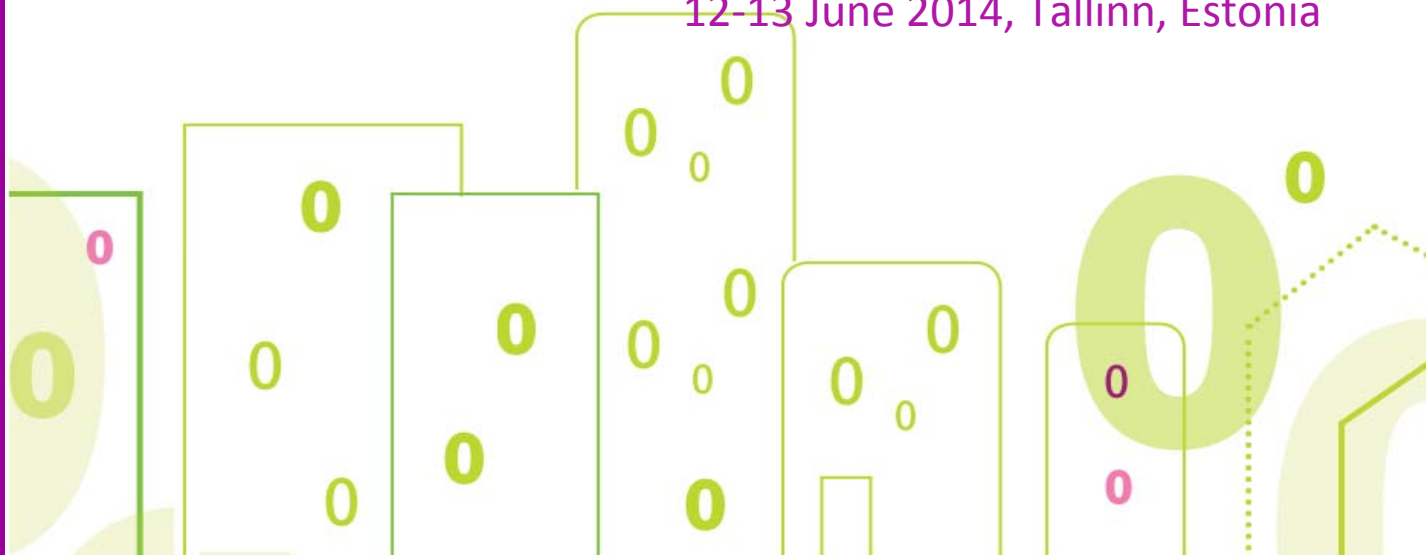


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NEARLY-ZERO ENERGY BUILDINGS IN DIVIDED/COOPERATIVE OWNERSHIP

Report of the Workshop “Legal and organisational
framework: Focus on divided and cooperative ownership
multifamily buildings”
12-13 June 2014, Tallinn, Estonia



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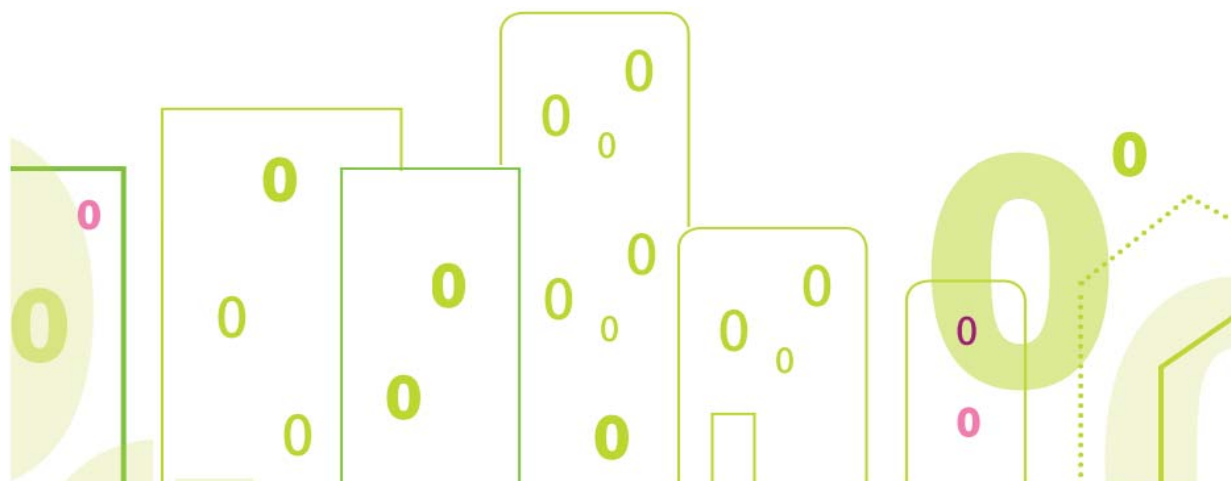
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1. Introduction

