SQUARE - A System for Quality Assurance when Retrofitting Existing Buildings to Energy Efficient Buildings

WP7 Treco-SQUARE workshops

Supported by

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SQUARE

SQUARE - A System for Quality Assurance when Retrofitting Existing Buildings to Energy Efficient Buildings

SQUARE-Treco workshops

Work Package 7 - Workshops

SQUARE
Coordinated by
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Preface

This report is part of the work carried out within the SQUARE project (EIE/07/093/SI2.466701), which stands for A System for Quality Assurance when Retrofitting Existing Buildings to Energy Efficient Buildings. The project is co-funded by the European Commission, supported by its Programme Intelligent Energy Europe (IEE). The SQUARE project aims to assure energy efficient retrofitting of social housing with good indoor environment, in a systematic and controlled way.

The partners of the SQUARE project are:

- AEE Institute for Sustainable Technologies, Austria
- EAP Energy Agency of Plovdiv, Bulgaria
- TKK Helsinki University of Technology, Finland
- Trecodome, Netherlands
- TTA Trama Tecno Ambiental S.L, Spain
- Poma Arquitectura S.L., Spain
- SP Technical Research Institute of Sweden, Sweden
- AB Alingsåshem, Sweden

The workshops have been organised under the responsibility of Trecodome, who are partner in SQUARE, but also technical coordinator of the Treco network of social housing organisations.

Summary

The purpose of the workshops is to discuss methods and exchange experience from introduction of the QA system for energy use and improved indoor environment, as well as methods to communicate and disseminate result from this work.

The workshops provide an opportunity for partners with technical background and partners with practical experience from pilot projects and associated partners (TRECO) from social housing companies, to meet in creative discussions and exchange experience.

The TRECO coordinator will be responsible for planning and arranging the workshops. The intension is that each workshop is held in one of the participating countries and coordinated with the current meetings of the TRECO members who will participate in the workshops organized in the SQUARE project. This will make it possible to arrange site visits at the pilot projects in connection to the workshops.

The SQUARE group has during its project life cooperated with the Treco group. TRECO (TRansnational ECO Network) was started in 2004 as one of the first private European initiatives to improve energy efficiency and energy effectiveness in housing.

TRECO is a project/cooperation actively involving their members, a group of international stakeholders in housing. Each partner has identified a project (new construction, regeneration, renovation or technique) for which the knowledge, labour and materials are to be sourced according to principles of sustainability and which is intended to achieve an output of higher than usual standards of energy efficiency. This may involve measures to reduce the energy demand or the installation of efficient technology or even both. Innovation plays a part in the project but the most important objective is to achieve replicable solutions and a wider use of the lessons learnt. More information about Treco at www.treco-housing.com

Throughout the SQUARE project, common workshops have been hold with the TRECO network, which has not only resulted in active feedback from TRECO partners on the SQUARE method, but also in the uptake of the essence of SQUARE by TRECO members.

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1 Introduction

1.1 Description of task

The purpose of the workshops is to discuss methods and exchange experience from introduction of the QA system for energy use and improved indoor environment, as well as methods to communicate and disseminate result from this work.

1.2 Objectives and target groups

The purpose of the workshops is to discuss methods and exchange experience from introduction of the QA system for energy use and improved indoor environment, as well as methods to communicate and disseminate result from this work.
The workshops provide an opportunity for partners with technical background and partners with practical experience from pilot projects and associated partners (TRECO) from social housing companies, to meet in creative discussions and exchange experience.

1.3 Scope and limits

Throughout the SQUARE project, common workshops have been hold with the TRECO network, which has not only resulted in active feedback from TRECO partners on the SQUARE method, but also in the uptake of the essence of SQUARE by TRECO members.

2 Background

The SQUARE group has during its project life cooperated with the Treco group. TRECO (TRansnational ECO Network) was started in 2004 as one of the first private European initiatives to improve energy efficiency and energy effectiveness in housing.
TRECO is a project/cooperation actively involving their members, a group of international stakeholders in housing. Each partner has identified a project (new construction, regeneration, renovation or technique) for which the knowledge, labour and materials are to be sourced according to principles of sustainability and which is intended to achieve an output of higher than usual standards of energy efficiency. This may involve measures to reduce the energy demand or the installation of efficient technology or even both. Innovation plays a part in the project but the most important objective is to achieve replicable solutions and a wider use of the lessons learnt. More information about Treco at www.treco-housing.com

3 The Treco-SQUARE workshops

3.1 Alingsas workshop

The first workshop in Alingsas has been an introductory workshop for the SQUARE participants with input from the challenging passive renovation scheme of Alingsashem.

3.1.1 Agenda

SQUARE agenda
Monday, November 5th, 2007
Meeting in Borås

Start	Item	By whom
8:45	Arrival at SP reception. Short walk to conference room.	All
9:00	Welcome and introduction to 1st SQUARE meeting - agenda (amendments, changes) - organisational aspects (lunch, dinner) - report changes during negotiations	Co-ordinator
9:30	Introduction round, - Presentation of partners organisations and personal - Expectations of the project (appr. 10 min each)	SP, TKK, AEE INTEC
10:00	Break	All
10:20	Introduction round continues (appr. 10 min each)	TTA, Trecodome, Alingsåshem, Poma, EAP
11:30	General presentation of the SQUARE project	Kristina Mjörnell
12:00	Lunch	All
13:00	Presentation of WP2 Survey of national conditions (Introduction, aim, tasks, deliverable(s))	TKK, Finland
13:20	Presentation of WP3 Break non-technical barriers (Introduction, aim, tasks, deliverable(s))	EAP, Bulgaria
13:40	Presentation of WP4 Adoption of a QA system (Introduction, aim, tasks, deliverable(s))	SP, Sweden
14:00	Presentation of WP5 Energy improvement measures (Introduction, aim, tasks, deliverable(s))	AEE INTEC, Austria
14:20	Presentation of WP6 Application of the QA system in pilot projects (Introduction, aim, tasks, deliverable(s))	TTA, Spain
14:40	Presentation of WP7 Work-shops (Introduction, aim, tasks, deliverable(s))	Trecodome, NL
15:00	Break	
15:20	Presentation of WP8 Communication and dissemination activities (Introduction, aim, tasks, deliverable(s))	SP, Sweden
15:30	Presentation of WP9 Common dissemination activities (Introduction, aim, tasks, deliverable(s))	SP Sweden
15:40	Agreements on further activities (website, logo,	All

	conferences)	
16:00	Time plan and deliverables	Co-ordinator
16:30	Administrative and financial issues	Administrator
17:00	Next meeting and workshop	All
17:30	Closing for transport to hotel	
19:00	Dinner	All
	-	

Tuesday 6th nov
Workshop in Alingsås at Grand Hotel

Start	Item	By whom
8:30	Meeting at hotel reception for transport to Alingsås	All
9:30	Welcome and introduction	Alingsåshem
9:45	Retrofitting social housing to passive house standard. Partnering in building consortium. Residents profiles.	Alingsåshem
10:30	Coffe break	All
10:50	QA system for indoor environment and energy use	SP
11.15	Experience from adopting the QA system in existing social housing	Poseidon
11:40	Other Swedish initiatives of energy efficient retrofitting of social housing.	Skanska
12:05	Questions and discussion	All
12:30	Lunch	All
13:30	Visit at Brogården	Alingsåshem
15:00	End of workshop and transfer to airport	
16:00	Arrival to airport	

3.1.2 Minutes

Minutes

Participants
Elisabeth Koschar, AEE, AT
Chiel Boonstra, Trecodome, NL
Jarek Kurnitski, TKK, FI
Jaume Serrasolses, TTA, ES
Leonidas Albano, TTA, ES
Jordi Espar Gasset, Poma, ES
Ing-Marie Odegren, Alingsåshem, SE
Hanna Blomdahl, Alingsås Municipality, SE
Hans Eek, Passivhuscentrum
Björn Berggren, Skanska

Present from SP
Kristina Mjörnell
Eva-Lotta Kurkinen
Åsa Wahlström
Tobias Törnström
Carolina Hiller
Ann-Marie Borén

Welcome and introduction (Hanna Blomdahl)

First, Ms Blomdahl talked generally about the city of Alingsås. She went on talking about their work and projects. She described the planned technical aspects of their work and also said that they have developed a custom oriented action plan, where they have identified five different types of customers.
A passive house centre has been established. It will open on 13 December 2007. As she had mentioned on the day before they are involved in another EU project called REBECEE (www.rebecee.eu). This regards knowledge transfer in exhibitions. Two projects of Alingsås municipality are involved, namely Brogården (also the pilot project of SQUARE) and Stadsskogen. In Stadsskogen new dwellings will be built, where 100 of them will be passive houses. There will also be a preschool built with passive house technology. The houses will be heated with district heating from biofuel.

Retrofitting social housing to passive house standard. Partnering in building consortium. Residents profiles. (Hans Eek)
Mr Eek started with another point of view – the global perspective. He went on talking about different low energy/passive housing projects that has been carried out the last 30 years. The projects show that it is possible to build low energy/passive houses by using simple techniques.
Important issues (e.g. in Lindås)

- Build the houses very air tight
- That all the workers and other actors must work in the same direction (the quality of the handy craft work is very important as well as corporation between the workers)
- To use dry material in the houses, cause there is no heat to dry them out

In Lindås there was a measured energy consumption of 4500-11000 kWh per apartment and year, which shows that the usage is very dependent of the behaviour of the residents.

What does it cost to build passive houses? 40-50 000 SEK extra costs for insulation, heat exchangers, and windows. But then the houses can be sold for 2 million SEK. Mr Eek stated that it is enough to use a hair dryer to heat the passive houses. Mr Eek went on and talked about Brogården. Today there is energy use of 216 kWh/m², year when the indoor temperature is 22°C

The following changes are planned:
- One heat exchanger per unit
- 50 cm insulation in the roof
- 35 cm insulation in the walls (will change the facade)
- Passive house windows
- Insulation in the floor (does not have any today)
- Low flow devices for tap water
- Change of white goods

The new energy use is estimated to 92 kWh/m², year
Mr Eek also told the participants that he is involved in a project in China. For the houses in the project (and maybe generally) there is the potential of reducing the energy use to a tenth by some simple measures such as installing a heat exchanger and insulation.

QA system for indoor environment and energy use (Åsa Wahlström)
Ms Wahlström talked about the Swedish QA system in general. The documentation that is needed for the system is important but there has been complains about the paper work (takes time and effort). But for the system to work it is important to see who is responsible for different tasks. The system now includes both the indoor environment and the energy use. There are specific predefined requirements for the indoor environment. But for the energy use it is not so easy to state requirements. The scopes of the system are new constructions, retrofit of buildings and existing buildings. Different types of buildings can be certified, e.g. residential houses, schools, commercial buildings. First an energy analysis is made, which leads to a number of energy targets that can be set.
So far buildings that are already P-marked (the certificate of the system) for indoor environment has been chosen. This means that the energy part of the system has only been tested for the management phase of a building, i.e. the system has not been tested for the retrofitting case. When it comes the implementation of the QA system; the first time you have to Pmark the whole management and the first building at the same time, which means quite an effort. But then, to P-mark the next building/s it needs much less effort. And also, even if not all the other buildings are P-marked they still work with the system due to that the management of the company is involved (the management has already been P-marked), which result in that they get a better energy use and indoor environment also, which is good.

Experience from adopting the QA system (Tobias Törnström)
Mr Törnström reported on experiences from adopting (implementing) the Swedish QA system. First he went through the handbook of the system and then he told the participants about the experience of three pilot projects; an office building (owned by the Borås Energy company), a school (owned by Borås municipality) and a multi-family building (owned by Poseidon – a housing firm in Gothenburg).

Other Swedish initiatives of energy efficient retrofitting of social housing (Björn Berggren)
Mr Bergren talked about a Swedish project that is called "Energy efficient renovation of multi family houses from the Swedish record years" The project consists of different task:
- State of the art: Documentation of already renovated projects (good and bad examples)
- Finding suitable reference project/s
- Applying methods for lower energy use identified in projects

One suitable reference project will most probably be a building in Malmö in the south of Sweden. Requirements of the reference project/s: Multi family house, 3 floors, facing brick wall. There will be final report of the project available in May/June 2008. Ms Mjörnell said that the "state of the art" may be useful to the SQUARE project. Mr Berggren said that he does not think there will be any problem to share this information with SQUARE group.

Visit at Brogården

A visit to the Swedish pilot project Brogården ended the two days of meetings/workshop.

Picture: Brogarden before renovation in 2007

Picture: visit to pilot apartment in Brogarden in 2007

3.2 Amsterdam workshop

In Amsterdam the workshop has been organised as the common part between a Treco meeting and a SQUARE team meeting.

3.2.1 Agenda

Amsterdam Tuesday 19 March 2008

TRECO agenda

Treco Group – meeting

To be held at: Delta Forte, Karspeldreef 2, 1100 DM Amsterdam Zuidoost

Sunday 16 th March 2008 – Tuesday 18th March 2008
For this venue are invited:

Andrew Sillitoe	**Midland Heart**	**England**
Graham Bettam	**Midland Heart**	**England**
Stewart Fergusson	**Orbit HA**	**England**
Sundeep Pawar	**Gallions HA**	**England**
Pierre Touya	**GIE Logirep**	**France**
Ad van Reekum	**Aramis Wonen**	**Holland**
Marc de Gelder	**Delta Forte**	**Holland**
Siobhan Brown	**Hearth Housing**	**N-Ireland**
Mina Bozzoni	**Aler Brescia**	**Italy**
Danilo Scaramello	**Aler Brescia**	**Italy**
Gaetano Campeone	**Aler Varese**	**Italy**
Hans Eek	**AB Alingsashem**	**Sweden**
Ing Marie Odegren	**AB Alingsashem**	**Sweden**
Didier Michon	**Opac de l'Ain**	**France**
Jacques Laffont	**Opac de l'Ain**	**France**
Chiel Boonstra	**Technical Coordinator**	**Holland**
Corné Koppelaar	**Administrative Coord.**	**Spain**

Sunday 16th March
Arrivals at Park Plaza Vondel Hotel, Koninginneweg 34-36 , Amsterdam 1075 CZ , The Netherlands Telephone: +31 (0) 20 664 6111 Fax: +31 (0) 20 573 7130

20.00 The people that did arrive by this time will have dinner together near the hotel. Restaurant bill will be split amongst participants. We meet in the lobby.

Monday 17th March

09.00 Welcome at Delta Forte, Karspeldreef 2, 1100 DM Amsterdam Zuidoost, The Netherlands
09.15 The administrative coordinator will tell what has happened on the issue of members.
09.30 Introduction of Delta Forte
10.00 Minutes Bourg en Bresse meeting of 24 and 25 September 2007 (attachment 1).
10.15 Coffee and tea break
10.30 Thematic presentation of the Technical coordinator about reducing electricity consumption
11.00 Discussion
11.30 Funding and grants by coordinators
12.30 Lunch
13.30 Visit the locations of Delta Forte sustainable projects
- Kruitberg
- Brandaris

16.30 An introduction of SQUARE by Kristina Mjornell

The European project SQUARE (2007 – 2009) will address quality management by housing associations in order to address energy and indoor environmental issues. Sweden (SP) has experience with this way of operating. Partners from other countries have been found to work in this project. The role of Trecodome is to arrange exchanges of information between the Treco participants and the new information coming from SQUARE in the next two years. The thinking is that this has an added value for both Treco and SQUARE. In practical terms the idea is to have a number of SQUARE meetings at the same location as Treco meetings. For the current Amsterdam meeting, the agenda's overlap in such a way that the SQUARE participants can join the Treco technical tour, and in the afternoon of Tuesday 18 March, a common discussion between SQUARE and Treco can take place.

17.00 End of programme and back to hotel
19.30 We have dinner in a typical Dutch restaurant

Tuesday 18th of March

09.00 Update on task sheets, website and hyperlinks
10.00 Coffee and tea break
10.15 ECO Homes and how the values across Europe differ
11.15 Possible project of Aler Varese, Delta Forte and Logirep
12.00 Discuss the programme of next meeting. What topics do we want to discuss? Date next meeting.
12.30 Lunch
13.30 Discussion between TRECO and SQUARE

If there is any problem finding location, being in time or else please call:
Corné Koppelaar +31 6 51048685
Chiel Boonstra +31 6 27885898
SQUARE agenda

Tuesday 18th of March 2008
Workshop and meeting in Amsterdam

Start	Item	By whom	Duration
Workshop and study tour in south east Amsterdam			
8:30	Departure from the Gresham Memphis Hotel	Square	
9:00-12:00	Introduction to site visit at office of Delta Forte and site visit to projects of Delta Forte in south-east Amsterdam	Square	3 hours
12.00-13.00	Lunch next to the Kandelar	Square and Treco	1 hour
13:00-15:00	Workshop Discussions about energy and indoor environment between Treco and Square members at the offices of Delta Forte • How do Treco members work with energy efficiency and indoor environment today? • What are their experiences from retrofitting projects? • What are the non technical barriers of energy efficient measures? • What kind of information and aids are needed for the parties of the building sector? • How should Treco be involved in the Square project?	Square and Treco	2 hours
15:00	Break	All	30 min
Meeting in the Square project			
15:30	Welcome and introduction to the 2nd SQUARE meeting - presentation of participants at the meeting - presentation of partner (EAP) - agenda (amendments, changes) - organisational aspects (lunch, dinner) - reported changes (organisation, etc) - minutes from last meeting (amendments, changes)	KNM	1 h
16:30	Reports from work packages:		
16:30	WP2 Survey of national conditions Presentation of the work done by the partners, remaining tasks, form of the coming report, time plan, delays, actions to be taken.	Jari Palonen + partners with contributions	1 h
17:30	Transportation back to the hotel		
19:00	Working-dinner at restaurant near the hotel Gresham Memphis		

Wednesday 19th of March

Meeting in the square project continues, location: Kandelar, Bijlmerdreef 1239			
Start	**Item**	**By whom**	**Duration**
8:30	WP3 Break non-technical barriers (Introduction, aim, tasks, deliverable(s)) Presentation of EAPs experience in this field, action plan for coming activities in WP3	Liyana Adjarova, EAP, Bulgaria	1 h
9:30	WP4 Adoption of a QA system Presentation of the progress of the work Swedish handbook Coming tasks and deliverables, time plan	Kristina Mjörnell SP, Sweden + all	30 min
10:00	Break		
10:20	WP5 Energy improvement measures Presentation of the progress of the work Coming tasks and deliverables, time plan	Elisabeth Koschar, AEE INTEC, Austria	40 min
11:00	WP6 Application of the QA system in pilot projects Presentation of the progress of the work Report from Brogården in Sweden (Hanna Blomdahl) Report from the pilot project in Finland Report from the pilot project(s) in Spain Reports from the pilot project in Austria Coming tasks and deliverables, time plan	TTA, Spain + all	40 min
11.40	WP7 Work-shops Presentation of the progress of the work Coming tasks and deliverables, time plan	Chiel Boonstra Trecodome, NL	20 min
12:00	Lunch		
13:00	WP8 Communication and dissemination activities Presentation of the progress of the work (website, newsletter, papers to conferences, presentations) Coming tasks and deliverables, time plan	Carolina Hiller, SP, Sweden	30 min
13:30	WP9 Common dissemination activities Presentation of the progress of the work Fact sheet, OH presentation	Kristina Mjörnell, SP Sweden	30 min
14:00	Agreements on further activities (website, newsletter, internal website, conferences)	All	15 min
14:15	Time plan and deliverables, any delays and actions to be taken	Kristina	15 min
14:30	Administrative and financial issues Logos, contact persons, reclaim of prefinanciation	Kristina	15 min
14:45	Dates and location for the next meeting and workshop	All	15 min
15:00	Closing for transport to airport		

3.2.2 Minutes

Mr Boonstra from the TRECO group opened the workshop. The purpose of the workshop is to find common grounds of the SQUARE project and the TRECO network. The following aspects about energy use and indoor environment were on the agenda to be discussed:

- How do TRECO members work with energy efficiency and indoor environment today?
- What are their experiences from retrofitting projects?
- What are the non technical barriers of energy efficient measures?
- What kind of information and aids are needed for the parties of the building sector?

Also, how could TRECO be involved in the SQUARE project?
The plan is to have several of these joint workshops where different themes can be dicussed. First a quick "round-the-table" to introduce all the participants. The persons from the TRECO group represent different housing associations and companies with a focus on social housing.

The first question that was addressed was: "In what way are issues on energy use and indoor environment considered by the housing companies? And what are their experiences in this field?"
Mr Pawar said that they have just started to address issues like energy management including carbon dioxide, detailed assessments and active managing of energy consumption. In the Gallions Housing Association all kinds of buildings are included. At the moment Mr Pawar is developing energy policies. He also said that the data side still has to be developed. They have inherited all of their stocks including existing meters. Today they actually do not know what kind of energy use they have. When this is made clear, targets etc will be set at a later stage.
Mr Barnham started to say that they have 13 000 properties, ranging in age. Many are pre 1960's buildings. Many have solid walls, large windows, etc, so at the moment the main focus is to retain the heat. They are working on that the energy use should be affordable, it should not be more than 10 % of the residents' incomes (it is a problem though to know the residents' incomes). Mr Barnham went on to talk about surveys that are made in the UK, using a standard assessment of thermal efficiencies of buildings. A scale ranging from 1-100 is used, where the average in UK is 57 and for Barnham's company it is 67.
A measure that is being done is the installation of external thermal insulation. Today there is no focus on the actual heating; the first step is to keep the heat in the building. Due to limited funding they only take small steps.
Mr Obeng-Manu said that regarding the indoor environment, they don't address this specifically (no assessments are made). They only deal with complaints, usually about noise issues.
Ms Mjörnell pointed out that if you do energy measures such as addition of external insulation, improvements of the air tightness etc., you might get problems with the indoor environment. In the SQUARE project both aspects are considered; both the energy use and the indoor environment.
Mr Obeng-Manu repeated that they do not look at both these aspects, except for one pilot project where passive house standard is being implemented. For the rest of the stock this is not taken into account. Mr Barnham remarked that effective solutions are needed.

Ms Mjörnell would like to see this document with the criteria.

Ms Brown said that they have a simple system. They only have 100 houses (old/historical buildings). They ask questions such as "Are your windows draughty?", "Can you hear your neighbours?", etc. They do this questionnaire on a regular basis. In every situation they try to include renewable energy if possible, and eco-friendly features on their buildings. (They have also asked tenants about this.)
Typical problems are draughty windows, so they are looking into using double glazing. Also, they are investigating how timbered floors can be insulated.
Another thing is how the air tightness of historical buildings can be improved. A balance between keeping the energy use down and trying to be as "green" (environmentally friendly) as possible. Breathable materials have to be considered due to the types of buildings that they are dealing with (due to the materials used in these buildings).
Ms Brown went on to talk about the ventilation. They reckon the ventilation to be OK in their buildings due to that they are very leaky and draughty.
They have developed a scoring system where they consider the whole building as a system. There are two alternative levels, eco option 1 and eco option 2.
Ms Mjörnell showed interest and would like to look at this system.
Mr Barnham pointed out that ground source heat pump systems are "not allowed" in the Standard.
Mr Pawar talked about different indicators – performance indicators – and there are some indicators on indoor environment.
Mr Obeng-Manu said that these indicators do not help in refurbishment.
Ms Brown said that she finds air pressure tests and thermal graphic surveys useful, otherwise it is impossible to know the status.
Mr Barnham brought up that ventilation rates can be manipulated in calculations.
Mr Boonstra commented that in passive houses uncontrolled ventilation is not wanted. Need to know/ guarantee a correct/good ventilation rate.
Ms Koschar informed about the Austrian progress in this field. How new regulations include quality systems, energy use, end use energy (comprehensive regarding refurbished with three levels), etc. She hopes that the new regulations will come into force April 1, this year. Ms Koschar went on to say that the indoor environment does not have to be considered by law. The Austrian initiative Klima Aktiv on how to encourage energy efficient and saving actions in a number of fields will also include refurbishment. And it will also be included in governmental work/documents.
She thinks that flats owned by private persons as well as single family houses are the problem, because the owners do not want to spend a lot of money on energy measures.
A discussion followed on grants and tax reduction for energy measures in private homes. In the different countries represented at the meeting the situation differs at lot.
For example in the UK, there exist some subsidies for buildings of different age categories.
In Sweden there exist subsidies for replacement of windows. The UK Carbon Trust was mentioned (The Carbon Trust, a government-funded independent company, helps businesses and the public sector to cut carbon emissions and to exploit the potential of low carbon technologies.)
In the Netherlands there is some financial support for companies. In Finland there are no obligations to improve the insulation when renovating. At the moment heat recovery is installed in new buildings, windows as well as the water supply systems are also considered. The government gives benefits but too few.
Other discussions followed about the number of window panes, especially in milder climates, and about the level of insulation. Ms Mjörnell mentioned that there can be problems with the air tightness. Mr Boonstra brought up heat recovery (from exhaust air)

systems to discussion. They contribute to meet the energy targets but cause problems with noise. Mr Gasset said that the Spanish situation is somewhat different due to their warm climate. Focus on air condition instead. Solar panels are used a little. Mr Serrasolses continued the Spanish input. He informed the group that there are Spanish regulations on thermal efficiency, air tightness of windows, air tightness of buildings etc.
It will be mandatory to install solar collectors (covering 50-60% of the hot water demand).
The regulations will hopefully come into force during 2008/2009. Today 700 000 new houses are built per year in Spain (single family houses and apartments).
When it comes to existing buildings, it is not mandatory to improve the energy use. But if refurbishment is needed, it is mandatory to include these regulations. Ms Adjarova told about the situation in Bulgaria. 97 % of the buildings are privately owned. Ms Adjarova raised the question: What is the definition of social housing? In Bulgaria it is the cheapest houses that have recently been privatised. Maintenance is the main problem since people are not used to care for their houses themselves. There are different financial aids such as an energy efficiency fund (if audited), a grant scheme (small grants to e.g. window replacement and installation of insulation).
Ms Adjarova further told the group that houses have double glazing, but they are not being taking care of. She also stressed that the ventilation must be considered when insulating. A lot of schools and kinder gardens have problems due to that have not taking care of their ventilation.
Only 20% of dwellings in Bulgaria are connected to the district heating net. Public buildings are mainly heated by oil. Ms Mjörnell asked Ms Adjarova how a renovation of multi family house can be done when everyone owns their own flat? (The grants are given to the owners without taking care of the building as a whole.). This is a problem, Ms Adjarova confirmed.

The workshop had to be rounded off at this point and Mr Boonstra ended by saying that he thought it had been a valuable discussion that could be continued
at the next joint workshop.

Visit to the South East district Bijlmer

At the information centre of the local council, an information film about the development projects of the South East district of Amsterdam, called Bijlmer, was shown. Many of the buildings of the district originate from the building boom in the 1960's, which is characterised by blocks of similar several-storied residential houses.

The area has not been considered as a safe and attractive place to live but during the 1990's it was decided to upgrade the area and the buildings, to make it attractive again.

The plan is to have a mixture of renovated 60's buildings with newly built smaller houses. 50% of the original multi-family houses will be demolished and replaced by new buildings. The standard of the remaining half will be improved.

The development of the area also includes plans and projects on how to make it a safe and attractive area to work and live in. New facilities such as shops, communication services, sports centre are on its way or are proposed. As the population of the district originates from approx. 150 countries the multi cultural aspects of the area will be emphasized. The vision is that Bijlmer will be the second city centre of Amsterdam! After the film followed a very interesting and informative guided tour in the district.

Picture: Renovation in Amsterdam South East district Bijlmer

3.3 Oulu workshop

The Oulu workshop has been organised as tri-partite workshop between the Treco network, the SQUARE team and TES, a research project group involved with prefabricated timber elements for passive housing and renovation.

3.3.1 Agenda

Oulu, Tuesday 23 September 2008

TRECO agenda

Treco Group – meeting

To be held at: LVI-laboratorio, PL4100, 02015 TKK, Oulu, Finland

Sunday 21st September 2008 – Tuesday 23rd September 2008 Oulu Finland
Programme:
For this venue are invited:

Stewart Fergusson	**Orbit HA**	**England**
John Barnham	**Orbit HA**	**England**
Sundeep Pawar	**Gallions HA**	**England**
Andrew Sillitoe	**Midland Heart**	**England**
Graham Bettam	**Midland Heart**	**England**
George Obeng-Manu	**Orbit HA**	**England**
Ad van Reekum	**Aramis Wonen**	**Holland**
Marc de Gelder	**Delta Forte**	**Holland**
Martijn van Rheenen	**UMG**	**Holland**
Siobhan Brown	**Hearth Housing**	**Ireland**
Hans Eek	**Alingashem**	**Sweden**
Ing Marie Odegren	**Alingsashem**	**Sweden**
Mats Andersson	**E.On**	**Sweden**
Richard Bengtsson	**E.On**	**Sweden**
Michale O'Hare	**E.On**	**Sweden**
Gaetano Campione	**Aler Varese**	**Italy**
Daniela Mudaro	**Aler Varese**	**Italy**
Mina Bozzoni	**Aler Brescia**	**Italy**
Danilo Scaramello	**Aler Brescia**	**Italy**
Chiel Boonstra	**Technical Coordinator**	**Holland**
Corne Koppelaar	**Administrative Coord.**	**Spain**

Sunday 21st September
Arrivals at Hotel (hotel details will be communicated soon)
20.00 The people that did arrive by this time will have dinner together near the hotel.
Restaurant bill will be split amongst participants. We meet in the lobby.

