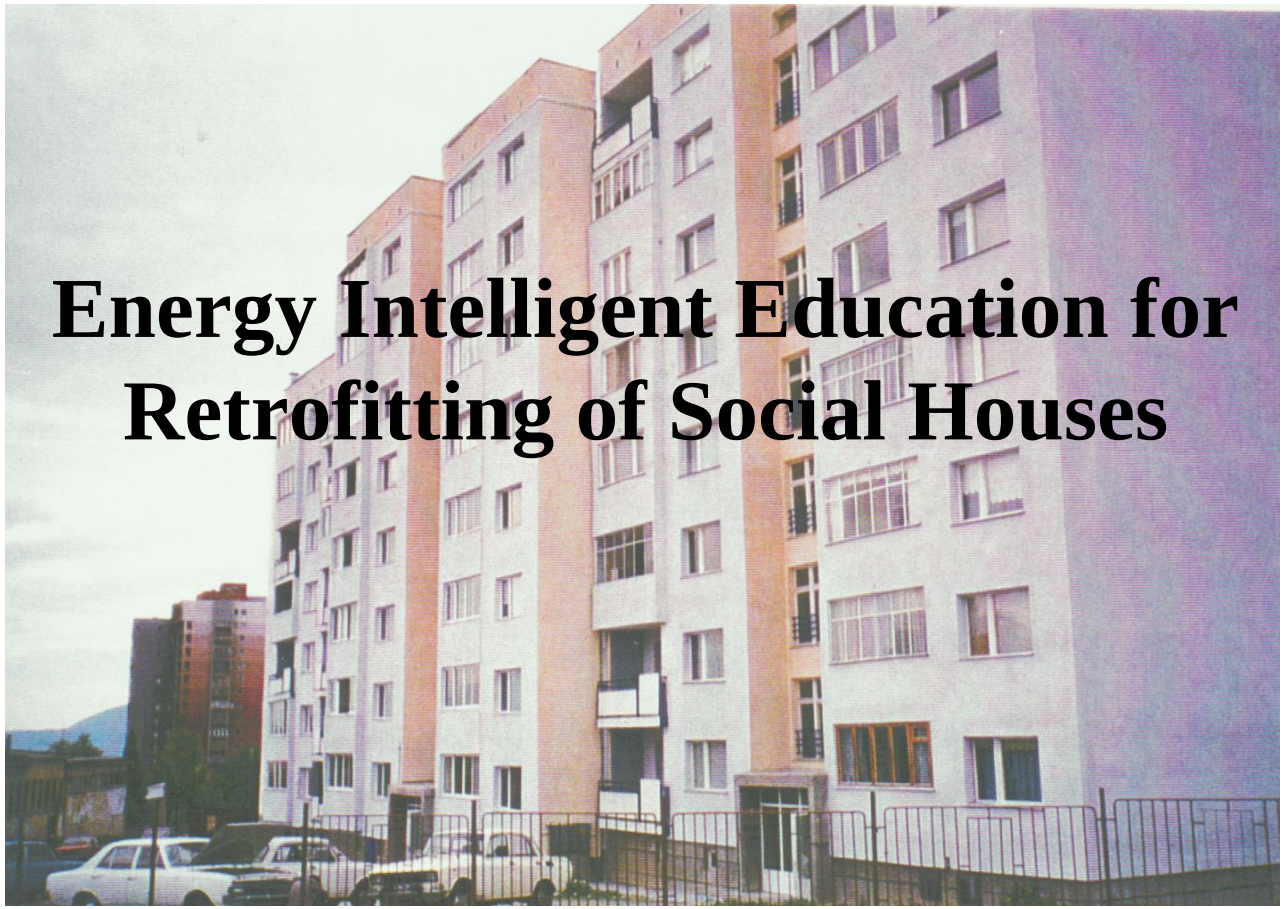
Intelligent Energy Europe



Energy Intelligent Education for Retrofitting of Social Houses

The main objectives of El-Education project are to:

•Give the social housing companies and municipalities knowledge and tools to perform energy efficient retrofitting in form of an education programme and

•Prepare a guidebook with best practical examples, ideas and checklists.

