

LIFELONG LEARNING OF PROPERTY MANAGERS IN ENABLING SUSTAINABLE AND ENERGY EFFICIENT RESIDENTIAL BUILDINGS: EXPERIENCES OF CARE PROJECT IN TAMPERE REGION

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ABSTRACT.

The existing building stock causes 40% of the total energy consumption in the European Union. The high energy consumption together with ageing buildings put strong pressure on renovation of buildings and lowering of CO₂ emissions. The Directives on Energy Performance of Buildings (EPBD) and Energy Efficiency (EED) were established to urge and steer the activities in the EU member countries.

There are about 90 000 housing companies in Finland. They consist of 1.7 million apartments and 2.7 million residents, which makes housing companies a significant energy consumer. Around 50% of the building stock in Finland was built between 1960s and 1980s. The average level of technical building systems is decent. Measures are still needed to tackle the increasing maintenance backlog and energy consumption objectives.

Management of housing companies consists of the general meeting of apartment owners and a board elected by the general meeting. In addition, a vast majority of housing companies have a professional property manager whose role corresponds to CEO. The property manager's expertise plays an essential role in planning and execution of maintenance and energy efficiency.

The role of the property manager calls for multidisciplinary competencies and continuous learning. The CARE – Resource efficient caretaking of residential buildings project implemented flexible courses and training for property managers to enhance their technical understanding of energy efficient renovations and retrofit of new energy solutions.

KEYWORDS: Low-carbon buildings, property management, retrofitting, housing company, lifelong learning.

1. INTRODUCTION

Finland has set a target to be carbon neutral by the year 2035 and so to become the world's first fossil-free welfare society. This requires accelerated emission reductions in all sectors and the strengthening of carbon sinks. The measures include new climate policy decisions, near-zero-emission electricity, and heat production already by the end of the 2030s, as well as a reduction in the carbon footprint of construction [1].

City of Tampere has its own target to become carbon neutral already by the year 2030 and The Roadmap for carbon neutrality as part of the sustainable Tampere 2030 Programme is the key policy instrument influencing on the city's sustainability activities. According to the roadmap 10% share of the reduction target should come from the residential buildings [2]. Most of the residential buildings are privately owned limited liability housing companies which have their own decision-making process concerning for example renovations.

The existing old building stock is seen as a highly potential target for improving energy efficiency and reducing climate emissions. Property managers managing limited liability housing companies look after the homes of 2.7 million people living in terraced houses and apartment buildings and they have the expert role in guiding the decisions concerning maintenance and renovations of the buildings. Property management services are provided by approximately 1 200 companies in Finland [3]. Thus, there is a need for life-long learning opportunities for property managers if energy efficiency of housing companies needs to be improved.

1.1. NATIONAL LONG-TERM STRATEGY FOR RENOVATIONS

Based on the Article 2a of the EPBD (2010/31/EU) [4], as amended by Directive 2018/844/EU [5], Finland has specified a national long-term strategy for renovations covering years

2020–2050 [6]. The strategy aims for achieving the energy efficient and decarbonised building stock by 2050. Strategy focuses on the building stock constructed before 2020.

It has been identified three primary means to transform the existing building stock into highly energy efficient and decarbonized:

- (1.) Building loss and space utilization efficiency,
- (2.) improvement of energy efficiency in connection with renovations and maintenance, and
- (3.) replacing fossil energy sources with renewable energy sources in heat production [6].

The loss of building stock has been estimated to be ca. 30 % during the strategy period. The estimation covers building stock built before year 2000. Partially the loss can be replaced with space and energy efficient buildings. The energy efficiency improvement through repair and maintenance actions is an obvious, but limited solution because of the good condition of the building stock. The structural energy efficiency improvements are usually implemented in connection with other repair and renovation actions, e.g., the windows can be replaced, or more thermal insulation can be added during the renovation of external cladding. The heat energy decarbonization is the third way to enhance the sustainability of the buildings, and for a single property the decarbonized heating can be achieved for example by replacing the expired oil heating system with a heat pump or a biofuel system. In Finland the most common form of heating buildings is district heating. There are targets set to reduce carbon-intensive fuels in producing energy for district heating. As an example, the usage of coal shall be abandoned in heat production by 2029.

The building stock can be divided into two main categories: residential and non-residential buildings. The residential buildings consist of three kind of buildings: single-family and semidetached houses, terraced houses and block of flats (i.e., apartment building). If considering the number of housing units, terraced houses and apartment buildings are forming most residential buildings. Terraced houses include a total of 0.4 million housing units in a total of 82 000 buildings. Blocks of flats include a total of 1.4 million housing units in a total of 62 000 buildings. According to energy performance certificates, a total of four per cent of terraced houses and ten per cent of blocks of flats have low energy efficiency. The terraced houses are responsible for approximately 10 % and the apartment buildings for 30 % of the heating emissions of the entire housing stock.

