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## **1. State of the art in January 2001 – Pilot project: Brunckviertel**

- The work in the section (B) of the pilot project, which is the most relevant for SUREURO, is going on according to the time schedule so that in summer 2002 the dwellings can be committed to the tenants. The external shells of the buildings are being insulated on the outside with very efficient thermal insulation material (NEOPOR, i.e. expanded polystyrene with graphite additives to reduce radiation).
- Work in the whole “Brunckviertel” is being done continuously so tasks of different phases of the refurbishment process are being done at the same time.
- Measurement on energy consumption and tenant behaviour in dwellings is in progress.
- The performance of the fuel cell actually installed is not satisfactory. It will be replaced by a fuel cell produced by another manufacturer.
- All in all the time schedule of the works could be kept.

## **2. The work performed during the first 24 month**

At the start of SUREURO Germany was represented by the housing company Marzahn, Berlin. In June 2001 Marzahn housing company had to give up its commitments to SUREURO and LUWOGÉ housing company took its place as German SUREURO partner. Consequently a new German pilot project had to be determined. The “Brunckviertel”, a LUWOGÉ residential area in Ludwigshafen, was taken as it fitted very well SUREURO demands.

The national pilot project “Brunckviertel” is situated in the immediate neighbourhood of the BASF plant and is integrated in the urban fabric of the local community of Friesenheim. It can make use of the existing infrastructure offering short distances to a variety of services. The residents – preferably employees of BASF - have short distances as well to their jobs in the BASF plant on the “other side of the street”. Thus having housing and working close together traffic is reduced. The substance of the existing old buildings is rather poor, as most of the housing, dating back to the first half of the last century, was damaged severely during World War II and has been restructured under conditions of scarce building material and urgent need for dwellings. German families no longer accept the small dwellings with small rooms and poor equipment today. So more and more households of single people and foreigners concentrated in the area. The area lost more and more its former attraction to active BASF employees. So refurbishment became urgent to avoid further social downgrading. The Brunckviertel now is seen by the LUWOGÉ as a challenge to create decent housing and an attractive living area for BASF employees in the immediate neighbourhood of the BASF chemical plant.

The refurbishment process in the Brunckviertel had already started in 1997 with various analysis and diagnosis. The results were evaluated and compiled and served as a solid basis for a structural concept for the refurbishment that had been produced in 1998. The structural concept covered the whole area and will be adapted over the time of the refurbishment process due to new experience, demands and developments. To adapt the time schedule of the work to be done to the working and financial capacities of LUWOGÉ the area was divided into six sections of action (A-F) where refurbishment should be performed successively. For the six sections, depending from the quality of the substance of housing and dwellings, different goals had been set for the way to improve housing and outdoor areas. Among these goals there was refurbishment as well as demolition and new construction on cleared sites. In one of the sections now under construction, the site was completely cleared and the new building is for commercial use only (section D). Housing has been abandoned in this case, as it is adjacent to a very busy street. The commercial buildings also serve as noise protection for the housing in the section behind it. In this section (E) rental terraced housing for young families of LUWOGÉ employees is planned and will be constructed after having the site cleared completely. Before the beginning of refurbishment “Brunckviertel” comprehended some 850 dwellings, after it will have been finished, there will be only 500 dwellings left, but bigger in size, so that the whole floor area of the dwellings will remain the same.



Though basic decisions had been already taken by the LUWOG before joining the SUREURO project, central objectives of the Brunckviertel refurbishment process were very much in line with SUREURO objectives, especially tenant's participation and the respect of tenant's needs as well as energy saving and reducing CO<sup>2</sup>-emissions.

Following to the time schedule refurbishment of the whole area will be finished in 2006.

## **2.1. Tenants participation**

To respect tenants' interests is basic for the work of LUWOG. As it is a subsidiary company of the BASF chemical works, it has a specific mission to fulfil. Housing is exclusively offered to employees of the BASF. This prevents LUWOG to submit its housing stock to economic objectives only and gives a high value to considerations about tenants' needs and satisfaction.