Monday 22nd September

09.00 Welcome at the LVI-laboratorio, PL4100, 02015 TKK, Oulu, Finland
09.15 Introduction new members of this group: E.On, United Momentum Group
09.45 Minutes Amsterdam meeting of 17 and 18 March 2008.
10.00 Coffee and tea break
10.15 Discuss the booklet of TRECO and the aims and goals and the new setting of this group
12.00 Lunch
13.30 Update on the project and possible new projects
14.30 International Energy labels
15.30 Theme presentation prepared by technical coordinator
17.00 End of programme
19.30 We have dinner in the city centre

Tuesday 23rd of September

09.00 SQUARE-TRECO workshop to be prepared by the coordinators
11.00 Visit Finnish pilot building
12.30 Lunch
13.30 End of TRECO meeting

If there is any problem finding location being in time or else please call:
Corné Koppelaar +31 6 51048685
Chiel Boonstra +31 6 29098290

SQUARE agenda
Tuesday 23rd of September 2008

Workshop and study tour in Oulu, Finland **Location:** University of Oulu, Department of Architecture, Aleksanterinkatu 6, 90100 Oulu, Finland Tel. +358 8 553 4913 / Tel. +358 8 553 4911			
Start	**Item**	**By whom**	**Duration**
8:30	Welcome and introduction Presentation of TKK Introduction to the Finnish pilot building	Jarek Kurnitski, TKK	0,5 hour
9:00-11:00	• Presentation of UK's Housing, Health and Safety Rating System (HHSRS) • Presentation of the QA system developed in the Square project • What are the needs for quality management systems? Discussion	John Barnham, Orbit Heart of England Kristina Mjörnell, SP All	2 hours
11.00-12.30	Visit to pilot project in Oulu	Square and Treco	1,5 hour

13:00-14:00	Lunch	Square and Treco	1 hours
14:30-16:00	Meeting with TES (TES is another project working with the pilot building)	Square and TES	1,5 hours
Meeting in the Square project			
16:00	Welcome and introduction to the 3rd SQUARE meeting - presentation of participants at the meeting - agenda (amendments, changes) - organisational aspects (lunch, dinner) - reported changes (organisation, etc) - minutes from last meeting (amendments, changes) - technical progress report	Kristina Mjörnell, SP	30 min
16:30	Reports from work packages:		
16:30	WP3 Break non-technical barriers Discussion and planning for coming activities, deliverables and time plan.	Liyana Adjarova, EAP + all	1 h
19:00	Working-dinner at restaurant		

Wednesday 24th of September

Meeting in the square project continues **Location:** Scandic hotel Oulu, Saaristonkatu 4, 90100 Oulu, Finland, Phone: +358 (0)8 543 1000			
Start	**Item**	**By whom**	**Duration**
8:30	WP4 Adoption of a QA system Presentation of the progress of the work Swedish handbook, Adaption of the system to other countries. Coming tasks and deliverables, time plan.	Kristina Mjörnell SP+ all	1 hour
9:30	WP5 Energy improvement measures Presentation of the progress of the work Coming tasks and deliverables, time plan.	Sonja Geier, AEE INTEC	30 min
10:00	Break		
10:15	WP6 Application of the QA system in pilot projects Presentation of the progress of the work - Report from Brogården in Sweden - Report from the pilot project(s) in Spain - Reports from the pilot project in Austria - Report from the pilot project in Finland (any additional information) Coming tasks and deliverables, time plan	Jaume Serrasolses, TTA + all	1 hour
11.15	WP7 Workshops Presentation of the progress of the work Coming tasks and deliverables, time plan. Planning of next work shop.	Chiel Boonstra Trecodome	30 min
11:45	WP8, WP9 Communication and dissemination activities Presentation of the progress of the work (website, newsletter, papers to conferences, presentations, template for coming Square reports) Coming tasks and deliverables, time plan	Kristina Mjörnell, SP + all	15 min
12:00	• Time plan and deliverables, any delays and actions to be taken • Administrative and financial issues • Time sheets, information to the interim report • Dates and location for the next meeting and workshop • Other issues	Kristina Mjörnell, SP + all	30 min
12:30	Lunch		
13:30	Departure for airport		

3.3.2 Minutes

Present	**Present from TRECO***
Sonja Geier, AEE Institute for Sustainable Technologies, Austria	Graham Bettan, Midland Heart HA, UK
Chiel Boonstra, Trecodome, Netherlands	Andrew Sillitoe, Midland Heart HA, UK
Jari Palonen, TKK Helsinki University of Technology, Finland	John Barnham, Orbit HA, UK
Jarek Kurnitski, TKK Helsinki University of Technology, Finland	Sundeep Pawar, Gallions Housing Association, UK
Jaume Serrasolses, TTA Trama Tecno Ambiental S.L, Spain	Corné Koppelaar, Global Habit, Netherlands
Oriol Muntane, Poma Arquitectura S.L., Spain	Joost Geerling, UM Group, Amsterdam, Holland
Jordi Espar Gasset, Poma Arquitectura S.L., Spain	Marc de Gelder, Delta Forte, Netherlands
Anders Kyrkander, Alingsåshem, Sweden	Ad van Reekum, Allee Wonen, Rosendaal, Netherlands
Kristina Mjörnell, SP Technical Research Institute of Sweden	
Peter Kovacs, SP Technical Research Institute of Sweden	

1	**Workshop**	
1.1	**Presentation of the TRECO** Corne and Chiel made a brief presentation of the TRECO network and talked about their objectives and coming activities. They also showed a new booklet about TRECO.	Corne Koppelaar, Chiel Boonstra
1.2	**HHSRS** John Barnham presented the HHSRS Housing, Health Safety Rating system The mail requirements are that the home should be warm, waterproof and have a reasonable modern facilities. The decent homes failure HHSRS is approximately 1-10 % of the homes. Two criterias: Reasonable modern standard Quite poor standard. The organization develop their owm decent home + (plus) standard. This system focus on the hazards. Who is affected? Private landlords, Housing associations Private sectors landlords have to incorporate in stock surveys. Orbit have done 100% stock surveys, 10% a year.	John Barnham

	The providor should assess/check their own houses. Assessment is made for the most sensible person. The hazards are ranged A-G. Hazards are defined within 4 groups: Physiological, Phycological, protection agains accidents and … Hygrothermal conditions, damp, mould, ligthing, falls, electic chocks, Guidance document. Enforcement Action: Issue an Demolition order, consider The publications are open to use. **Presentation of the QA system developed in the Square project** Some organizations have their own quality management systems like ISO. The QA system could be incorporated into the general QM system.. Questionaires Measurements of technical status. Call centre: Complaints. Cold survey: Overall survey before renovation. Warm survey: More thorough survey in the appartment forms the base of the renovation. An English (UK) version of the Appendices would be very useful. The TRECO parterns from UK will look into that. Chiel and Corne: There should be a certain targets on energy use.	Peter Kovacs
1.2	**Visit to the Finnish Pilot project in Oulu together with participants in the TES project**	
2	**WORKSHOP WITH SQUARE, TRECO AND TES** Presentation of the pilot project in Oulu Presentation of the Square project Presentation of TES project	Juha Aitamurto, PSOAS and Venanzia Rizzi, Aveforma Kristina Mjörnell
2	**WORKSHOP WITH TRECO**	
	Mr Boonstra from the TRECO group opened the workshop. **Cooperation TRECO/ SQUARE** TRECO is meeting 2 days next time in order to get a full day with SQUARE. SQUARE will extend the duration of coming meetings too in order to make it work.	Chiel Boonstra All

Prel. Time for next meeting: 2009-03-9—10 (TRECO) and 10—11 (SQUARE)
Prel. Location: Graz, Austria

TRECO comments on the QA System:

QA system applied to UK/(Coventry projects). TRECO members will work on developing UK annexes.
English SQUARE version ready by mid October, nat. versions by end November.
Possibly there will be a Dutch version aswell…..

Sundeep Pawar proposes a two level Thorough primary investigation (TPI): Global first and apartment wise later, ahead of design and construction

Cooperation TRECO- SQUARE:
Main topic of cooperation is on the application of the QA System and exchange of experience from pilot projects.

Sundeep Pawar made a short presentation on UK application of **BSA 8555** which was described as ISO 14001/ EMAS implementation broken down into 5 steps. Last step is the auditing. He presented a pilot project where several QA measures, testing etc have been implemented. Consultancy supplied the testing and reports results and will coordinate the planning. The same company could apply the SQUARE QA system requirements. Mr. Pawar pointed out that a structure is needed in the organisation to put requirements in place.

KM: TRECO can contribute to Non technical barriers (WP3) and to WP 5 as well, as exchange of experience. This will be the two main topics for the next TRECO-SQUARE workshop

ToDo:
Questionnaires to UK:
KM checks for translated version and send to SQUARE partners and TRECO members.

Communicate to TRECO when the updated version of the QA system is in place

TRECO members shall develop English (UK) versions of the QA system annexes.

Picture: Oulu project before renovation

3.4 Gleisdorf workshop

The Gleisdorf workshop was a meeting between the Treco partners and the SQUARE participants, providing the exchange of views about the use of the SQUARE method in practice, and feedback from Treco partners from the UK, who had worked on the implementation.

3.4.1 Agenda

Gleisdorf Tuesday 10 March 2009

TRECO agenda

Treco Group – meeting

To be held at: Trend Hotel Ananas, Vienna, Austria

Sunday 8th March 2009 – Tuesday 10th March 2009 Vienna and Graz Austria
Programme:
For this venue are invited:

Stewart Fergusson	**Orbit HA**	**England**
John Barnham	**Orbit HA**	**England**
Sundeep Pawar	**Gallions HA**	**England**
Andrew Sillitoe	**Midland Heart**	**England**
Graham Bettam	**Midland Heart**	**England**
George Obeng-Manu	**Orbit HA**	**England**
Ad van Reekum	**Aramis Wonen**	**Holland**
Marc de Gelder	**Delta Forte**	**Holland**
Martijn van Rheenen	**UMG**	**Holland**
Siobhan Brown	**Hearth Housing**	**Ireland**
Hans Eek	**Alingashem**	**Sweden**
Ing Marie Odegren	**Alingsashem**	**Sweden**
Sebastien Nguyen	**Cité Nouvelle**	**France**
Gordon Callaway	**Hyde Group**	**England**
Chris White	**White Associates**	**England**
Ellenor Jonsson	**Botkyrkabyggen**	**Sweden**
Steven Rudman	**Portland Housing Auth.**	**USA**
Chiel Boonstra	**Technical Coordinator**	**Holland**
Corne Koppelaar	**Administrative Coord.**	**Spain**

Sunday 8th March
Arrivals at Hotel: AUSTRIA TREND HOTEL Ananas
Verkehrsbüro Hotellerie GmbH:
FN 37952m, Firmenbuchgericht HG Wien,
Sitz: Wien

A-1050 Wien, Rechte Wienzeile 93-95
T: +43-1-546 20-902 F: +43-1-545 42 42

20.00 The people that did arrive by this time will have dinner together near the hotel. Restaurant bill will be split amongst participants. We meet in the lobby.

Monday 9th March

09.00 Welcome at the Ananas Trendhotel Vienna, Austria
09.15 Introduction new members of this group: Cité Nouvelle, Hyde Group and Botkyrkabyggen. Other membership issues.
09.45 Minutes Oulu meeting of 22 and 23 September 2008.
10.00 Coffee and tea break
10.15 Discuss the second booklet of TRECO and the topics for the next booklet
12.00 Lunch
13.00 The TRECO contract and commitment.
13.30 Update on the projects of the members and possible new projects.
14.30 A presentation of the new website

Theme presentation prepared by technical coordinator: A presentation comparing the different assessment methods on sustainability (LEED USA, BREEAM UK, EPC standards NL etc.) with the focus on residential buildings.

17.00 End of programme and transfer to Gleisdorf by minibus (arranged by coordinator)
19.00 Get together with the SQUARE group: Typical Styrian buffet at a sun brewery

This night is booked in the following hotel:
Hotel Brauner Hirsch
Fürstenfelderstraβe 5-7
A-8200 Gleisdorf
Tel. +43 (0) 3112/2401
www.hotel-brauner-hirsch.at

Tuesday 10th of March

08.30 Meet at hotel for bus transfer to pilot project
09.00 and procedures "Dieselweg" Short presentation what had happened and explain some SQUARE-TRECO site visits and site visit *hosted by AEE INTEC*
see for information: http://www.lev.at/Download/Sanierung_Stmk_1108.pdf
SQUARE is co-funded by the European Commission, supported by its Programme Intelligent Energy Europe (IEE). It started in November 2007 will end in April 2010. There are partners from several European countries; Austria, Bulgaria, Finland, Netherlands, Spain and Sweden. SP Technical Research Institute of Sweden is the coordinator of the project.
10.30 Transfer to "Friedrich Schiller home for students
10.45 Visit at the "Friedrich Schiller home for students" *hosted by AEE INTEC*
11.45 Transfer to Gleisdorf
12.00 Lunch in Gleisdorf
13.00 Meeting TRECO-SQUARE

- Presentation of "A guide to quality assurance of the indoor environment and energy use when renovating apartment buildings" *by Peter Kovacs of SP*
- Discussions and comment from partners and TRECO members on QA system and guidance *All*
- Discussions on non technical barriers defined by partners and TRECO members *All*

15.00 Coffee and tea break. TRECO members leave for airport.

If there is any problem finding location being in time or else please call:
Corné Koppelaar +31 6 51048685
Chiel Boonstra +31 6 27885898

SQUARE agenda
Monday 9th of March 2009

"GET TOGETHER" in Austria			
Start	**Item**	**By whom**	**Duration**
19:30	Meeting Point at the "Hotel Brauner Hirsch" in Gleisdorf, bus transfer to sun brewery	AEE INTEC	15 min
19:45/ 20:00	Sun brewery – guided tour Typical Styrian buffet at a sun brewery	All	about 2 hours
22:00	Bus transfer back to the "Hotel Brauner Hirsch"	AEE INTEC	

Tuesday 10th of March 2009

Workshop and study tour to the Austrian demonstration project "Dieselweg" in Graz, Austria			
Start	**Item**	**By whom**	**Duration**
	MORNING SESSION: TECHNICAL TOUR Meeting Point at the "Hotel Brauner Hirsch" in Gleisdorf, bus transfer to Graz		
8:30 9:00 10:15 10:45 11:30	Meet at hotel for bus transfer to pilot project "Dieselweg" Short presentation what had happened and explain some procedures - Site visit at pilot building Bus transfer to "Friedrich Schiller home for students" Visit at the "Friedrich Schiller home for students" Bus transfer to Gleisdorf	All Sonja Geier, AEE INTEC All All "	30 min 75 min 30 min 45 min 30 min
12:00-13:00	Lunch in Gleisdorf LOCATION: Restaurant "Sonnenwirt" located at the "*forum* KLOSTER" in Gleisdorf- see attached "how to find it"	AEE INTEC	1 hour
	AFTERNOON SESSION: TRECO and Square Workshop Meeting Point at the "*forum* KLOSTER" in		

	Gleisdorf (conference room "Martin")		
13:00-15:00	• Presentation of "A guide to quality assurance of the indoor environment and energy use when renovating apartment buildings" • Discussions and comment from partners and TRECO members on QA system and guidance • Discussions on non technical barriers defined by partners and TRECO members	Peter Kovacs, SP All All	2 hours
15:00	Coffee break TRECO members leave for airport	Square and Treco	30 min
Meeting in the Square project			
15:30	Welcome and introduction to the 4rd SQUARE meeting - presentation of participants at the meeting - agenda (amendments, changes) - organisational aspects (lunch, dinner) - reported changes (organisation, etc) - minutes from last meeting (amendments, changes) - interim report (coming)	Kristina Mjörnell, SP	1 hour
16:00	Information from IEE	Timothée Noel, IEE	20 min
16:20	Reports from work packages:		
16:20	WP3 Break non-technical barriers Discussion and planning for coming activities, deliverables and time plan.	Liyana Adjarova, EAP + all	1 hour or more?
18.30	Bus transfer to Graz, Meeting Point "Hotel Brauner Hirsch"	AEE INTEC	
19:00 21:30/22:00	Working-dinner at restaurant "Glöckl- Bräu" in Graz Bus transfer back to Gleisdorf	AEE INTEC	

3.4.2 Minutes

Present:
Jari Palonen – TKK Helsinki University of Technology, Finland
Jarek Kurnitski, TKK Helsinki University of Technology, Finland
Liyiana Adjarova– Bulgaria
Oriol Muntane, Poma Arquitectura S.L., Spain Spain
Anders Kyrkander, Passivhuscentrum, Alingsas, Sweden
Jordi Espar Gasset, Poma Arquitectura S.L., Spain
Jaume Serrasolses, TTA Trama Tecno Ambiental S.L, Spain
John Barnham, Orbit Heart of England, UK
Andrew Sillitoe, Midland Heart, Birmingham, UK
Armin Knotzer – AEE Intec, Austria

Sonja Geier – AEE Intec, Austria
Tomothee Noell, EACI, Brussels
Kristina Mjornell, SP, Sweden
Peter Kovacs, SP Sweden
Graham Watss, Social Housing Services Corporation, Canada / Orbit Heart of England
Chiel Boonstra, Trecodome, Netherlands

Peter Kovacs presented the SQUARE system with an extensive Powerpoint presentation, following the various stages, such as TPI: questionnaires and templates, FEA: first energy analysis, Targets: external and internal

What is needed during the design stage is good communication and a good dialogue between representatives of all organizations. The same is valid for the construction stage.

During construction there is the need for Quality requirements, and methods to control, such as airtightness test (blowerdoortest), and good attention to moisture issues.

In the construction stage, contractors follow their own quality management. This typically results in a gap to the maintenance people who will have the responsibility after project completion. The question is how to bridge the gap to management and maintenance; How is the building handed over to the owning organization.

Austria has an official hand over document- proof systems work, mistakes must be corrected. All is documented and includes procedures how to check

It was commented that this may work if there is an external developer / contractor. But how to organize within an organization which has its in house contractor. There is a need for good checklists.
It was mentioned that in The Netherlands a so called building dossier is being developed: an agreed way of documenting a building, and changes during its life time.

In the discussion it was noted that there is generally spoken funding for demolition and new construction but not for retrofit projects.
A solution to this issue is the involvement of maintenance departments in decisions about new construction and design issues, both for new build and renovation.

Guidelines
It was discussed and agreed that the Guidelines will be issued in different languages. The discussion emphasized that the quality management system addresses not only the need for quality in components and systems, but that it involves organizational issues in how to move the organization forward in a changing environment, whilst keeping track on overall and project objectives.

Implementation
It is essential for the implementation to assure effectiveness inside the organization
The system is connected to policy and anchoring targets, management, money. The method requires local customization and a balance between efforts and practical use

It was commented that the general report is generic, the guidelines will help in adding tools and how to do work with it.

It was recommened to identify a name for the system.

Graham Watts has developed routines and documents for Orbit Heart of England and he appreciated the good resources, and found inspiration. Also he found the templates useful. Het met with different roles in organization: good step by step process

We must find out if there can be a more simplistic outcome, using flowchart better than big document. The presentation works well. It was concluded that the flowchart should become key in future dissemination of the method, e.g. used as frontpage of the website.

Graham Watts recommended to adapt the method to national acronyms, get close to payment schemes for energy, etc.

Organisations should list their Top 7 goals, and understand their habits, and define criteria for decisions about their existing stock.

A final open question was: Can you put heating equipment worth 15000 Euro in a drugs using house. In other words: how can we define robust approaches to energy efficiency in social housing.

Picture: Austrian pilot renovation project

3.5 Barcelona workshop

The Barcelona workshop was the last common Treco SQUARE meeting with a focus on renovation practice in Spain. It was illustrated with a common site visit to the SQUARE pilot project. Experiences by SQUARE partners were discussed during the workshop.

3.5.1 Agenda

Barcelona, Tuesday 29 September 2009

TRECO agenda

Treco Group – meeting

To be held at: H10 Itaca Hotel, Barcelona, Spain
Sunday 27th September 2009 – Tuesday 29th September 2009 Barcelona Spain
Programme:
For this venue are invited:

Stewart Fergusson	**Orbit HA**	**England**
John Barnham	**Orbit HA**	**England**
Harry Stevens	**Gallions HA**	**England**
Rabinda Samarai	**Gallions HA**	**England**
Andrew Sillitoe	**Midland Heart**	**England**
Ad van Reekum	**Allee Wonen**	**Holland**
Marc de Gelder	**Delta Forte**	**Holland**
Martijn van Rheenen	**UMG**	**Holland**
Siobhan Brown	**Hearth Housing**	**Ireland**
Hans Eek	**Alingashem**	**Sweden**
Ing Marie Odegren	**Alingsashem**	**Sweden**
Sebastien Nguyen	**Cité Nouvelle**	**France**
Axelle Milochevitch	**Cité Nouvelle**	**France**
Gordon Callaway	**Hyde Group**	**England**
Chris White	**White Associates**	**England**
Ellenor Jonsson	**Botkyrkabyggen**	**Sweden**
Chiel Boonstra	**Technical Coordinator**	**Holland**
Corne Koppelaar	**Administrative Coord.**	**Spain**

Sunday 27th September
Arrivals at Hotel: H10 Itaca Hotel, avenida Roma 22-30, Barcelona, Spain Tel. +34 932 265 594 (next to railway station Sants)
20.00 The people that did arrive by this time will have dinner together near the hotel. Restaurant bill will be split amongst participants. We meet in the lobby.

Monday 28th September
09.00 Welcome at the H10 Itaca Hotel Barcelona, Spain
09.15 Introductions

09.45 Minutes Vienna/Graz meeting of 9 and 10 March 2009.
10.00 Coffee and tea break
10.15 Discuss the second booklet of TRECO and the topics for the next booklet
13.00 Lunch
14.00 The TRECO contract and commitment.
14.30 Update on the projects of the members and possible new projects.
15.00 A presentation of the new website
15.30 Theme presentation prepared by technical coordinator: "Domotica or housing management systems"
17.00 End of programme
20.00 Dinner in 7 Portes (world famous restaurant since 1836); Pg. Isabel II 14, 08003 Barcelona, Tel. +34 93 3193033

Tuesday 29th of September

09.00 Meeting TRECO-SQUARE part I
10.30 Coffee Break
10.45 Meeting TRECO−SQUARE part II
12.00 Lunch in
13.00 Transfer to the pilot SQUARE project in Clot
15.00 Transfer to the RESTART project in Molins de Rei
15.30 Visit the biomass `Restart` project with Nuria Reol Solano, Head of the Renewable Energy Programme ICAEN - Institut Catala d'Energia

17.00 TRECO members leave for airport.
There is the possibility for TRECO members to extend their stay and attend the rest of the SQUARE meeting until Wednesday.

If there is any problem finding the location, being in time or anything else please call:
Corné Koppelaar +31 6 51048685
Chiel Boonstra +31 6 27885898

SQUARE agenda

Monday 28th of September 2009

"GET TOGETHER" in Barcelona			
Start	**Item**	**By whom**	**Duration**
19.30 *20:00*	*Meeting point at Hotel ITACA hall or* *Dinner in 7 Portes (Pg Isabel II 14, 08003 Barcelona, Tel +34 93 31 93 033* *http://www.7portes.com/angles/index.htm*	All	

Tuesday 29th of September 2009

Workshop and study tour to the Spanish demonstration project

Location: H10 Itaca Hotel, Avda. Roma 22-30, Barcelona, Tel: +34 932 265 594 (next to railway station Barcelona-Sants) http://www.hotelsearch.com/H10/hotelitacabarcelona/			
Start	**Item**	**By whom**	**Duration**
	Meeting point H10 Itaca Hotel		
9:00	MORNING SESSION: Common workshop on experiences from QA implementation. Pilot project representatives makes the presentations. Technical partners will present. • QA implementation in Alingsåshem AB • Implementation related to design phase in the Oulu project • Ongoing work at Dieselweg and implementation of QA system • QA implementation and commissioning in the Spanish project • GB Presentation of ongoing work by Orbit	Square and Treco	
12:00	Local experience in planning QA in energy renovation. Views form public developers and energy regulators	ICAEN Montcada Municipality	
12:45	Questions/Answers		
13:00	*Buffet - Lunch at the same hotel*		
14:00	AFTERNOON SESSION: TECHNICAL TOUR Meeting Point at H10 Itaca Hotel Visits to: (i) Spanish pilot project in Barclona (Clot neighborhood) (ii) Renovated municipal building "La Fàbrica del Sol" (energy efficiency and renewable energies, exhibition, etc.)	Square and Treco	
16:30	TRECO members leave for airport		

Tuesday 29th of September 2009 (continued)

Fifth meeting in the SQUARE project – Session 1 **Location:** TTA offices (Avda Meridiana 153. Barcelona)			
Start	**Item**	**By whom**	**Duration**
17:00	Welcome and introduction to the 5th SQUARE meeting - presentation of participants at the meeting - agenda (amendments, changes) - organisational aspects (lunch, dinner) - reported changes (organisation, etc) - minutes from last meeting (amendments, changes) comments from IEE on the interim report	Kristina Mjörnell, SP	30 min
	Reports from work packages:		
17:30	WP3 Break non-technical barriers	Liyana	1 hour

	Short presentations and comments on results from interviews, discussion of results, agreement on report and time plan.	Adjarova, EAP + all	
18:30	Wrap-up and transfer to hotel		
20:00	*Working dinner at restaurant La Paradeta (Sants district, near the Hotel)*		

Wednesday 30th of September

Fifth meeting in the Square project – Session 2 **Location:** TTA offices			
Start	**Item**	**By whom**	**Duration**
8:30	Meeting point at Hotel Hall		
9:00	WP4 Adoption of a QA system Presentation of the final version of the guidelines.	Peter Kovacs SP+ all	30 min
9:30	WP5 Energy improvement measures Presentation of the energy efficient solutions, their effect on indoor environment etc. Discussion on deliverables, presentation materials, time plan.	Armin Knotzer, AEE INTEC+ all	45 min
10:15	*Coffee Break*		
10:30	WP6 Application of the QA system in pilot projects Presentation of the progress of the work in each pilot project and discussion on the final report and time plan	Jaume Serrasolses, TTA + all	1,5 hour
12:00	WP7 Workshops Presentation of the progress of the work Local workshops, time plan. Planning of next work shop.	Chiel Boonstra Trecodome	30 min
12:30	WP8, WP9 Communication and dissemination activities Presentation of the progress of the work (website, newsletter, papers to conferences, presentations, template for Square reports) Information material (brochure, pp presentation) Coming tasks and deliverables, time plan	All	1 hour
13:30	*Buffet - Lunch*		
14:30	• Time plan and deliverables, any delays and actions to be taken • Administrative and financial issues • Time sheets, information to the interim report • Dates and location for the next meeting and workshop • Final report Other issues Wrap up	Kristina Mjörnell, SP + all	30 min
15:00	End of Fifth meeting in the Square project Departures for airport		

3.5.2 Minutes

Workshop Experiences with QA system

Sweden
Anders Kyrkander works for the Passivhuscentrum in Alingsas and was involved from an architectural and consultancy role, and not as client – building owner. The main reason for using the QA system it so achieve better quality and effectiveness.
The building owner Alingsashem is interested in the SQUARE method but had no clear why to put effort in it, because they already have their own process. Since Brogarden is a large project with a long duration it will not be repeated in other projects in the next few years, because at first all efforts are in Brogarden itself.
This makes QA a bit fragile. The current knowledge is with key persons, e.g. the project leader, and they don´t need the QA system for their current work.

On an organisational level however there is a need. For instance there are political agreements to have a yearly energy saving of 2,03%. But nobody knows what such targets means in practice. Learning from good examples such as Lindas for new construction it becomes clear that in order achieve large overall savings, also household electricity must be addressed. This was a bit shocking to Alingsashem that is was not enough to just attack the heat demand.. The new proposed objectives for the future for Alingsashem:

- 25% of energy used today.
- All energy renewable

This strategy asks for an approach based on backcasting, with a building stock as a whole, and tools for decision making.

Nevertheless QA is in heart of company. A company only make routines every 5 or 10 years, and can thus integrate routines in course of maintenance. Example of possible new routines is investigation when tenant leaves. Thus inventory of 30% of stock in 10 years time for free.

One of the issues in practice is that current records about projects, buildings and tenants are in different databases. Examles are: complaints records, ventilation reports, different filing systems, sometimes no drawings.
On a deeper level there is more information, such as detailed questionnaires.
QA can help connecting information in order to find all information in one place.

A comment from Alingsashem is that small housing associations do not execute projects themselves, but make use of external contractors, whose information must included in the QA system.
Alingsashem will use certain elements of the QA system and integrate this in their existing system.