1.1 About the Power House Nearly-Zero Energy Challenge

Social, cooperative and public housing providers in Europe own and manage 12 per cent of the housing stock.¹ The Power House Nearly-Zero Energy Challenge (NZEC), funded by Intelligent Energy Europe and led by Housing Europe, seeks to build capacity and confidence amongst these providers ahead of the requirement, that in 2020, all new buildings should be nearly-zero in terms of their energy consumption and that any energy required is sourced from renewable supplies. Providers have a key role to play in ensuring the actual delivery of the nearly zero energy building (nZEB) requirements, not only in terms of their new construction but also in the retrofitting of their existing stock to reduce carbon emissions. This is done by taking a close look at the practical experience of four thematic inter-European Taskforces:

- nearly-Zero energy housing experiences in cold, continental climates (nZEB Cold)
- nearly-Zero energy housing experiences in warm/Mediterranean climates (nZEB Med)
- nearly-Zero energy housing in regions characterised by divided/individual ownership (nZEB Divided Ownership)
- financing of nearly-Zero energy housing renovation and new-build (financing nZEB)

The Power House NZEC initiative will help social housing organisations to identify avoidable mistakes and ‘reinvention of the wheel’ so they can get on track to meet the nearly-Zero 2020 obligations outlined in the Energy Performance of Building Directive².

1.2. About the nZEB Divided/Cooperative Ownership Taskforce

The nZEB Divided/Cooperative Ownership Taskforce involves representatives from Bulgaria, Estonia and Italy and focuses on divided and cooperative property housing, where residents play a major role in the decision making process concerning the management of the building. The resident, who is either the owner of the dwelling in a multifamily building (divided ownership) or has a stronger right of occupation (cooperative ownership) than in the case of a normal renting contract, is called to

¹ Diacon, et al. Progress Report: Fair Energy Transition towards nearly-Zero Energy Buildings, 2013

² For further info, visit www.epbd-ca.eu

participate actively to the decision making process regarding the management of the building or its renovation.³

The taskforce is coordinated by EKÜL and Finabita. EKÜL, the Estonian Union of Co-operative Housing Associations, is an independent organisation that brings together over 1,400 co-operative housing associations across Estonia. Finabita is an agency of Legacoop Abitanti, the Italian National Federation of Housing Cooperatives, which represents 3,000 cooperatives across Italy. As part of the Power House NZEC project, the nZEB Divided/Cooperative Ownership Taskforce will investigate what the nZEB standard means in practice and will facilitate the adoption of the standard in divided and cooperative property housing.

1.3 About the workshop

In divided and cooperative property buildings, the role of the tenant or owner is crucial for the decision making process, especially with regard to the retrofitting of existing buildings. Different member states have different regulatory frameworks regarding the decision making process, in some cases with special rules for energy efficient renovation. In order to discuss the situation in divided and cooperative buildings in different member states, the Estonian Union of Co-operative Housing Associations (EKÜL) organised a workshop in Tallinn, Estonia on 12-13 June 2014. The workshop involved representatives of the cooperative and social housing sector, national experts and housing managers and those who had a responsibility for the drafting and management of programmes to incentivise and finance energy efficiency. The workshop aimed to address organisational practices in multifamily dwellings and share lessons learned in facilitating the decision making process for energy efficient refurbishment in the different national/regional legal frameworks. Experiences in multifamily buildings from different European countries were presented by invited speakers. The workshop was followed by a technical study visit to three refurbished multifamily buildings in the cities of Tallinn and Rakvere.

1.4 About this report

This report highlights the discussions and outcomes from the workshop and study visit held in Estonia on 12-13 June 2014. It includes a brief description of the presentations by and discussion amongst EKÜL's members, partners and other representatives on nZEB developments in Estonia. Examples and experiences from different European countries on the legal and organisational framework of energy efficient renovation in multifamily buildings which were presented at the

³ Rossi, et al. WP3 Divided and Cooperative Ownership Deliverable D3.1 'Needs Analysis and Work Programme', 2012

workshop are also briefly described in this report. Additionally, the report summarises the key features of three refurbished divided property buildings in the cities of Tallinn and Rakvere that were visited as part of the event. The report concludes with some recommendations for the cooperative and divided ownership sector to help address the barriers to collective decision making for energy efficient refurbishment in multifamily buildings.

2. nearly Zero Energy Building developments in divided/cooperative ownership in Estonia

The morning session of the workshop provided an opportunity for representatives of apartment associations to meet and discuss nZEB developments with a focus on refurbishment of apartment buildings in Estonia. Below is a brief summary of the speakers' presentations.

Opening remarks

Mrs Eha Võrk, Deputy Mayor of the City of Tallinn

Mrs Võrk welcomed all participants to the seminar and pointed out the relevance of the subject of legal and organisational frameworks to the apartment associations' activities in Estonia. An apartment association is a non-profit association established by apartment owners for the purpose of shared management of the legal shares of the building and plot of land and represents the shared interests of the members.⁴ Mrs Võrk outlined the tasks and aims of the city government of Tallinn in supporting housing associations in their activities and introduced some successful examples of services and cooperation between apartment associations, one of which is the "Yards in order" project started by the City of Tallinn in 2005. "Yards in order" is financial support available for apartment associations that provide subsidies of up to 70 per cent of the project costs for the building of pavements, playgrounds and car parks, installation of dustbins, green space development and street lighting improvements etc. In the last eight years, more than EUR €6 million have been allocated for the "Yards in order" project.