After the first steps in the refurbishment process of diagnosis and brief the results regarding the whole area of the "Brunckviertel" were submitted to broad discussion with the tenants. A big tent was used as meeting hall where all tenants were invited to get the general information and for discussion. Besides they were informed in small groups and individually about perspective consequences for each household.



For the first three sections of Brunckviertel, already finished or under construction, LUWOG had to find different ways of respecting the interests of the tenants and involve them into the refurbishment process. In the first section (A) this was done by direct participation of the residents. Tenants living in this section (A) preferred that the refurbishment was done while they remained in their dwellings. LUWOG followed this demand of the tenants. So in this case all decisions could be submitted to tenants' information and discussion. The advantage was that the tenants knew their personal environment very well and could contribute to the planning with their experience. Yet the experience was that in the

course of construction the tenants regretted their decision and would not have voted again for living in the dwellings while refurbished works were being carried out.

Because of the problems both for the tenants and for the construction work LUWOGÉ decided to refurbish the following sections only when all tenants had moved out. Also to some extent the impact of the refurbishment work to the existing buildings was much more severe in the following section (B), as groundplans were changed and parts of the buildings had to be demolished. So there were no actual tenants left to participate in the refurbishment process. To be, however, respective of tenants' needs LUWOGÉ organised workshops concentrated on the social situations and needs of specific groups with special importance for the housing company: elderly people, shift workers and young families. For each issue there were about 4 workshop sessions monitored by experts. The results were documented and evaluated as a basis for brief and design.



In order to select tenants for the three-litre-house a public assembly was organised in October 2000. Persons looking for a new dwelling were invited to attend. The three-litre-house and its technical components were presented in detail. Participants then could apply for a dwelling. There were more applicants than dwellings.

Before the beginning of refurbishment in cleared dwellings tenants are assisted individually to find a new dwelling, get the removal organised, get informed on the future rent and the compensations for costs in connection with the change of dwelling. They also may decide on several aspects of the equipment and design features of their new dwelling.

## **2.2. Partnerships research**

To develop its refurbishment program LUWOGÉ has organised a series of so called "co-operation projects". The aim of the "co-operation projects" is to involve in the planning process the relevant actors also from outside LUWOGÉ for specific issues. Among these are: "Structural Change and Urban Planning", "Design and Construction", "Three-Litre-House", "Public Relations", "Building Material" and "Scientific Assessment". For these issues working groups had been formed. It was the task of the co-operation project "Structural change and urban planning" e.g. to develop a traffic concept, that had been worked out by a sub-group including the municipal department for urban planning, and a private planning firm.

For specific issues of technical innovations for building sustainability LUWOGÉ contracted with research institutions as the "University Kaiserslautern", the "Fachhochschule Bingen" and the "IWU". Subject of the research are technical as well as economic performance and the experience of the users. The practical performance of the three-litre-house is being evaluated (after the tenants had moved in in April 2001) from June 2001 to June 2004. For comparison there will also be measurements in a seven-litre-house over the period from 2002 to 2004. Also the installation of a fuel cell is under scientific observation. (See also:

<http://tsb.fh-bingen.de/brennstoffzelle.html> and  
<http://www.basf.de/de/corporate/innovationen/inarbeit/energie/3liter.htm> )

Within SUREURO there is also a co-operation with IRS, Erkner, which has been contracted to evaluate tenants' involvement in the refurbishment process.

To develop building and planning on the level of the land Rheno-Palatia a forum ("Bauforum") was founded in 1999 by the Ministry of Treasury, also responsible for Housing and Planning with the support of institutions in the land relevant for housing, building and construction. The aim is to support innovation and transfer knowledge bringing together any 3 – 4 months representatives of the respective organisations and institutions in Rheno-Palatia. LUWOG is a member of the bauforum and contributes as well as it takes profit from the co-operation. SUREURO experience can also be spread on this level (see <http://www.fm.rlp.de/060bauen/015Wohnen/008%20EXWOST/Einweihung.htm>).