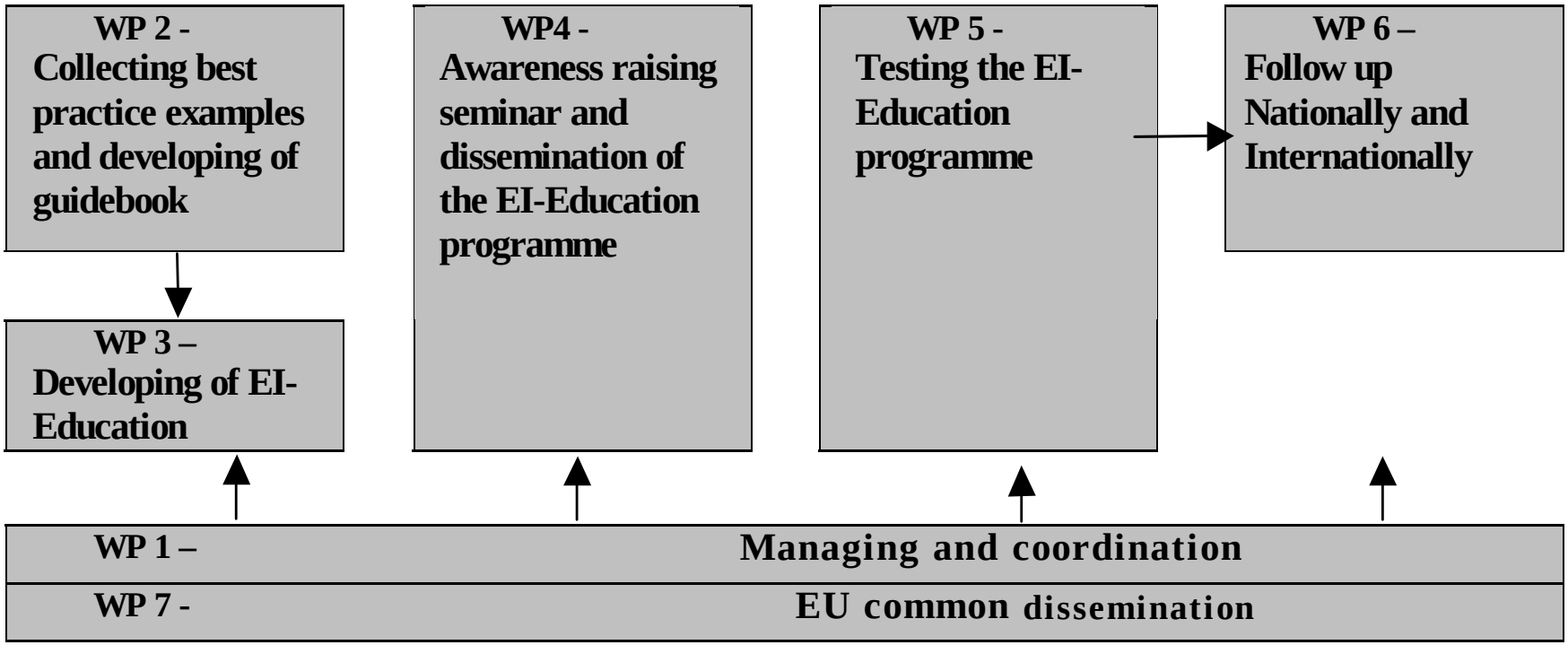
Partners in the project are:

- Aarhus School of Architecture, department for Supplementary Education (AAA), coordinator – Denmark;
- Energy research Centre of the Netherlands (ECN), the Netherlands;
- Cenergia Energy Consultants (Cenergia), Denmark;
- O.Oe. Energiesparverband (ESV), Austria;
- Centre Scientifique et Technique du Bâtiment (CSTB), France;
- Sofia Energy Centre (SEC), Bulgaria;
- Building and Civil Engineering Institute ZRMK (BCEI ZRMK), Slovenia;
- National Association of Housing Companies in Denmark (BL), Denmark;
- Housing Fund of Ljubljana (HF LJ), Slovenia;
- Development, Etudes pour le Logement, la Promotion de l'Habitat, l'Innovation et le Social (DELPHIS), France.

Description of work:

- **An El-Education programme for social housing companies, including a practical guidebook** is under elaboration to motivate and educate them on how to perform energy saving measures. The programme has its base on the best practice projects on energy efficient retrofitting in Europe.
- Implementation of the El-Education programme by organizing **national training courses** for social housing companies in 6 countries.
- **An awareness rising seminar** for Housing Associations will be organized under the auspice of CECODHAS, the European Liaison Committee for Social Housing and inviting ECTP (European Construction Technology Platform).

Structure of the work programme



Content of the guidebook

Chapter 1: Status quo of renovation (common practice) and needs for innovation and education in the partner countries

Chapter 2: Why to renovate – needs of refurbishment and high energy consumption in social housing

Chapter 3: When to renovate – organisational and financial preconditions

Chapter 4: How to renovate - In the guidebook the 10 most important elements of saving energy will be described

Chapter 5: Checklists and tools

Chapter 6: Best practice examples - The guidebook will describe 5-10 best practice examples from each region – from technical, financial and from organizational point of view, demonstrating that it is possible to increase the energy efficiency in social houses by retrofitting by at least 30%.

Chapter 7: Recommendations to overcome barriers and support drivers.

Best practice from Bulgaria

Block №10, district Zaharna Fabrica, Sofia. The multi-dwelling building was constructed in 1947 with 1100 m^2 living area (13 dwellings) and renovated in 2004.

