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Performance gap in building retrofit

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Energy saving potential in real use condition

Performance Gap in Building Retrofit

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Key Figures

- **Project Duration**
1/11/2013 – 31/12/2016
Extension foreseen within 2nd phase of SCCER FEED&D
- **Funding Agencies**
Commission for Technology and Innovation (CTI) – SCCER FEED&D
Swiss Federal Office of Energy (SFOE)

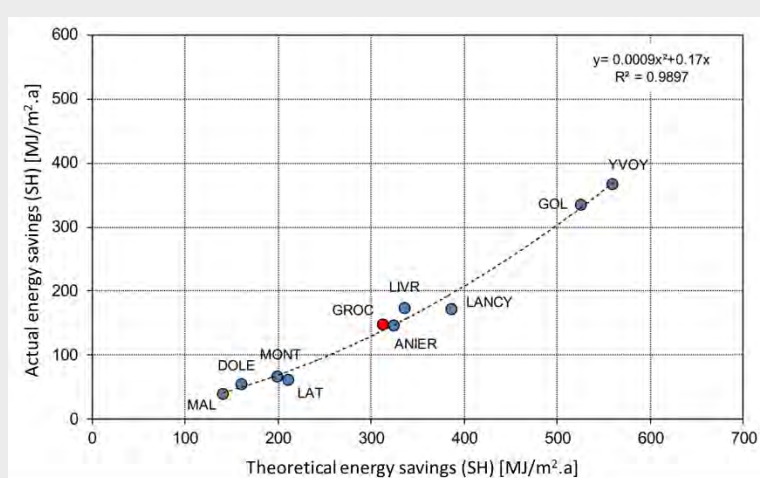
Challenges

- Given the slow transformation of the building stock, focus needs to be set on retrofit of existing buildings. Major related challenges are:
- Assessment of the effective energy saving potential of the building stock, taking into account actual performance of retrofitted buildings in real use condition.
- Characterization of the gap between actual (real) and planned energy saving performance (energy performance gap).
- Identification of possible counter-measures for reduction of this gap.

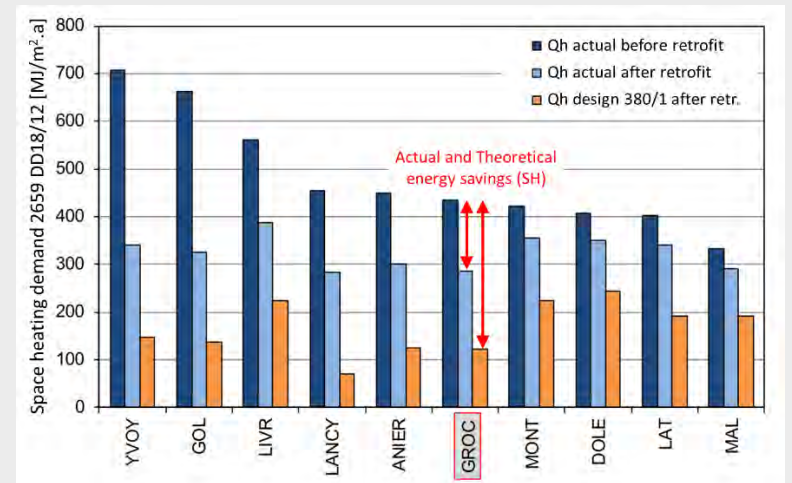
Main objectives

- Analysis of the performance gap in building retrofit (inaccurate design, imperfect execution, operation and maintenance, user behavioral aspects).
- Identification and characterization of the determining factors in terms of design, execution, operation and user behaviour and estimation of their impact on the energy performance.
- Estimation of the actual energy saving potential of the building stock, under current practice.
- Provide guidance on countermeasures and policy recommendations to reduce the energy performance gap.

Performance: actual vs design



Case studies



Relation to Energy Strategy 2050

- The Energy Strategy 2050 strongly relies on massive reduction of the demand for the building sector (46% of final energy):
- Objective: drastic reduction of the heat demand of buildings: 45% by 2035, 64% by 2050.
- Underlying assumptions / issues: 1) high retrofit rate (quantity); 2) high retrofit performance (quality).
- Understanding and reducing the performance gap is an essential step towards achievement of the ambitious goals of ES2050.

Approach

- Case studies analysis of several retrofitted post-war multifamily buildings (~ 25 cases studies, 3'000 flats, 300'000 m2 heated floor area).
- Analysis of the measured energy performance (SH demand) before and after retrofit and comparison with the design values (simulation in normed and actual use conditions).
- Cross-cutting with data concerning the entire building stock (upscaling of results at regional/national scale).
- Constitution of an expert panel on performance gap issues (underlying reasons, corrective actions, etc.).

Achievements

- Major achievements so far:
- Statistical correlation between planned and actual energy saving values.
- Estimation of the actual energy saving potential of the building stock, under current practice.
- Upscaling to Geneva's postwar building stock: under current practice, **only 40% of the theoretical potential of building retrofit can be achieved.**

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