A special feature in Alingsas are discussions with the energy company, which in this case is a public body. The energy company has all statistics for buildings in Brogarden. The energy company is changing from delivering energy to saving and services.
Housing companies are paying for services outsourced to energy companies.

There are currently discussions about business ideas
- dimensional state planning, own roof or basement for energy company.
- Use roofs and basement for renewable energy – complement district heating.
- Sell electricity for electric cars.

Finland

In Finland there are no total QA systems like SQUARE, but several well defined tools e.g.

- Simple energy analysis, 50% paid by Finnish government
- Simple condition survey, 50% paid by Finnish government
- Detailed condition survey

Sub QA methods

- Guidebook low energy building
- Indoor climate classification 2008
- Over 1000 low emitting VOC + odor building materials
- Design for clean supply air systems
- Moisture control during construction work
- Dust control during construction
- Guidelines clean ventilation system
- How to clean building before occupancy
- Maintenance handbook
- Energy certification (annual if simple, every 10 years more detailed)

There is no continuous track record of advanced renovation projects in Finland. There have been advanced renovation schemes in 1994 – 1996, using small heat recovery units. The projects were successful, but the tenants were not keen to use the ventilation system.

In 2003 advanced renovation schemes were seen as 1,5 time more expensive than demolition and new construction.

In 2009 several projects were demolished and replaced by new low energy buildings.

The pilot project for SQUARE is Oulu Pohjankaleva. It has unrented rooms, and has undergone different renovations. The questionnaires indicate IAQ problems such as

- draught in winter
- too warm, and
- Tenants are prepared to pay 10-20 Euro/month for a private bathroom, balcony, sauna

The condition survey indicated that the building is in good condition
Good conditions no need for deep renovation.. Investment next 19 years 200 Euro/m2
A deeper analysis is required for the outer walls

The energy analysis shows an energy consumption of 170 kWh/m2, which is less than average. The current design proposals include a new lay-out, the addition of a balcony, and a bathroom.

When applying the passive house principles Passive house contacts near Arctic indicate a future energy use of
30 kWh/m2 heating
DHW 25 kWh/m2

The approach would be the application of TES wooden elements, regenerative heat recovery, need odour filter in exhaust. central system for whole building. The costs are fixed in round table discussions. There is a special permit from Finnish housing fund
TES elements will be manufactured in North Finland.
It is still open if the project will be renovated or demolished.

How to implement QA system:
The work normally happens in silos. The building owner does not make major renovations. Would have difficulties to persuade to use QA systems. There are existing tools.

It is concluded that the value of SQUARE system is to integrate systems in a framework. Finnish tools can be integrated in Finnish version of the tool.

Who is driving QA in Finland.
There are no specific building codes for renovation, so the benefit for QA is for the building owner.

Austria
Sonja Geier reported about the QA system and the pilot scheme. She has looked at is from the architects point of view. She has seen the site until commissioning en operation.

The QA system is good system, but if there are no advantages it will not be implemented
The advantages of SQUARE are the overview of implementation and key issues.
QA system has basic principle of ISO 9001. In Austria EN 16001 is called energy management systems for guidance for use)related also to EMAS.

Pre/renovation
Weak points in the existing project have been identified during investigation, ie thermal bridges, and they had to find systems to eliminate those.

The objectives of the pilot project are rather wide: energy, social, not to remove older people from their flats, also improve outdoor living conditions. Providing a better new built environment.

The energy reduction will be significant from space heating energy around 200 kWh/m2 before to around 10 kWh/m2 heat demand after renovation.
Major refurbishment works

Façade less than U<0,2 W/m2K
Windows U<0,85 W/m2K

Building envelope approach with prefabricated elements has been developed together with GAP Solution. Balconies are integrated in renovation approach:

- Existing wall with old window inside
- Prefab module with new window outside. Later remove old window

Solar thermal collectors – with heat pump heat storage tank are used. There are no radiators, only thermal activation of outside wall

The workflow has been optimized:

- Develop responsibilities on site
- Inspections by Kulmer Holz Leimbau
- Dimensions optimized for truck: 12 * 3m
- Integrated windows
- Strategy about set up area, and crane

Comment from the workshop: The radiators are outside – embedded in insulation. This might be tricky – how about leakage and maintenance.

A lot of attention has been given to close vapour barriers and closing corners. The airtightness has been tested following ISO 9972.

An information brochure for tenants has been developed
How to manage
How to control ventilation

There will be system monitoring and energy information on Internet for tenants
Also there will be temp + humidity loggers for analysis of construction.

There is a need to analyse these data and feed this back into the organisation or into new projects.

Spain
The focus in the pilot project has been on the design. The buildings are for sale not for rent, since in Spain there is no rental social housing sector. Good manuals for the future inhabitants have been developed, but there is no control on how they use it. The apartments function independent of each other.

Several presentations explained the Spanish situation in more detail. See Appendices.

Picture: Spanish renovation project

Picture: Site visit by SQUARE-Treco participants

3.6 Roosendaal event

In The Netherlands a national event was organised as a collaboration between Technical University Delft, Trecodome and others. Speakers from and related to the SQUARE and TRECO network have given high quality lectures, followed by a site visit to the project of Treco partner Aramis Alleewonen, a social housing provider in Roosendaal, The Netherlands. Three Treco housing associations participated in the event and site visit

3.6.1 Agenda

Roosendaal 13 October 2009

Workshop agenda
TU Delft leaflet

International symposium and fieldtrip

Energy transition at housing renovation: a successful approach

13 October 2009 in Roosendaal, the Netherlands (in English)

10.00	**Registration opens, coffee**
10.30	Welcome in Roosendaal

The issue in perspective

10.40	**Introduction into Low Energy Housing Retrofit** *Erwin Mlecnik, PHP/OTB Research Institute, Delft University of Technology*
11.10	**Community strategies for improvement of energy efficiency** *Ingeborg Strassl, SIR, Salzburg Institute for Regional Planning and Housing, Austria*
11.40	**Quality assurance of social housing companies to manage energy projects** *Kristina Mjörnell, SP, Sweden*
12.10	**TES EnergyFacade - a timber building system for the modernisation of social housing** *Frank Lattke, TU München, Germany*
12.30	**Lunch**

The case explained

13.30	**Actions of the social housing association for the retrofit of De Kroeven** *Ad van Reekum, Aramis Alle Wonen, Roosendaal, the Netherlands*
14.00	**Technical development and experiences of renovation project De Kroeven** *Chiel Boonstra, Trecodome, Roosendaal, the Netherlands*

The hands-on visit

14.45	**Bus transport to building site**, drinks in the bus
15.00	**Visit in subgroups**
16.15	**Return for reception**
16.30	Social **gathering** with drinks, offered by Trecodome

3.6.2 Minutes

The event provided a good overview of new approaches to passive renovation, such as prebricated timber elements for renovation of existing buildings. The SQUARE project formed was presented in detail. The afternoon consisted of a site visit to the advanced passive renovation project in Roosendaal, The Netherlands.
Aramis Alleewonen is developing a large passive renovation project in the area called Kroeven in Roosendaal.

Social housing provider Allee Wonen owns 19,000 properties in Roosendaal and Breda, The Netherlands. In Roosendaal, in 1960 a large scale residential development was built in an area called De Kroeven, which mainly consists of identical single family houses.

After 40 years of use, and only gradual improvements and normal maintenance, Allee Wonen decided to upgrade and redesign the area. Also the tenants had expressed interest in an energy efficient renovation. Whereas Allee Wonen had learned about the passive house concept as part of her involvement in the European Treco network for social housing providers, Allee Wonen and the tenants developed a shared interest in low energy renovation.
The full upgrade of Kroeven consists of 370 single family houses, of which 246 will be renovated and 124 units will be newly constructed, replacing about 100 existing houses.

Two architect firms and energy consultants have been appointed to develop different approaches to passive renovation, and to ensure a variety in architectural and technical solutions, whilst aiming at the same low energy demand for space heating and domestic hot water.
The renovation will happen in such a way that the tenants shall stay in their houses. This requires a fast, and non-intrusive renovation process.

Approach 1 resulted in two test houses, demonstrating how the houses can be insulated using 200 mm external EPS insulation and a plastered facade, passive house window

frames and triple glazing, and prefabricated timber roof elements, filled with 350 mm cellulose insulation.
From 2010 to 2012 this approach will be implemented in 112 houses.

Picture: test house external insulation, plus prefabricated timber roof

Approach 2 resulted in one test house demonstrating the how the houses can be insulated using a new 350 mm timber frame element with cellulose insulation, with triple glazed passive house window frames, and again prefabricated timber roof elements, filled with 350 mm insulation. The external façade cladding are natural slates.
From 2010 to 2012 this approach will be implemented in 134 houses.

Picture: test house prefabricated timber façade and prefabricated façade

In both cases the heating, ventilation and domestic hot water system will be upgraded using new compact systems, which include per house a mechanical heat recovery system, a 200 liter storage tank, connected to a solar collector array, with a backup by a small condensing gas boiler.

3.7 Sofia workshop

The Sofia workshop consisted of an external presentation about both SQUARE and Bulgarian activities to implement energy efficiency in social housing.

3.7.1 Agenda

Sofia, Tuesday 9 March 2010

SQUARE agenda

Hosting Partner: EAP Date: 8th – 10th March 2010 Location: Sofia, Bulgaria Meeting venue: REHAU North Industrial Zone – Kazichene Road 438	Contact EAP: Tel: + 359 896 610 364 (Ms Liyana Adjarova) Tel: + 359 893 558 648 (Ms Bogdana Bogdanova) Contact SP: Tel. +46 105 165 745 (Ms. Kristina Mjörnell) Mobile: +46 730 88 57 45
Hotel: 149 Tsarigradsko Shose Sofia 1784	

Monday 8th of March 2010

"GET TOGETHER" in Sofia, Bulgaria			
Start	**Item**	**By whom**	**Duration**
20:00	Get-together dinner: Restaurant Bulgarka Meeting point - the hotel lobby at 19:45h	All	

Tuesday 9th of March

Meeting in the Square project Location: REHAU building			
Start	**Item**	**By whom**	**Duration**
8:15	Meeting point at the lobby of the hotel and transfer to the meeting venue;		
8:30	Welcome and introduction to the 6th SQUARE meeting - presentation of participants at the meeting - agenda (amendments, changes)	Kristina Mjörnell, SP	30 min

	- organisational aspects (lunch, dinner) - reported changes (organisation, etc) - minutes from last meeting (amendments, changes) - comments from IEE on budget shifts etc.		
	Reports from work packages:		
9:00	WP3 Break non-technical barriers Presentation of main results and final report.	Liyana Adjarova, EAP	1 hour
10:00	Coffe/tea break	All	30 min
10:30	WP4 Adoption of a QA system Presentation of the national versions of the guidelines. Presentation of the report on how the QA system could be connected to existing standards.	Peter Kovacs SP+ all	30 min
11:00	WP5 Energy improvement measures Presentation of the final report, excel-sheet and pp presentation of energy efficient solutions, their effect on indoor environment etc.	Armin Knotzer, AEE INTEC	1,5 hours
12:30	Lunch	All	1 hour
13:30	WP6 Application of the QA system in pilot projects Presentation of the progress of the work in each pilot project and discussion on the final report and time plan.	Jaume Serrasolses, TTA + all	1,5 hours
15:00	WP7 Workshops Presentation of the progress of the work Local workshops, results and discussions. Discussion on how Square partners can be connected to TRECO in the future.	Chiel Boonstra Trecodome	30 min
15:30	Coffe/tea break	All	30 min
16:00	WP8, WP9 Communication and dissemination activities Presentation of the progress of the work (website, newsletter, papers to conferences, presentations, template for Square reports) Information material (brochure, pp presentation)	Kristina Mjörnell, SP + all	30 min
16:30-18:00	• Time plan and deliverables, any delays and actions to be taken • Administrative and financial issues • Time sheets, information to the final report • Final report • Other issues	Kristina Mjörnell, SP + all	1,5 hours
20:00	Working- dinner for Square partners.	All	

3.7.2 Minutes

Chiel Boonstra presented an overview of the workshops, and collaboration between SQUARE and Treco. See Appendix.

Pictures: typical Bulgarian social housing stock. Key issue is the lack of collective ownership, iniatives and investment options to maintain or upgrade the stock to better standards.

4 Results

The SQUARE group has during its project life cooperated with the Treco group. TRECO (TRansnational ECO Network) was started in 2004 as one of the first private European initiatives to improve energy efficiency and energy effectiveness in housing.

Throughout the SQUARE project, common workshops have been hold with the TRECO network, which has not only resulted in active feedback from TRECO partners on the SQUARE method, but also in the uptake of the essence of SQUARE by TRECO members

A Handouts of presentations Alingsas workshop

Intelligent Energy Europe

SQUARE

A System for Quality Assurance when Retrofitting Existing Buildings to Energy Efficient Buildings

Project duration: Nov 2007 – April 2010

Project co-ordinator: SP Technical Research Institute of Sweden
Contact: Kristina Mjörnell

Project web-site: http://www.iee-square.eu

SQUARE

Project summary

Intelligent Energy Europe

A quality assurance system for energy use and indoor environment will be adopted to suit the process of retrofitting social housing and used in pilot projects in Sweden, Spain, Finland and Austria.

Participating partners:

Sweden Austria Finland Spain

Sweden Spain The Netherlands Bulgaria

SQUARE

Background

Intelligent Energy Europe

- Several million residential buildings in the EU
- Many were built before the oil crises and have high energy use
- Neglected maintenance of building envelope and building services
- Retrofit provides an opportunity for cost-effective energy measures
- By using a quality assurance system, a good indoor environment is ensured when efficient energy saving measures are implemented in the retrofitted buildings

SQUARE

Aim of the project

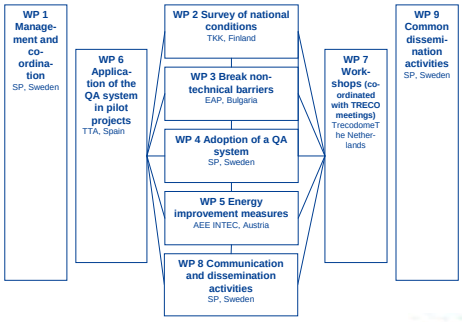
Intelligent Energy Europe

- To promote energy efficient retrofitting with improved indoor environment in social housing by using a flexible QA system
- To disseminate information on the QA system, practical experience and results from using it in at least four pilot projects in the participating countries
- To improve awareness of energy efficient retrofitting and improved indoor environment
- To present solutions for efficient use of energy and integration of renewable energy sources in the social housing sector

SQUARE

Overview of the project

Intelligent Energy Europe



SQUARE

WP 2 – Survey of national conditions

- Survey of the energy savings potential of retrofitting social housing in different countries and climate zones
- Overview of promising existing energy efficient measures
- Survey of existing QA systems for energy efficiency and good indoor environments in Europe.

SQUARE

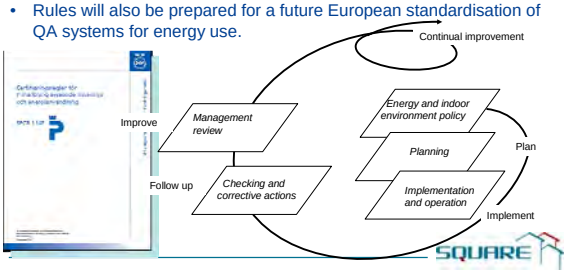
WP 3 – Breaking non technical barriers

- There are many non-technical barriers, such as attitudes, tradition, shortcomings in knowledge and motivation among tenants and stakeholders in the building industry that have to be overcome in order to introduce energy-efficient retrofitting and operation of social housing.
- The aim of this work package is to identify the most significant barriers in the different countries and find common and specific methods of overcoming these barriers.



WP 4 – Adoption of a quality assurances system

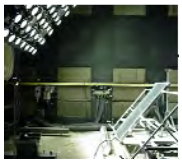
- Based on the Swedish quality assurance (QA) system for energy use and indoor environment, together with input from other existing QA systems, the working groups in the participating countries will adopt and develop QA systems that suit the specific conditions in their countries, such as regulations and climate.
- Rules will also be prepared for a future European standardisation of QA systems for energy use.



WP 5 – Energy improvement measures

- The energy improvement potential in different types of social buildings in different countries will be evaluated.
- An investigation of the influence of energy efficiency measures on indoor air quality in different types of buildings will be made.
- The evaluation will take into account the varying building traditions, climates and local resources and regulations.





WP 6 – Application of the QA system in pilot projects

- The QA system will be applied to real retrofitting projects in at least four countries, Sweden, Spain, Finland and Austria.
- Experience from design, construction and operation will be evaluated, and the results will be used for improvements of the QA system and promising energy efficient measures.


WP 7 - Workshops

- Workshops and site visits will be arranged where the participants will meet and discuss implementation of the QA system and energy improvement measures, to exchange results and experience from the pilot projects and to present outlines of information material.
- Some workshops will be arranged together with TRECO
- TRECO plays an important role for the exchange of experience and following the progress of the complete project.


Workshop and site visit in Alingsås, November 2007

WP 8 Information and communication

- Information on the QA system, as well as the potential of its use and experience from the pilot projects, will be disseminated at conferences, seminars, in papers etc. in the different countries.


Square web site: www.iee-square.eu

WP 9 Common information and communication

- Contribution and participation in common dissemination activities at the request of the European Commission.
- Fact sheet and PP presentation

Partners and Contact

Part	Participant name	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	NL
6	Energy Agency of Plovdiv	EAP	Bulgaria
7	AB Alingsåshem	Alingsåshem	Sweden
8	POMAA S.L.	POMAA	Spain

Contact: Co-ordinator Kristina Mjörnell, SP Technical Research Institute of Sweden, e-mail: kristina.mjornell@sp.se, phone: +46 10 516 57 45, mobile: +46 730 88 57 45
Project web-site: www.iee-square.eu

SQUARE

A QUALITY ASSURANCE SYSTEM FOR INDOOR ENVIRONMENT AND ENERGY USE

Åsa Wahlström

Background:

A certified labelling system

To establish means of control which will assure good indoor environment

What is the objective?

To secure that:

- The building and its services complies with functional requirements.
- The management of the building should keep an good indoor environment.

What is the usefulness?

- Own control of the buildings performance
- Plan for actions of measures or maintenances
- Motivation and target guidance
- Show the public

How is the system incorporated ?

- Responsible persons are selected for all actions
- Competence and education need is defined for all actions and actors
- Communication and information routines
- Documentation of the routines

How is controls and corrective measures performed?

- Inspections and measurements (internal audit)
- Routines for identify deviations and to make corrective actions
- Internal system audit
- Yearly inspection of third party

Who are involved in the management phase?

Operation and maintenances routines/ instruction should be established for:

- Property manger (ventilation and heating)
- Operational staff (daily maintenance)
- Cleaning personall (i.e. type of detergents and methods for cleaning)
- Users (maintenance)

Åsa Wahlström

The performance of the building – a question of system

Effective energy use ⟷ Adequate indoor climate

Åsa Wahlström

BORÅS STAD

BOSTADS AB POSEIDON

BORÅS ENERGI OCH MILJÖ

BIC

Åsa Wahlström

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

Åsa Wahlström

Scope

New construction

Retrofit

Existing buildings

Schools
Kindergartens
Multifamily houses
Offices
Hospitals

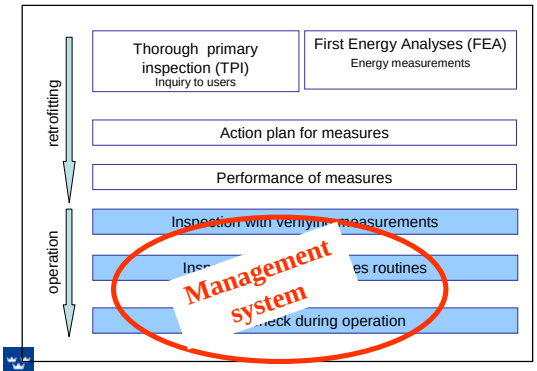
Åsa Wahlström

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

Åsa Wahlström

Quality assurance system

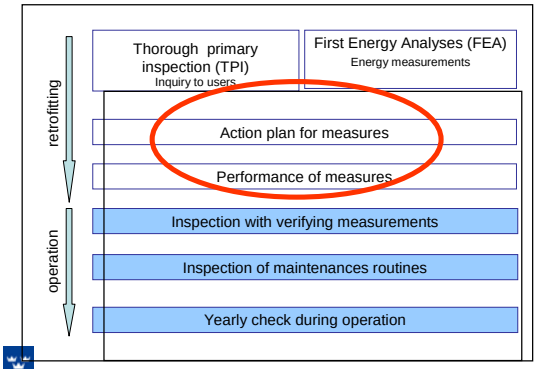


Åsa Wahlström

- building categories and
- property management organisations

Åsa Wahlström

Quality assurance system



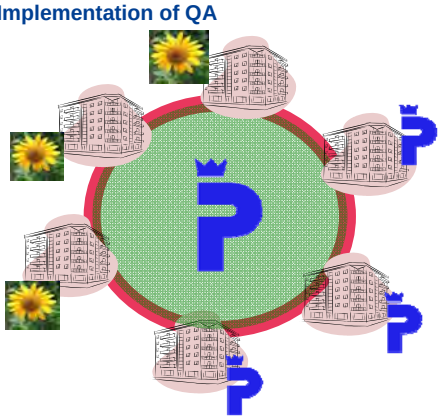
Åsa Wahlström

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

Åsa Wahlström

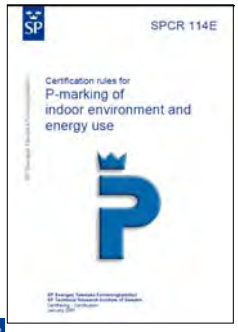
Implementation of QA



Åsa Wahlström

QA-system: SPCR 114E Handbook

www.sp.se



Åsa Wahlström

Experience from adopting QA system

Three Pilot projects:
1) Office building (Borås Energi och Miljö)
2) School (Borås Stad)
3) Multi-dwelling block (Poseidon)

Adequate indoor climate

⇕

Effective use of energy

SP Technical Research Institute of Sweden

Handbook for certification of energy use

- First Energy Analysis (**FEA**)
- Determination of goals for the annual energy usage
- Maintenance and action plan
- Measuring methods and equipment
- Certification system for energy use

SP Technical Research Institute of Sweden

Handbook for certification of energy use

Content of FEA

1) General information of the building/buildings
2) The buildings energy status (technical status)
   - technical installations
   - identification of defects and improvement possibilities
   - performed actions influencing the energy usage
   - adjustment of heat, water and ventilation
3) The buildings energy aspects
   - activity related to internal heat loads and electricity usage
   - outdoor environment and circumstances that influence the energy usage

SP Technical Research Institute of Sweden

Handbook for certification of energy use

Content of FEA (cont.)

4) The buildings energy performance
   - energy supplied to the building
   - statistics of energy usage
   - follow-up on previous energy efficiency actions

SP Technical Research Institute of Sweden

Handbook for certification of energy use

Purpose of FEA

- Documentation of the building/buildings
- Support for determination of energy goals
- Support for action and maintenance plan
- Support for energy declaration
- Support for maintenance and revision plan
- Basis for application of the certification of energy use

SP Technical Research Institute of Sweden

Experience from adopting QA system in office building

Borås Energi och Miljö AB

1894 the building constructed as a power plant

1970 the building was reconstructed to office building, 2100 m^2

1990 the office building was renovated and the building status and performance was improved

SP Technical Research Institute of Sweden

Experience from adopting QA system in office building

Certified SPCR114 indoor environment in 2003
Valuable tool to handle and assure the indoor environment

Project time about 2 months
Borås Energi och Miljö AB made the FEA report
2006 certified according to SPCR 114E including energy use

SP Technical Research Institute of Sweden

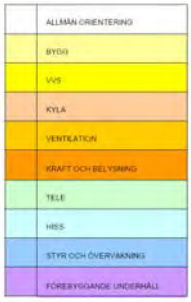
Experience from adopting QA system in school building

- Borås Stad decided in 1997 to apply the SPCR114 to the municipally owned buildings
- Borås Stad was involved when the SPCR114E was designed
- School building (Sjöboskolan)
- Nursery school and comprehensive school grade 1-6
- Total about 520 children
- 6673 m^2 building area

SP Technical Research Institute of Sweden

Experience from adopting QA system in school building

- Project group with the headmaster and the caretaker from the school, Borås Stad management, Energy optimisation consultant and SP
- SP made the FEA report
- Energy optimization work
- Building documentation work
- Intermittent ventilation when and how?
- Interpretation of the general rules in SPCR 114E



SP Technical Research Institute of Sweden

Experience from adopting QA system in school building

Interpretation of the general rules in SPCR 114E
(for premises with low risk for reducing the indoor air quality)

1) Valves in the ventilation system
2) Before the building is used, new buildings < 6 months 2 air changes, for other 1
3) Before the ventilation is shut down 1 air change
4) During long periods without ventilation 1 air change each hour each twenty-four hour
5) When change from continuous to intermittent ventilation inquiry during the first year

SP Technical Research Institute of Sweden

Experience from adopting QA system in social building

Multi-dwelling blocks
Poseidon: 23500 apartments, 363 buildings, 7 districts, almost 1.6 million m^2

Poseidon was involved when the SPCR114E was designed
They have used the SPCR 114 for the indoor environment for several years

SP Technical Research Institute of Sweden

Experience from adopting QA system in social building

- Energy usage follow-up program
- Energy group meetings every month
- House hosts that work on the field
- Energy hunters
- Outsourcing of the monitoring and management

2007 certified according to SPCR 114E including energy use

SP Technical Research Institute of Sweden

Conclusions from the pilot projects

- Straight forward to implement SPCR 114 E when already SPCR 114
- The project plan (time and work effort) varies a lot
- One has to focus on both avoid sub-optimization

Adequate indoor climate

⇕

Effective use of energy

SP Technical Research Institute of Sweden

1

Energy efficient renovation of multi family houses from the Swedish record years

Project leader: Jens-Erik Jörgensen – Skanska
Project group: Ulla Jansson – LTH
Henrik Sundqvist – Skanska
Björn Berggren – Skanska

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Energy efficient renovation of multi family houses from the Swedish record years

- Background
- Purpose of the project
- Method
- Risks/Problems
- Status

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3

Energy efficient renovation of multi family houses from the Swedish record years

- Background
- A project funded by:
  - SBUF
  - Faculty of Engineering, LTH
  - Skanska Sverige AB

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4

Energy efficient renovation of multi family houses from the Swedish record years

Background

- The 40 percent sector
- 35 % of the Swedish multi family houses were produced during the record years
- A great need of renovation
- An overall perspective is missing
- Energy prices are increasing

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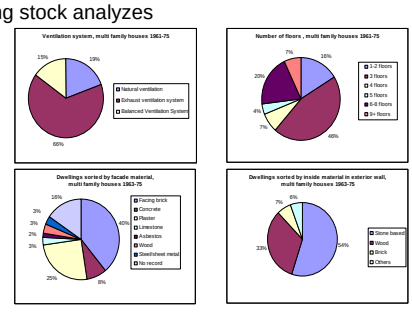
5

Energy efficient renovation of multi family houses from the Swedish record years

Dwelling stock analyzes



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Energy efficient renovation of multi family houses from the Swedish record years

Purpose of the project

- Identify methods to get a significant reduction of the energy consumption
- Identify and analyze technical solutions
- Gather experience – Knowledge base
- Guidance when choosing between different technical solutions
- Study PassiveHouse technology

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Energy efficient renovation of multi family houses from the Swedish record years

Method

- State of the art report
- Evaluation
- Application of the best methods in a reference building

8

Energy efficient renovation of multi family houses from the Swedish record years

Risks - Problems

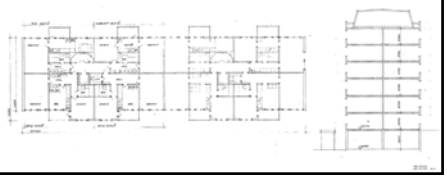
- Swedish building regulations
- Quality assurance regarding moist/damp when applying new methods

9

Energy efficient renovation of multi family houses from the Swedish record years

Status

- Documentation of projects for state of the art report - Done
- Analyze of documented projects – Under progress
- Finding suitable reference project – Done
- Applying methods – The next step



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Energy efficient renovation of multi family houses from the Swedish record years

Reference building

- Multi family house
- 3 floors
- Facing brick wall
- Malmö municipal housing - MKB

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Energy efficient renovation of multi family houses from the Swedish record years

Good examples - Ekoporten, Norrköping

- Multi family house, three floors
- New windows
- New roof design
- Increased thermal insulation exterior walls
- Great focus on healthy materials
- Energy consumption decreased with 30%

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Energy efficient renovation of multi family houses from the Swedish record years

Good examples – Orrholmen Karlstad

Before

After

- Multi family houses
- Increased thermal insulation in roof and exterior walls, new windows
- Exhaust ventilation with heat recovery
- Energy savings 100% larger compared to calculations
- Analyzing under progress

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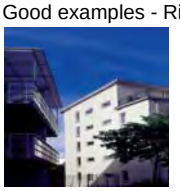
Energy efficient renovation of multi family houses from the Swedish record years

Good examples - Ringdansen, Norrköping



- Multi family house, 3-8 floors
- Extra glass on the inside of the windows
- New roof design
- Increased thermal insulation exterior walls
- Individual billing for water, heat and electricity
- Energy consumption decreased with 62%

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Energy efficient renovation of multi family houses from the Swedish record years

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SKANSKA

Alingsås

36 400 inhabitants and growing fast

Excellent location close to Göteborg, Landvetter airport and good conditions for commuting

1 000 companies

Trade, Service and Manufacturing industry

1 300 employment opportunities

Regional market

Visionary urban planning strategy

Working with lighting design

Lights in Alingsås

Alingsåshem

Municipal housing corporation

Owns and manages approx. 3 400 homes

Builds approx. 50 new homes every year

32 co-workers

Managing Director Ing-Marie Odegren

International coordinator Hanna Blomdahl

Alingsåshem

Offers attractive, secure and pleasant housing

Offers a varied range of homes and other facilities

Contributes to accessibility for everyone and to integration

Contributes to planning and construction in the municipality being appropriate to demand

Municipal companies

Working together towards common goals

Alingsåshem, FABS and Alingsås Energi are municipal companies joined in the group AB Alingsås Rådhus

Policy of Alingsåshem

Holistic approach for sustainable development

”Our tenants and their individual needs of an attractive, secure and comfortable living environment are in focus when we strive to contribute to the development of a sustainable society.”

