

<b>Setting</b>	
Country	Bulgaria
Location	Sofia
Project start date	2003
Project end date	2004
Technology keywords	Buildings
Host sector	Multifamily residential building - owner occupied flats

<b>Technical summary of the project</b>	
Objective of the project	<p>To carry out a renovation of multi-dwelling building which flats are owned by the inhabitants, leading to lower energy consumption and improvement of the comfort of the flats.</p> <p>Given the fact that in Bulgaria there are about 95 thousand multifamily buildings with 3 and more floors built predominantly in the 60s and 70s with poor energy characteristics, the potential of replication of the project is huge.</p>

<b>Project description</b>	
<p>The project was executed in a multi-family residential building situated in Block 10, district Zaharna Fabrika, Sofia. It was initiated and realised by Bulgarian Housing Association in partnership with Housing Association De Nieuwe Unie, Rotterdam and Housing Association Woondrecht, Dordrecht.</p> <p>The project included:</p> <ul style="list-style-type: none"> <li>• Thermal insulation of external walls;</li> <li>• Whole reconstruction of the attic;</li> <li>• Water proofing and thermal insulation of roof;</li> <li>• New double glazed windows with PVC frames;</li> <li>• Thermal insulation of basement ceiling;</li> <li>• Improvement of heating system.</li> </ul> <p>On the last floor (attic) there are two common premises that were transformed in small flats. The rent of these new flats will help the reimbursement of the loan.</p> <p><b>Project results:</b></p> <p><i>Energy consumption before renovation:</i></p> <ul style="list-style-type: none"> <li>• KWh/m<sup>2</sup> per year: 194.7</li> </ul> <p><i>Energy consumption after renovation:</i></p> <ul style="list-style-type: none"> <li>• KWh/m<sup>2</sup> per year: 105.6</li> </ul> <p>Percentage energy saving 46%.</p> <p>After the renovation the building get certificate A.</p> <p>For the realization of the project was registered the first association of owners in Bulgaria.</p> <p>The project is financed through a loan from banks from Nederland as they offered lower interest rates, the loan is for 20 years.</p> <p>The monthly payment of the loan is 700 BGN (approx. 350 Euros), but half of this amount is ensured by the rent of the two new flats in the attic.</p> <p>The project can easily be replicated in the neighbouring buildings, as they are the same.</p>	

An energy monitoring was done before and after the refurbishment.

The inhabitants are satisfied by the results, the renovation lengthen the life span of the building with 40 years, the insulation of the external envelope lead to a better comfort and energy saving.

**The building of Block 10 in Zaharna Fabrika, Sofia**



Before renovation



After renovation

#### Lessons learned and conclusions

- For the realization of refurbishment of a multi-dwelling building 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. Most of the buildings could be extended with an additional floor;
- The financing institutions should be flexible when giving loans for such projects, most of the owners are with low or medium incomes and the banks should take this into account.

#### *Environmental and social benefits*

(Estimate of) Greenhouse Gases abated (in metric tons of CO <sub>2</sub> -equivalent)	Annual: 23,04 tCO <sub>2</sub> -equivalent Up to and including 2012: 184,3 tCO <sub>2</sub> -equivalent Up to a period of 10 years: 230,4 tCO <sub>2</sub> -equivalent Up to a period of 15 years: 345,54 tCO <sub>2</sub> -equivalent
Number of reduction units (EAU, CER, ERU, AAU)	-
Socio-economic aspects What social and economic effects can be attributed to the project and which would not have occurred in a comparable situation without that project?	The inhabitants are satisfied by the results, the renovation lengthen the life span of the building with 40 years, the insulation of the external envelope lead to a better comfort and energy saving.  The economic effects of the project based on the current heat prices in Sofia, amounts to 11 855 Leva/year savings or 6 061,5 Euro/year.

<b>Methodology used</b> (if applicable: approved baseline methodology or study done - refer to this; and monitoring organisation)	The methodology for CO <sub>2</sub> calculations is based on the approved by the Bulgarian Ministry of Environment and waters emission factors.
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<b>Economic data</b>	
Capital costs	104 750 leva or 52 375 Euro
Financing scheme	Bank loan
Financing organisation (if third party)	Nederlands banks

<b>Project developer</b>	
Name of the project developer	Bulgarian Housing Association
E-mail and/or web address	bha@mail.orbitel.bg
Contact person	Arch. Georgi Georgiev

<b>Host organisation</b>	
Name of Host organisation	Association of owners of Block 10 in district Zaharna Fabrika, Sofia
E-mail and/or web address	-
Contact person	-

<b>Technology provider</b>	
Name of Technology provider	-
E-mail and/or web address	-
Contact person	-