The renovation includes:

- Thermal insulation of external walls;
- Whole reconstruction of attic;
- Water proofing and thermal insulation of roof;
- Thermal insulation of basement ceiling;
- New double glazed windows with PVC frames;
- Improvement of heating system.

The costs of the renovation were 104 750 BGN (approx. 52 375 euros)

Building before renovation

Energy saving - 46%

	Energy consumption (in KWh/m^2 per year)	
	Before	After
Heating	162.6	60.2
Hot water	30.5	43.8
Int. Ch.	194.7	105.6

Refurbished building

Lessons learned and conclusions:

✓ **For the realization of refurbishment of a multi-dwelling building in Bulgaria it is necessary to involve all owners and to organise them in an association;**

✓ **The costs of refurbishment can be, at least partially, covered by an extension of the building.**

Best practice from Geneva (Switzerland)

Low rent residential building, rue de Lancy 1-3, Carouge, Geneve.
The apartment building was constructed in 1953 and renovated in 2005. The building has total floor area of 3845 m^2 and 62 dwellings.
The owner is “Fondations Immobilières de Droit Public” (housing association).
The renovation is financed by the owner.

The renovation includes:

- Roof, façade and floor insulation;
- High efficiency insulation of glazing and frames;
- High efficiency boiler;
- Low temperature heating;
- Controlled natural ventilation;

Building before renovation

Energy saving - 80%

Energy consumption before renovation was 214 kWh/m^2 and after is 42 kWh/m^2 (for heating and domestic hot water)

Lessons learned and conclusions

- ✓ **This project proves that even buildings with limited refurbishment budgets can afford high energy performance and indoor environment quality.**
- ✓ **High energy performance means also high building quality.**
- ✓ **High energy performance does not necessarily mean complex, expensive and exotic technical installations. It can also be achieved by robust conventional solutions.**

Building after renovation

Some preliminary conclusions from the best examples

- **The comparison between the retrofitting models in different European regions is extremely important.**
- **The increase of the energy efficiency in the presented examples ranges from 25% to 94%. The average value is 50%.**
- **The renovation of a building aimed at increasing the energy efficiency can be done both in old and in new buildings.**
- **The cost of renovation in Euro per m^2 varies in wide range.**

Some preliminary conclusions from the best examples

The cost for renovation depends on:

- **Whether the measures applied are for energy efficiency only or for renovation of the building in general;**
- **The number of different measures taken;**
- **The characteristics of the suggested measures (traditional or ones requiring high technologies);**
- **The standard of living in the country.**

Main refurbishment measures

The main conventional measures taken can be divided in the following types:

- **High envelope performance, including:**
  - Insulation of façades, roof, top ceiling, ground floor;
  - Double glazed windows with PVC frames;
  - Renovation of the balconies and the entrances.
- **Improvement of the heat systems**
  - Insulation of distribution pipes;
  - Management and control system;
  - Installation of heat meters and heat valves;
  - New energy-efficient boiler.
- **Installations**
  - Mechanical ventilation with heat recovery.
- **Renewable energy sources**
  - Solar thermal collectors;
  - PV-systems.

Lessons learned and conclusions from the best examples

- **Austria**
  - o It is worthwhile to involve and inform the occupants well and to listen to their wishes and proposals and, where possible, to fulfill some of them.
  - o New buildings in GIWOG (social housing association) should be equipped with mechanical ventilation from now on.
  - o The energy saving potential is very high but is dependant also on the user behaviour, especially with the new windows and installed outside walls.
- **Bulgaria**
  - o For the realization of refurbishment of an apartment building in Bulgaria it is necessary to involve all owners in an association.
  - o The implemented insulation of external walls, roof and basement are cost-effective.

Lessons learned and conclusions

- **Latvia and Lithuania**
  - o It is very important to involve all occupants in the process of refurbishment.
  - o A flexible financing scheme would help for a better implementation and better results.
  - o The availability of grants, soft loans and flexible credits is necessary for the realization of projects for renovation of multi-dwelling buildings.
  - o The role of the municipalities is very important for the implementation of a wide-scale social housing refurbishment.

- **Denmark**
  - o PV modules are efficient.
  - o The individual heat recovery ventilation system has performed well and contributed to a much improved indoor air climate.
  - o Solar low energy retrofit projects are among the most important in the housing sector in Denmark.

Lessons learned and conclusions

- **France, Germany and Switzerland**
  - o The improvements of the apartment buildings increase their quality and the living comfort.
  - o Balanced ventilation with heat recovery can be achieved even if interior interventions must be avoided.
  - o Solar thermal panels for DHW and PV for pumps, ventilation and lightning are good solutions.
- **The Netherlands**
  - o The effort to communicate with tenants has contributed to a final success.
  - o The total living costs after the renovation cannot increase.

Thank you for Your attention!

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