

## Overbuild

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Renovation and Conversion Home for the Elderly to Nursing Home and Refurbishment Concepts for School Buildings to be Green Energy Houses

### Starting Point/Motivation

The Austrian government and the federal states invest several Million Euros each year into refurbishment measures regarding public buildings above all schools.

The other aim is Renovation and conversion Homes for Elderly to Nursing Homes.

The city of Vienna alone has set up a plan which foresees 570 million Euros for refurbishment measures to be undertaken until 2017 in 242 Viennese Schools in the framework of the "Substanzsanierungsprojekt Schulen Wien" (SUSA).

The planned measures show a substantial potential of greenhouse gas emissions in existing schools. However, at the moment this vast potential is by far not exhausted as there are no comprehensive refurbishment concepts considering energy related criteria available to the relevant decision makers. Through the proposed feasibility study based on concrete example of a typical school in Vienna (FranzJonasEuropaschule, 1210 Wien) innovative Energy Positive concepts for refurbishment of schools should be developed.

### Objectives and Methods

The goal of the project is to develop functionally, economically and energetically optimized Energy-Positive Refurbishment concepts for school buildings based on a concrete example.

The goal of the project Elderly Home city Landeck/Tirol is the same as well for refurbishment and conversion to Nursing Home on a concrete example.

The definition of "Energy-Positive" used in the studies is as follows: more on-site product can be summarized as follows:

- Development of future-orientated refurbishment concepts for public building, as schools (e.g. all-day schools) and elderly homes (nursing home), which surpass the current refurbishment standards (refurbishment achieving passive house standards)
- Development of innovative concepts with a high signal- and replication factor

- Optimization of the room layouts to adapt to the changed requirements of new school, elderly home/public buildings types
- Detailed analysis of the developed concepts through energy and Whole-Lifecycle
- Cost (WLC) studies
- Supporting the decision-making process in the implementation of public buildings
- Refurbishment projects towards Energy-Positive buildings.
- Providing the basis for concrete example of a Energy-Positive concept implemented in follow-up demonstration building

### Results

On the basis of concrete and in-depth analysis, the projects demonstrated that an Energy-Positive Refurbishment of a typical 'Grunderzeit'-Style (1850-1918), school or elderly home Architecturally, functionally and energetically feasible. A comprehensive thermal refurbishment together with the application of about 400m<sup>2</sup> photovoltaic and 30m<sup>2</sup> solar-thermal collectors, in case school Vienna, leads to a negative yearly primary energy balance. This would result in 50.000 Euro savings in energy costs / year with a return of investment (ROI) of 18 years if only the energetically relevant refurbishment measures would be included and a ROI of 30years if everything else would be included. Since a comprehensive refurbishment result in high investment costs which cannot always be accommodated. It is necessary to develop concepts with clearly defined measures which can be distributed in succession over several years. Based on the current framework conditions (financing and contracting aspects within the city halls as well as limited funding possibilities for the public sector) a comprehensive refurbishment of this projects can – at this time – not be pursued.

### Prospects / Suggestions for Future Research

In order to succeed in the implementation of innovative School/ Elderly home-refurbishment projects new financing models (e.g. Privat-Public-Partnerships, Contracting or Intracting) are needed. In addition, it is necessary to adapt funding structures and other potentials financing possibilities to cater for the complex structures of a cities' municipality. The high visibility as well as the intrinsic role model function of public buildings necessitate financing models which promote innovation (e.g. through an energy-efficiency' funds for public buildings). From an architecturally as well as energetically point of view research must focus on the detailed elaboration of comprehensive concepts which are

structured based on potential refurbishment measures in the individual public buildings as schools. A variation of energetically, economically as well as functionally developed concepts based on

different typologies (e.g. type / age / condition of building) would thus support the deployment of comprehensive refurbishment actions.

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