Building of Tomorrow (PLUS)

An Austrian Research and Technology Programme
Overall aims of the research programme Building of Tomorrow

- Low energy solar house
- Passive house
- Ecological building materials and systems
- Renewable energy sources
- Energy efficiency
- Renewable raw materials, building ecology
- User and service aspects
- Comparable costs

**New buildings**

- 1999
- 2000
- 2001
- 2002
- 2003
- 2004
- 2005
- 2006
- 2007
- 2008
- 2009

**Retrofitting**
Results and Experiences from *Building of Tomorrow*

- More than 250 research projects
- 25 Mio EUR project funding
- >25 demonstration projects
- Austria has (now!) the highest density of passive houses
New technologies

- Development of solid wood passive house window
  Tischlerei SIGG
  U-: 0,78 W/m²K

- Passive house window with integrated sun shield
  Fa. INTERNORM
Technologies

Facade-integrated solar collector for water and space heating
Demonstration buildings

Mit Forschung zur Technologieführerschaft: Österreichische Demonstrationsgebäude aus dem Forschungsprogramm „Haus der Zukunft“

Leadership in research and technology: Austrian demonstration projects within the research programme “Building of tomorrow”
New buildings

ENERGY base
Office Building in passive house standard

- Active and passive use of solar energy
- Thermal comfort due to thermally activated building systems
- Ground water used for cooling and additional heat
- Using plants for natural air-conditioning
- Energy-saving lighting
- Wellness at work (best indoor climate and comfort)

- 4500 m² office space
- 1500 m² Laboratories
- 100% heating and cooling with renewable energy
- 400 m² of photovoltaic modules
New buildings

S-House:
Straw house in passive house standard,
Böheimkirchen, Lower Austria

Office & exhibition building of the University
Energy efficiency Faktor 20
Wall system: wood construction, straw bale as insulation material
Development of a solar cooling system
New buildings

Utendorfgasse:
social housing in passive house standard, Vienna

- construction costs less than 1055 €/m²
- passive house standard (≤ 15 kWh/m²a, ≤ 10 W/m², n50 ≤ 0,6/h)
- primary energy consumption ≤ 120 kWh/m²a
- High use comfort
High buildings

Schiestlhaus:
Ecological alpine refuge hut, Hochschwab area, Styria (2153 m)

- Autarkic building
- Collection of rain water from roof
- Warm water/flat thermal collectors integrated in the façade
- Electricity generated by 70 m² of façade integrated photovoltaic panels
Makartstraße: Passive house renovation, Linz, Upper Austria

- renovation of a multi-storey-building from the 1950s
- use of prefabricated wall units
- central element of the façade system is a special solar comb, which is mounted on the outside wall in form of a panel (gapsolar)
- controlled ventilation with single room ventilators
Old buildings

Renovation single family house in passive house standard, Pettenbach, Upper Austria

- first renovation of a single family house in Austria to passive house standard, reduction of energy consumption 95%
- use of prefabricated timber wall elements
- thermal bridges of the existing rising brickwalls were compensated by a circumferential umbrella-shaped insulation
- insulation of the floor by using vacuum insulation
Historical buildings

Demonstration building „Tschechenring“, Felixdorf, Lower Austria

- renovation of a historical workers‘ development from 1880
- extension of housing space by attic development
- thermal optimization of the envelope with interior insulation due to the protected facade
- comparable costs to conventional building methods
- use of renewable energy (central wood chips heating)
Building of Tomorrow

The Austrian Program on Technologies for Sustainable Development

The Austrian Program on Technologies for Sustainable Development is a five-year research and technology program. It has been developed by the Austrian Federal Ministry of Transport, Innovation and Technology (BMVIT). It initiates and supports transdisciplinary research and development projects and the implementation of exemplary pilot projects. The program pursues clearly defined emphases, selects projects by means of tendering procedures and is characterized by networking between individual research projects and by accompanying project management. The Ministry invites tenders in two subprograms:

- Subprogram "Building of Tomorrow"
- Subprogram "Factory of Tomorrow"
- Subprogram "Energy Systems of Tomorrow"

Project proposals will be accepted in German language only.

What is the "Building of Tomorrow"?

The "Building of Tomorrow" makes use of the two most important developments in solar and energy efficient building: the passive
The next step:

- A new thematic RTD-Programme

Building of Tomorrow PLUS

The idea:


- Running from 2008–2011
- Budget 32,6 Mio. EURO
PLUS means …

PLUS buildings as generators of energy
PLUS strengthening technological leadership
PLUS from the building to the settlement
PLUS from single to series manufacturing
PLUS visible demonstration projects
PLUS intensified international networking
PLUS know-how transfer and education
PLUS from the building to the settlement

- Solar orientation
- Traffic reduction
- Smart grids
**PLUS visible demonstration projects**

**Key project: BIGMODERN**

**Amtshaus Bruck an der Mur**
- Year of construction: 1963 – 1965
- Heating demand now: 153.38 kWh/m²a
- Heating demand aim: < 25 kWh/m²a
- 6,342 qm n.b.ar

**Universität Innsbruck, Architekturfakultät**
- Year of construction: 1971
- Heating demand now: 248.57 kWh/m²a
- Heating demand aim: < 25 kWh/m²a
- 6,467 qm n.b.ar

- Transferability of results for future projects
  - **multiplier effect**
  - Potential ca. 1,200 objects with 4.3 Mio. m² net building area (n.b.ar)
PLUS visible demonstration projects

Key project: Gründerzeitgebäude

Holistic modernisation of buildings in Wilhelminian style
- Development of multipliable concepts
- Development of innovative technical and organisational solutions (windows, façade)
- Implementation of at least 5 demonstration projects
- Close cooperation with City of Vienna
- Dissemination and international networking
**ERA-Net Eracobuild**

Strategic Networking of RDI Programmes in Construction and Operation of Buildings

Based on ERABUILD (2004 to 2007)

Two thematic frameworks:
1. Sustainable renovation
2. Value driven processes

**ECTP / ACTP**

Strategic Research Agenda

Joint Technology Initiative on Energy Efficient Buildings → E2B
IEA ECBCS
Integration of energy-efficient and sustainable technologies into buildings
ExCo, Austrian participation in Annex 44, 45, 49, 50, 51, 52, 53, 55, 56

IEA SHC
International collaborative programme in solar heating and cooling technologies
ExCo, Austrian participation in Task 25, 32, 33, 36, 37, 38, 39, 40, 41, 42, 43, 44
(e.g. IEA-SHC Task 38 - Solar Air-Conditioning and Refrigeration)
Thank you for your attention!

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