### 2.3. Phase in progress

Due to segmentation of the whole area into six sections (A-F) to be subsequently refurbished, the state of work is different in each. The first section (A) is completely finished (beginning and finished in 1998). For the second one (B) refurbishment had started in 1999 when tenants were assisted to leave the dwellings. The second section (B) is primarily looked upon within the SUREURO project. Energetic improvement is for "seven-litre houses" with the highlight of even a "three-litre-house". Construction work is fairly advanced, now infill and exterior insulation and coverings have to be done. In 2001 some of the "seven-litre-houses" and the "three-litre-house" were finished and tenants moved in. All houses in section (B) are for residential use.



In section (A) in co-operation with the tenants essential improvements of sustainability were achieved:

- Improvement of the tenants living conditions because of a higher quality of buildings, dwellings equipment and outdoor spaces;

- Environmental improvements such as lowering CO<sup>2</sup>-emissions and water consumption leading also to a reduction of tenants' charges.
- Integration of the refurbishment and upgrading of the different sections of the “Brunckviertel” housing area to the improvement process in the local community around it.

The work done until now or under construction had the following main features:

- Reducing energy consumption by very good external insulation of outside surfaces including double glazed windows;
- Reducing energy consumption as far as to the equivalent to 3 l fuel per m<sup>2</sup> (one building);
- Reducing energy consumption as far as to the equivalent to 5 l fuel per m<sup>2</sup> (average Brunckviertel);
- Generate heat and electricity with a fuel cell (experimental installation);
- Produce heat by solar roof panels for hot water production (one building);
- Produce electrical energy by photovoltaic roof panels to deliver electrical energy to the public web (one building);
- Reduce water consumption by water saving faucet aerators and double flush toilets;
- Reduce water consumption by giving up sprinkling of lawns and plants;
- Reduce noise in the area by using buildings along the main street as noise protection for the buildings behind and designing them to have all living rooms and bedrooms opposite to the street;
- Offering refurbished dwellings appropriate for families, and for shift workers;



LUWOGÉ selected building materials according to economic and sustainability criteria: they should be environmentally friendly and cause only low maintenance costs.

Indoor use of rainwater for toilet flushing had not been installed. There was consideration of inadequate handling by the tenants that could not be excluded so hygienic problems might have emerged.

LUWOGÉ aims at giving out the tender completely before starting with the construction works, so that prices are fairly certain. If that is not possible, work is started on the basis of a substantial estimation of costs. In some of the more complex parts of the project a check of the costs is carried out any three months.

The tender goes to a selection of round about 20 firms for each work package. LUWOGÉ controls the performance of the contracted firms by a special quality control. Annually the performance of the firms working in the Brunckviertel or elsewhere for LUWOGÉ is assessed by giving points on a scoreboard for different aspects of quality of their work. The three firms with worst assessment are invited by LUWOGÉ to discuss the defaults in order to lead them to more quality. There are talks with the firms that had received best assessments as well, to assure the good performance was not just due to exceptional conditions. Thus quality and durability of the construction as preconditions for sustainability are improved continuously.

## **2.4. Measurements**

With the IWU as well as other contracting scientific institutions (see above) LUWOGÉ is analysing the performance of the different components of the energy saving concepts pursued. Among these are:

- Reduction of energy consumption after very good external thermal insulation based on thoroughly planned construction details;
- Reduction of energy consumption through heat exchanger within the ventilation system;
- Contribution to the energy necessary for hot water through solar roof panels;
- Contribution to the electric energy through photovoltaic roof panels;
- Contribution to the energy necessary for heating through a fuel cell;
- Effects of the comportment of the users (e.g. by opening windows) on the use of energy;
- Noise insulation from outdoors spaces and inside common spaces;
- Heat retaining plaster of internal walls and ceilings.

As far as some of the components listed above are still experimental (e.g. the fuel cell) perspectives of further use within the LUWOGÉ stock of dwellings are to be cleared.

## **2.5. Co-operation with SUREURO partners**

During the recent six months since LUWOGÉ is part of the SUREURO project it was not yet possible to integrate experience of other SUREURO partners in the every day work of the German pilot project already on the way. But as there was the opportunity for the other SUREURO partners to have a guided visit of the “Brunckviertel” during the meeting in Ludwigshafen in January 2002 it can be expected, that the relevant information have been spread. Representatives of LUWOGÉ as well took the chance of visiting the Alphen residential areas of wonenCentraal during the Delft SUREURO congress in October 2001. This will hopefully be the basis for further exchange of information.