The effect of the reconstruction grants and the conditions regarding applications in the new programming period

Mrs Triin Reinsalu, Acting Head of the Housing and Energy Efficiency Division at Fund KredEx

Mrs Reinsalu gave an overview of the condition of the housing stock in Estonia and the impact of KredEx's reconstruction grants. She showed that with the help of these reconstruction grants,

⁴ Co-operatives in Estonia <http://www.housinginternational.coop/co-ops/estonia>

apartment associations have invested a total of €151.4 million into the renovation of apartment buildings. These investments are large-scale and dependent on state grants. As a result of the continuous allocation of apartment building reconstruction grants, people have become better informed and consequently the number of fully renovated apartment buildings has increased over the years. In 2010, only one apartment building (three per cent of the buildings that received the grant) was renovated with a 35 per cent grant. In 2013, 62 buildings were fully reconstructed (61 per cent of the buildings that received the grant). It is estimated that as a result of the renovation works, the apartment buildings have managed to save 43 per cent of their energy consumption. In the new EU Structural Funds programming period 2014-2020, €102 million is planned to be provided to the programme to give those apartment associations which have not yet embarked on a renovation project the opportunity to be able to undertake this work.

Energy audit and renovation project management

Mr Aare Vabamägi, Energy Auditor, nZEC Project Expert

Mr Vabamägi focused his presentation on the different aspects of the energy audit and refurbishment process in multi-apartment buildings from an energy auditor's perspective. He illustrated some practical renovation cases in Estonia, described the decisions that were successful and highlighted mistakes that were made. The presentation led to an active discussion with the audience over practical questions about the renovation process in multi-apartment buildings. It was pointed out that the best results of energy efficiency in apartment buildings are always achieved with full-scale reconstruction and therefore it is essential for members of apartment associations to make efforts to reach decisions during the general assembly to renovate their apartment building as comprehensively as possible. Mistakes are often made when associations decide to organise 'piecemeal' renovation works which could take longer to complete. In addition it was highlighted that in the technical renovation process, the building's architectural solution and landscaping around the building should be taken into consideration so that renovation not only aims to achieve improvements to the energy efficiency of the building but also to improve the wider living environment.

The impact of the new Building Act on the apartment associations

Mr Ago Pelisaar, Adviser in the Ministry of Economic Affairs and Communications

Mr Pelisaar gave an overview of the new Building Act in Estonia, explaining the simplification and expediting of the procedure for issuing building permits. The new Building Act will exempt several works that needed a license before from such requirement and therefore the Act will bring about a positive impact to apartment associations and their activities. All documentation concerning construction works will only be processed via electronic register, which will reduce the paperwork

and process for undertaking new renovation works. It will also be easier for apartment associations to seek permission for constructing small ancillary buildings as the permit procedure will be simplified for these types of buildings.

3. Energy refurbishment in divided/cooperative ownership buildings: Legal and organisational examples from European housing providers

The afternoon session of the workshop presented a number of decision-making experiences and examples on refurbishment in Europe, focusing on multifamily buildings. All the presentations are available on the Powerhouse Europe website.⁵

3.1 Split incentives in the building sector across the EU

Speaker: Dr Marina Economidou, Joint Research Centre – European Commission

Dr Economidou introduced the split incentives issue in the building sector across the EU. Split incentives are barriers between building owners and tenants that hinder the uptake of energy efficiency investments. A classic example is where landlords must pay for energy renovation but tenants receive the immediate benefits of energy savings, which may dissuade the landlord from improving the property's energy efficiency. In multi-family residential buildings, many different property owners have to either approve a decision or make a financial contribution and this makes it very challenging to agree about energy saving investments. Hence, designing programmes or mechanisms that address who pays and who benefits from energy efficiency upgrades is critical.

Article 19 (1)(a) of the Energy Efficiency Directive recognises the importance of addressing the split incentive issue. In March 2014, the Joint Research Centre (JRC) organised a workshop to further discuss this barrier and investigate various solutions in social housing, private residential and commercial sectors. A number of schemes across the EU that tackle split incentives were discussed during that workshop. Detailed information on these practices is available as a publication on the Joint Research Centre website⁶. Dr Economidou highlighted that there is no 'one-size-fits-all' solution to split incentives due to differences in national conditions and across building sectors. However, there are several lessons that can be learned and applied from the existing practices in order to deal with the barriers. This includes incorporating strategies to tackle split incentives in an energy

⁵ Presentations can be accessed at http://www.powerhouseeurope.eu/nc/news_events/events/detail/back/past-events/article/power-house-dividedcooperative-ownership-taskforce-workshop-study-visit-12-13-june-2014-tall/

⁶ A summary of the JRC workshop on "Overcoming the split incentive barrier in the building sector" is available at http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/32715/1/2014_jrc_sci_pol_rep_cov_template_online_final.pdf

efficiency policy and splitting the costs and benefits in a balanced way between all the actors involved.