Brogården before refurbishment

”An attractive, secure and comfortable living”

- Extensive energy use / High costs in the future
- Poor indoor climate due to many thermal bridges and inadequate insulation
- Damp in the foundation slab
- No financial incentive for the tenants to save energy and no feedback about their personal energy use
- Poor building services
- Small bathrooms
- Limited disabled access
- Few meeting places for the tenants

Brogården after refurbishment

”An attractive, secure and comfortable living”

- The tenants can individually control and take responsability for energy use and indoor climate
- Low energy supply
- Easy to operate technique – low costs
- Small maintenance needs – conscious choices of material
- Better disabled access
- Long-term stable rent levels
- Meetingplaces for the tenants

Partnership procurement

Partnership procurement is a structured cooperation agreement in the building process between the proprietor, the consultants and the contractors. The cooperation is built on trust, honesty and shared objectives. The different professions complement eachother through all phases of the building process.

Partnership procurement

Key factors:

- Shared goals
- Shared activities
- Shared finance

Example: Training in passive house technique at Brogården

Energy guidance

The purpose with energy guidance is to inspire the tenants to keep their energy costs to an absolute minimum.

The individual in focus

How can we meet the different needs of our tenants?

How do we communicate in a way that suits all personalities?

Typologi

5 categories

Based on a survay of 3 000 people

A continuing process – interviewing tenants at Brogården

Petra

Action plan for diminishing energy use:
The professional attitude and curiosity of Petra implies that she would show interest in the plan, but she wouldn't put much effort in investigating different options. She doesn't have the time.

A package deal will make it easier for her to reach a decision.

Fredrik

Action plan for diminishing energy use:
Fredrik doesn't need as well-laid proposals as Petra does. If it attracts his attention, he would want to do it his own way. This can become another "personal project" of his.

He sees the suggested action plan as an example of how it can be done.

Tina

Action plan for diminishing energy use:
It is difficult to forsee the reaction of Tina. She identifies with her residential area and it is possible that she chooses to do the same as the neighbours do.

She will not choose an "ugly" heat exchanger.

Passive House Centre

Regional Center for passive house technique and knowledge

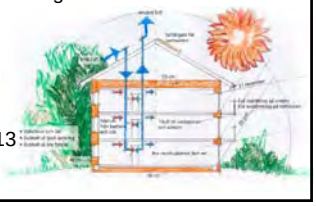
Cooperation between public and private organisations

Stimulate market, increase demand, exhibitions, education, research and knowledge

Location Alingsås

Supported by VGR

Grand opening December 13



REBECEE

- Renewable Energy and Building Exhibitions in Cities of the Enlarged Europe
- Project financed by Intelligent Energy Europe
- Germany, Estonia, Slovenia and Bulgaria, Latvia, Lithuania
- Knowledge transfer and exhibitions
- Including Brogården and Stadsskogen
- www.rebecee.eu

Activities

B Handouts of presentations at Amsterdam workshop

Introducing Delta Forte

TRECO meeting, March 17th 2008

Introducing Delta Forte

Agenda:

1. Mission
2. Company profile
3. Main activities
4. Organization
5. Area development
6. Some projects
7. Sustainable solutions
8. Focus Delta Forte 2008

Mission

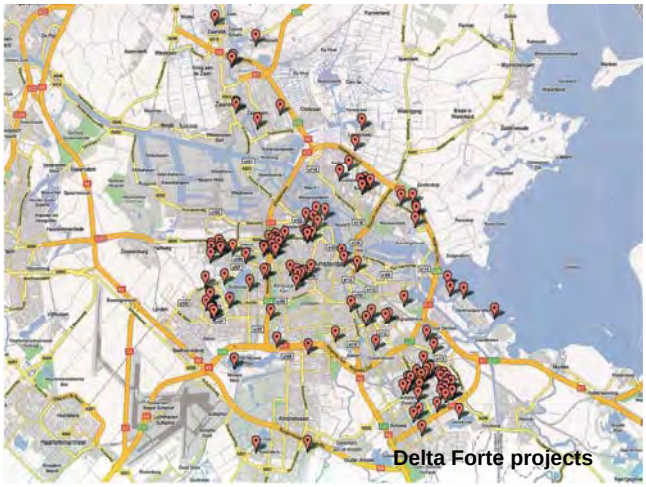
Delta Forte is a socially driven developer of housing projects, creating a surplus value for their clients

Profile

Delta Forte is a delegated project developer for social and commercial housing projects in Amsterdam and the northern Randstad including Almere and Lelystad.

A service provider in the field of project development to which a constituent can put out to contract the whole project from a to z.

By its origin in social housing Delta Forte distinguishes itself of its competitors by its social focus. For this reason not only technical project management and coordination of sales, but also participation of tenants and project administration.



Delta Forte projects

Main activities

1. Area development;
2. Project acquisition for its clients;
3. Development and management of projects (demolition, new build and refurbishments);
4. Sales coordination for new houses in projects;
5. Organising and executing participation with (future) tenants;
6. Filling in financial administration for these projects.

Organization

Since July 2004: as independent subsidiary company of housing association Rochdale and AWV

Stock holders: Rochdale and AWV

Further clients: Far West, DUWO, Pré Wonen, Woon op Maat, Wooncompagnie, Goede Stede

Several collaborations with commercial real estate developers

Development on financial and risk account of clients (delegated)

100 employees

Organization

Fee developer

Stocks exclusively for housing associations

Intermediating hub due to extensive network

Organization

Order portfolio:

- worth € 1.600.000.000;
- 104 projects;
- 14.000 houses (5.300 private and 8.700 affordable).

In 2007 construction of approximately 1000 houses has started. In 2006 construction started for 3.435 houses (new build and refurbishment)

Area Development

Bijlmermeer (Amsterdam)

Westelijke Tuinsteden (Amsterdam)

Amsterdam Noord (Amsterdam)

Poelenburg (Zaandam)

Projects

Evergreen (Amsterdam Zuidoost)
Saendelft (Zaandam)
La Foresta (Amstelveen)
Mi akoma di color (Amsterdam Zuidoost)
Leeuw van Vlaanderen (Amsterdam)
De Kandelaar (Amsterdam Zuidoost)
Weidevenne Woonzorgcomplex (Purmerend)

Saendelft

Realisatie van 33 eengezinswoningen in de sociale huur

La Foresta

Nieuwbouw van 26 koopwoningen en 43 parkeerplaatsen in Amstelveen.

Mi akoma di color

Onderdeel van project Nieuw Grunder. Ongeveer 35 toekomstige bewoners van Mi Akoma di Color ontwierpen in `particulier opdrachtgeverschap` mee aan hun woning en woonomgeving. Het resultaat: een mooi, afwisselend geheel met 17 appartementen (9 koop en 8 huur) en 35 eengezinswoningen (10 koop en 25 huur).

Leeuw van Vlaanderen (Winnaar Renovatieprijs)

Vanwege ligging tegen A10 moest in hoge mate geïsoleerd worden tegen geluid. Dit is gerealiseerd met een geluidsscherm dat tevens het aangezicht van de flat moet verbeteren. Door samenvoegingen van bestaande woningen en het optoppen van de flat met twee lagen nieuwbouw is een veel gevarieerder aanbod van woningen ontstaan.

De Kandelaar

Multicultureel en multifunctioneel. In het nieuwe gebouw tegenover metrostation Ganzenhoef komen 27 koopappartementen, een kinderdagverblijf, horeca, vergaderzalen en vijf kerkzalen.

Woonzorgcomplex Weidevenne is een complex dat volgens de nieuwste inzichten over zorg en huisvesting van senioren is ontwikkeld en bevat zowel intramurale zorg als zelfstandige sociale en middeldure huurwoningen met een breed scala aan service- en zorgmogelijkheden.

Project ‘Brandaris’

Refurbishment during the end of the ‘90’s

New installation for space heating and water heating

Water is heated centrally by arrays of solar thermal collectors on the roof covering an area 760 m2

Expected yearly performance: 475 kWh/m2.

Yearly performance: 346 kWh/m2

Project ‘De hallen’

Combination of refurbishment and new build

Geothermal exchange heat pump

Aiming 25 % to 40 % reduction of energy use.

Houses will mainly be heated through underfloor heating.

Project ‘Kruitberg’

Refurbishment of the Kruitberg complex

Aim: self suffiency

3 types of improvement regarding energy:

- Solar thermal system
- Heat pump
- District heating

Delta Forte 2008

Focus:

Finding new stock holders

Housing and health care

Sustainability

Implementing quality management system / IT

Thank you for your attention

C Handouts of presentations at Oulu workshop

SQUARE

A System for Quality Assurance when Retrofitting Existing Buildings to Energy Efficient Buildings

Project duration: Nov 2007 – April 2010

Project co-ordinator: SP Technical Research Institute of Sweden
Contact: Kristina Mjörnell

Project web-site: http://www.iee-square.eu

Project summary

A quality assurance system for energy use and indoor environment will be adopted to suit the process of retrofitting social housing and used in pilot projects in Sweden, Spain, Finland and Austria.



Participants

Logo	Participant name	Short name	Country	Main role in project
SP	SP Technical Research Institute of Sweden	SP	Sweden	CO Coordinator Leader of WP 1, WP 4, WP 8 and WP 9
tta	Trama Tecno Ambiental S.L.	TTA	Spain	CB Leader of WP 6
	Helsinki University of Technology	TKK	Finland	CB Leader of WP 2
	AEE - Institute for Sustainable Technologies	AEE INTEC	Austria	CB Leader of WP 5
TRECODOME	Trecodome	Trecodome	The Netherlands	CB Leader of WP 7
	Energy Agency of Plovdiv	EAP	Bulgaria	CB Leader of WP 3
	AB Alingsåshem	Alingsåshem	Sweden	CB Participant with pilot project
POMA	POMAA S.L.	POMAA	Spain	CB Participant with pilot project

* CO = Co-ordinator
CB = Co-beneficiary

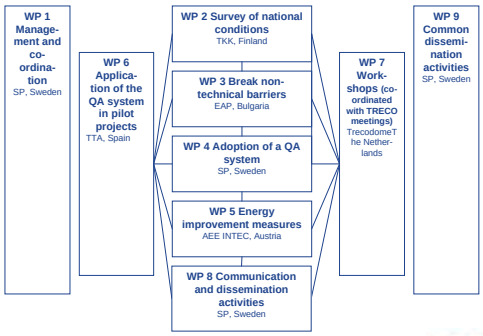
Background

- Several million residential buildings in the EU
- Many were built before the oil crises and have high energy use
- Neglected maintenance of building envelope and building services
- Retrofit provides an opportunity for cost-effective energy measures
- By using a quality assurance system, a good indoor environment is ensured when efficient energy saving measures are implemented in the retrofitted buildings


Objectives and main steps

1. To contribute to improved energy performance and indoor environment of social housing
2. To adopt an existing quality assurance system for indoor environment and energy use to suit the process of retrofitting and operation of social housing in different European conditions
3. To apply the quality assurance system in retrofitting projects in different European countries
4. To provide up to date knowledge and good examples of successful energy-intelligent solutions tailored to the social housing sector
5. To prepare rules for a future European standard on quality assurance system for energy use and indoor environment

Overview of the project



WP 2 – Survey of national conditions

- Survey of the energy savings potential of retrofitting social housing in different countries and climate zones
- Overview of promising existing energy efficient measures
- Survey of existing QA systems for energy efficiency and good indoor environments in Europe.

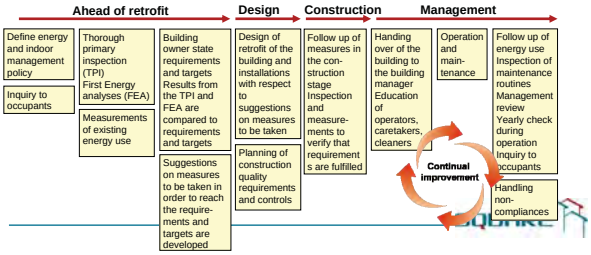

WP 3 – Breaking non technical barriers

- There are many non-technical barriers, such as attitudes, tradition, shortcomings in knowledge and motivation among tenants and stakeholders in the building industry that have to be overcome in order to introduce energy-efficient retrofitting and operation of social housing.
- The aim of this work package is to identify the most significant barriers in the different countries and find common and specific methods of overcoming these barriers.



WP 4 – Adoption of a quality assurances system

- Based on the Swedish quality assurance (QA) system for energy use and indoor environment, together with input from other existing QA systems, the working groups in the participating countries will adopt and develop QA systems that suit the specific conditions in their countries, such as regulations and climate.
- Rules will also be prepared for a future European standardisation of QA systems for energy use.



WP 5 – Energy improvement measures

- The energy improvement potential in different types of social buildings in different countries will be evaluated.
- An investigation of the influence of energy efficiency measures on indoor air quality in different types of buildings will be made.
- The evaluation will take into account the varying building traditions, climates and local resources and regulations.



WP 6 – Application of the QA system in pilot projects

- The QA system will be applied to real retrofitting projects in at least four countries, Sweden, Spain, Finland and Austria.
- Experience from design, construction and operation will be evaluated, and the results will be used for improvements of the QA system and promising energy efficient measures.


WP 7 - Workshops

- Workshops and site visits will be arranged where the participants will meet and discuss implementation of the QA system and energy improvement measures, to exchange results and experience from the pilot projects and to present outlines of information material.
- Some workshops will be arranged together with TRECO
- TRECO plays an important role for the exchange of experience and following the progress of the complete project.


Workshop and site visit in Alingsås, November 2007

WP 8 Information and communication

- Information on the QA system, as well as the potential of its use and experience from the pilot projects, will be disseminated at conferences, seminars, in papers etc. in the different countries.

Square web site: www.iee-square.eu

WP 9 Common information and communication

- Contribution and participation in common dissemination activities at the request of the European Commission.
- Fact sheet and PP presentation

Partners and Contact

Part	Participant name	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	NL
6	Energy Agency of Plovdiv	EAP	Bulgaria
7	AB Alingsåshem	Alingsåshem	Sweden
8	POMAA S.L.	POMAA	Spain

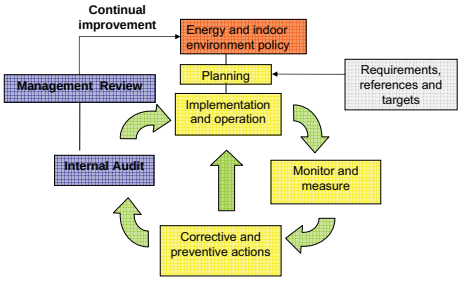
Contact: Co-ordinator Kristina Mjörnell, SP Technical Research Institute of Sweden, e-mail: kristina.mjornell@sp.se, phone: +46 10 516 57 45, mobile: +46 730 88 57 45

Project web-site: www.iee-square.eu

A Quality Assurance System for Improvement of Indoor Environment and Energy Use when Retrofitting Social Housing

Peter Kovacs
SP Technical Research Institute of Sweden

Outline of the Energy and Indoor environment QA system model

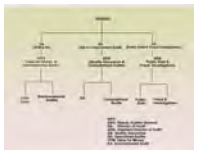


Procedures, Records & Templates

Basic features of the QA system

- Document control
  - "How to identify, store, keep up to date and distribute documents in the QA system" (Everything from building plans and maintenance plans, to adjustment records and questionnaires)

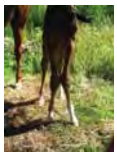
- Definition of responsibilities and authorities
  - Regarding retrofit actions, energy use and indoor environment within the organization



Basic features of the QA system

- Preventive action
  - Maintenance, checks, follow up, inquiries….

- Handling of non-compliances
  - The organisation shall document how faults, shortcomings and non-compliances identified during operation, maintenance or audits shall be rectified
  - Resources shall be available for quick handling of large non-compliances and for preventive measures



  - Deviations in energy use shall be analyzed and any actions taken or plans made for dealing with it should be documented

Basic features of the QA system

- Internal audits according to documented procedure (Annual)
  - Inspection of maintenance routines and results from maintenance and adjustments
  - Verifying that energy targets and requirements are being met
  - Reviewing check measurements and questionnaire results to assure that requirements on indoor environment are being met for the whole building population

Basic features of the QA system

- Management reviews (Annually);
  - Assuring the efficiency and suitability of the QA system
  - Reviewing policy, target values and resource allocation

Basic features of the QA system

• Continal improvement of Energy performance and maintained indoor environment will be the outcome - IF

- The QA system is developed to an appropriate level

- It is kept up to date

- It is acknowledged and found meaningful and helpful in the concerned parts of the organization

Basic features of the QA system

• Document control

• Definition of responsibilities and authorities

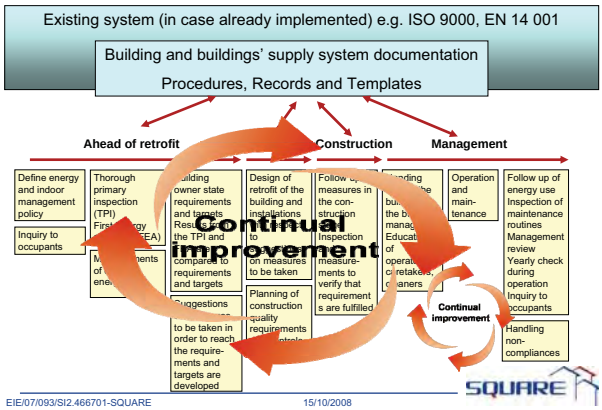
• Handling of non-compliances

•Internal audits

• Management reviews

• Continuous improvement

Overview of the QA system



Planning stage- Ahead of the retrofit

• Define energy and indoor management policy

- Providing a framework for setting and reviewing targets

- Ensuring availability of information and resources needed to reach targets

- Committing to comply with applicable requirements

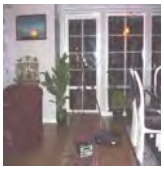
- Documented, implemented, maintained and communicated to "all"

- Regularly reviewed and updated

Planning stage- Ahead of the retrofit

• Thorough primary inspection (TPI)

- Inspection and measurements, checking fulfilment of requirements



- Inquiry to occupants identifying existing or potential problems

- Inventory of construction status and damages, design concepts, materials

Planning stage- Ahead of the retrofit

•First Energy analysis (FEA)

- Analysis of data of current (and past) energy use

- Inventory of design and standard of HVAC systems, lighting, monitoring system etc.

- Inventory of insulation standard, previous energy efficiency measures, adjustment records etc.

Planning stage- Ahead of the retrofit

• Definition of requirements and targets

- Based on legal requirements (binding), guidelines and recommendations (voluntary)

- Energy requirements and targets for the buildings under consideration of the indoor environment

- Requirements on the indoor environment

- Quality requirements and targets for the construction process, including components

- (Performance requirements on critical components)

Planning stage- Ahead of the retrofit

• Results from the TPI and FEA are compared to requirements and targets

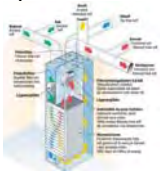
• Σ(Requirements - Actual status) = Major retrofit or Limited action?

• Conditions encouraging choice of major retrofit

- Adequate knowledge and active policies in the organization
- Calculation models using LCC
- Financing options
- Access to experienced and dedicated contractors

Planning stage- Ahead of the retrofit

• Measures needed to reach the requirements and targets are developed



- Examples of desirable achievements:

• Minimized ventilation heat losses (by closing air leakages, efficient heat recovery)

• Improved indoor environment (through increase or decrease of temperatures of inner surfaces, guarantee of adequate supply air volume,…)

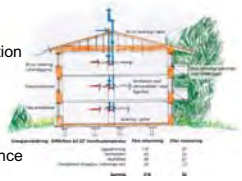
• Removal of construction damages (moisture, degradation)

• Minimized thermal bridges (to avoid moisture damages and mould growth)

Planning stage- Ahead of the retrofit

• Measures needed to reach the requirements and targets are developed

- Examples of desirable achievements:



• Minimized transmission heat losses (through insulation of exterior walls, high-performance windows, etc.)

• Increased share of renewable energy input

• Enabling continuous monitoring of energy performance parameters through proper instrumentation

• Encouraging “energy wise” behaviour of the occupants e.g. by means of separate temperature control and metering of hot water and electricity per apartment

Design stage

• Design of retrofit of the building and installations according to chosen measures

- Active participation by the org’s representative(s) in construction meetings required!

- Communicate the importance of high quality in the construction work to reach targets for Indoor environment and Energy use

- Present and discuss new energy efficient concepts and products

- Highlight “extraordinary” requirements

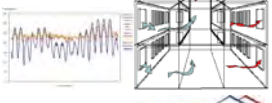
Design stage

• Planning of construction quality requirements and controls

- Discuss methods for quality checks; e.g. Sound or Illuminance levels, air tightness, moisture content

- Agree on “who checks what ?” and how to report results

- Request calculation or simulation showing that requirements on indoor environment and energy use are fulfilled



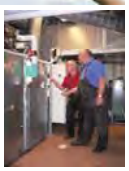
- Third party testing/ control on new/ advanced components required?

Construction stage

- Follow up on measures
- Inspection and measurements to verify that requirements are fulfilled
- Supervise, collect verification reports and system documentation
- Continue the dialogue, visualize the property management phase, encourage knowledge sharing and feedback on upcoming challenges

Property Management Stage

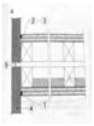
- Handing over of the building to the organisation
- Consider outsourcing of e.g.;
  - Operation and maintenance
  - Energy delivery
  - Measurements and analysis of energy use
- Education of operators, caretakers, cleaners
- Documented plans for operation and maintenance, including e.g.
  - Cleaning
  - Inspection/ calibration of meters and sensors
  - Inspection/ adjustment of buildings and technical systems
  - Purchase of energy demanding equipment



Property Management Stage

- Follow up of energy use
  - Monthly monitoring/ compilation
  - Electricity, heating and cooling separated and further broken down if possible (tap water, heating…)
  - Comparison to target values (all targets must be possible to verify through measurements+calculations)
- Regular (e.g. monthly) checks during operation;
  - Indoor air temperature
  - Moisture problems/ leakages
  - Hot water temperature
  - Cleaning
  - Function of central heat and electricity meters
- Inquiry to occupants and continuous feedback

A guideline to the Quality Assurance System



- A general guide to the QA system
- Checklists to be used in different parts of the process e.g. at TPI, at moisture and design audits
- Guidance on cooperation modes, formulation of requirements, measurements etc.
- Fact sheets on e.g. moisture proof renovation and ventilation

Thank you for your kind attention

WoodWisdom-Net

TES EnergyFacade

Timberbased element systems for improving the energy efficiency of the building envelope

Dipl. Ing. Architect Frank Lattke
Chair for Timber Architecture, Prof. Hermann Kaufmann
Technische Universität München

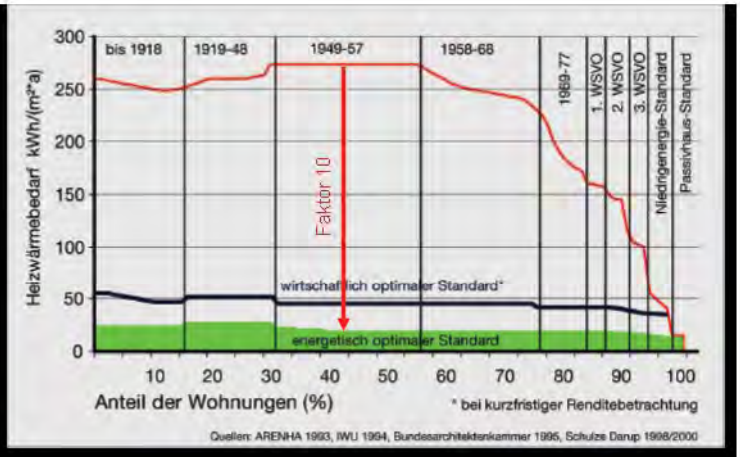
Project Objectives and Main Tasks

- prototype design of large-scale prefabricated elements based on timber and other biogenic construction materials to improve the energy efficiency of the building envelope
- implementation of prefabrication methods in the renovation process
- optimization of a frictionless 'digital chain' of the whole process (i.e. on site measurement-planning -production-mounting)



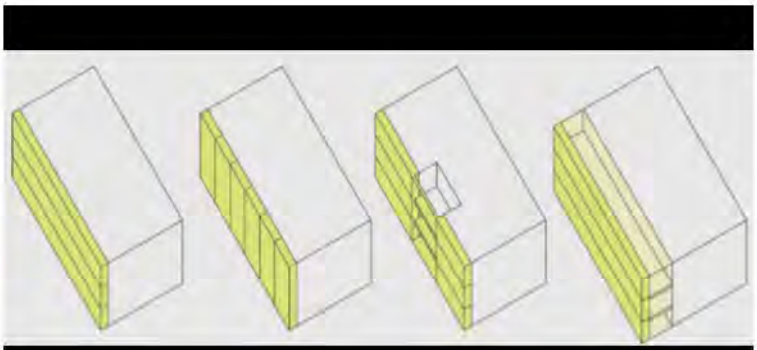
Haus Ambros, Hopferau (D), 2007
Architekt: Michael Felkner

Quelle: Josef Ambros



Reduction potential of heating energy demand

learning from case studies



Interventions

Sanierung Realschule Kamperweg, Düsseldorf (D), 2004
Wollenweber Architektur

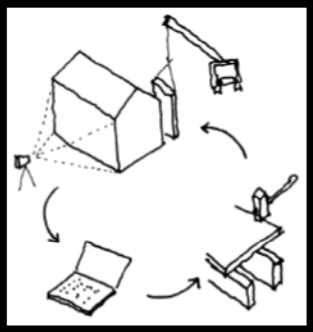
Quelle: Wollenweber Architektur

presumption of a pure concrete skeleton was proved wrong!

→ a thorough investigation is a must

Investigation & Measurement

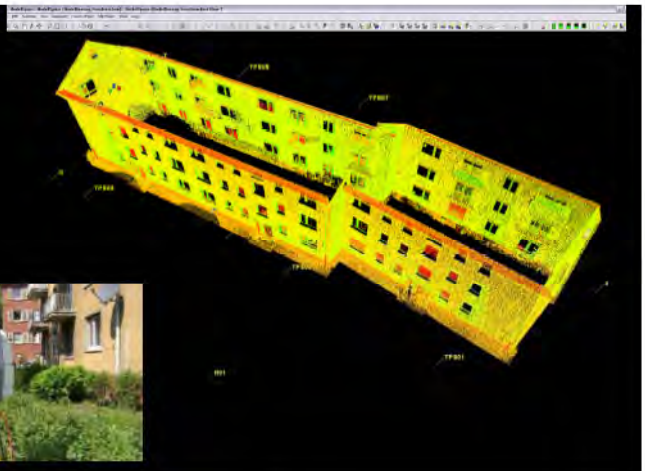
Quelle: Wollenweber Architektur



‚digital workflow'

Optimierung des Arbeitsablaufes:
Gebäudeaufmass – Planung – Produktion – Montage

Arbeitsschritte



BIM & 3D-Laserscaning of Frankfurt, Rotlintstraße

Gallions Housing Association

Gallions Housing Association

Environmental Management System (BS 8555) & QA Project

TRECO - SQUARE 2008-09

What is BS8555?