## **3. The coming 24 month**

### **3.1. Tenants participation**

One year after having moved in, there will be a meeting of the tenants’ of the three- and seven-litre-house to inform them on the results of the measurements so far and to have an exchange of information among the tenants. This is also seen as a way to sustain attention to the necessities of a specific handling of the energetic components.

As the outdoor spaces shall be refurbished as soon as possible, and most of the tenants that will be living in the dwellings of section (B) are not yet known, there is no intention to have participation with only a few tenants already living there. Even those do not yet have own experience with the use of the outdoor spaces that still are widely fenced in or used as store place for building material as construction is going on.

Workshops with experts and tenants on specific subjects will be held in the future as far as necessary to elaborate the brief, e.g. for the terraced housing so that it best meets needs and demands of families with little children.

### **3.2. Partnerships research**

The partnerships with IWU, the “University of Kaiserslautern” and the “Fachhochschule” Bingen” will continue to achieve accurate long-term measurements and evaluations. Using the network of other housing companies LUWOGÉ will disseminate the results of the research carried out on the basis of these partnerships e.g. in professional conferences and training. Also IRS will continue its work.

### **3.3. Phases in progress**

The refurbishment process will go on running during the next years. Following the time schedule the Brunckviertel as a whole will be refurbished in 2006.

- Section (B) (refurbishment of seven old buildings and the construction of five new buildings) will be finished in 2002, tenants are supposed to move in in summer; the outdoor spaces will be finished in the beginning of 2003.
- Section (C) (4 houses to be refurbished and one new building after demolition of an old house) will be finished at the end of 2003.
- Section (D) will be finished in 2003. A possible extension to the buildings under construction will probably realised later. To provide shelter from traffic noise probably landfill will be used for this purpose provisionally.
- In section (E) 40 dwellings as terraced rental housing are being planned for families (110 m<sup>2</sup> living space, individual garden). They are designed to be 1,5-litre-houses. Construction is previewed for 2003 to 2005.
- For section (F) planning is still vague, prospectively there will be terraced housing and new landscaping after having cleared the site. Restructuring of this last section will be finished in 2006.

For the open space between the buildings of section (D) and the planned terraced housing of section (E) a landscape design is intended to be realised that best serves the interests of both residents and people working in the offices of section (D). This may be subject to a workshop with tenants, users and experts. Also specific experience with such kind of multi-use open spaces of other housing companies is looked for. For sections (E) and (F) until now only first drafts had been worked out.

### **3.4. Co-operation with SUREURO partners**

The co-operation with the other SUREURO partners initiated in 2002 will hopefully be extended in the years to come after midterm. LUWOG is interested to make use of the SUREURO project as a basis of exchange of experience. It is very willing to give away its own experience as well.

## **4. Conclusion**

Since 1995 LUWOG has been active in large-scale urban regeneration projects. The improvement and revitalisation of urban residential areas is a task to be accomplished successfully only in joint action with local and state authorities. The objectives of housing and urban planning programs must be considered and be integrated into the programming of co-operative housing projects. The Brunckviertel project is a model for refurbishment and urban revitalisation with significance far beyond the city limits of Ludwigshafen.

Until now LUWOG has made use of different forums existing on the local, regional or national level to exchange experience. LUWOG takes SUREURO as a chance to participate in the exchange of experience also on the European level.

Though being affiliated with a very big and powerful industrial corporation LUWOG is dependant on market conditions and must shape its stock of dwellings to the demand. Demand is changing in Ludwigshafen as well as in large parts of Germany, widening the scope of choice for the tenants. This demands an improvement of quality of the dwellings and their surrounding open spaces and a decrease of overall housing costs (rent and operation costs) for the tenants. As criteria of ecological sustainability go to a good part along with lower operation costs (e.g. lower costs for energy, water, waste etc.) the economic advantages support the social sustainability.

LUWOG expects to use the contact with other social housing companies to broaden its experience. Knowledge is also transferred by the way of the different Work Package working groups in either ways.

Ludwigshafen, Germany, in February 2002