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

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Background:

To establish means of control which will assure good indoor environment

A certified labelling system

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

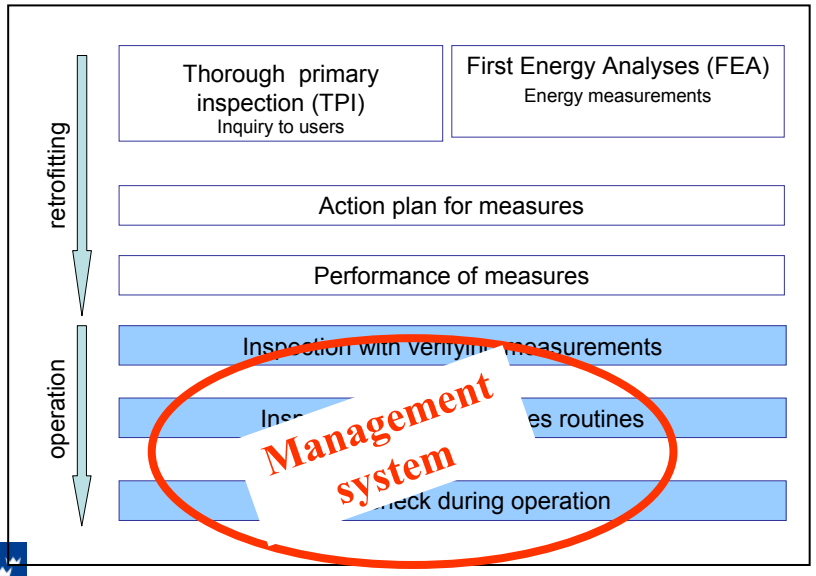
Existing buildings

Schools
Kindergartens
Multifamily houses
Offices
Hospitals

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



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- building categories and
- property management organisations

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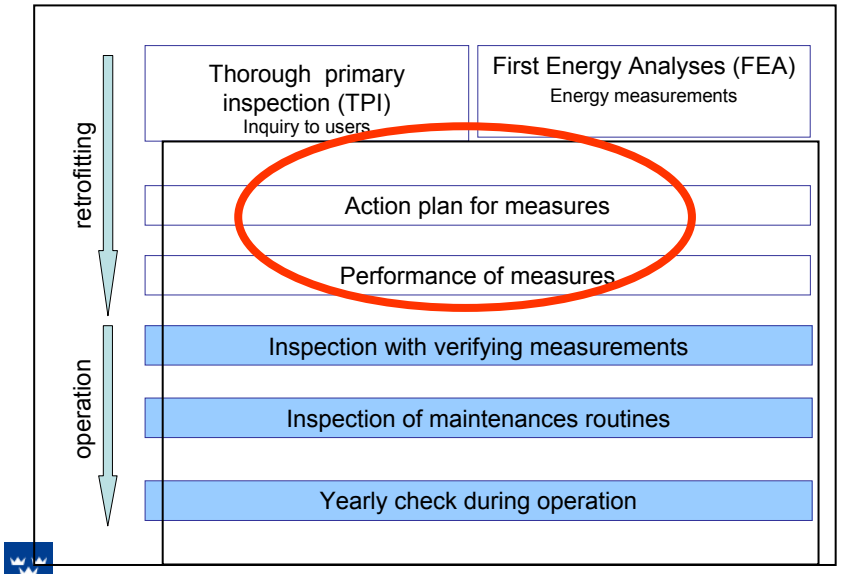
Quality assurance system



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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

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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

	Participant	Short name	Country
1	SP Technical Research Institute of Sweden	SP	Sweden
2	Trama Tecno Ambiental S.L.	TTA	Spain
3	Helsinki University of Technology	TKK	Finland
4	AEE - Institute for Sustainable Technologies	AEE INTEC	Austria
5	Trecodome	Trecodome	The Netherlands
6	Energy Agency of Plovdiv	EAP	Bulgaria
7	AB Alingsåshem	Alingsåshem	Sweden
8	POMAA S.L.	POMAA	Spain
(9)	*VVO*		Finland
(10)	*GIOWOG*		Austria

SQUARE

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

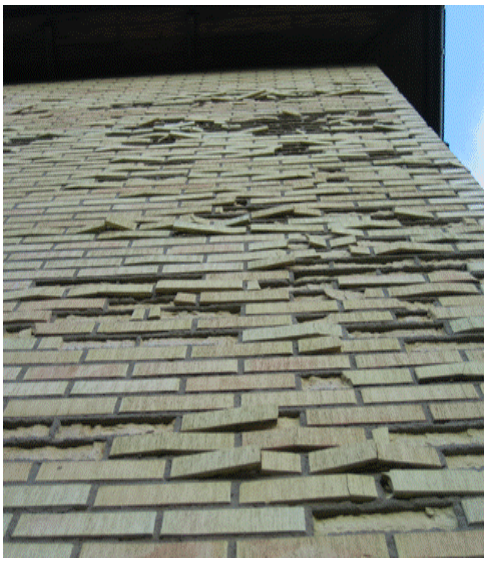
Spain, Barcelona

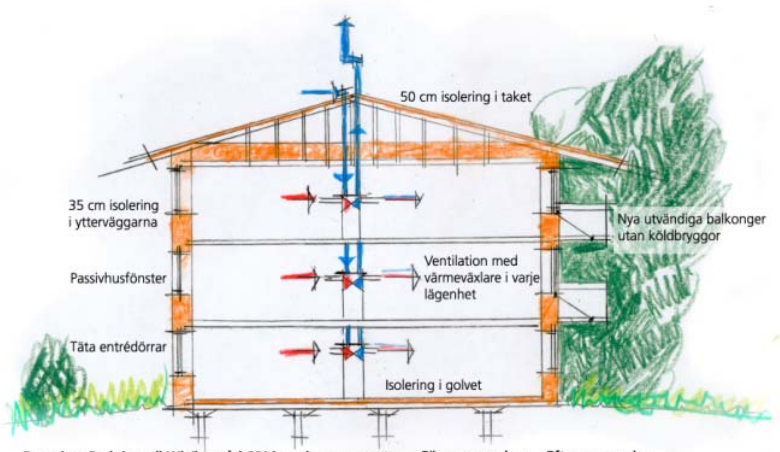
Austria, Graz

Finland, Helsinki

Sweden Alingsåshem

- Insulations of walls, balconies, attics and basements
- Thermal bridges (balcony)
- Tight doors
- Passive house windows
- Solar collectors
- District heating (biomass)





Energianvändning: (kWh/kvm år) 22° inomhustemperatur	Före renovering	Efter renovering
Uppvärmning:	115	27
Varmvatten:	42	25
Hushållsel:	39	27
Fastighetsel (trappljus, tvättstuga etc):	20	13
Summa:	**216**	**92**

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)

QA-system: SPCR 114E Handbook

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