A Quality Assurance Management System for Retrofitting with Good Indoor Environment and Energy Efficiency

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Background:

A certified labelling system

To establish means of control which will assure good indoor environment
The performance of the building – a question of system

Effective energy use ↔ Adequate indoor climate

Quality assurance of indoor environment

- Moisture assurance
- Indoor climate
- IAQ
- Choice of material
- Radon
- Ventilation
- Air tightness
- Sound
- Lighting
- Tap water temperature
- Cleaning

Specific predefined requirements
Scope

New construction

Retrofit

Existing buildings

Target determination of energy use:
First Energy Analyse

- Energy status (the envelope and services, climate)
- Energy aspects (category, activity)
- Energy performance (before retrofit)
- Present organisation
Quality assurance system

Thorough primary inspection (TPI)
Inquiry to users

First Energy Analyses (FEA)
Energy measurements

Action plan for measures

Performance of measures

Inspection with verifying measurements

Inspection of maintenance routines

Check during operation

Management system

- building categories and
- property management organisations
Quality assurance system

Routines and means of control for clients, architects, builders, consultants

• Responsible persons are selected for all actions

• Competence and education need is defined for all actions

• Communication and information routines

• Documentation of the routines
Why retrofit of residential building stock?

- several million residential buildings in the EU
- many were built before the oil crises and has high energy use
- many years of neglected maintenance
  - both the building envelope and building services

Why retrofit of residential building stock?

- the retrofit provides an opportunity for cost-effective energy measures
- since social housing stocks consist of many similar buildings, the measures can be replicated
## Objective

- Exchange knowledge and develop energy improvement measures for retrofitting of social housing
- Adopt and develop QA system for each country with their different conditions
- Demonstrate actions in pilot projects
Pilot projects

Sweden, Alingsås
Spain, Barcelona
Austria, Graz
Finland, Helsinki
• Insulations of walls, balconies, attics and basements
• Thermal bridges (balcony)
• Tight doors
• Passive house windows
• Solar collectors
• District heating (biomass)
3 building types:

Year of construction: 1952/1959/1970
Heating: decentral; 13% solid fuel; 33% Oil; 54% electric
Hot water: decentral electric boilers
Ventilation: natural ventilation

Renovation needs:

Insulation: (total heated building envelope)
- Facade (U-value: < 0.2 W/m²K)
- Top floor (U-value: < 0.2 W/m²K)
- Ground floor (U-value: < 0.2 W/m²K)

Windows exchange; Target Uw-value: < 0.85 W/m²K

Balcony renewal / living room extension (thermal bridge)

HVAC-System:
- Central radiator heating system; (Target: Biomass district heating)
- Solar thermal system for hot water and heating (2-pipe network)
- Ventilation system with heat recovery (central or decentral)