3.2 Contractual and decision making aspects with homeowners of an energy renovation project: the Factor20 experience in the City of Lodi, Italy

Speaker: Mr. Matteo Zanchi⁷, Polytechnic University of Milan

The Factor20 project (**F**orwarding **O**n demonstrative **ACT**ions **O**n a **R**egional and local scale to reach EU targets of the European Climate Action Plan “20-20-20”) aims to define a set of tools to support local authorities in developing and implementing concrete actions that can help achieve the sustainability objectives set by the European Union in 2020 – reduce energy consumption and greenhouse gas emissions by 20 per cent, increase the share of renewable energy to 20 per cent and achieve a 20 per cent increase in energy efficiency.

Mr Matteo Zanchi of the Polytechnic University of Milan presented the case of Lodi, a city in the Lombardy region of Italy, which participated as a pilot area in the Factor20 project. Within the framework of the project, the city developed a model for investing with ESCo (Energy Service Company) to upgrade the energy efficiency of condominiums. An ESCo was tasked with conducting a feasibility study on the refurbishment of multifamily dwellings, through third-party financing. The selected building was a private residential condominium built in the 60s which has 98 apartment units with gas-fired central heating and a separate system for hot water generation. Based on scenarios and cost-benefit analysis, the proposed interventions were identified and included replacement of the boiler, installation of thermostatic valves and separate meters, attic insulation and installation of double glazed windows. An EPC (energy performance contract⁸) with guaranteed results and third party financing would be introduced to finance the utilities/measures selected. In the contract, the ESCo would guarantee energy savings of 30 per cent compared to the baseline and a portion of the savings to be shared between the ESCo and owners. Several discussions were held with owners, building managers, operations and management (O&M) company, the energy provider and bidding ESCOs in order to define the economic and financial aspects of the measures and outline

⁷ Matteo Zanchi was the former Lead Coordinator for the development and implementation of energy conservation and renewable energy action plans (SEAP) of Lodi Municipality, Italy.

⁸ Under an EPC arrangement, an ESCo develops, implements and finances (or arranges financing of) an energy efficiency project and uses the stream of income from cost savings to repay project costs, incl. costs of investment. The ESCo also guarantees to the client that they will achieve a specified level of energy savings. Under EPC, energy users can borrow money from a financial institution with a performance guarantee from the ESCo. When linked to third party financing, energy cost savings can exceed the cost of repaying the third party capital.

Source: www.iea.org/media/workshops/2012/energyefficiencyfinance/2d4Langenheld.pdf

agreements among the parties involved in the contract. The residents agreed to the proposed technical measures and procedures. However, the O&M company and the energy provider which provides 80 per cent of the gas in the City of Lodi believed that they would lose some of their market share of the fuel provision from the process. During the decision making, these two actors planted a seed of doubt among the residents, who then decided not to give remuneration to the ESCo and to keep all the gains from energy savings. With this arrangement, the residents could not make the investments so they also lost the savings and, together with the other parties involved, lost the opportunity of optimising the building refurbishment market.

The Factor20 pilot experience in the City of Lodi offers some lessons about decision making in multifamily buildings such as:

- It is crucial to gain and increase the trust of the final beneficiaries, the residents.
- Engage the local service providers/market actors in the process to get their buy-in and prevent misleading information to clients.
- Showcase existing best practice in order to build the confidence of the parties involved.

3.3 An overall approach to energy efficiency measures in a housing cooperative in Sweden

Speakers: Ms Emilia Fang and Ms Sofia Berg Horner, Riksbyggen

Riksbyggen, the Cooperative Building Organisation of the Swedish Trade Unions, is a cooperative enterprise founded in 1940 owned by the trade unions of the building sector, housing cooperatives and other national cooperative organisations. As the second largest cooperative housing organisation in Sweden, it manages 2,600 housing cooperatives and 16,000 rented apartments. Most of the housing cooperatives are multifamily housing units located in urban areas and 25 per cent of these cooperative apartment blocks were built during the 60s and 70s as part of the government's Million Homes Programme to overcome housing shortages, and are not energy efficient. With few new apartments built per year in the country, it is more important to renovate these old buildings.

Ms Emilia Fang and Ms Sofia Berg Horner of Riksbyggen introduced their organisation's approach and experiences in implementing energy refurbishment projects. In a housing cooperative, both the residents or tenant owners (members of the cooperative) and the Board (elected by members/general assembly) have divided responsibilities in the maintenance and refurbishment of their dwellings. A major challenge faced by the owners is the large investment costs and construction fee needed to do a full scale renovation. In addition, heating bills in housing cooperatives are already included in the rent, which offers no incentive for residents to save energy. In order to overcome these difficulties and engage the tenant owners, Riksbyggen partnered with KTH (Royal Institute of Technology) and SUST (a national centre for energy efficiency in Sweden) in a project called 'Renovation Workshop', which highlighted 13 good practice examples of renovation

efforts in multifamily buildings. The speakers featured the work in Tuvehus 6, where a replacement of the plumbing system opened up further renovation possibilities. A decision support system was also applied based on knowledge transfer between different parties involved in the refurbishment project. Through this process, it was found that the tenant owners had to be involved very early in the process to implement the energy saving measures; technical experts were key to understanding the different measures and get buy-in from owners to support the measures and cooperation between parties was essential for successful implementation.

