

General information

▶ Aims:

- Ultra-efficient renovation of a panel building
- Passive house components
- Demonstration building
- Technical information on the physical state of the panel buildings
- Optimised concept for the building envelope and service systems
- Monitoring in order to control the quality
- Research on ecological impacts
- Research on social aspects
- Education and dissemination

▶ **EU 5th Framework Program**

▶ **Jan. 2002 - Dec. 2006**

▶ **Austro-German-Hungarian project**

Building and renovation measures

- ▶ Located in Dunaújváros, 80 km from Budapest
- ▶ 42 flats

MEASURES:

- ▶ External thermal insulation of walls (16 cm PS)
- ▶ Thermal insulation of roof (30-40 cm) and cellar ceiling (10 cm)
- ▶ Double glazed and triple glazed windows ($U=0,9..1,2 \text{ W/m}^2\text{K}$)
- ▶ Flatwise ventilation system with balanced heat recovery
- ▶ Solar collectors supporting hot water supply (72 m^2)
- ▶ New low-performance double pipe heating system
- ▶ Water saving taps and shower heads
- ▶ Green roof



RESULTS AND CONCLUSIONS

- ▶ **First low-energy-retrofit panel building worldwide**
- ▶ **85% savings in heating energy consumption**
- ▶ **High satisfaction with thermal and acoustic comfort, low energy costs**
- ▶ **Better communication between the dwellers**
- ▶ **Lower average temperatures in summer**
- ▶ **Operation of the building service systems and envelope is not appropriate**
- ▶ **With more energy awareness from the dwellers' side further savings could be realized**
- ▶ **Retrofit is better than „dynamite”**