- British Standard –published in 2003

  –“Guide to the phased implementation of anenvironmental management system including the use of environmental performance evaluation”

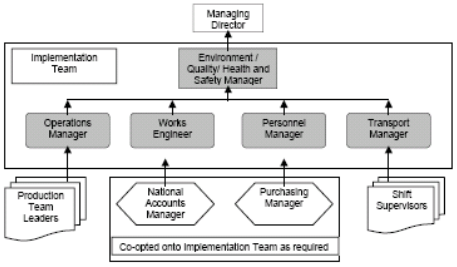
BS 8555 – Project Acorn

In short it provides a route to ISO 14001 and EMAS, with stopping off places on the way

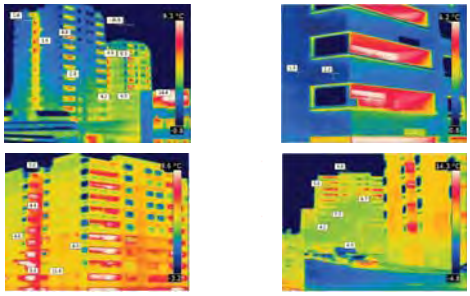
- Breaks ISO 14001 and EMAS implementation into six levels
- Links Environmental Management Systems (ISO 14001) and Environmental Performance Evaluation (ISO 14031)
- Provides for focused training, auditing & implementation at each level
- Supports relationships between suppliers and customers

EMS – BS8555 stages

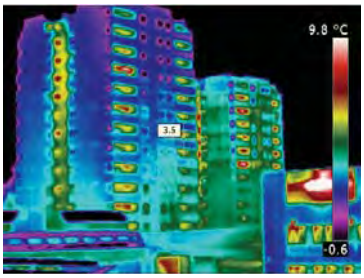
Implementation team – EMS recommended structure



Tavy - Thermal Imaging



Post completion



- **Camera Model** FLIR ThermaCAM T-360
- **Image Date** 2008:01:30 20:46:13
- **Image Name** IR_1139.jpg
- **Emissivity** 0.95
- **Reflected Temperature** 20.0 °C
- **Object Distance** 1.0 m

The way forward…

- Air Pressure testing
- Thermal imagining
- Humidity Testing
- Report and Analysis of the testing carried out for the properties
- QA audit???

Gallions Housing Association

Gallions Housing Association

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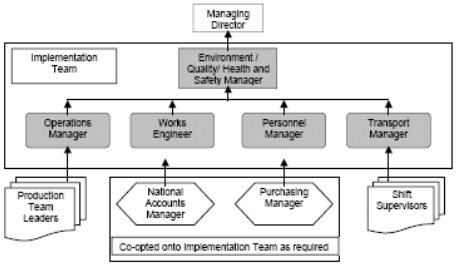

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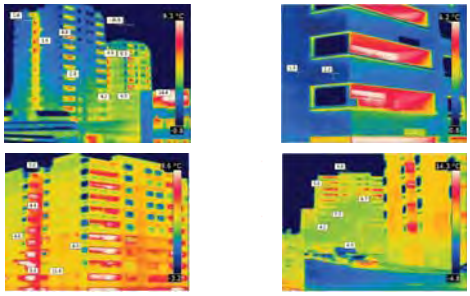
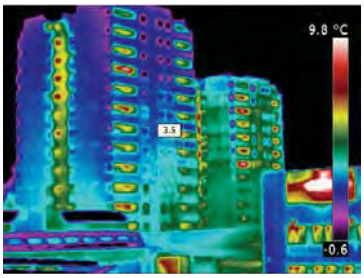


Post completion



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Gallions Housing Association

HOUSING HEALTH and SAFETY RATING SYSTEM

(HHSRS)

John Barnham, Head of Asset Management
Orbit Heart of England Housing Association

Building Brighter Futures...
for people and communities

CONTENTS:

Introduction

The Housing Health and Safety Rating System (HHSRS):

- Is a risk assessment procedure which aims to tackle poor housing conditions within England and Wales.
- It also replaces the *Fitness Standard* as an element of the *Decent Homes Standard*.
- It provides Local Authorities (Government) with new duties and powers in legally dealing with the greatest risks to health and safety in dwellings.

Decent Homes Standard:

- In order to be decent a home should be warm, weatherproof and have reasonably modern facilities.
- In short decent homes are a key element of any thriving, sustainable community.
- Social landlords must aim to provide *Decent Homes* by 2010
- To be Decent a landlord must ensure:
  - a) It meets the current statutory minimum standard for housing
  - b) It is in a reasonable state of repair
  - c) It has reasonably modern facilities and services
  - d) it provides a reasonable degree of thermal comfort

Why is the HHSRS needed?

- It focuses on the hazards that are most likely to be present in housing.
- Tackling these hazards will make more homes healthier and safer to live in.
- The *Fitness Standard* did not deal with, or dealt adequately with, cold and falls for example.

Who is affected by HHSRS?

- Private landlords and Managing Agents will be most affected by HHSRS assessments. Greater emphasis on proving minimum housing conditions.
- Public Sector landlords (Example: RSLs and LAs) also need to incorporate HHSRS into stock condition surveys. To be *Decent* all homes in social housing should be free of Category 1 hazards.
- Occupiers should benefit from having accommodation which is both healthy and safe in terms of livings standards and usage of the property.

What is the HHSRS?

- It is a system which is used to comprehensively assess a range of health and safety risks (hazards) to occupiers of domestic dwellings
- In undertaking an assessment the aim is to identify:
  - The risk of *harm* to an actual or potential occupier
  - Which results from any *deficiency* that is considered a hazard
  - The *severity* and *likelihood* of the risk is assessed in being in existence over a 12 month period
  - The risk is assessed as impacting upon the most vulnerable
  - It can be used to assess both occupied and unoccupied properties.

What is the HHSRS?

- The assessment uses numbers to represent the *likelihood* of an occurrence (incident) as a result of a hazard and to represent the possible spread of harm
- In this way a score is produced as to the *severity* of a hazard
- Scoring bands are used to compare the severity of differing hazards, for example damp and mould with carbon monoxide
- The bands range from A to J
- A – C bands are the most dangerous and life threatening
- D – J bands are less dangerous but may require action

How does it work?

- A risk assessment looks at the likelihood (within 12 months from assessment) of an incident arising from the condition of the property and likely harmful outcome.
- For example: How likely is a fire to break out and what will happen if one does.
- In assessing the *Risk* of the hazard it is considered against affecting the most vulnerable

Profiles of potential hazards?

- Potential hazards are defined within 4 groups:
  - Physiological requirements
  - Psychological requirements
  - Protection against infection
  - Protection against accidents

Resulting in 29 categories of hazard

Physiological requirements includes:

- Hygrothermal conditions
  - Damp and Mould growth
  - Excess Cold
  - Excess Hot
- Pollutants (Non-microbial)
  - Asbestos and MMF
  - Biocides
  - Carbon monoxide and fuel combustion products
  - Lead
  - Radiation
  - Uncombusted fuel gas
  - Volatile Organic Compounds (VOCS)

Psychological requirements includes:

- Space, Security, Light and Noise
  - Crowding and space
  - Entry by intruders
  - Lighting
  - Noise

Protection against infection includes:

- Hygiene, sanitation and water supply
  - Domestic Hygiene, Pests and Refuse
  - Food safety
  - Personal Hygiene, sanitation and Drainage
  - Water supply

Protection against accidents includes:

- Falls
  - Falls associated with baths etc
  - Falling on level surfaces etc
  - Falling on stairs etc
  - Falling between levels
- Electric shocks, Fires, Burns and Scalds
  - Electrical hazards
  - Fire
  - Flames, Hot surfaces etc

Protection against accidents includes:

- Collisions, Cuts and Strains
  - Collision and entrapment
  - Explosions
  - Position and operability of amenities etc
  - Structural collapse and falling elements

Enforcement Action:

The Local Authority will be guided by three main points when making an enforcement decision:

a) The HHSRS hazard rating

b) Whether the Authority has a legal duty or power to take action

c) The best way of dealing with the hazard having regard to the enforcement guidance

Enforcement Action

- Serve an Improvement Notice
- Make a Prohibition Order
- Take Emergency Action
- Serve a Hazard Awareness Notice
- Issue a Demolition order
- Consider Clearance

Useful References

Websites:

- www.communities.gov.uk/housing/decenthomes/housingstandards/housinghealth
- www.communities.gov.uk/publications/housing/reducingtherisks
- www.communities.gov.uk/housing/decenthomes/housingstandards/housinghealth/publicationsabout

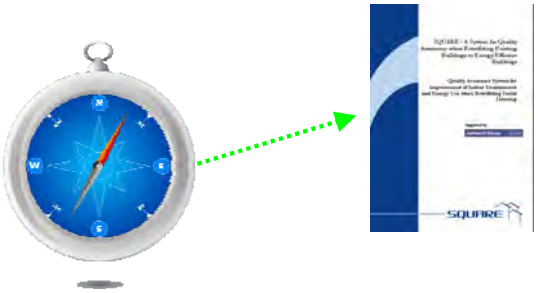
Publications:

- Housing Health and Safety Rating System – Guidance for Landlords and Property Related Professionals
- Housing Health and Safety Rating System – Enforcement Guidance
- Reducing the risks - The Housing Health and Safety Rating System


Thank you

D Handouts of presentations at Gleisdorf workshop

A guide to the SQUARE Quality Assurance system

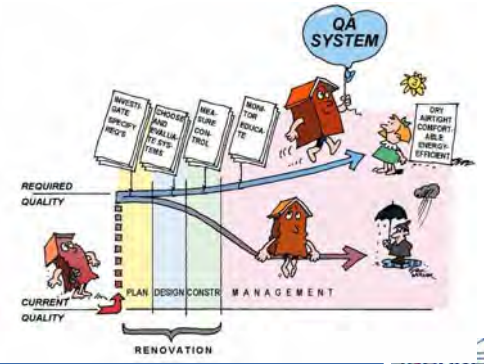


Peter Kovacs- SP Technical Research Institute of Sweden

Presentation contents

- Introduction and objectives of the presentation
- Why is QA important?
- What are the main challenges of QA implementation?
- Main features of QA system and guide
- How can the guide help? Some details…..
- Discussion

Why is QA important?



Why is QA important?

- Delivering Quality is about meeting expectations
- Expectations on achievements in energy efficiency and indoor environment are HIGH in modern renovation
- High quality in the end product requires high quality:
  - In components and systems
  - In works from initial planning to long term management

- QA at its best brings the organisation forward in a rapidly changing environment

What are the main challenges of QA implementation?

- Assuring applicability and effectiveness
- Anchoring the system in the organisation (Top management commitment, time and money)
- Balance between administrative effort and "practical use"
- Every organisation will need its own unique system customized to their particular needs

Customization and Balance

✓ As far as possible, coordinate the system with any existing quality systems

✓ Agree on a suitable ambition level before setting up the system (Small is beautiful- to start with!)

✓ Possibly employ an external consultant to set up the system and start it up, but take steps to ensure that it remains the organisation's own product

Customisation and Balance…

✓ **As far as possible, use computerised aids for operational monitoring and documentation, as well as for administration of the system as such**

✓ **Don't re-invent the wheel: Use templates and existing procedures as far as possible!**

Main features of QA system and guide

QA System:

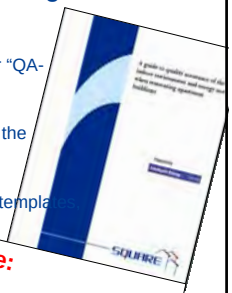
- General description of the system structure, its procedures, templates etc.
- Formal system requirements
- Description of third party certification
- … indoor env. and
- … main differ… appendix 1

Main objective:
To provide a logical framework for Quality Assurance in building renovation and operation

Main features of QA system and guide…

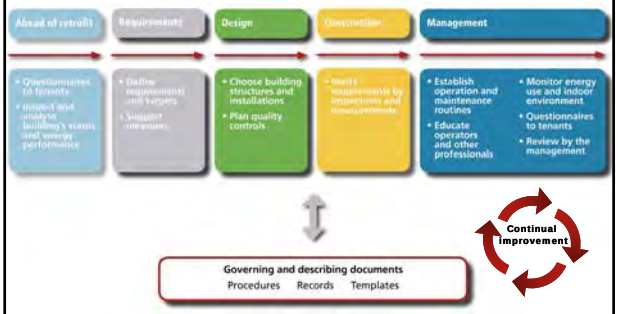
Guide to QA system:

- Description of stakeholder groups and their "QA-uses"
- Arguments for applying the QA system and the different routines
- M… …ion such as example templates, cl…
- Descrip…
- Practically useful links, references
- EN and SE version planned and available in April 2009



Main objective:
To encourage use and facilitate the implementation of the QA system

Implementation of a QA System…



Topics for discussion

- **Are the main objectives of the guide essentially fulfilled?**
- **Anything essential missing?**
- **National versions? There will be a Swedish one….**
- **Inputs to the guide: Swedish references are there for inspiration! Should they be kept?**

  Complemented by similar Austrian, Spanish etc. references? (Free downloads can be translated and customised to national conditions)

Square

A System for Quality Assurance when Retrofitting Existing Buildings to Energy Efficient Buildings

WP 6 - Progress of works:

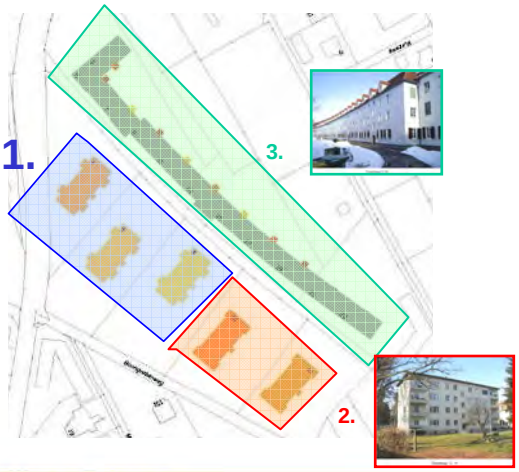
Pilot project Dieselweg, Graz, Styria

AEE INTEC - Institute for Sustainable Technologies
A-8200 Gleisdorf, Feldgasse 19
AUSTRIA

Residential building in Styria, Graz, Dieselweg

map of location

3 retrofit phases



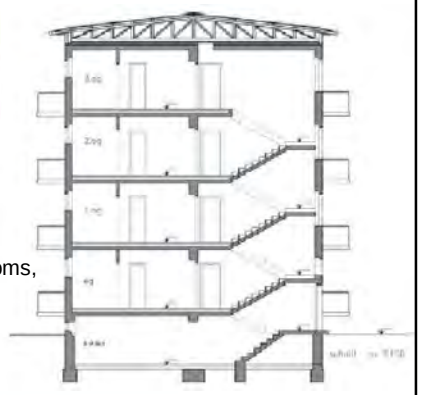
Building construction before retrofit

Year of construction	Net floor area:	Number of apartments	Walls	Floors	Roof	Heat demand (PHPP):
1970 	1.240 m²	3 x 16	concrete	concrete	gabled roof	184 kWh/m²a
1959 	1.298 m²	2 x 19				225 kWh/m²a
1952 	858 m²	9 x 14				142 kWh/m²a

Building services before retrofit

Year of construction	Heating system	DHW conditioning	Ventilation
1970  1959  1952 	Non-central single heating systems: 13% single solid fuel boilers 33% single oil boilers 54% single electric boilers	Non-central boilers	Natural

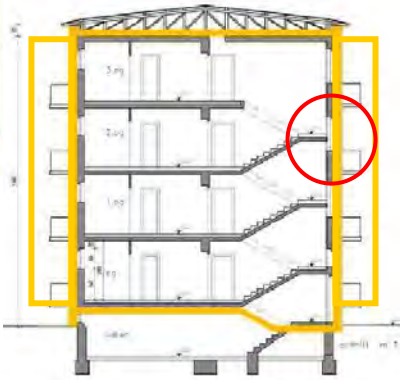
Dieselweg 4,6,8 – thermal building envelope before retrofit



Number of apartments: 16
Number of floors: 4 + basement
Access: 1 internal staircase, 4 apartments /floor, non-central bath rooms, kitchen

Facade: concrete (U ~1,28 W/m²K)
Top floor: concrete (U ~1,50 W/m²K)
Roof: gabled roof

Dieselweg 4,6,8 – thermal building envelope after retrofit



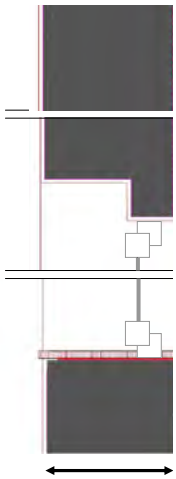
Facade →	U < 0,2 W/m²K
Top floor →	U < 0,2 W/m²K
Ground floor →	U < 0,2 W/m²K
Windows exchange →	Uw < 0,85 W/m²K

Balcony enlargement and housing
→ living room extension
→ removement of thermal bridges

Outer wall detail before retrofit

Existing exterior walls:
U-value: 1,28 W/m²K

Existing windows:
Uw-value:
>2,0 W/m²K

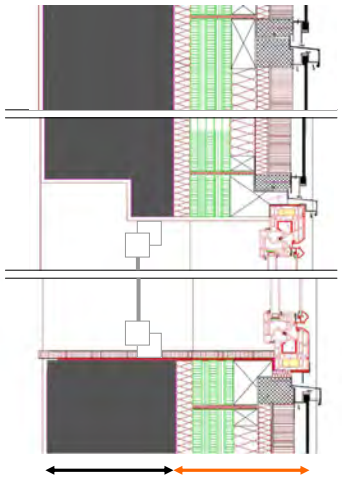


Building stock

Outer wall detail – insulation

Existing exterior walls:
U-value: 1,28 W/m²K

Existing windows:
Uw-value:
>2,0 W/m²K



Exterior walls after insulation:
U-value: < 0,2 W/m²K

Windows exchange:
Uw-value:
< 0,85 W/m²K

Building stock

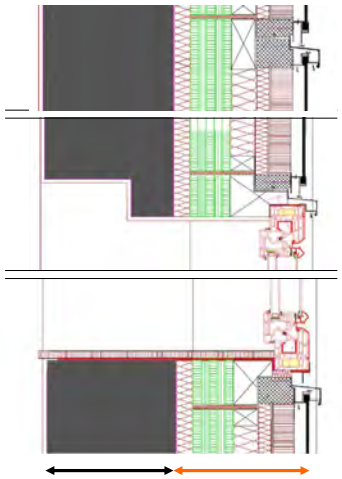
Pre-fabricated facade/window element (GAP SOLAR)

3rd SQUARE Meeting – WP 6 Pilot project Dieselweg, Austria

Outer wall detail after retrofit

Existing exterior walls:
U-value: 1,28 W/m²K

Existing windows:
Uw-value:
>2,0 W/m²K



Exterior walls after insulation:
U-value: < 0,2 W/m²K

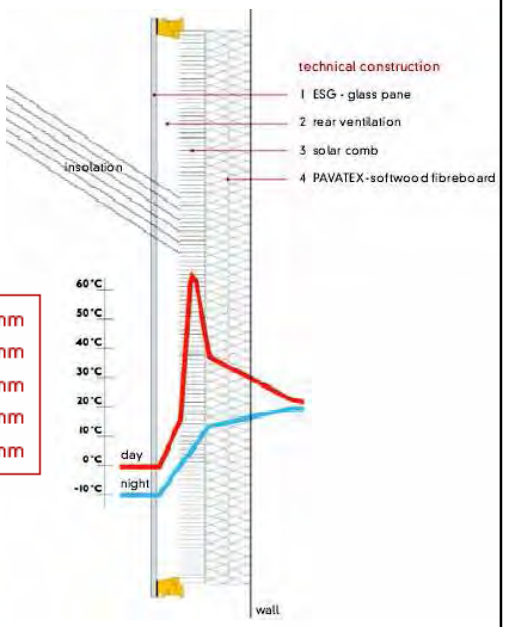
Windows exchange:
Uw-value:
< 0,85 W/m²K

Building stock

Pre-fabricated facade/window element (GAP SOLAR)

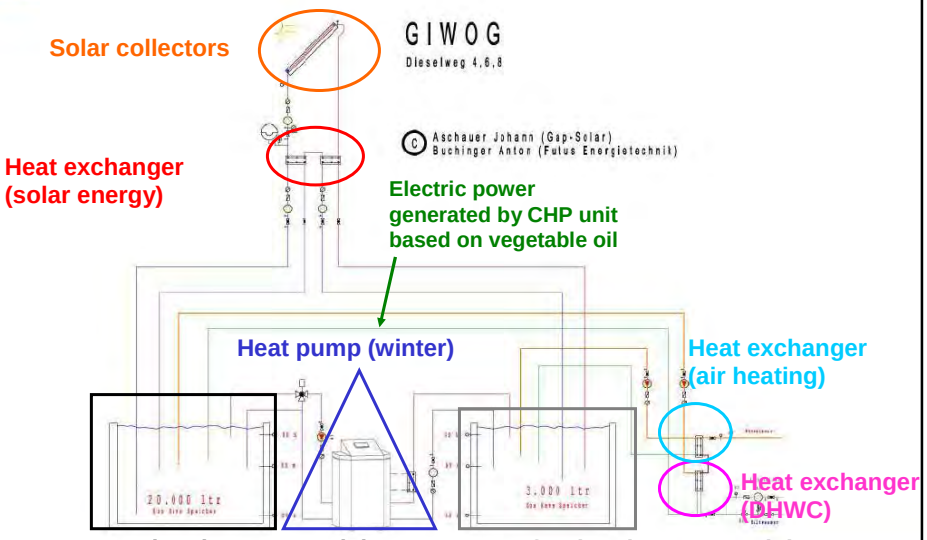
www.aee-intec.at AEE - Institute for Sustainable Technologies

GAP solar facade panel



01_ESG - glass pane	6-8 mm
02_rear ventilation	27 mm
03_solar comb	30 mm
04_panel rear wall	35 mm
05_rear ventilating gap	3 mm

Heating and DHWC-system after retrofit



Heating and DHWC-system after retrofit

Solar heating system:
central storage systems for each house

Energy source	Energy demand coverage for heating*	Energy demand coverage for DHW conditioning
solar energy	50%	85%
heat pump by biomass based power unit	50%	15%

*air heating system:
supplied by heat exchange with hot water circulation

Ventilation-system after retrofit

Non-central ventilation units with heat recovery (1/ room)

Dieselweg 4,6,8 – Energy demand after retrofit

Energy demand for heating:	10 kWh/m²a
Primary energy demand:	29,6 kWh/m²a
	(PHPP 2004)

Documented by a
web-based energy monitoring system !!

Dieselweg 4,6,8 – Construction of elevator - 2008, April

Dieselweg 4,6,8 – Elevator - 2008, July

Dieselweg 4,6,8 – Exterior insulation - 2008, August

WP 6
Application of the QA-system in pilot projects

SPAIN

Sant Joan de Malta

PILOT PROJECT

POMAARQUITECTURA

WP 6 Application of the QA-system in pilot projects

SPANISH PILOT PROJECT

The number of public residential buildings in Spain is only a very small fraction of the total stock.

The majority of existing residential buildings are not managed under lease schemes (by social housing associations or similar organisations), but privately owned (usually the community of users or owners of the block or development).

The pilot project in Spain is being conducted in a private development, so as to serve as a basis for replication at a larger scale

POMAARQUITECTURA

WP 6 Application of the QA-system in pilot projects

SPANISH PILOT PROJECT

The main characteristics of the target building were:
- existing building with a need for an integral renovation
- high replication potential of the developed renovation model
- developer organisation with the aim to go beyond the actual energy regulations

The development consists of a 5 storey building, located in the city of Barcelona (Sant Joan de Malta street)

The renovation of the selected building included the following aspects:
- structural: floors, roof, internal divisions
- thermal envelope: insulation, windows
- services: all the building services, including specific improvements (e.g. forced ventilation)

POMAARQUITECTURA

WP 6 Application of the QA-system in pilot projects

SPANISH PILOT PROJECT

Pilot Project Building Block	Initial state
adress	Sant Joan de Malta street. Barcelona
Number apartments	6
Year of construction	Around 1890
Materials	Brick and stone (walls), wood (beams), tiles (roof)
Orientation	45º SW
General systems	Electricity, water and sewer
Situation	Block with two external façades and two dividing walls
Ownership	Private (POMA as a developer)

POMAARQUITECTURA

WP 6 Application of the QA-system in pilot projects

SPANISH PILOT PROJECT

Establishing pre-renovation conditions
The old building was in very bad general condition, without permanent tenants. Hence, the analysis of the pre-renovation conditions has been focused on structural aspects, while other pre-renovation procedures, like residents' questionnaires, TPI and FEA, were not applicable.

ENVELOPE	U before retrofit (W/m2ºC)	U after retrofit (W/m2ºC)
external north	1,70	0,50
external south	1,70	0,50
dividing wall east	1,70	1,70
dividing wall west	1,70	1,70
roof	2,00	0,30
basement floor	2,70	0,30
wall touching stairs	2,00	0,80
windows	4,20	2,60
internal walls	2,00	2,00
internal floors	2,70	2,00

POMAARQUITECTURA

WP 6 Application of the QA-system in pilot projects

SPANISH PILOT PROJECT

Formulation of requirements and targets prior to renovation (1)
- POMA and TTA defined the values for the main thermal and indoor environment quality parameters. Most of them are current requirements set in recent building regulations (CTE and RITE).
- Further -more strict- requirements were also introduced as part of the pilot project added value, like:
  - better global U-value
  - better performance of thermal generation
  - better performance of the ventilation system

POMAARQUITECTURA

WP 6 Application of the QA-system in pilot projects

SPANISH PILOT PROJECT

Formulation of requirements and targets prior to renovation (2)

The project revision carried out by TTA made several proposals in order to improve the energy efficiency and the indoor environment quality.

- consider the external thermal insulation on the main façade
- insulate the internal walls surrounding not heated spaces, and the basement floor
- consider a vented roof
- correct thermal bridges
- introduce a collective heating system (instead of individual boilers in each flat) and collective hot water generation
- introduce high efficiency boiler (condensation)
- introduce hot water and heating metering (each apartment)
- centralise ventilation (roof air entrance and evacuation) with individual energy recovery from renovated air flow
- introduce free cooling

WP 6 Application of the QA-system in pilot projects

SPANISH PILOT PROJECT

Formulation of requirements and targets prior to renovation (3)

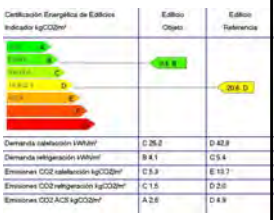
- improve air tightness using windows without permanent venting
- avoid the capillary moisture from the basement
- prevent eventual flow of radon from basement
- introduce continuous monitoring of energy performance
- encourage of energy-awareness behaviour by users by means of individual temperature control in each apartment, supported by electricity and heat consumption meters
- rainwater collection (pre-installation)

WP 6 Application of the QA-system in pilot projects

SPANISH PILOT PROJECT

Energy efficiency and indoor environment (1)

- The reformulated project has been tested with official software in order to verify the accomplishment of Spanish Building Energy requirements (CTE) and later to calculate its Energy Certificate. The target was to reach at least the level B.
- The Certificate will be issued after the renovation is completed. Targets are to keep heating needs below 25 kWh/m2, and emissions from thermal consumption (heating, cooling and HW) below 9,4 kg CO2/m2 .



WP 6 Application of the QA-system in pilot projects

SPANISH PILOT PROJECT

Energy efficiency and indoor environment (2)

In order to guarantee a good indoor environment quality, the adopted design criteria were:

- correction of thermal bridges (prevent condensation and moisture)
- forced ventilation regulated by a CO2 sensor
- low emissivity finishings, paints, etc.

WP 6 Application of the QA-system in pilot projects

SPANISH PILOT PROJECT

Cooperative partners for the QA system implementation

The main difference between the Square QA system and the QA procedures carried out during the first part of the renovation project, refer to the role of the developer organisation and its partners. In the Spanish pilot project, the participant organisations are:

- POMA: private developer and responsible for the architecture design. During the renovation work, POMA is also the general contractor and carries out the site management, and quality control checking.
- TTA: consultant in energy, indoor environment quality and general systems. TTA also carries out also the site management on the above mentioned areas.
- Subcontractors: responsible for specific works, coordinated by POMA.

WP 6 Application of the QA-system in pilot projects

SPANISH PILOT PROJECT

General strategy and overall goal for the QA system implementation

The Square QA system is a pioneer system within building project development for POMA. The procedures involved in the Square QA system have been implemented gradually, integrating them into the usual management procedures of a building renovation work. TTA has coordinated the QA implementation.

The objective is to test:

- the advantages derived of the QA implementation
- the time required for the document management
- the difficulties to implant the QA guidelines between the pilot project partners
- the QA system adaptation to specific Spanish requirements

WP 6 Application of the QA-system in pilot projects

SPANISH PILOT PROJECT

Focus areas for the QA system implementation

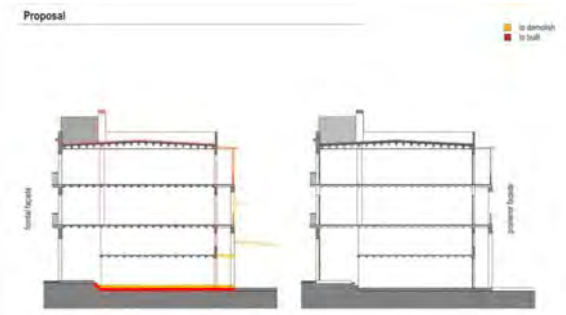
- The QA system implementation on Spanish pilot project has focused mainly on the definition of targets to be reached, and the project adaptation in order to fulfil them.
- The assumption of the changes by all the project partners (architects, engineers, installers, building workers, etc.) has required several meetings, reasoned discussions during the site management visits and teaching on the proposed new technologies.

