# EUROPEAN CONFERENCE AND COOPERATION EXCHANGE ON SUSTAINABLE ENERGY SYSTEMS FOR BUILDINGS AND REGIONS 2005

# ABSTRACTS

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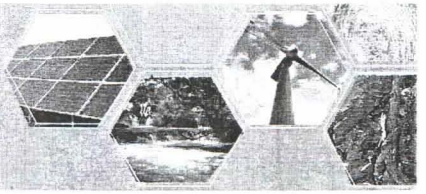

# Strategies for the Ecological Rehabilitation of Panel Buildings in Brno (Czech Republic)

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## Introduction

Only an economy based on the principles of sustainability will be able to secure our prosperity and quality of life in the long run. This, however, requires a radically reduced consumption of resources, which, in turn, can be achieved only by a fundamental change in our way of life and our economy. In addition to an appropriate political framework and increased awareness in consumer behaviour, the economy itself will be an important factor in sustainable development.

## Content

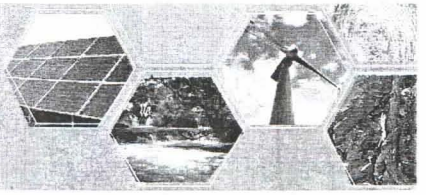
The presentation will focus on two projects in Brno. The first project was the establishment of a SOS children's village in the district of Medlánky, on the principals of low energy housing using passive house technology. The second was a pilot study that investigated methods to refurbish panel buildings within a passive house level.

### 1. SOS children's village

An SOS children's village designed according to low-energy principles using passive house technologies was constructed in the district of Medlánky in Brno, Czech Republic. The assignment on the part of the non-profit organization SOS Children's Villages International comprised the construction of ten family homes and one administration building, as well as the conversion of two existing single-family units. The planned outdoor facilities included a hard-top sports ground, a soft-top playground, pathways and lawns.

### 2. Rehabilitation of Panel Buildings

Within the framework of the Czech-Austrian Energy Partnership, and in cooperation with the Austrian Energy Agency E.V.A., the study in Brno in the Czech Republic established the foundation for strategies aimed at the ecological, energy-efficient rehabilitation of three typical panel buildings in Brno – Nový Lískovec. The study was supported by the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management and the European Union and represents the state of the art of in solar technology for buildings. The principal idea of the study consisted in creating a flexible model for rehabilitation, which can be serially applied to various types of prefabricated housing. The study emphasized on the refurbishment using alternative technologies to create passive house standards.



## Result

### 1. SOS Childrens Village

The principal idea was to design the children's village in such a way to clearly reduce its energy consumption and make it largely independent of energy suppliers while keeping planning and construction costs constant. This was achieved by the project's low-energy design in regard to following passive house aspects:

- Location of the houses
- Form of the houses
- Heat insulation
- Orientation
- Shading
- Zoning
- Massive construction
- Green roof
- Hot water generation
- Rain water collection

The houses showed reduced energy heating energy needs of 32 kWh/m²a.

### 2. Rehabilitation of Panel Buildings

The study served to clarify the technological, economical and financial conditions for the rehabilitation of the three panel buildings to achieve low-energy-housing levels considering the following aspects:

- Low Energy Strategy I focuses on measures to improve the interior layout and the electro-mechanical facilities.
- Low Energy Strategy II emphasizes the improvement of floor plans and interior layout of the apartments according to the principles of heat zoning.
- The Passive House Technology aims to provide necessary infrastructure for the ecological improvement of the building by means of a southward reorientation.

Furthermore, a pilot project was done that serves as prototype for refurbishment of panel buildings with a heating use of 23 kWh/m²a. To achieve reduced energy consumption the following steps were implemented:

- insulation of the building shell
- roof insulation
- rehabilitation of balconies – loggias / winter gardens
- central heating regulation, radiator regulation
- repair or replacement of windows
- natural lighting for the stairwells