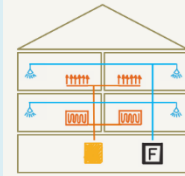


## Green buildings - geothermal, Germany

In Ennepetal, North Rhine-Westphalia in western Germany, a private investor is building three apartment buildings of which one is being used as a reference project for achieving energy efficiency in the most economical way.



F1.3

### Key facts

#### Buildings

Location	<i>Ennepetal, Germany</i>
Construction	<i>ongoing at time of case study intake</i>
Project type	<i>newly built</i>
Heat distribution	<i>panel-heating/underfloor</i>
Heated space	-
No. of apartments	<i>12</i>
Level of insulation	<i>very good*</i>

#### Heat pump and sources

Number of	<i>1</i>
Operation mode	<i>bivalent</i>
Heat source	<i>ground</i>

#### Heating system

Installed power	<i>46kW</i>
Heating temperature	<i>flow 35°C, return 30°C</i>

#### Domestic hot water

Type of system	<i>central</i>
Kind	<i>Electric wall heater</i>
Max. temperature	-
Buffer tank	<i>2000l</i>

#### Other information

Coefficient of Performance	<i>4.4</i>
Refrigerant	<i>R410A</i>
Cost	<i>70,000€ (without drilling)</i>

#### What to look out for

- The target is to reach the 'KfW Efficiency House 55 standard'
- Is the project economically viable and will the investment pay off?



The three new buildings contain 34 residential units altogether (16, twelve and six units respectively) where the middle one serves as the reference object for this case study. The building is very well insulated, but these measures alone were not sufficient to achieve the energy efficiency target.

"The investor was very much concerned with the issue of urban development in his home town," says architect Janet Kaya of developers Frey & Frey in Ennepetal.

The price-performance ratio, for example, should allow for a permanently mixed tenant picture, if possible. "Because 80% of property costs are incurred during the operating phase, the topic of 'energy consumption' then played a decisive role, particularly with regards to the economic viability and ultimate recouping of the investment," says Kaya.

## Green buildings - geothermal, Germany



### Description of the technical concept

In order to reach the target – the ‘KfW Efficiency House 55 standard – ten possible system configurations were compared.

In this particular case, the planners chose the option based on a geotherm brine/water heat pump with an output of 46 kW. An eLoBLOCK electric water wall heater secures peak loads and drinking water hygiene. A multi-functional storage tank with a capacity of 2,000 liters serves as a heat buffer to ensure sufficient hot water supply. Space heating is distributed via a panel heating system with a flow/return temperature of 35/30°C. All living spaces are also ventilated in a controlled manner.

This approach massively saves operating costs. A further benefit is that everything comes from a single source. Thus, the various system components are perfectly matched to each other – from the heat pump to the supporting electric heating to the identical control system.