- The second part has focused on the checking of the quality of the building work (structure, envelope, etc.), general systems (piping, air ducts, heating, ventilation, etc.). This part is currently underway.
- The next steps will focus on the commissioning of general systems, the adjustments of thermal and ventilation systems, and the operational phase.

POMAARQUITECTURA

WP 6 Application of the QA-system in pilot projects

WP 6 Application of the QA-system in pilot projects



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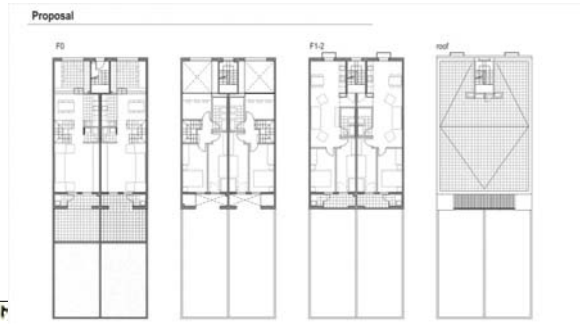

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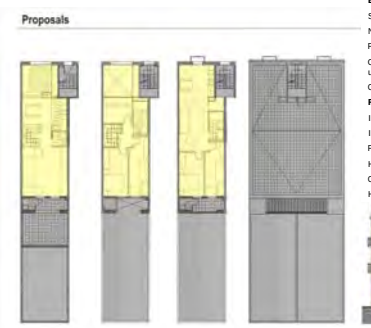
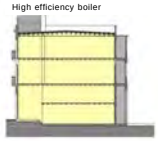


Environmental conditions

Shadows on the roof (neighbor buildings)
Narrow street
Few solar radiation available on the roof
Old structure with thermal mass higher than usual
Crossed ventilation by opposite façades

Refurbishing features

Improved insulation
Internal open spaces
Forced ventilation
Heat recovery of used air
Central heating and hot water generation
High efficiency boiler



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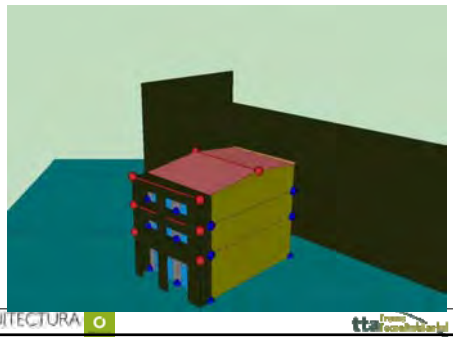

POMAARQUITECTURA

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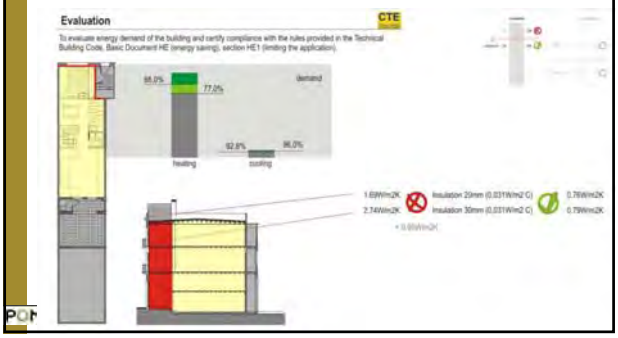

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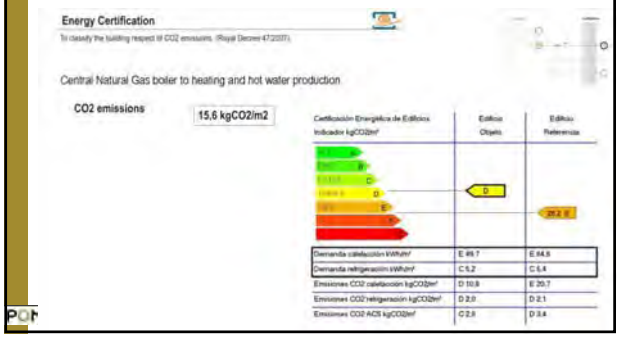

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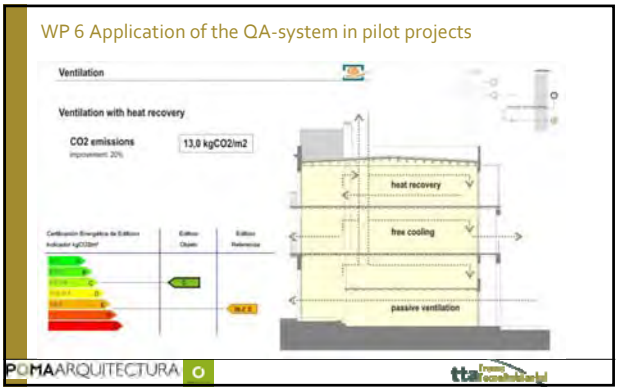

POMAARQUITECTURA

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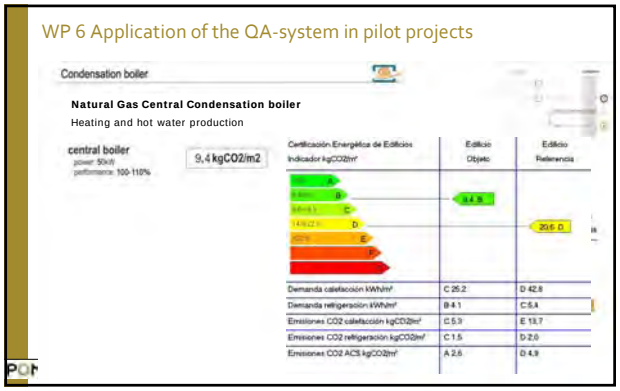

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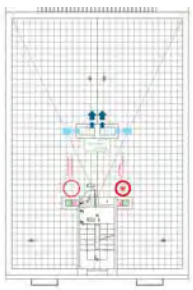


Flat vented roof

POMAARQUITECTURA

WP 6 Application of the QA-system in pilot projects

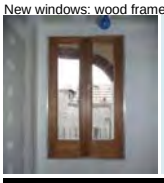
Roof waterproofing and vented finishing by timber

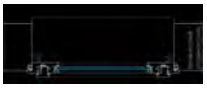
Thermal insulation (10 cm)

POMAARQUITECTURA

WP 6 Application of the QA-system in pilot projects

New windows: wood frame, 4 -9- 5 double glazing



Air tightness: 4 Class

Thermal U value: 2,7 W/m2K

WP 6 Application of the QA-system in pilot projects

Façades and internal walls insulation


WP 6 Application of the QA-system in pilot projects

Forced ventilation

With energy recovery from used air

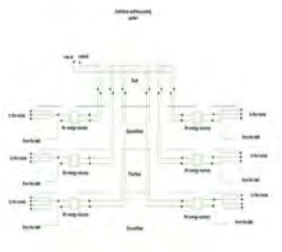
High air tightness

Free cooling

Forced night ventilation during the summer

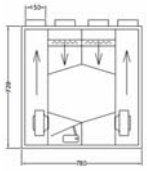
Natural ventilation

Crossed ventilation controlled by the users



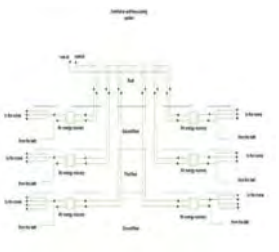
WP 6 Application of the QA-system in pilot projects

Forced ventilation and energy recovery



Air energy recovery unit

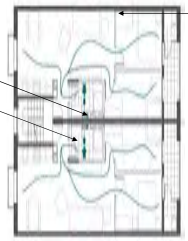
- High efficiency >90%
- Free cooling bypass
- 1 unit per apartment
- air intake and evacuation on the roof



WP 6 Application of the QA-system in pilot projects

Used air flow return by plenum to bath, where the energy recovery unit exchange thermal energy with input fresh air and vent the exhaust air to the roof

Air energy recovery unit



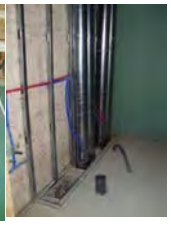
gallery

WP 6 Application of the QA-system in pilot projects

1- Ventilation ducts mounting process.

2- Metallic ducts for vertical circulation (from and to roof)

3- Insulated horizontal ducts in order to prevent noise

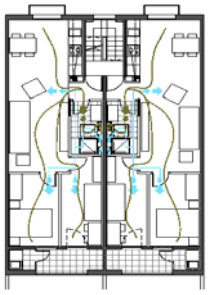




WP 6 Application of the QA-system in pilot projects

Horizontal distribution of fresh air after heat recovery.



WP 6 Application of the QA-system in pilot projects



Collective Heating and Hot Water scheme

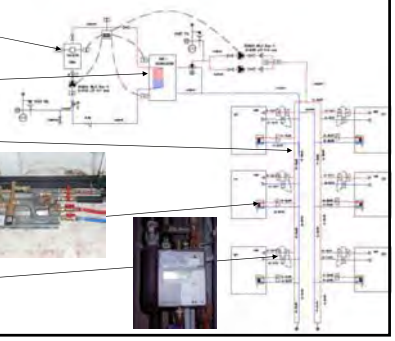
Condensation boiler

Inertial tank

Heating and hot water circuit

Hot water thermal exchanger

Heat meter



WP 6 Application of the QA-system in pilot projects

Timetable Spanish pilot project

WP6 **National Pilot Projects Timetable**

Building selection	Energy use and indoor environment requirements	Thorough primary investigation - TPI	First energy analysis – FEA	Renovation concept development and analysis	Envelope renovation	General systems renovation	Measurements and checks during construction	Operation and maintenance	Monitoring, metering and measurements	Non-compliances, corrective and preventive actions
sep-07				6/07 - 12/07	12/07 - 9/08	3/08-7/09	12/07 - 7-09	9/09 -	9/09 -	9/09 -

E Handouts of presentations at Barcelona workshop

Intelligent Energy Europe

SQUARE

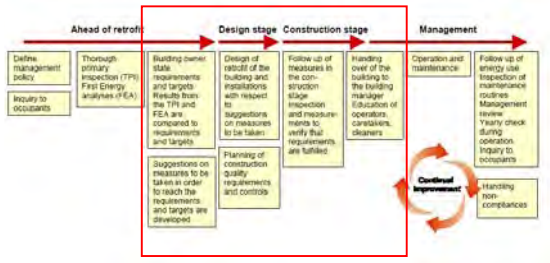
WP 6
Application of the QA-system in pilot projects

SPAIN

Sant Joan de Malta

PILOT PROJECT

POMAARQUITECTURA



POMAARQUITECTURA

AHEAD OF RETROFIT → DESIGN STAGE → CONSTRUCTION STAGE

REQUIREMENTS AND TARGETS: Better global U-value

Better performance of thermal generation and ventilation system

Defined the values for the main thermal and indoor environment quality parameters. They were more strict than building requirements regulations

Achive B energy qualification.

Re use rain water.

POMAARQUITECTURA

AHEAD OF RETROFIT → DESIGN STAGE → CONSTRUCTION STAGE

REQUIREMENTS : No over loading vertical structure.

Not subjecting existent structure (walls) to new efforts.

Compatible technology with existent.

Election of the wood as a material that has nules emisions of CO2

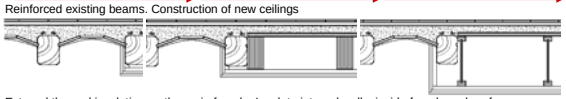
Avoid thermal bridges and the capillary moisture from the basement

Maintenance a vented roof, and the cross ventilation through the flats

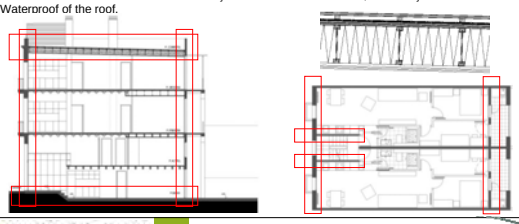
POMAARQUITECTURA

AHEAD OF RETROFIT → **DESIGN STAGE** → CONSTRUCTION STAGE

Reinforced existing beams. Construction of new ceilings



External thermal insulation on the main façade. Insulate internal walls, inside façade and roof. Waterproof of the roof.



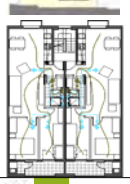
POMAARQUITECTURA

AHEAD OF RETROFIT → **DESIGN STAGE** → CONSTRUCTION STAGE

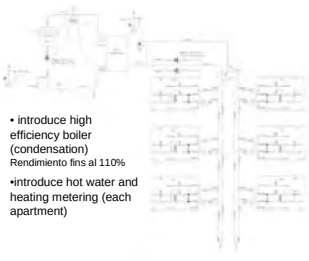
Centralise ventilation (roof air entrance and evacuation) with individual energy recovery from renovated air flow. Introduce free cooling. Natural ventilation: Crossed ventilation controlled by the users

Air energy recovery unit: HRE- 350 ECH
High efficiency >90%

- Free cooling bypass
- 1 unit per apartment
- air intake and evacuation on the roof



Introduce a collective heating system (instead of individual boilers in each flat) and collective hot water generation

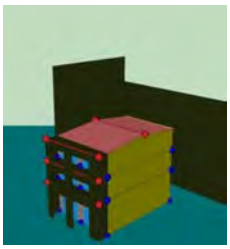


- introduce high efficiency boiler (condensation)
Rendimiento fins al 110%
- introduce hot water and heating metering (each apartment)

POMAARQUITECTURA

AHEAD OF RETROFIT → **DESIGN STAGE** → CONSTRUCTION STAGE

The reformulated project has been tested with official software in order to verify the accomplishment of Spanish Building Energy requirements (CTE) and later to calculate its Energy Certificate



Certificación Energética de Edificios Indicador kgCO2/m²	Edificio Objeto	Edificio Referencia
	9.4 B	20.6 D
Demanda calefacción kWh/m²	C 25.2	D 42.8
Demanda refrigeración kWh/m²	B 4.1	C 5.4
Emisiones CO2 calefacción kgCO2/m²	C 5.9	E 13.7
Emisiones CO2 refrigeración kgCO2/m²	C 1.5	D 2.0
Emisiones CO2 ACS kgCO2/m²	A 2.6	D 4.9

Simulation by LIDER and Energy Certificate by CALENER

POMAARQUITECTURA

AHEAD OF RETROFIT → DESIGN STAGE → **CONSTRUCTION STAGE**

Demolishment and preventive works: Construction the new sewer

POMAARQUITECTURA

AHEAD OF RETROFIT → DESIGN STAGE → **CONSTRUCTION STAGE**

Reinforced existing beams and new timber beans.

POMAARQUITECTURA

AHEAD OF RETROFIT → DESIGN STAGE → **CONSTRUCTION STAGE**

Avoid the capillary moisture from the basement. Waterproofing and keep the vended roof.
Façade and internal walls Insulation.

POMAARQUITECTURA

AHEAD OF RETROFIT → DESIGN STAGE → **CONSTRUCTION STAGE**

Improved airtight. New windows: wood frame, 4 -9- 5 double glazing

Permeabilitat a l'aire: CLASE 4
Estanquitat a l'aigua E1050
Resistència a la càrrega de vent CLASE 4
Index reducció sonora 32 dB
Transmitància tèrmica 2,7 W/m2k

Air tightness: 4 Class
Thermal U value: 2,7 W/m2K

POMAARQUITECTURA

AHEAD OF RETROFIT → DESIGN STAGE → **CONSTRUCTION STAGE**

Head recovery

Used air flow return by plenum to bath, where the energy recovery unit exchange thermal energy with input fresh air and vent the exhaust air to the roof

POMAARQUITECTURA

AHEAD OF RETROFIT → DESIGN STAGE → **CONSTRUCTION STAGE**

Natural Gas Central Condensation boiler

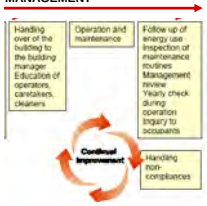
Heating and hot water production

Individual heat meter to monitor how much each neighbour spends.

AHEAD OF RETROFIT → DESIGN STAGE → **CONSTRUCTION STAGE**

Rainwater harvesting. The ground floor dwellings uses rain water for the garden.

MANAGEMENT



Housing association vs the community owner
Rented dwelling vs sold properties
Vertical property vs horitzontal property

Pilot project Finland Pohjankaleva student house

Jari Palonen

Helsinki University of Technology, Finland

HELSINKI UNIVERSITY OF TECHNOLOGY
Laboratory of Heating, Ventilation and Air Conditioning

INVESTMENTS FOR ENERGY EFFIENCY IN APARTMENT BUILDINGS IN FINLAND

- REPLACEMENT OF OLD HOT AND COLD WATER SYSTEM
  - 20-25% LESS WATER
- REPLACEMENT OF OLD WINDOWS
  - OUTDOOR AIR VENTS MANDATORY
  - CLEANING OF EXHAUST AIR DUCTS
  - INCREASED ENERGY USE

DEMONSTRATION BUILDINGS

- 1994-96
- IMPROVED INSULATION, SMALL VENTILATION UNITS WITH HEAT ECOVERY, NEW HOT AND COLD WATER SYSTEM
  - GOOD RESULTS BUT VENTILATION UNITS ARE NOT USED
  - NEED FOR SPECIAL HOUSING SCHOOL FOR TENANTS – HOW TO LIVE AND USE VENTILATION

INCREASING BUILDING COST

- WORST CASE IN HELSINKI
- 2003
  - RENOVATION COSTS WERE 1,5 X (DEMOLITION + NEW BUILDING)
  - PLUMBING
  - EXTRA INSULATION
  - NEW BALANCED VENTILATION WITH HEAT RECOVERY
  - LIFTS

2009

- RENOVATION COSTS EVEN 2500-3000 €/M2
- SEVERAL TOTAL OR PARTIAL DEMOLISHON PROJECTS PLANNED

- TREND
- OLD SOCIAL APARTMENT BUILDINGS WILL BE REPLACED BY NEW SOCIAL, LOW ENERGY BUILDING
- NEW PASSIVE HOUSES 2400 €/M2

QA-SYSTEMS IN FINLAND

- NO TOTAL QA-SYSTEMS LIKE SQUARE
- SEVERAL WELL DEFINED TOOLS FOR SPECIAL PURPOSES

Sub-QA-methods before design process

- Simple energy analyse
  - 50% paid by the Finnish goverment
- Simple technical analysis
  - 50% paid by the Finnish goverment
- Detailed conditions survey
  - Outdoor walls
  - Moisture and mold problems
  - Plumbing and water systems
  - Indoor air and ventilation
  - Electrical installations

Sub-QA-methods during design process

- Guidebook how to design healthy apartment building
- Guidebook how to design low energy building (2009) (Jarek Kurnitski et al)
- Indoor climate classification 2008
  - If you want build better than required by the building code
- Over 1000 low-emitting (VOC's + odors) building materials M1-mark
- Designbook for clean supply air systems

Sub-methods during renovation

- MOISTURE CONTROL DURING CONSRUCTION WORK
- DUST control during construction work
- GUIDELINES FOR HOW TO BUILD A CLEAN VENTILATION SYSTEM
- How to clean building before occupancy

Sub-methods during operation

- MAINTENANCE HANDBOOK
  - MANDATORY
- ENERGY CERTIFICATION
  - ANNUAL
  - BETWEEN 10 YEARS
- CONDITIONS SURVEYS

POHJANKALEVA

POHJANKALEVA STUDENT HOUSE

- Built 1970
- Shared WC and bathroom in
- First renovation in 1993
- Windows, fresh air vents
- Number of unrent rooms increasing
  - 10 % in 2007
  - 20 % in 2008
  - 50 % during summer

Evaluation of building

- Occupants questionnaire
  - IAQ-problems
  - If tenants wants to pay higher rent
    - Private bathroom
    - Own balcony
    - More saunas
- Conditions surveys
- Energy analysis.

Results

- Ouestionnaire study
  - Draught during winter caused by outdoor air vents in window fame
  - Too warm during summer
  - Private bathroom and WC 10-20 €/month extra
- Building is in relatively good conditions
- Investments needs during next 19 years 200 €/m2
  - Deeper analyses required concerning outer walls
- Energy analysis
  - Better than average apartment building from 1970.
  - 170 kWh/m2

New layout

Passive house in Artic area

- The goal is to reach passive house standard level which in northern Finland is 30 kWh/m2 per year for heating energy (domestic hot water 25 kWh/m2). (Design outdoor temperature -35 C)
- TES-elements (Wooden)
  - TES-project
- Regerative heat recovery (rotating heat wheel)
  - 80-85% efficiency
  - Needs odor filter in exhaust air duct
  - Special permit from the city of Oulu

Contractors

- NCC Finland
  - Cost are fixed in round table discussions
  - Special permit from Finnish Housing Fund
- TES elements will be manufactured in North Finland

Design team

- The largest housing design consult in Finland, Optiplan, will coordinate the design process.
  - Energy simulation
  - Simulation of room temperatures
- Local consults must be used because of expensive travelling costs between Southern and Northern Finland.
- The Buildings Regulations Department of the city of Oulu will be present during design and construction meetings.
- HUT
  - How QA system is used?

QUALITY CONTROL DURING CONSTRUCTION

- Moisture control and protection
- Dust control plan
  - Clean ventilation system
- TES-elements will be tested (air tightness) in before delivered to construction site
- Measurements in construction site; thermal performance, air leakages, moisture in structures

Updated timetable

- Renovate of demolish?
- Renovate, costs 1600 €/m2
- No balconies at all
  - Solar protection?
- NCC Finland will start August 2010.
- New students August 2011
- Follow-up will be made partially in national project KIMU (ends 6/2011

SQUARE

A Quality Assurance System for Improvement of Indoor Environment and Energy Use when Retrofitting Residential Houses

Pilot project Brogården in Alingsås, Sweden

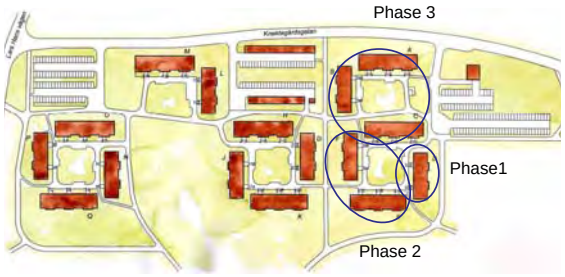
Kristina Mjörnell and Peter Kovacs
SP Technical Research Institute of Sweden

The residential area Brogården in Alingsås

A multifamily housing area of 300 apartments owned by the municipal housing association Alingsåshem AB.

The residential area Brogården in Alingsås

The intension is to renovate the area to “passive house standard”.



Brogården before retrofit

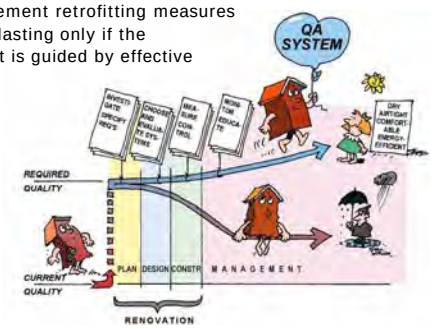
- Extensive energy use would give high costs in the future.
- No financial incentive for the tenants to save energy and no feedback about their personal energy use.
- Poor indoor climate due to air leakages in the building envelope, thermal bridges and inadequate insulation.
- Moisture damages in the foundation slab.
- Poor building services.
- Small bathrooms.
- Limited access for disabled pers
- Few meeting places for the tena

Energy efficiency and good indoor environment

- Concentrating only on energy efficiency might cause negative effects on the indoor environment and vice versa.
- To achieve an energy efficient retrofitted building with good indoor environment, requires knowledge, continuity and communication.
- This can be assured by using a quality assurance system (QA system), describing a systematic and controlled way of working.

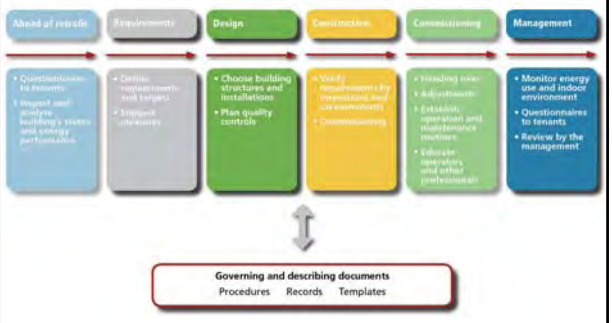
QA system for retrofitting multifamily houses

Energy improvement retrofitting measures will be long-lasting only if the management is guided by effective routines.



Implementation of the QA system in Brogården

..in planning, design, construction, operation and maintenance.



Ahead of retrofit – Analyse building status and energy performance

Picture: Hans Eek

Ahead of retrofit – Inspection of building structure

The inspections showed:

- Damages in brick façade
- Moisture damages in ground slab
- Air leakage

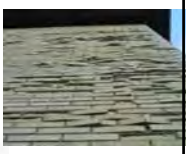


Figure 2.17 Exterior wall before renovation.

Picture: Ulla Jansson, 2008

Requirements - Define requirements and targets

Energy use: Passive house standard, increasing share of renewables (solar thermal)

Indoor environment: Thermal comfort, air quality, moisture control etc.

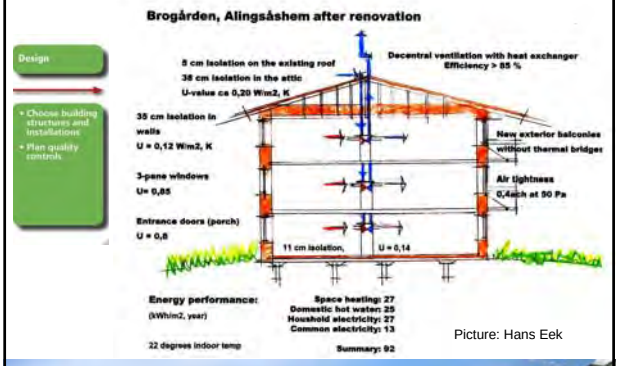
Others:

- Individual control of energy use and indoor climate
- Easy to operate techniques
- Small maintenance needs through conscious choice of material
- Long-term stable rent levels
- Better access for elderly and disabled people
- Meeting places for tenants

Requirements – Suggest measures

- Additional insulation and highly improved air tightness of the building envelope
- New windows
- New heating and ventilation system including efficient heat recovery
- Include balconies in living room space
- Larger bathrooms
- Better accessibility
- Individual metering

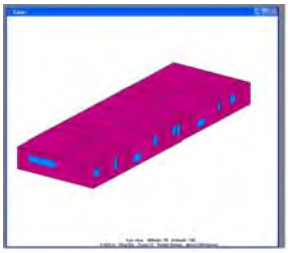
Design – Choose building structures and installation systems



Picture: Hans Eek

Design – Energy simulations

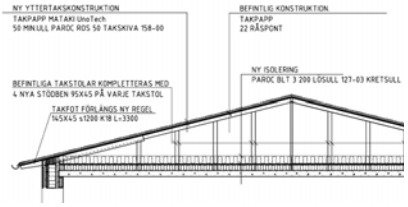
- Energy balance calculations of the whole building with different measures in order to find optimum combinations of (energy efficient) improvement measures.



Picture: Ulla Jansson

Design – Moisture simulations

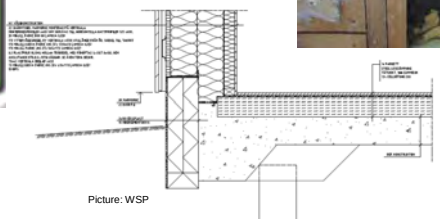
- Moisture calculations of additional insulated roof, walls and slab on ground



Picture: WSP

Design – New walls and façade

- New walls instead of additional insulation on existing walls
- New façade material
- Cultural heritage preservation?



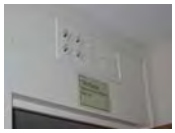
Picture: WSP

Design – Plan quality controls

- Follow-up meetings with designers
- Planning of weather protection
- Planning of moisture measurements and air-tightness tests

Ahead of construction – Display apartment

Giving occupants the opportunity to examine the technical systems and practical arrangements in the new apartments.



Before construction starts

- Long time partnering contract with common targets and open cost accounting
- Information meetings with all project participants before construction starts
- Building contractor continually supplies information to employees on quality targets

Construction – Work at site

- Show prototype of wall element
- Do job planning before critical elements
- Use weather protection




Construction – Verify requirements by inspections and measurements

CH7

- Moisture rounds at site
- Moisture measurements
- Air tightness testing


Commissioning – Tenants

- Information meeting with tenants
- Continuous information at website and in newsletter

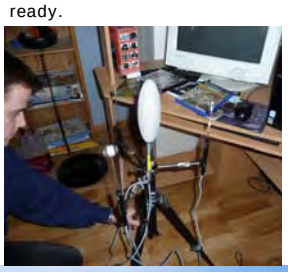
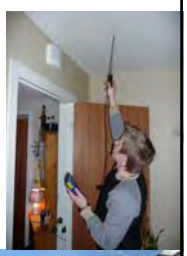
Commissioning - Operators

- Handing over of the building
- Adjustments of the systems
- Establish operation and maintenance routines
- Educate operators

Commissioning is a long term process lasting for a year.