3.4 Buildings in Estonia's National Energy Strategy

Speaker: Mr Madis Laaniste, Energy Department of the Estonian Ministry of Economic Affairs and Communications

Mr Madis Laaniste presented the national energy strategy of Estonia and its implications on the housing sector. Buildings consume 49 per cent of total energy use in Estonia and 85 per cent of these buildings are owner-occupied. The national energy policy that was adopted by the Parliament in June 2009 focuses on a more energy efficient consumption (119 PJ or 2,818 ktoe⁹) and a higher share of renewable energy (25 per cent) by 2020. The government is currently reviewing this energy policy in line with the EU competitiveness strategy 2020. Estonia's new energy strategy until 2030, to be submitted to the Government for approval in November 2014, is aimed at ensuring an energy supply that is available to consumers at a reasonable price, while observing the terms and conditions established in the EU's long-term energy and climate policy.

Mr Laaniste stated that by integrating individual energy policy domains (transport, energy supply, etc) and the national housing strategy, the new energy plan will address housing and energy issues in a holistic way through coordination among social and transport infrastructure sectors in urban spatial planning, training the construction industry to meet the technological challenges of nZEB 2020 requirement and engaging housing associations and cooperatives at a local level. Deep renovation of buildings offers a significant opportunity and a cost efficient option for achieving energy savings. However, substantial refurbishment needs to be done on a long-term basis and this requires active intervention from the state to ensure financing for householders and working with housing associations to encourage energy saving behaviour. With appropriate interventions in energy efficiency, a scenario analysis found that an additional €1 billion of GDP could be generated in Estonia.

⁹ Tons of oil equivalent or energy that is equivalent to energy obtained by burning one ton of oil, 1 toe = 41,868 GJ, 1 TWh electricity energy = 0,086 Mtoes (Mtoe – mega toe or million toes, ktoe – kilo toe or thousand toes). Source: www.mkm.ee/en/objectives-activities/energy-sector/energy-efficiency

3.5 Legal and organisational framework – The Estonian case

Speaker: Mr Andres Jaadla, The Estonian Union of Co-operative Housing Associations

Mr Andres Jaadla presented the Estonian experience in renovating apartment buildings through the work of the Estonian Union of Co-operative Housing Associations (EKÜL), the umbrella national organisation for the co-operative movement in Estonia with over 1,400 members across the country. EKÜL provides their members with training and legal services for managing apartment associations. In Estonia, 96 per cent of the apartments have been privatised and are organised through housing co-operatives and apartment associations (where 65 per cent of the Estonian population live). The majority of these buildings were a product of Soviet mass housing construction and need refurbishment to improve their energy efficiency. EKÜL is promoting the nZEB principles to their members and supports them in the legal and organisational processes of refurbishment. EKÜL also takes a wider integrated look at urban surroundings when renovating. For instance, the renovation project in the city of Rakvere has improved the public spaces and streets as well as refurbishing the buildings.

In order to achieve the nZEB 2020 regulation, Mr Jaadla called for urgent action to renovate these buildings as the whole renovation process takes time. Based on EKÜL's experience in Rakvere in 2013, the organisational and decision-making process for renovation within apartment owners could take up to two years before the actual renovation can get started. Applying for funding also requires time and resources. For instance, for any renovation projects planned for 2016, applications for the new EU Structural Funds would have to be prepared and sent urgently. Moreover, it takes time to find experts that are not only good technically but are also good communicators in providing information about renovation to owners. EKÜL is trying to address this issue by building a database of experts on the bidding process and through 3D visual presentations so the members/owners understand how their buildings would look like after the renovation.

3.6 Implementation of a programme to improve energy efficiency in residential buildings in Latvia

Speaker: Mr Sergej Sidorko, The Latvian Union of Apartment Associations

Mr Sidorko gave an overview of Latvia's regulations on residential properties and decision-making conditions and process in a community of apartment owners. Detailed information about the legal and regulatory framework around ownership and management of multi-apartment block buildings in Latvia is available as a case study report on the European Investment Bank website.¹⁰ All apartment

¹⁰ Please see: <http://www.bei.europa.eu/attachments/documents/jessica-study-latvia-en.pdf> (pp.10-23)

owners of the residential building make up a community of apartment owners – an administrative body of the residential building which decides on any matter relating to the existing joint property including the management/maintenance of the building. They may perform the management activities themselves or decide to assign these tasks to a building manager/administrator.

As the majority of the housing stock in Latvia was built between 1950 and 1990, it has very high energy consumption of around 150 to 350 kWh/m² per year and needs substantial renovation. Initiatives and projects were implemented to improve the buildings' energy efficiency. With co-financing by the EU and financial support from banks, more than a thousand buildings in Latvia were renovated from 2009-2013, resulting in the reduction of energy consumption from 30 to 50 per cent. An example is the case of Bāka-2, a cooperative society of apartment owners in Riga representing 28 apartment houses with 1800 units and 4500 inhabitants, which renovated nine apartment buildings (with six buildings renovated using EU co-financing) allowing them to save 100 kWh/m² per year.

