

Example name: Dorota's house in Poland



BISTS characteristics:

System for hot water supply and central heating (combi). Primary heat source – heat pump with vertical ground heat exchangers. Flat plate solar collectors with collection area 10,92 m² (6*1,82m²). Orientation south (azimuth 0°), inclination 38°. Buffer storage tank 750l + DHW storage with electric heater 100 l. The solar heating system provides 30% of space heating and hot water of annual demand. April – September (6 months) no space heating, DHW is accomplished by solar heating system in 95%. Solar collectors: Hewalex KS2000 TLP. Absorber: harp, material: copper.



Stage of Development:	Responsible: D. Chwieduk Research institute, Company, .
 O Idea/Patent O Prototype O Demonstration ⊕ Integral building element ⊕ Commercially available 	Hewalex?? Hewalex??
BISTS description and context	
Building was designed to use solar energy by passive and active systems. The building has a solar buffer space at south side which provides high solar gains during autumn, winter and spring. In summer buffer space limits heat gains to living space (residential part) of the building. The building details are: Building Envelope: U-values (W/m ² K); facade 0.145, roof 0.19, floor 0.21, glazing 1.4 Volume: 1026m ³ Surface Area: 348m ² Annual primary energy demand: 25 kWh/m ² year Building has mechanical ventilation system with recuperation. Heat pump electric power: 1,8kW. Electrical energy consumption during one year: 7600 kWh. There are 4 residents in the building.	
System viability The system has been operated for 1,5 year. Running costs are mainly connected with electric energy consumption of: 7,6 MWh/a, it corresponds to 800 €/a. All operation parameters (constant and fluctuated in time) can be checked through visualisation system. However, there is no data acquisition system.	
Modelling and simulation tools developed/used	
Building energy consumption has been calculated using ISO standards for energy performance of buildings to create energy performance certificate. Simulation program PWSun (own code) to determine useful solar energy gained from solar collectors and to simulate solar thermal energy systems has been developed at IHE WUT. This program has been used to calculate the useful energy from solar collectors and the whole installations to evaluate performance of the system. Both water heating system and space heating system supplied by solar collectors of different type can be modelled by application of the PWSun.	







Additional information:

The project of a building – single family house, its energy interactive architecture has been made with strong cooperation with the architect. Solar heating system coupled with a ground heat pump has been designed and planned with co-operation with solar collectors (Hewalex) and heat pump (Viessman) companies. In addition heat recuperation from ventilation system has been planned with cooperation of HVAC company (Wolf).

Sources and references:

It is own author's planned and constructed house based on own calculations and predictions. Description of a house and its systems has not been presented in literature, only some elements of the heating system has been mentioned.in literature.