THE FUTURE OF RED VIENNA.
PORTFOLIO APPROACH TO BUILDING STOCKS

Maja LORBEK
Vienna University of Technology, Department of Housing and Design, Karlsplatz 13/E253-2; A-1040 Wien, Austria, email: lorbek@wohnbau.tuwien.ac.at

Iva KOVACIC
Vienna University of Technology, Department of Industrial Building and Interdisciplinary Planning, Karlsplatz 13/E234-2, A-1040 Wien, Austria; email: iva.kovacic@tuwien.ac.at

Michael HÖFLINGER
Vienna University of Technology, Research Center of Building Construction and Maintenance, Karlsplatz 13/E206, A-1040 Wien, Austria, email: michael.hoeflinger@tuwien.ac.at

Summary

Refurbishment practices, subsidy policies and assessment tools deal predominantly with single buildings and small ensembles. Large portfolios of social housing building stock are suitable for case study research on sustainable features of historic built environment and for developing long term, portfolio-based strategies. The social housing of Red Vienna was examined a case study. This building stock consists of interdependent elements: small dwelling units, based on the principle of sufficiency and complementary communal facilities. The buildings are located next to existing material infrastructures and in the vicinity of public transport. Research on building stocks revealed several original features, which are sustainable according to contemporary criteria. Portfolio approach to long-term refurbishment, in which several scenarios are assessed, allows historic building stocks to be transformed through reactivation of social facilities, ownership options and targeted tenant allocation and thus including further options for reducing emissions and enabling sustainable use of cultural resources.

Keywords: Red Vienna, social housing, portfolio, scenario-based, refurbishment

1 Introduction

In the course of the research project “anonymised”: funded by “anonymised” we developed an integrated approach to sustainable renovation of historical building stocks, based on knowledge about historical, technical, social and cultural understanding of the chosen building stock and its portfolio potential. Built between 1919 and 1934, the building stock consists of both council housing (Gemeindebau) and settlements (Siedlungen). Multi-storey council houses come in a variety of forms and volumes: as superblocks, “dissolved” superblock, mid-size solitary structures, mid-sized perimeter blocks and small infill buildings. The historic concept of Gemeindebau lies in the interdependency of two elements: small-sized (affordable) dwelling units, and complementary communal facilities which also serve dwellers in the adjoining neighbourhoods. The buildings are spread almost evenly in all Viennese districts. Due to explicit economic calculation of the municipality,
the buildings were located next to existing material infrastructures and in the vicinity of public transport. We hypothesized that these specific features (small dwellings, communal facilities and proximity to existing material infrastructures) all contribute to sustainable, long term use of the building stock and its resilience. Nevertheless, except for local supply and communal amenities, there is no space reserved for work and production. The exclusion of work space from the stock is problematic in the light of today’s re-emergence of home/remote working.

1.1 Description of construction features

Construction of the buildings is in general still based on traditional techniques and materials, most of which are of high quality and proved to be resilient with very little maintenance work. Some of the elements, most notably the foundation and brick mortar do not comply with contemporary normative standards and also restrict further interventions such as rooftop extensions. Loss of authentic original substance affects predominantly windows and façade plastering, but not crucial load bearing elements of the houses. ETICS on some of the buildings are reversible in the sense of monumental protection.

1.2 Missing data and lack of long term strategies

While historic information the number of dwellings, inhabitants and joint facilities is readily available, there is no data on the current state of the stock. Originally, there were 61,175 dwellings in 348 apartment houses [1]. There is no information on how the size of households changed over time. According to current statistics 46 % [2] of all households in Vienna are single households. The societal process of individualisation probably affected the building stock of Red Vienna significantly. There are even less facts available on the current use of communal facilities, social infrastructures and local businesses. While rents are kept low, and tenant protection is high, social landlord (Wiener Wohnen) depends heavily on subsidies and follows traditional renovation schemes. Status quo practice and policy is devoid of any strategic, pro-active and long-term interventions. The municipality of Vienna pursues a strategy of “business as usual”. Fundamental questions such as what will happen because of: continuous demographic growth, persistent economic crisis and deepening societal inequality remain unanswered.