3.7 Legal and organisational framework – The German case

Speaker: Mr Fabian Viehrig, GdW

GdW, the Federal Union of German Housing and Real Estate Associations, is the umbrella organisation of housing and real estate in Germany representing nearly 30 per cent of all rental flats, managing around 6 million housing units. With a homeownership rate that is among the lowest in Europe, the country has a controlled rental market and legal framework that protects tenants against eviction and high rent increases. Landlords are obliged to carry out required maintenance work including refurbishment works that comply with the energy saving ordinance (minimum requirements for the energy efficiency of the building) and could possibly pass on up to 10 per cent of the refurbishment costs to the tenant. The government provides financial support or subsidies for individual tenants and properties in the social housing sector.

Mr Viehrig also pointed out the legal and organisational frameworks in condominiums and cooperative dwellings. The German Condominium Act (WEG) constitutes the basis for all legal regulations involving individual freehold ownership or condominium owners. The costs incurred for maintaining/refurbishing the common property (i.e. land, common areas and major parts of the building) are shared between the condominium owners with respect to the size of their apartments. However, decision making issues also occur among owners, particularly when a large amount of money is needed for a comprehensive refurbishment of the building as only a few banks grant loans to condominium owners. The Condominium Act allows a 75 per cent agreement in the owner-assembly for undertaking major refurbishment works. Nonetheless, the remaining 25 per cent are forced to contribute financially regardless of their financial capacity, which could pose a sequestration risk to these owners. Cooperatives differ from other housing organisations because

residents are at the same time owners/members of the cooperative. Due to their not-for-profit nature and long-term interests, housing cooperatives are more likely to invest in energy efficiency improvements. The landlord-tenant dilemma that hinders investment in other housing organisations is also less relevant for cooperatives.

4. Examples of refurbished divided property buildings in Estonia

To complement the Workshop, EKÜL organised a study visit to three different divided developments in the area. The first building, located in Tallinn (Sõpruse 202), is the biggest multi-apartment building refurbished in Estonia with 162 dwellings. The visit continued in Rakvere, where participants had the opportunity to visit the Rakvere Smart House Competence Centre, a regional competence centre in Estonia that focuses on smart house/intelligent building technologies, and other two multi-apartments buildings managed as apartment associations – Võidu 42 and Tuleviku 10. During the visits, participants were able to interact with the building managers and hear from them about the measures that had been adopted to achieve high energy standards. A video of the study visit can be viewed at http://youtu.be/PWJWJPmdHqw?list=PLiSIXg3Q3z_YXVfnyn-lolAZTrSmOI1oG.

4.1. Sõpruse 202, Tallinn



Photo credit: www.ekyl.ee

Sõpruse 202 is a multifamily building located in Tallinn constructed in 1970 and refurbished during 2012-2013. The building is in divided ownership and operated as an apartment association. The renovation project received funding from KredEx's reconstruction grant for associations and communities amounting to 35 per cent (€721,600) of the total project cost (€ 2,062,000). The apartment owners were able to secure bank funding to pay the remaining 65 per cent cost and have a fixed interest loan for 20 years.

Sõpruse 202 is the biggest renovated multi-apartment building in Estonia with 162 dwellings or apartments and was awarded "The Best Renovation Project" in Estonia by EKÜL in 2013. The building's energy consumption has been reduced to 65 per cent.

Selected technology

- A heat recovery technology ventilation system was installed;
- Thermal insulation was used to insulate the building;
- The roof was reconstructed and insulated;
- The heating system, water system and piping were refurbished;
- The electricity system was renovated;
- Triple glazed windows were installed in the façade;
- The elevators were renovated.

Lessons learned

It is critical to prepare for the general meetings of the apartment association. The board should prepare and organise the meetings with support from an energy expert and project manager. All information should be provided to the owners to help them make decisions regarding the comprehensive renovation. It is also essential that the board of the apartment association employ professional services for supervising the construction in order to prevent mistakes and problems during the reconstruction process.

4.2. Võidu 42, Rakvere

Võidu 42, located in the city of Rakvere, is a multifamily building constructed in 1989 and renovated in 2012. The building has 40 dwellings and is in divided ownership, operated as an apartment association. The renovation project received funding from KredEx's reconstruction grant for associations and communities amounting to 35 per cent of the total project cost.

Maintenance work needed to be done on the building's façade as well as its heating system and ventilation as there was uneven heat distribution and mould. However, apartment owners had different opinions regarding the renovation. A number of meetings were organised over several years but without any result due to the passive attitude of apartment owners. It took some time to get the votes needed for starting the renovation process from the majority of owners. The decision was finally made during the general assembly in 2004 and an energy audit with thermal photography was carried out a year later. In 2010 the apartment owners decided to arrange for a new energy audit and new construction project using the reconstruction grant from KredEx. The coordination and management of the project lasted almost six months. The association faced many difficulties in 2011 while looking for a suitable construction



Photo credit: Powerhouse Europe

company as construction prices had increased significantly but eventually they were able to find a local well-known company to do the construction works.

Financing scheme

- KredEx Fund provides 35 per cent subsidies for the comprehensive renovation;
- The apartment owners were able to secure bank funding to pay the remaining 65 per cent cost and have a fixed interest loan for 20 years;
- The flat owners are the beneficiaries of the financing schemes and will benefit from a high value property and a comfortable healthy indoor climate with a 50 per cent reduction in energy use.

