems for all 8 buildings

- » complete renewal of heating substations (energy supply by district heating) including domestic hot water supply in all buildings Summary
- » upgrade of water supply (new shower heads, toilet flushes etc.) in all rooms to reduce water consumption
- » implementation of hydraulic balance of heating and water supply system
- » renewal of thermostat valves (> 1.500)
- » replacement of lighting systems by LED (> 3.000 lamps)
- » implementation of metering concept for heating, electr. & water
- » installation of new controls (DDC substations) in all buildings and implementation of cloud solution for BMS and EMS

Results

The project proved that energetic renovation of a building can be included in an EPC project without prolonging the payback period beyond the borders of being uneconomical. Using government funding by the KfW through their programme 431 helped financing the project and ensured the project success as funding only takes place when the result is proven, in this case by calculation and practical test for windproofing (blower door test).

Key Results

Energy savings:	district heating: 470,203 kWh / year, electricity: 115,153 kWh / year, water: 14.151 m ³ / year
Reduction of CO₂ emissions:	157 tons / year (21% / baseline)
Cost savings:	145,049 € / year

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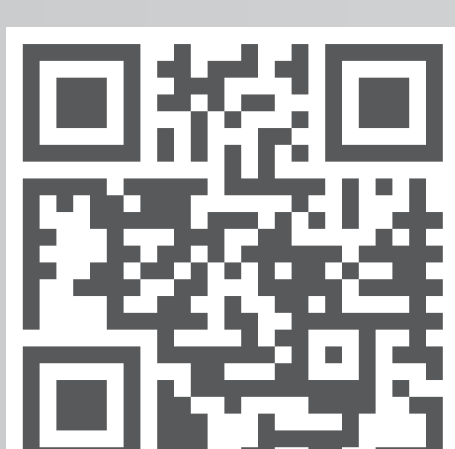
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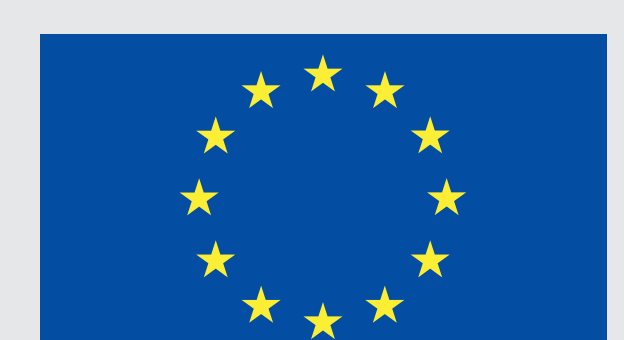
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