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
Quality assurance of indoor environment

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

Specific predefined requirements
Scope

New construction

Retrofit

Existing buildings

Schools
Kindergartens
Multifamily houses
Offices
Hospitals
The labelling system has now been extended to also include an Energy Management system.
QA-system: SPCR 114E

Handbook

Certification rules for
P-marking of
indoor environment and
energy use

P-marking of indoor environment and energy use
- Considerations prior to certification of energy use

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When extended to also include energy leads to two different types of criteria to meet:

- Effective energy use
- Adequate indoor climate

How do we set the targets for an existing building? … or for a building to be retrofitted?
Target determination of energy use:
First Energy Analyse

- Energy status (the envelope and services, climate)
- Energy aspects (category, activity)
- Energy performance (before any retrofit)
- Present organisation
- building categories and
- property management organisations
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

Inquiries to users routines

Yearly check during operation

Management system
Objective

- Exchange knowledge and develop energy improvement measures for retrofitting of social housing
- Adopt and develop an QA system for indoor environment and energy use - during retrofitting and operation - in each country with their different conditions - and use the existing certification system as a starting point
- Demonstrate actions in pilot projects
<table>
<thead>
<tr>
<th>Participant</th>
<th>Short name</th>
<th>Country</th>
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</thead>
<tbody>
<tr>
<td>1    SP Technical Research Institute of Sweden</td>
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<td>2    Trama Tecno Ambiental S.L.</td>
<td>TTA</td>
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<td>3    Helsinki University of Technology</td>
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<td>4    AEE - Institute for Sustainable Technologies</td>
<td>AEE INTEC</td>
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<td>5    Trecodome</td>
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<td>6    Energy Agency of Plovdiv</td>
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<td>Bulgaria</td>
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<td>(10) GIOWOG</td>
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Why “energy upgrade” 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)
• the retrofit provides an opportunity for cost-effective energy measures
• since social housing stocks consist of many similar buildings, the measures can be replicated
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 maintenances routines

Yearly check during operation
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
Pilot projects

Sweden, Alingsås
Spain, Barcelona
Austria, Graz
Finland, Helsinki
The Swedish pilot project: Alingsåshem - Brogården
- typical houses from the ”million program” (300 apartments)

The goal is to retrofit almost to passivhouse standard
• Insulations of walls, balconies, attics and basements
• Thermal bridges (balcony)
• Tight doors
• Passive house windows
• Solar collectors
• District heating (biomass)
The retrofitting of Brogården in Alingsås

<table>
<thead>
<tr>
<th>Energianvändning: (kWh/kvm år) 22° inomhustemperatur</th>
<th>Före renovering</th>
<th>Efter renovering</th>
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<td>Varmvatten:</td>
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<td><strong>Summa:</strong></td>
<td><strong>216</strong></td>
<td><strong>92</strong></td>
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Why this combined Quality Assurance system?

Because, especially for Passive houses,

- It is very important that the calculated values are met, both regarding energy use and indoor environment!
- There are no oversized heating system that can compensate for faults in design and construction

Only a few "backlashes" may give the whole passive house concept a bad reputation, and halt it from fully entering the market!