Management – Monitoring

- Monitoring energy use (This is made by the local energy provider Borås Energi).
- Measuring indoor environment, mainly in case of complaints once commissioning is ready.

Management – Tenants

- Questionnaires to tenants
- Interviews with tenants
- Establishing good regular communication channels with tenants

Management - Review

- Review by the management and handling of non-compliances
- Feedback to responsible parties
- Adjustment of targets, governing documents etc.
- Continual improvement

Thank you for your attention!

www.iee-square.eu

F Handouts of presentations at Roosendaal event

A Quality Assurance System for Improvement of Indoor Environment and Energy Use when Retrofitting Social Housing

Kristina Mjörnell and Peter Kovacs
SP Technical Research Institute of Sweden

The energy efficiency improvement potential

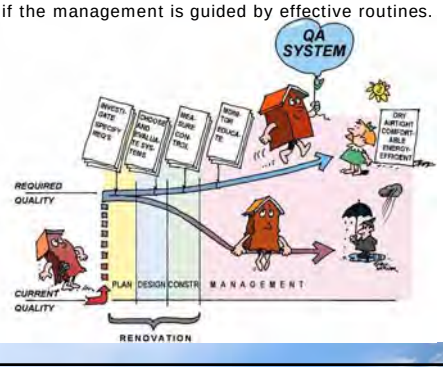
…lies in the existing building stock, especially in the large areas of multifamily houses built in the 1970-ties.

Energy efficiency and good indoor environment

- Concentrating excessively on either energy efficiency or good indoor environment might cause mutual effects, and it is important to avoid this.
- To achieve the intended results of the retrofit requires knowledge, continuity and communication.
- This can be assured by a quality assurance system, describing a systematic and controlled way of working.

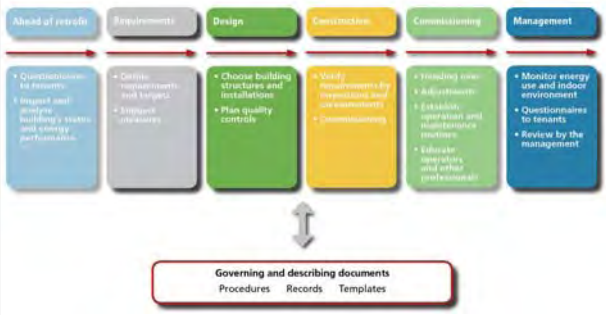
QA system for retrofitting apartment buildings

Successful energy improvement retrofit will be permanent only if the management is guided by effective routines.



Implementation of the QA System…

..in planning, design, construction, operation and maintenance



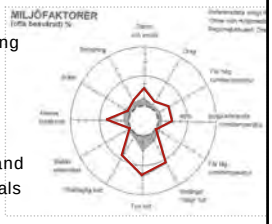
Implementation of the QA System…

..in planning, design, construction, operation and maintenance

Ahead of Retrofit 1

Questionnaire

- Questionnaire to tenants identifying existing or potential problems



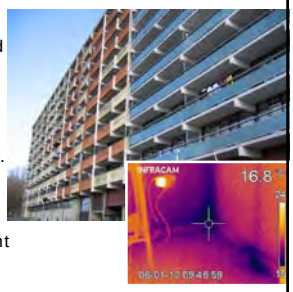
Thorough Primary Inspection (TPI)

- Inventory of construction status and damage, design concepts, materials
- Inspection and measurements (temperatures, air velocity, ventilation rates, light, noise, radon etc.) checking fulfilment of requirements

Ahead of Retrofit 2

First Energy analysis (FEA)

- Analysis of data of current (and past) energy use
- Inventory of design and standard of HVAC systems, lighting, monitoring system etc.
- Inventory of insulation standard, previous energy efficiency measures, adjustment records etc.

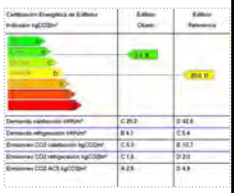


Definition of Requirements and Targets

The requirements and targets are based on legal requirements (binding), guidelines and recommendations (voluntary)

Requirements and targets concerning:

- Energy performance and energy use
- Indoor environment
- Quality requirements and targets for the construction process
- Performance requirements for critical components



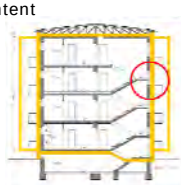
Requirements and needed measures

- Results from the TPI and FEA (actual status) are compared with requirements and targets
- Σ(Requirements - Actual status) = Major retrofit or Limited action?
- Measures needed to reach the requirements and targets are suggested and planned

Design Stage

Designers:

- Work out solutions of the building structures and building services systems in accordance with chosen retrofitting measures
- Decide on methods for quality checks; e.g. sound or luminance levels, air-tightness, moisture content
- Do calculations or simulations showing that requirements concerning indoor environment and energy use are fulfilled
- Participate in construction meetings to follow up!



Construction Stage

Contractors:

- Carry out retrofit measures
- Make inspections and measurements to verify that requirements are fulfilled
- Supervise, collect verification reports and system documentation
- Continue the dialogue, visualise the property management stage, encourage knowledge sharing and feedback on upcoming challenges

Commissioning Stage

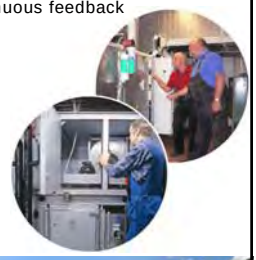
The QA system aims to bridge the gap between the renovation and the management stage

Important activities include:

- Handing over of the building to the management organization
- Consider outsourcing of e.g.
- Training of operators, caretakers, cleaners
- Documented plans for operation and maintenance

Property Management Stage

- Follow up of energy use
- Regular (e.g. monthly) checks during operation
- Questionnaire to tenants and continuous feedback



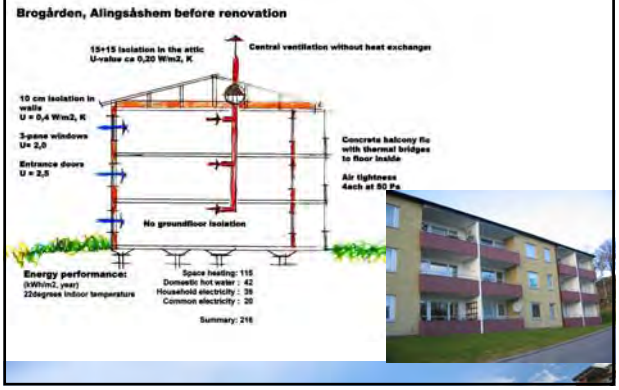
Pilot project Brogården

- Swedish multifamily housing area of 300 apartments
- The municipal housing association Alingsåshem AB intended to retrofit the houses to passive house standard
- Challenging targets on energy use and indoor environment
- Long time partnering contract with common targets and open cost accounting

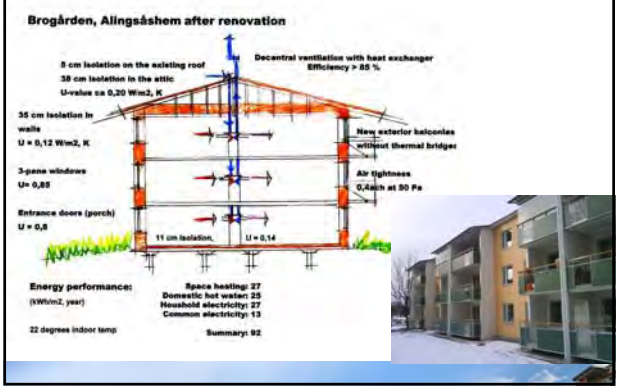
Application of the QA system in Brogården

- Information meetings with all project participants
- Building contractor continually supplies information to employees on quality targets
- Keeps residents informed of the renovation process
- A display apartment providing occupants to examine the technical systems and practical arrangements in the new apartments.
- Job-planning before critical elements
- Verification with measurements and testing

Brogården before retrofit



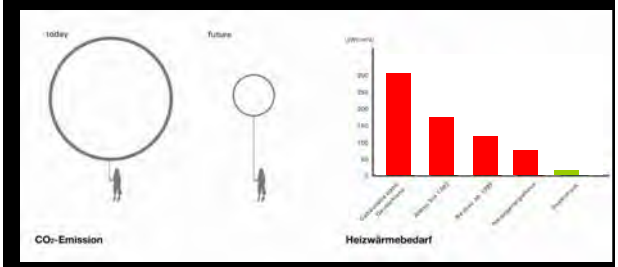
Brogården after retrofit



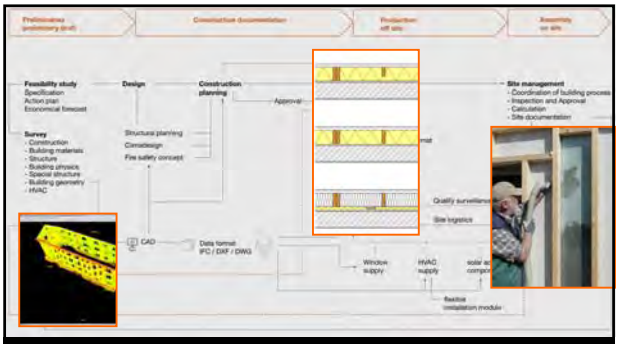
Conclusions

- A QA system for indoor environment and energy use has been adjusted to suit the retrofitting process
- The QA system is used to assure organization, routines, responsibility and resources to maintain a good indoor environment and energy use performance
- The QA system has been applied in a number of pilot project in Europe
- Experience from these project will be used to further improve the QA system
- The Pilot projects will serve as good examples inspiring other housing owner to carry out retrofitting projects

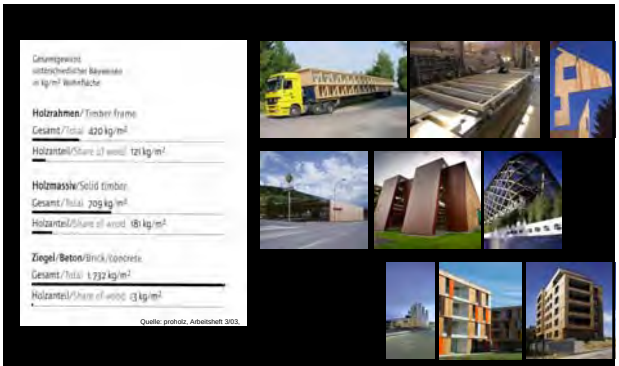
www.tesenergyfacade.com



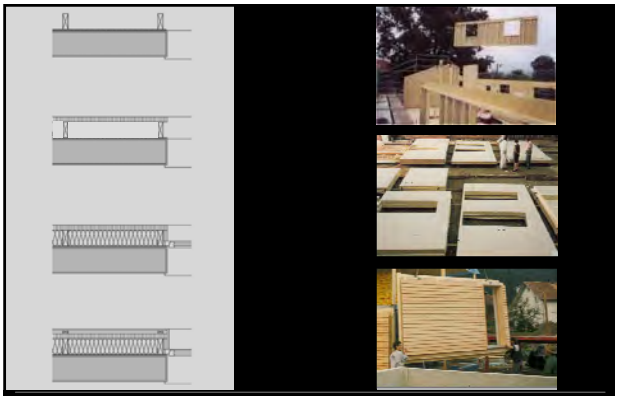
Objective



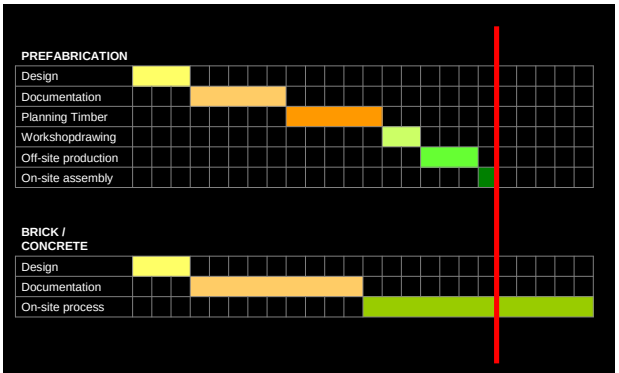
TES modernisation – optimisation of a process



Competence of the timber construction sector



Levels of prefabrication



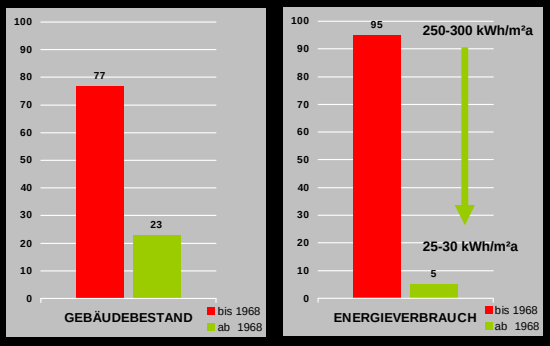
Quelle: J. Kolb, 2007

Project process

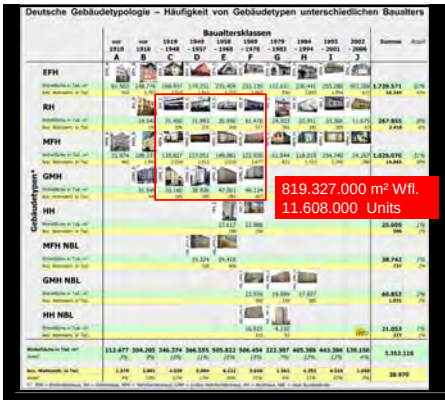
PAST
- Profit (€€€)
- Matching needs

FUTURE
- Environment
- Life cycle cost (€€)

Change in Values



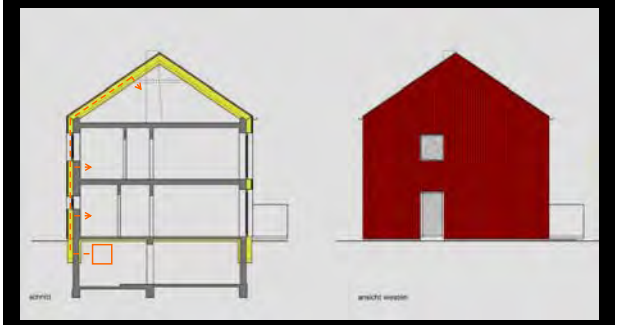
Energy consumption



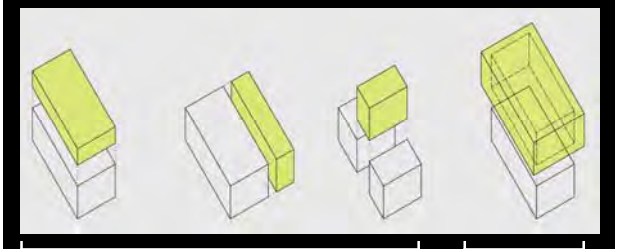
Building stock in Germany

Quelle: IWU

Modernisation – the 2nd chance for architecture!



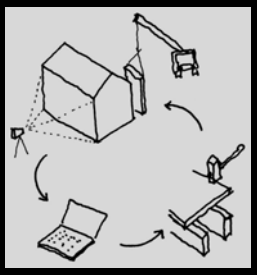
System: Building and envelope



Intervention

surrvey

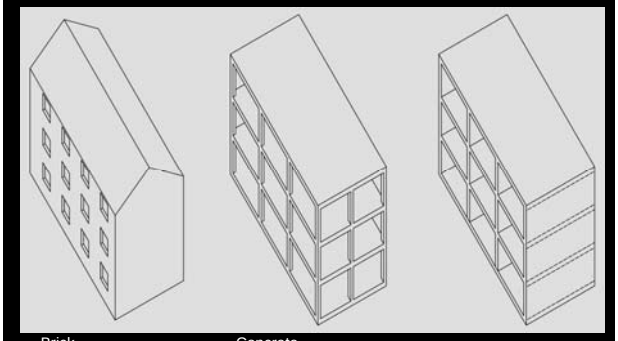
on-site assembly



planning

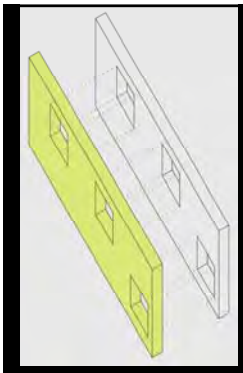
off-site fabrication

Method

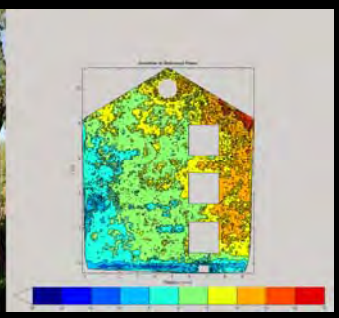


Brick Concrete

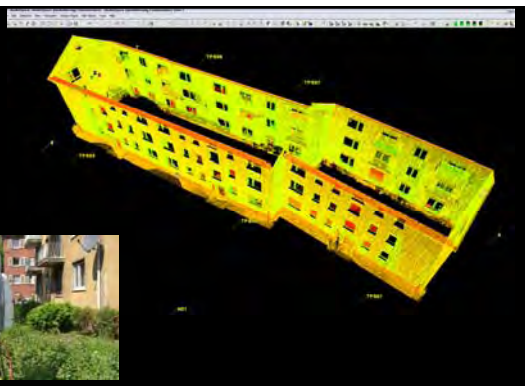
Building stock



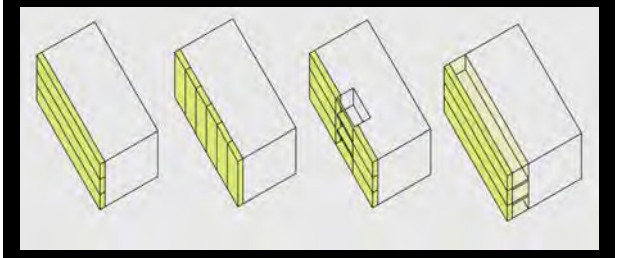
Precison



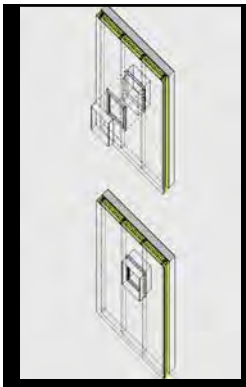
Quelle: TUM, LS für Geodäsie und FB Photogrammetrie



Terrestrial 3D-Laserscaning



Envelope



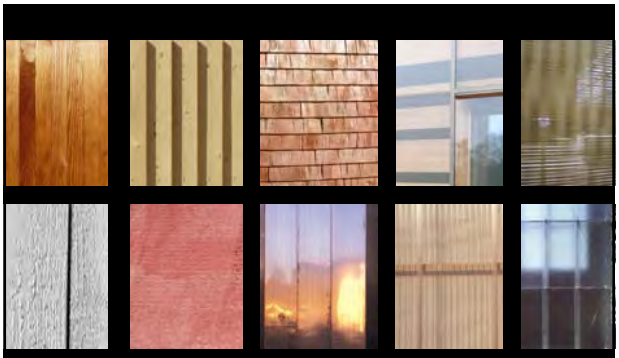
Prefabricated Timber based Building System

+ integrated components (windows)

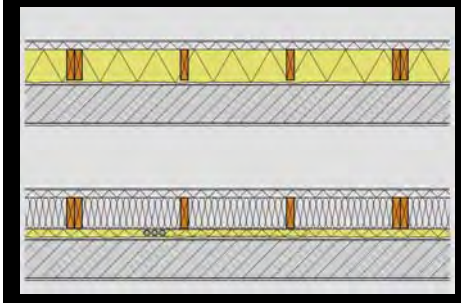
+ load bearing elements (balconies)

+ solaractive components

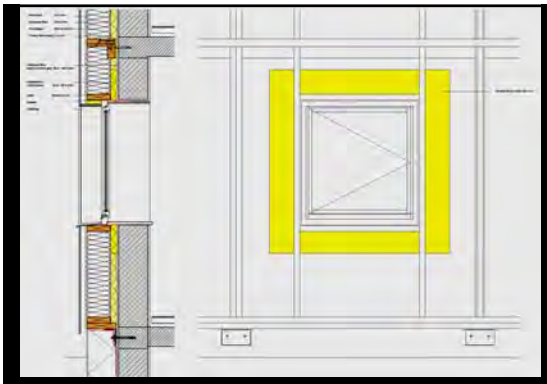
TES Element



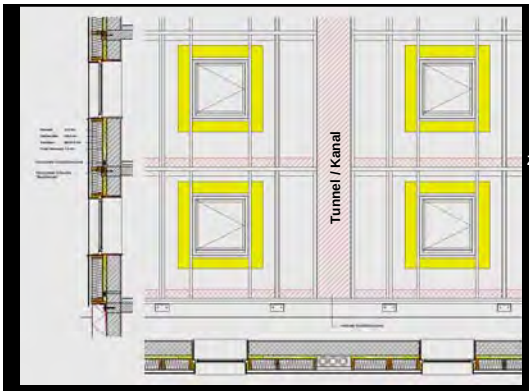
Surface



Cavity free



Window



Integration HVAC

Baujahr:
1954

Baugrundstücksfläche:
10.194,0 m²

bebaute Grundfläche:
2.254,0 m²

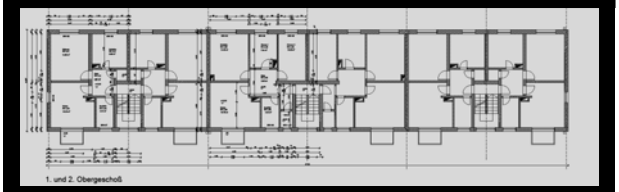
Geschossfläche:
6.762,0 m²

Geschossflächenzahl: **(GFZ)**
0,66

Brutto Rauminhalt: (BRI):
19.007,0 m³

Eigentümer: GWG München

GWG Wohnanlage Fernpaßstraße, München
Kaufmann Lichtblau Architekten



GWG Wohnanlage Fernpaßstraße, München
Kaufmann Lichtblau Architekten

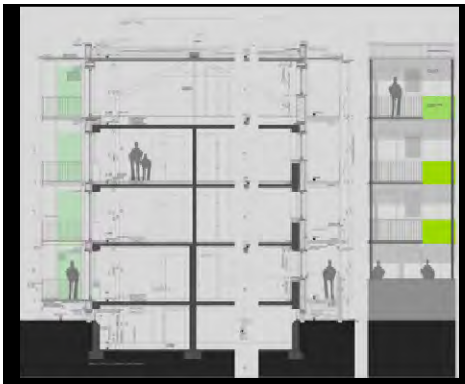
GWG Wohnanlage Fernpaßstraße, München
Kaufmann Lichtblau Architekten

Quelle: Kaufmann Lichtblau

GWG Wohnanlage Fernpaßstraße, München
Kaufmann Lichtblau Architekten

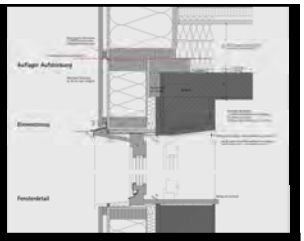
Quelle: Kaufmann Lichtblau

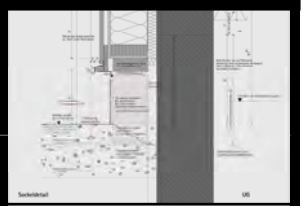
GWG Wohnanlage Fernpaßstraße, München
Kaufmann Lichtblau Architekten



Quelle: Kaufmann Lichtblau

GWG Wohnanlage Fernpaßstraße, München
Kaufmann Lichtblau Architekten





GWG Wohnanlage Fernpaßstraße, München
Kaufmann Lichtblau Architekten


Realschule Buchloe
e3 architekten Marktoberdorf
Josef Ambros GmbH


Realschule Buchloe
e3 architekten Marktoberdorf
Josef Ambros GmbH

Realschule Buchloe
e3 architekten Marktoberdorf
Josef Ambros GmbH

Added value through off-site fabrication

- Precision and quality of the ecological system
- Reduction of time on-site = less noise and disturbance
- Utilization of a great variety of cladding materials
- Integration of load bearing, spacial elements and / or solar active or HVAC components

Added value

Germany

Finland

Norway

NTNU Trondheim

TES Partners

Passive renovation in practice

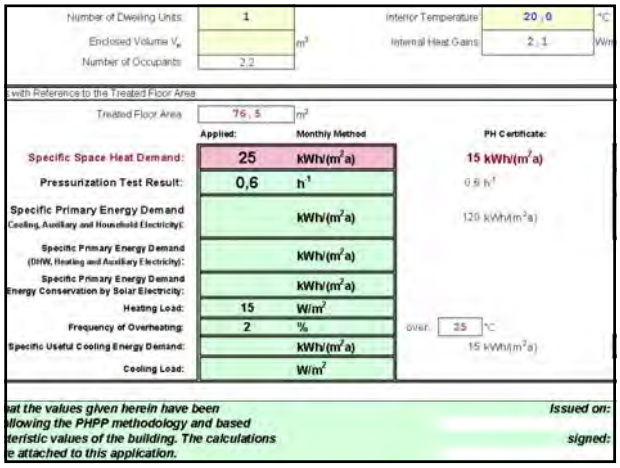
14 October 2009
St Jan Cultuur, Roosendaal

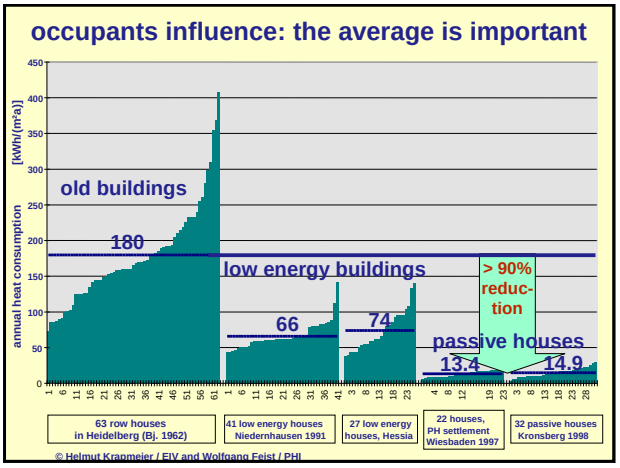
Trecodome

Passive renovation in context

- Beyond regulation and practice
- Modern methods of construction
- Airtigtness + ventilation
- International product sourcing
- Investment and scenario planning

Trecodome





Where do we stand

- 200 kWh/m2 - existing building stock
- 100 kWh/m2 – standard renovation
- 50 kWh/m2 – new homes
- 25 kWh/m2 – passive renovation
- 15 kWh/m2 – passive housing

Trecodome

Current renovation practice

- Building Code only requires U value 0,4 and low E glazing for renovated components.
- No better ventilation than mechanical exhaust

Trecodome

15 kWh/m2

Continuous insulation

- U values in range of 0.10 – 0.15 W/m²K
- U glazing in range of 0.5 – 0.8 W/m²K
- U window frames around 0.8 W/m²K
- No thermal bridges
- No unwanted air leakage

Trecodome

- Energy labelling system is not able to cope with passive house components:
  - Best U value 0,24 W/m2K by default
  - Best windows 1,5 W/m2K

Trecodome

Trecodome

Passiefbouwen Keur voor Sleephelling

2. Modern methods of construction

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Trecodome

Trecodome

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Duurzaam renoveren

Trecodome

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Duurzaam renoveren

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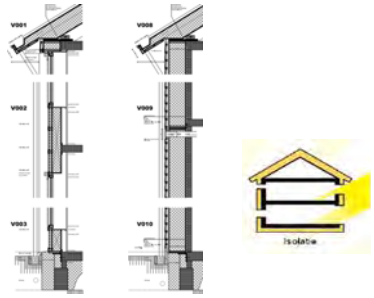
Duurzaam bouwen-renoveren



Trecodome

3. Airtightness + ventilation

15 kWh/m2

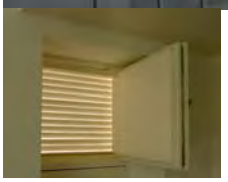
A breathing indoor environment

- Balanced ventilation with heat recovery
- Operable windows
- Summer night ventilation

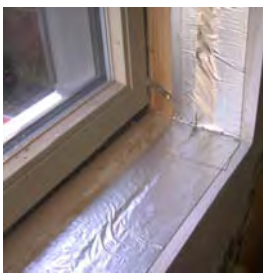
Trecodome

Summer night ventilation

- Ventilation rate between 4 – 20 depending on climate and temperature difference
- Night ventilation allows building to cool during evenings and night



Trecodome



Trecodome

Trecodome

Trecodome

4. International product sourcing

- Passive house timber frame elements and window frames not standard available in The Netherlands, whilst more common in Germany, Austria

Trecodome

European construction market ?