Communication tasks for the manager

- The first step was the presentation of energy audit results made by an independent expert to the board members of the apartment association.
- The energy audit results were then presented to apartment owners at the general meeting. The board of the apartment association itself convinced owners to vote for renovation. Based on the communication and information available, apartment owners made a decision to start the renovation.
- The discussion on rising heating costs convinced the apartment owners to renovate the building.

Results

- The heat pump technology (heat recovery ventilation) for heat recovery and hot water production was installed. The technology is suitable for multi-family buildings because the capacity of exhaust air should be large enough for the heat pump. It is also suitable both for divided and cooperative ownership, because the ventilation systems and hot water systems are common systems for buildings with different ownership.
- External walls have been clad with 150mm EPS (expanded polystyrene foam) panels.
- A heating system has been replaced with a two-pipe system and new radiators were installed.
- A ventilation system was built by using heat pump recovery ventilation based on exhaust air.
- Energy consumption has been reduced to almost 50 per cent.

In numbers

- Savings estimated from running costs: Saved energy cost 289 MWh_h and 2 MWh_{el} in 2011 and 86 MWh_h and 31 MWh_{el} in 2013. Cost for the saved energy = 203 MWh_h*86 EUR/MWh - 29 MWh_{el}*130 EUR= 13 700 EUR/year.
- Simple payback time: 21 years.
- Saved energy is calculated by comparing 2011 and 2013. The achieved saving is 60 per cent.
- Investment costs for heated m² were 211 EUR.
- Specific heat consumption in 2011 was 208 kWh/m², in 2013 97 kWh/m².

Lessons learned

A detailed technical project plan for renovation helps speed up the organisational processes for renovation. It helps the apartment association to ask for tenders from construction companies and to compare different offers. It also helps construction companies make tenders to the association. Moreover, it is the basis of effective control and supervision during the renovation process. Preparing for the apartment association's general meetings is also crucial. The board should prepare and organise the meetings with support from an energy expert and project manager. All information materials should be provided to owners for them in order to make the decisions regarding the renovation.

Additional information

Further information of the Võidu 42 case can be accessed on the Powerhouse¹¹ website including the key elements of its design and the costs of the development. The Powerhouse Europe website includes nZEB case studies to facilitate good practice on new build and retrofitting across Europe. Võidu 42 building's primary energy consumption data is also tracked since 2010 and this can be accessed on the Hive¹² website, a database that tracks the consumption data of examples of new build and refurbished buildings in Europe.

4.3. Tuleviku 10, Rakvere

Tuleviku 10 is a 60-unit multifamily building located in Rakvere. It was constructed in 1977 and is a divided ownership type of building, operated as an association, which was established in 1990. Like Võidu 42, Tuleviku 10 was also renovated in 2012 with funding from KredEx's reconstruction grant for associations and communities amounting to 35 per cent of the total project cost.



In 2010 the building had maintenance issues: a leaking heating system, uneven heat distribution, mould and cold bridges. The association of apartment owners then decided an energy audit should

¹¹ Võidu 42 case study is available on the Powerhouse Europe website at www.powerhouseeurope.eu/nc/cases_resources/case_studies/single_view/?tx_phecasestudies_pi3%5Bid%5D=170

¹² Hive <http://panel.hiveproject.net/building-chart.php>

be conducted. Before the results of the energy audit were presented, the apartment owners were divided on the decision to renovate: a third was in favour of comprehensive renovation, another third was totally against any renovation work and the other third did not have a clear position on renovation. However, as the energy audit results were shown, the technical solutions of reconstruction were explained and upon knowing that the energy savings would meet the terms of the bank loan payments, an additional 1/3 of apartment owners started to support the renovation process garnering a 2/3 majority in favour of renovation.

The apartment association made a decision to take a loan, use a building design and building supervision grant from Climate and Energy Agency KENA and use the 35 per cent reconstruction grant from KredEx. A construction company was chosen and the construction process started immediately. The association had to wait two months for the decision and loan from one bank so they finally decided to change to another bank and completed the renovation.

Results

- The heat recovery technology *Intelivent inverter heat recovery system* was installed
- Thermal insulation of 150 mm was used for building insulation
- The heating system was changed to a two-pipe system with individual regulators
- Energy use has been reduced to 50 per cent.

In numbers

- Savings estimated from running costs: saved energy cost 610 MWh in 2011 - 315 MWh in 2013 = 295 MWh*86 EUR MWh = 25 370 €/year
- Simple payback time: 26 years
- Saved energy is calculated with a comparison of 2011 and 2013. The achieved savings is 50 per cent.
- Investment costs for heated m² were €165. Even if the savings are notable, the energy price is low compared with the investment price and this makes the payback period long.
- Specific heat consumption in 2011 was 154 kWh/m² and in 2013 79 kWh/m².

Additional information

Further information on the Tuleviku 10 case study is available on the Hive¹³ website, which is a database that tracks the consumption data of examples of new build and refurbished buildings in Europe. Some of these buildings are also featured as case studies on the Powerhouse¹⁴ website. The

¹³ Hive <http://panel.hiveproject.net/building-chart.php>

¹⁴ Powerhouse Europe http://www.powerhouseeurope.eu/cases_resources/

Hive website shows the electricity and heating consumption of the building and the coefficient values such as primary energy, CO2 equivalent and cost as well as the building's renewable energy production. Users can also compare consumption data for up to four buildings simultaneously.