2 Conventional refurbishment practices versus portfolio approach

Conventional refurbishment methods have several problematic aspects. The focus on single buildings (of similar use class and/or age class) is one of them. Subsidies for refurbishment and energy efficiency in Vienna rely on these parameters as well. In a study from 2011, Hochbaudepartement in Zürich evaluated a portfolio based approach for their school building stock, as a part of the “2000 Watt Society” strategy. The goal of the 2000-Watt society principle is to reduce energy consumption to 2000 Watts per person. Each of the several municipal departments developed their own implementation of this one general principle compliant with common goal of lowering energy consumption by 2050. In school refurbishment scenarios, the building stock is treated as a portfolio and different energy efficiency standards were proposed for different types of schools. Following this approach, it is possible to carry no energy efficiency measures on the façades on schools under monumental protection, while schools with average formal characteristics can upgraded
even up to passive house standard (Minergie-P) [3]. Such a portfolio-based approach allows different standards in different parts of the building stock.

2.1 Case Study on impact of refurbishment level on emissions-reduction

A typical small infill building has been chosen for the case study on the impact of different levels of refurbishment on minimisation of energy consumption and CO₂ emissions. The building comprises 18 apartments, with total of 1,340 m² GFA in five storeys, is attached to the neighbouring buildings from two sides; exposing north and south facade (with loggias). The building, which is under monumental protection, built in 1927 is un-refurbished, featuring only small alterations from the original state. This type of infill building with up to 90 dwelling units per building accounts for ca. 36 % of all multi storey council houses. In the case study we conducted a life-cycle assessment for CO₂ emissions, including CO₂ equivalents for production of ETICS for improvement of building hull (without transport and setting up) and emissions resulting from operation (heating energy demand). The heating energy demand calculation was based on Austrian Energy Certificate Calculation [4]; the PEI and CO₂ equivalent for energy carrier according to OIB 6 Guideline [5], the CO₂ emissions for ETICS from Ökobau.dat [6]. For the improvement of building hull an ETIC system with 14 cm EPS and mineral ornate plaster was chosen. The calculation of heating energy demand, based on energy certificate, comprises three variants: A: non-refurbished (A); B: “fully refurbished” – facade (without windows-change), basement and attic slab; C: “refurbishment protected” – basement and attic slab (C). For all three variants two heating systems were assessed – district heating and gas.

<table>
<thead>
<tr>
<th>Tab. 1 Refurbishment Variants</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variants</strong></td>
</tr>
<tr>
<td>A: Non-refurbished</td>
</tr>
<tr>
<td>B: Refurbished full (ETICS + Attic Slab + Basement Slab)</td>
</tr>
<tr>
<td>C: Refurbished “protected” (only Attic + Basement Slab)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tab. 2 Heating system Variants</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Heating system</strong></td>
</tr>
<tr>
<td>Gas</td>
</tr>
<tr>
<td>District Heating</td>
</tr>
</tbody>
</table>

The assessment shows that through a sole action of heating system change from gas to district heating already significant CO₂-emission minimization can be achieved (Table 2, Variant 1). The most significant CO₂-saving potential features the Variant B (“full refurbishment”). The demolishion and disposal cost and related CO₂ impact still represent uncertainty, as unknown determinant. As most of the buildings of Red Vienna are under monumental protection, only very reduced modifications are possible on visible envelopes of these buildings. Further on, since the decision on employment of heating system remains with tenants, even the installation of district heating does not guarantee its actual use by all of the tenants, and therefore the predicted energy consumption remains only calculated and not consumed value. All these limitations show the necessity of integral, transsectoral and portfolio-based approaches.
3 Conclusion and outlook

Research on factors affecting the stock as a whole within its urban socio-cultural context and on selected case study buildings and neighbourhoods indicated that traditional refurbishment, energy efficiency and emission reduction measures remain limited when restricted to single buildings and distinct planning sectors such as housing, transport and infrastructures. Architectural historic research on the initial concept of the council houses of Red Vienna shows that it is necessary to uncover and re-create some of the original sustainable features of the stock, most notably, its communal neighbourhood amenities. By deliberately overcoming the system boundaries of single buildings, further factors with impact on CO₂ emissions, such as mobility and joint use of communal infrastructures must be considered as well. This is only possible, if assessment is extended beyond the building stock to its history and the interrelation with its urban neighbourhood. Within this research project, some of this extended assessment was carried out.

References