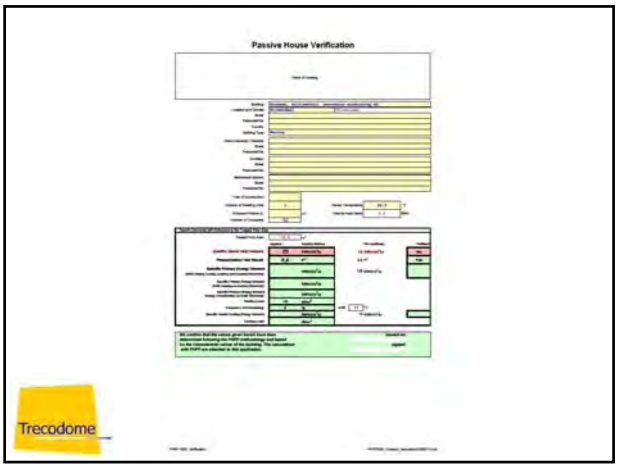
- Construction market is national
- Quality certificates, building specifications, pre-conditions for insurance etc
- all refer to national definitions

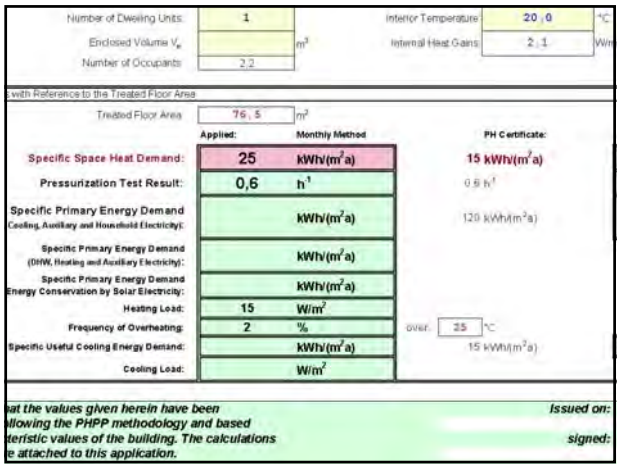
Trecodome

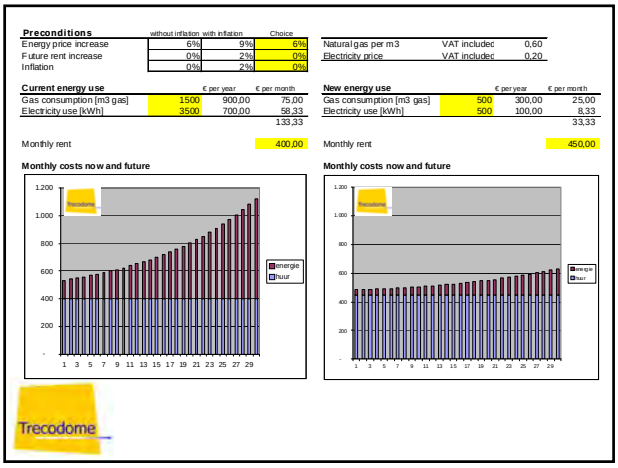
- Need for international harmonisation or international recognition of
  - Quality certificates of passive house components

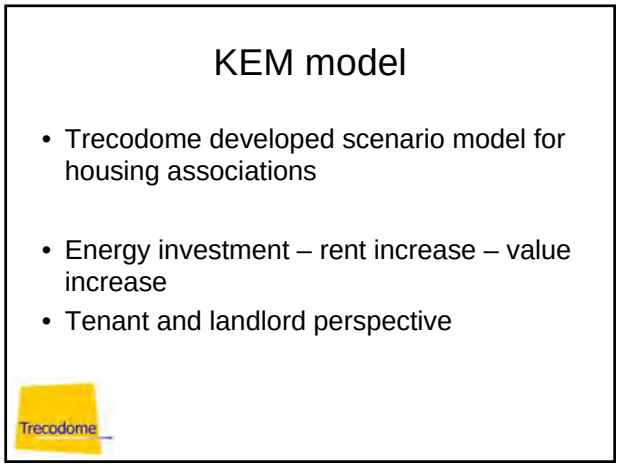
Trecodome

5. Investment + scenario planning


Passive House Verification
Trecodome


Number of Dwelling Units: 1
Enclosed Volume V_e m³
Number of Occupants: 2,2
Interior Temperature 20,0 °C
Internal Heat Gains 2,1 W/m²
with Reference to the Treated Floor Area
Treated Floor Area 76,5 m²
Applied: Monthly Method PH Certificate:
Specific Space Heat Demand: 25 kWh/(m²a) 15 kWh/(m²a)
Pressurization Test Result: 0,6 h⁻¹ 0,6 h⁻¹
Specific Primary Energy Demand Cooling, Auxiliary and Household Electricity): kWh/(m²a) 120 kWh/(m²a)
Specific Primary Energy Demand (DHW, Heating and Auxiliary Electricity): kWh/(m²a)
Specific Primary Energy Demand Energy Conservation by Solar Electricity: kWh/(m²a)
Heating Load: 15 W/m²
Frequency of Overheating: 2 % over: 25 °C
Specific Useful Cooling Energy Demand: kWh/(m²a) 15 kWh/(m²a)
Cooling Load: W/m²
at the values given herein have been Issued on:
llowing the PHPP methodology and based
teristic values of the building. The calculations signed:
e attached to this application.


Preconditions
without inflation with inflation Choice
Energy price increase 6% 9% 6%
Future rent increase 0% 2% 0%
Inflation 0% 2% 0%
Natural gas per m3 VAT included 0,60
Electricity price VAT included 0,20
Current energy use € per year € per month
Gas consumption [m3 gas] 1500 900,00 75,00
Electricity use [kWh] 3500 700,00 58,33
133,33
Monthly rent 400,00
New energy use € per year € per month
Gas consumption [m3 gas] 500 300,00 25,00
Electricity use [kWh] 500 100,00 8,33
33,33
Monthly rent 450,00
Monthly costs now and future
Monthly costs now and future
Trecodome


KEM model
• Trecodome developed scenario model for housing associations
• Energy investment – rent increase – value increase
• Tenant and landlord perspective
Trecodome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Duurzaam bouwen
3X PASSIEFHUIS DE KROEVEN-ROOSENDAAL
ANTWOORD OP WOONLASTENBEHEERSING
Han van Zwieten
Erik Franke
Architecten Werkgroep
Trecodome


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you don't use
THANK YOU
www.trecodome.com
chiel.boonstra@trecodome.com

G Handouts of presentations at Sofia workshop

MINISTRY OF REGIONAL DEVELOPMENT AND PUBLIC WORKS
REPUBLIC OF BULGARIA

UNITED NATIONS DEVELOPMENT PROGRAMME

Demonstration Project for the Renovation of Multifamily Buildings:

BEST PRACTICES AND BARRIERS TO LARGE-SCALE HOUSING REFURBISHMENT

WWW.OBNOVENDOM.COM

BACKGROUND INFORMATION

- Over 80,000 multifamily buildings with 700,000 residential units housing more than 2,000,000 people need serious retrofitting;
- An investment of approx. EUR 4 billion is needed for this purpose.

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A STATE HOUSING RENOVATION PROGRAMME envisages retrofitting of the multifamily housing stock in most urgent need (51% of all) – adopted in 2005

Expected results:

Social:
- Improved quality of life for 1/3 of the population;
- Contribution to social cohesion

Environmental:
- Energy consumption reduced by 3,990,000 MWh/per year;
- Greenhouse gas (GHG) emissions reduced by 3,420,000 t/per year

Economic:
- Boost to construction business and related industries;
- Contribution to employment preservation and generation

Urban:
- Urban upgrading and elimination of the threat for ghettoization of whole areas

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BULGARIA IS ELIGIBLE TO RECEIVE EU STRUCTURAL FUNDS FOR HOUSING POLICY (OPRD 1.2)

NO FUNCTIONING MECHANISM FOR LARGE-SCALE RETROFITTING ACTIONS

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DEMONSTRATION PROJECT FOR THE RENOVATION OF MULTIFAMILY BUILDINGS

- A joint initiative of the MRDPW and UNDP Bulgaria
- Objective - to develop and test a full cycle renovation action on multifamily buildings in order to prepare:
  - the start of the National Programme
  - the access to EU Structural Funds for "Housing Policy"

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PROJECT PARTNERS - PPP

- Bulgarian Ministry of Regional Development and Public Works (MRDPW);
- local authorities (municipalities) – centres of agglomerations according to the Operational Program Regional Development;
- Associations of private owners from the multifamily buildings:
- National Energy Efficiency Fund
- UNDP

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THE PROJECT SCHEME

Provision of a systematic support for renovation of multifamily buildings and surrounding public domain to voluntarily associated homeowners in whole building units through:

- technical assistance
- subsidies
- facilitated access to loans

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ACTIVITIES

- Technical and energy surveys;
- Energy efficiency measures – thermal and hydro insulation, replacement of windows and doors, etc. recommended in the energy survey report;
- Refurbishment of common parts, related to the safe habitation - repair of roof, stairwell, main entrance door, roof overhang over entrance, the entrance steps, etc. recommended in the technical survey report;
- Replacement of old amortized internal plumbing systems;
- Renovation of surrounding public areas.

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QUALITY ASSURANCE OF THE RENOVATION ACTIVITIES (1)

ACTIVITIES ARE IMPLEMENTED ON AN ENTIRE BUILDINGS BASED ON:

- Energy survey resulting in a report with recommendations for appropriate energy efficiency measures
- Technical survey of the buildings and their installations resulting in a status report as compared to the original building designs and respective recommendations for appropriate renovation activities

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QUALITY ASSURANCE OF THE RENOVATION ACTIVITIES (2)

MULTI-STAGE CONTROL MECHANISM IS IMPLEMENTED

- Project-employed technical experts supervise the execution of renovation activities in terms of schedule and financial resources and coordinate the actions of the participants in the process towards achieving the set goals
- Construction supervision contractor provides construction and investment supervision on behalf of the Project
- Condominium-appointed technical expert is authorized to represent the Beneficiary (condominiums) in the process of renovation and to perform investment supervision

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QUALITY ASSURANCE OF THE RENOVATION ACTIVITIES (3)

A quality assurance system is observed with a clear delimitation of responsibilities and warranties between the contractor, the investor and the vendors of used materials in order to achieve the contracted design parameters

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ENERGY PASSPORT

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ACHIEVEMENTS 2007–2009 (1)

Results

- 27 multifamily buildings renovated
- 27 buildings undergoing renovation - technical and energy surveys executed and design documentation prepared

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ACHIEVEMENTS 2007–2009 (2)

Outputs

- 8,488,575 kWh (40-60%) planned energy savings due to renovation works per annum
- 6,672 t planned saved CO_2 emissions per annum
- 219 jobs created per annum

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VARNA

Address: Vladislav Varnenchik qtr., bl. 406, entr. 3
Type of structure: prefab concrete panel
Beneficiary households: 18
Reduction of energy consumption: 55%
Reduction of greenhouse gas emissions: 141 t per annum

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BLAGOEVGRAD

Address: Zapad Complex, bl. 17
Type of structure: lift slab
Beneficiary households: 30
Reduction of energy consumption: 47%
Reduction of greenhouse gas emissions: 115 t per annum

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BLAGOEVGRAD

Address: Elenovo Complex, bl. 152
Type of structure: prefab concrete panel
Beneficiary households: 12
Reduction of energy consumption: 85%
Reduction of greenhouse gas emissions: 52 t per annum

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GOTZE DELCHEV

Address: Simeon Radev Str., bl. 15
Type of structure: lift slab
Beneficiary households: 38
Reduction of energy consumption: 64%
Reduction of greenhouse gas emissions: 79 t per annum

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SMOLYAN


Address: Raikovo qtr., Byalo More str., bl. Izvor 6, entr. C
Type of structure: prefab concrete panel
Beneficiary households: 12
Reduction of energy consumption: 63%
Reduction of greenhouse gas emissions: 21 t per annum

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SOFIA


Address: Mladost 3 Complex, bl. 355
Type of structure: prefab concrete panel
Beneficiary households: 24
Reduction of energy consumption: 57%
Reduction of greenhouse gas emissions: 53 t per annum

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BURGAS


Address: Bratia Miladinovi Complex, bl. 27, entr. A
Type of structure: prefab concrete panel
Beneficiary households: 10
Reduction of energy consumption: 68%
Reduction of greenhouse gas emissions: 19,1 t per annum

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MAJOR BARRIERS TO LARGE-SCALE HOUSING REFURBISHMENT (1)

The renovation of multifamily residential buildings is a complex and complicated process. For the successful launch of a large-scale renovation process it is necessary that all problems (legal, financial, organizational, and technical) be addressed simultaneously and coordinated by the owners of residential buildings, the responsible institutions, the business.

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MAJOR BARRIERS TO LARGE-SCALE HOUSING REFURBISHMENT (2)

- Ownership structure, traditions in condominium management, legal framework
  - *96% private ownership in condominium buildings in Bulgaria* creates problems with decision making about refurbishment
  - *Diverse social mix of owners* - inadequate financial means of low income owners to undertake refurbishment
  - No traditions in the management and maintenance of multifamily buildings; professional management is an unknown practice but renovation requires a complex technical intervention, application of technical norms and achievement of high standards
  - The newly adopted Condominium Law does not encourage the creation of associations (legal persons) for the management and renovation of the common property

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MAJOR BARRIERS TO LARGE-SCALE HOUSING REFURBISHMENT (3)

- Lack of working financial support mechanisms
- Difficult access to credit for some households
  - The standard package of retrofitting measures (to achieve technical standards) on average costs EUR 3,000 to 5,000;
  - This amount is only affordable to 30% of households;
  - A subsidy of around 50% increases the share of households to 70%;
  - The remaining households cannot afford any investment and/or loan and require additional targeted support.

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MAJOR BARRIERS TO LARGE-SCALE HOUSING REFURBISHMENT (4)

- Vaguely defined roles of the institutions in support of the large-scale housing refurbishment process
  - Absence of a specialized government body responsible for housing policy
  - Lack of available resources for the municipal administrations to conduct housing policy at the local level

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THANK YOU FOR YOUR ATTENTION!

Tatyana Stoyanova

Manager
Demonstration Project
for the Renovation of Multifamily Buildings

tel. +359-2-9808314, +359-2-9808316,
fax +359-2-9804227

obnovendom@gmail.com

http://www.obnovendom.com

SQUARE

A Quality Assurance System
for Improvement of Indoor Environment and Energy
Performance when Retrofitting Multifamily Houses

National Pilot Project
Dieselweg Graz – Austria
National Workshop Sofia 10.03.2010

Armin Knotzer
AEE - Institute for Sustainable Technologies (AEE INTEC)
A-8200 Gleisdorf, Feldgasse 19

Renovation residential area "Dieselweg, Graz"

Pre-renovation

Austrian Pilot Project

Builder: GIWOG — Non-profit housing association in Austria

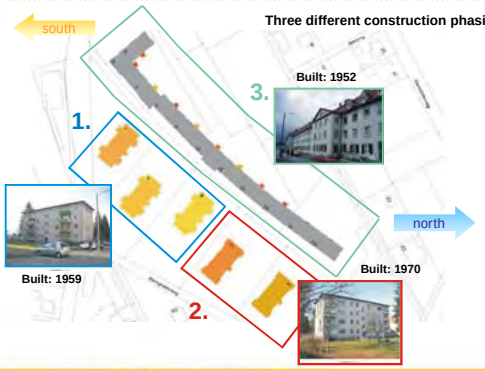
2007 The GIWOG took over the residential area
No measures had been carried out during the last 50 years - Bad living - situation for tenants !

source: gis2 – digital atlas Styria (www.gis.steiermark.at, download 03.03.2009)

Renovation residential area "Dieselweg, Graz"

Existing building stock

Austrian Pilot Project



Renovation residential area "Dieselweg, Graz"

Following the QA-System...

Austrian Pilot Project

Pre - renovation	Requirements	Design	Construction	Commissioning	Management
Inspection and investigation of building status. Energy analysis of the existing building stock. Participation of tenants.	Defined objectives and targets according to legal and normative requirements and the intra-corporate policy. Advanced targets (passive house standard and create pilot project)	Design building structures and installation system. Energy engineering Project schedule Plan quality control Approval of planning	Systematic construction-management Serial inspections in the fabrication hall and on-site Ongoing awareness-training	Scheduled hand-over Thermographical analysis Hand-over inventory documents Hand-over operation and maintenance documents	Monitoring energy consumption and indoor environment Questionnaires to tenants Establish operation and maintenance routines

acc. to **QA-system ISO 9001**
acc. to **EN 16001**
"Energy management systems – Requirements with guidance for use"

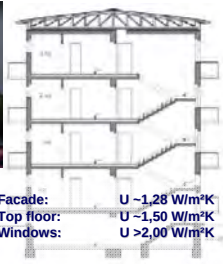
Renovation residential area "Dieselweg, Graz"

Situation before renovation

Austrian Pilot Project

Pre - renovation

Inspection and investigation of building status.
Energy analysis of the existing building stock.
Participation of tenants.



Facade: U ~1,28 W/m²K
Top floor: U ~1,50 W/m²K
Windows: U >2,00 W/m²K

Existing building stock

Graz, Dieselweg 4, 6, 8

Source ground floor, cross-section: **Hohensinn Architektur ZT GmbH**

Renovation residential area "Dieselweg, Graz"

Objectives

Austrian Pilot Project

Requirements

Defined objectives and targets according to legal and normative requirements and the intra-corporate policy.
Advanced targets (passive house standard and create pilot project)

Objectives to improve **energy efficiency** and increase **renewable energy sources**

- Reduce energy demand
- Reduce running costs
- Reduce green house gas emission
- Eliminate constr. damages

Objectives to improve **indoor environment**

- Single-room ventilation devices with heat recovery
- Centralised heating system
- Usage of solar thermal systems
- Increase living space
- Barrier-freeness through elevators

Objectives to improve **social environment**

- „Inhabited building site"
- Increased indoor living quality
- Increased outdoor living quality

Renovation residential area "Dieselweg, Graz"

Target – performance comparison

SQUARE Austrian Pilot Project

Phase	Picture	Year of Construction	Net Floor Area [m2]	Number of Apartments	Heat Demand (calculated PHPP) in [kWh/m2.y] BEFORE	Heat Demand (calculated PHPP) in [kWh/m2.y] AFTER (calculated)
1.		1970	1.240	3x16	184	9,6
2.		1959	1.298	2x19	225	9,6
3.		1952	858	9x14	142	13,6

Comparison **"Objectives and current status"**

Major renovation !

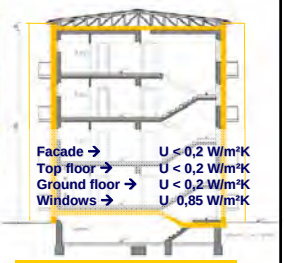
www.aee-intec.at AEE - Institute for Sustainable Technologies

Renovation residential area "Dieselweg, Graz"

Design & planning stage

SQUARE Austrian Pilot Project

living room extension
elimination of thermal bridges



Facade → U < 0,2 W/m²K
Top floor → U < 0,2 W/m²K
Ground floor → U < 0,2 W/m²K
Windows → U 0,85 W/m²K

Design

Design building structures and installation system.
Energy engineering
Project schedule
Plan quality control
Approval of planning

Retrofitted building

Graz, Dieselweg 4, 6, 8

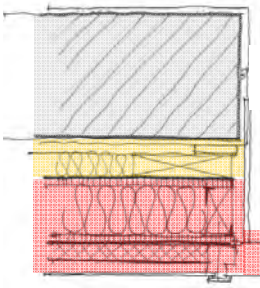
Source ground floor, cross-section:
Hohensinn Architetur ZT GmbH
Modifications: AEE INTEC

www.aee-intec.at AEE - Institute for Sustainable Technologies

Renovation residential area "Dieselweg, Graz"

Composition of pre-fabricated module

SQUARE Austrian Pilot Project



existing outside wall

after completion of mounting procedure:
the old window is removed from inside

on-site installation

pre-fabricated module

Develepoment of the pre-fabricated module
by the technical office "gap-solution"

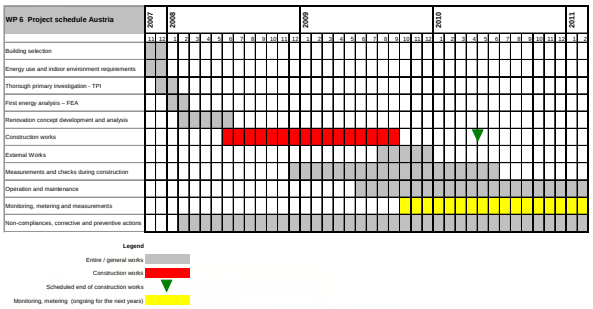
Source:

www.aee-intec.at AEE - Institute for Sustainable Technologies

Renovation residential area "Dieselweg, Graz"

Project schedule

SQUARE Austrian Pilot Project



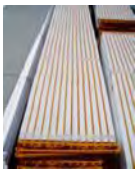
www.aee-intec.at AEE - Institute for Sustainable Technologies

Renovation residential area "Dieselweg, Graz"

Mounting on-site

SQUARE Austrian Pilot Project

- Elevator
- Electricity cables (wiring)
- Bore-holes for ventilation-pipes
- Heat dissipation system on exterior walls
- Equalization plane with…
- Rock wool between post a. mullion constr.
- Vapour-proof barriers
- Cutting-off roof-overhang





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Renovation residential area "Dieselweg, Graz"

Mounting of pre-fab modules

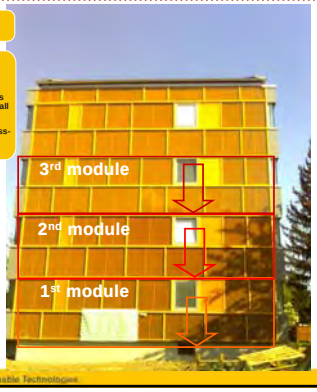
SQUARE Austrian Pilot Project

View on the gable end of one building façade:

- Horizontal joints
- Integrated windows
- Dimension of modules fixed by the line of the ceiling slab and the upper line of the windows
- Mounting order: starting with the lowest module

Construction

Systematic construction-management
Serial inspections in the fabrication hall and on-site
Ongoing awareness-training



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Renovation residential area "Dieselweg, Graz"

Mounting of pre-fab modules

Austrian Pilot Project

Construction

- Systematic construction-management
- Serial inspections in the fabrication hall and on-site
- Ongoing awareness-training

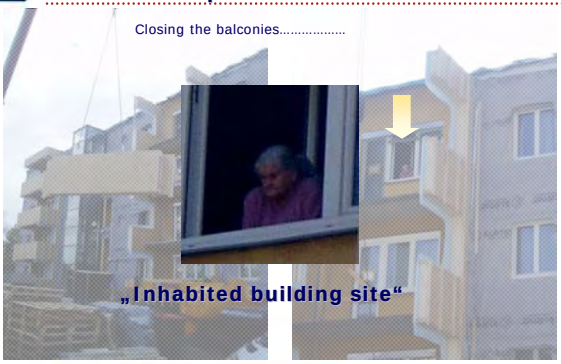
Mounting sequence of pre-fab modules on-site

Renovation residential area "Dieselweg, Graz"

Construction procedure

Austrian Pilot Project

Closing the balconies.....



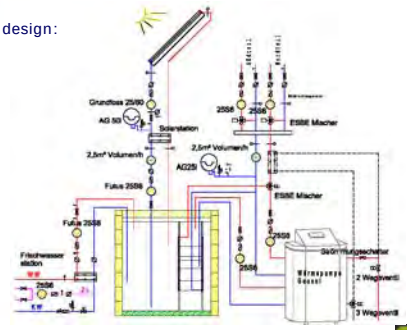
„Inhabited building site"

Renovation residential area "Dieselweg, Graz"

Building services

Austrian Pilot Project

Plant design:

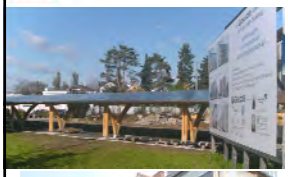


Source:

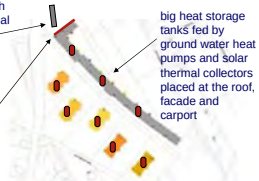
Renovation residential area "Dieselweg, Graz"

Heating and hot water system

Austrian Pilot Project

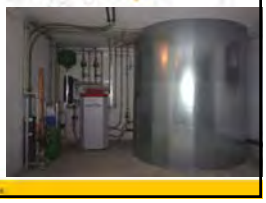


Carport with solar thermal collectors



big heat storage tanks fed by ground water heat pumps and solar thermal collectors placed at the roof, facade and carport

solar thermal facade collectors



Renovation residential area "Dieselweg, Graz"

Renovation of the building row

Austrian Pilot Project

Source pictures: AEE INTEC

Renovation residential area "Dieselweg, Graz"

Opening ceremony 11th Sept. 09

Austrian Pilot Project

Commissioning

- Scheduled hand-over
- Thermographical analysis
- Hand-over inventory documents
- Hand-over operation and maintenance documents

EINLADUNG

Freitag, 11. September 2009 um 15:00 Uhr

EINLADUNG

Renovation residential area "Dieselweg, Graz"

SQUARE Austrian Pilot Project

User manual for tenants

Management

Monitoring energy consumption and indoor environment

Questionnaires to tenants

Establish operation and maintenance routines

To establish operation and maintenance routines

Renovation residential area "Dieselweg, Graz"

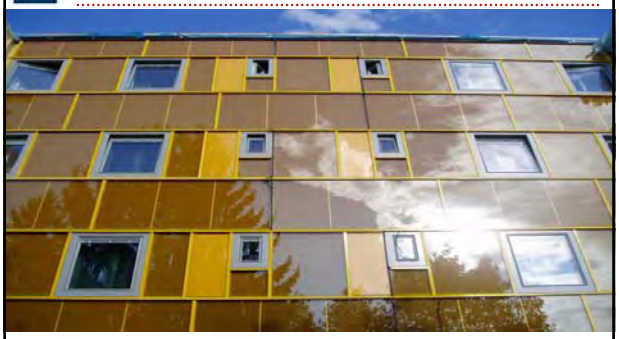
SQUARE Austrian Pilot Project

Awarded by...

Energy Globe Styria 2009

Renovation residential area "Dieselweg, Graz"

SQUARE Austrian Pilot Project



Thank you *for your attention!*

Findings Treco – SQUARE

SQUARE - WP7 workshops

WP 7 Workshops

Overview:

- The purpose of the workshops is to discuss methods and exchange experience from introduction of the QA system for energy use and improved indoor environment, as well as methods to communicate and disseminate result from this work.

Overview (cont.)

The workshops provide an opportunity for partners with technical background and partners with practical experience from pilot projects and associated partners (TRECO) from social housing companies, to meet in creative discussions and exchange experience.

- workshop 1 - Alingsas local workshop in Alingsas - introduction to SQUARE and passive house - 2007
- workshop 2 - Amsterdam - introduction to SQUARE and TRECO - 2008
- workshop 3 - Oulu - What are the needs for quality management systems, outline SQUARE system - 2008
- workshop 4 – Gleisdorf - Ins and outs of SQUARE system - feedback from Treco partners - 2009
- workshop 5 – Barcelona - Experiences with SQUARE-system
- workshop 6 – Sofia - Implementation routes for SQUARE-system

What is Treco

- Treco is a network of European social housing organisations
- exchanging the implementation of building sustainability in practice
- By following pilot demonstration projects and
- Discussing selected issues and themes

SQUARE - Treco

- The SQUARE Treco meetings have been arranged with
  - A common discussion workshop
  - A common project site visit

Workshop Alingsas

- Introduction to SQUARE
- Introduction to passive renovation

- Site visit to Brogarden

Workshop Amsterdam

- Introduction to SQUARE method

- Site visit to Bijlmer area, the largest renovation in The Netherlands

Workshop Oulu

Oulu, Finland

- Explanation and in depth presentation of SQUARE method.
- Meeting between SQUARE – Treco and TES, prefabricated timber elements

  > spinoff to passive school in NL, passive new built houses in UK, and passive renovation in NL

Workshop Gleisdorf

- In depth application of SQUARE method in pilot project
- Useful exchange with Treco partners
- Presentation of SQUARE application by UK Treco members

Workshop Barcelona

- In depth presentation of SQUARE application in Spanish pilot project
- Discussion about Spanish renovation practice

International event Roosendaal

- International gathering 13 October 2009 Roosendaal, The Netherlands, with site visit to large scale passive renovation project
- SQUARE presented by Kristina Mjornell
- UK Treco partners visited

Kroeven, Roosendaal

Two passive renovation concepts

Next Treco meeting

- May 2010
- Belfast
- Example of energy renovation of historical monuments in social housing

- SQUARE participants welcome to join Treco

SQUARE - A System for Quality Assurance when Retrofitting Existing Buildings to Energy Efficient Buildings

Coordinated by
SP Technical Research Institute of Sweden
Box 857, SE-501 15 BORÅS, Sweden

www.iee-square.eu