5. Conclusions

The workshop in Tallinn introduced and facilitated the discussion on the barriers and solutions to the problems of collective decision making regarding energy efficient renovation in divided and cooperative property buildings among European housing providers. Decision making is more complex in divided and cooperative property buildings as owners are dependent on each other to reach a decision. In these multifamily buildings, the role of owners or tenants is crucial as they have the final decision and financial responsibility for the building's overall maintenance and energy efficiency investment. However, decisions to invest in energy efficiency in multifamily buildings are linked to other decisions concerning the building and its users. These are also influenced by other factors such as legal and regulatory contexts and the organisational or decision making process used to manage and renovate the building.

Based on examples presented by European housing providers in the workshop, aside from the split incentive barrier, a common issue for building owners is deciding collectively on a full scale renovation of the building. Deep renovation of large buildings offers a significant opportunity to reach nZEB 2020 goals and a cost efficient option for achieving energy savings. However, this type of work requires more resources and detailed information regarding the technical, legal, organisational and financial aspects of the project which owners may be sceptical about or have difficulty in accessing/understanding. Therefore it is essential for house managers or administrators in charge of daily management of the building and external experts such as energy advisors or consultants to engage the owners or tenants very early in the process and support them to reach a collective decision on what energy efficiency improvements are to be included and how they could be properly implemented. The Factor20 project experience in Lodi also highlighted the crucial role of service providers in providing reliable information to residents in order to gain their trust in the process. Showcasing existing good practice examples of renovation in multifamily buildings also helps facilitate the decision making process of residents, as in the case of Riksbyggen in Sweden.

Estonia offers some good practice examples and lessons in energy efficiency improvements. The refurbished buildings that were visited in the cities of Tallinn and Rakvere showed the importance of planning, information, participation and communication among all owners and parties involved in

the process to achieve a successful renovation. Moreover, improving public spaces and streets aside from the energy efficiency of buildings has also been pointed out by EKÜL and its members as an important part of the renovation process in order to improve the wider living environment. The city of Rakvere is a leading example of this initiative. There are a number of factors that encourage the uptake of energy efficiency among apartment owners in Estonia. In terms of financing, KredEx has been instrumental in stimulating the refurbishment market in the country. As a result of KredEx's continuous allocation of apartment building reconstruction grants, people have become better informed and the number of fully renovated apartment buildings has increased. The buildings visited in Tallinn and Rakvere have all received KredEx's reconstruction grant for associations and communities. Additionally, private banks have been willing to provide loans to apartment associations and training programmes are available for apartment associations.

The state's new energy plan until 2030 could further facilitate the renovation of existing buildings as it pushes for a holistic way of addressing housing and energy issues through coordinated urban spatial planning and initiatives to meet nZEB 2020 requirement. Deep renovation of existing buildings will also be supported by ensuring financing for householders and working with housing associations to encourage energy saving behaviour. The new EU Structural Funds programming period 2014-2020 and the newly revised Building Act offer significant opportunities for apartment associations in Estonia to fully improve the energy efficiency of their buildings. Apartment associations should take advantage of these opportunities and actively seek the support of stakeholders in both housing and energy sectors.

APPENDIX: Workshop Programme

International workshop
Legal and organisational framework: Focus on divided and cooperative ownership multifamily buildings

12th June 2014, 13:00-18:00

Park Inn Radisson Central Tallinn, Narva road 7c, Tallinn

Languages: EN/ET

- 13:00 Lunch
- 14:00 **Welcome and introduction to the workshop program**
Ms Marit Otsing, Council Chairman, the Estonian Union of Co-operative Housing Associations
- 14:15 **Welcome speech**
Mr Madis Laaniste, Manager of Strategic Planning, Energy Department of the Estonian Ministry of Economic Affairs and Communications
- 14:30 **Split incentives in the building sector across EU**
Dr Marina Economidou, Scientific/Technical Project Officer at the Joint Research Centre, European Commission
- 15:00 **Contractual and decision making aspects with homeowners of an energy renovation project: the experience of Factor 20**
Mr Matteo Zanchi, Researcher, Polytechnic University of Milan
- 15:30 **An overall approach to energy efficiency measures in a housing cooperative**
Ms Emilia Fång and Ms Sofia Berg Horner, Legal Experts at the head office of Riksbbyggen
- 16:00 *Coffee break*
- 16:30 **Legal and organisational framework – focus on divided and cooperative ownership multifamily buildings: the Estonian case**
Mr Andres Jaadla, Board Chairman, the Estonian Union of Co-operative Housing Associations
- 17:00 **Implementation of a programme to improve energy efficiency in residential houses, Latvia 2009-2013**
Mr Sergejs Sidorko, Board Chairman, Flat owners cooperative society “Bāka-2”
- 17:30 **Legal and organisational framework – focus on divided and cooperative ownership multifamily buildings: the German case.**
Mr Fabian Viehrig, Research Assistant, GdW Federal Association of German Housing and Real Estate Companies
- 18:00 Conclusions and final remarks



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