Vast majority, 77 % of the apartment buildings in Finland have been built before 21st century [6]. The energy consumption of such an old apartment building is divided to the following segments [7]:

- ventilation (36–37 %)
- windows (19–21 %)

- water heating (17–19 %)
- walls (13–17 %)
- base (5–6 %)
- roof (4–6 %)

Ventilation of old buildings is possessing a high potential for energy savings because the heat recovery ventilation has been obligatory for new buildings only after 2003. The development of heat pumps has enabled solutions to transfer the energy from exhaust air to heating that further improves the energy efficiency of ventilation. If exhaust air heat pumps are utilized the reduction in building's heat energy consumption can reach level of 30–50 %. Water heating is another major energy sink in residential buildings. The water consumption is significantly reduced by making it visible to residents. The EED initiated legislation change in 2020 has made the apartment-specific measurement and invoicing of water consumption compulsory in Finland. According to Motiva (Sustainable Development Company) studies the apartment-specific measurement reduces the water consumption by 10–30 % and brings 3–9 % savings in energy consumption of a building [8].

1.2. HOUSING COMPANIES IN FINLAND

In Finnish legislation a housing company is defined as a limited liability company whose purpose is to own and manage at least one building or part of a building in which at least half of the combined floor area of the apartment or apartments is reserved for residential use possessed by the shareholders [9]. Each housing company shall have its own Articles of Association that defines the details of the company and its operation.

The housing companies are very popular form to manage residential buildings in Finland. There exist ca. 90 000 limited liability housing companies in Finland [10] with approximately 1.7 million apartments and 2.7 million residents [11]. This makes the housing companies a significant stakeholder managing large portion of property. Maintaining the value of the housing companies' property and ensuring the long lifecycle of the buildings is very important both for the apartment owners and the society in general.

1.2.1. MANAGEMENT OF HOUSING COMPANIES

Management of the limited liability housing company is taken care by the board of directors and the property manager whose role corresponds to CEO. Property manager is chosen by the board of directors, and the board of directors is chosen in the annual meeting by the shareholders. The Finnish Real Estate Management Federation and the Finnish Real Estate Federation (FREF) [12] conducted a survey on the quality of property management in 2020. According to the survey the most important quality factor of the property manager's work was general expertise and overall knowledge [13].

Decision making process of the housing company is challenging. The board of directors and the property manager prepare and present the renovation plans in the general meeting, and shareholders vote about the project implementation. Most of the shareholders and members of the board of directors are not experts in the construction and the real estate business. That is the reason why the property manager has an important role in the administration of the housing company and must have knowledge of property management, ensuring the energy efficiency of the building and timing of necessary renovation projects.

1.2.2. ROLE OF PROPERTY MANAGER

Eligibility requirements of the property manager are prescribed in the limited liability housing companies act [9]. There are no expressly defined requirements for qualification or training for property manager.

Even if there are no requirements for professional ability in the law, working as a property manager requires various competences. Task field of property manager is extremely interdisciplinary, and multidisciplinary expertise is required, for example technical, financial, and legal expertise. Typically, knowledge of property manager is based on bachelor's degree in business administration or technology which they have supplemented with additional training. Most professional property managers have a professional degree in property management or an ITS or AIT degree of the Real Estate Training Foundation, which qualifies for property management tasks.

To maintain professional skills there are available various training courses on different topics to property managers which provide information of topical themes. This kind of training courses are usually organized in Helsinki Metropolitan area in Finland. It can be challenging to participate for a property manager living in some other areas of Finland.

1.3. LIFELONG LEARNING

Today, the pace of work has changed significantly, and lifelong learning has become part of the work life. Technologies are developing rapidly, and it is crucial for professionals to update their know-how. Adult learning is also a way to remain competitive on the labour market.

A resolution adopted by the EU on a renewed European Agenda for Adult Learning highlights the need to significantly increase adult participation in formal, non-formal and informal learning whether to acquire work skills, for active citizenship, or for personal development and fulfilment [14, 15]. One priority is to offer more flexible opportunities for adults to learn, and improved access through more learning at the workplace and increase the use of ICT and so-called 'second chance' qualification programmes.

In Finland workforce is ageing, and it is important to make sure everyone's skills are up to date so that

people can remain employable. The reform of continuous learning [16] examines especially the potential for upskilling, reskilling, and developing competence over the course of people's careers.

The vision and objectives of the reform of continuous learning:

- Everyone develops their skills and competence during their careers.
- Everyone has the knowledge, competence and skills required for employment and a meaningful life.
- Competence renews the world of work and the world of work renews competence.

Higher education in Finland is expected to create new models for supplement training to develop professional skills during different phases through working years. Challenge is to correspond to competence needs of a rapidly changing working life and create new methods to educate professionals. One recommendation also in national long-term strategy for renovations is to increase open, digital education in the fields of renovation and energy efficiency to support lifelong learning [6].

2. CARE PROJECT IMPROVING THE DEPLOYMENT OF ENERGY EFFICIENCY SOLUTIONS

The changing climate, tighter energy efficiency requirements and increasing number of technical solutions influence directly on the maintenance and renovations of residential buildings. This causes a demand of new information and education, and that has been noticed also in property management companies. Based on the negotiations with property management companies Tampere University of Applied Sciences and EcoFellows Ltd. made an initiative to authorities for improving the property managers' competence on energy and renovations related matters.

There was started a two-year project called CARE – Resource efficient caretaking of residential buildings at Tampere region in 2019 which offered lifelong learning possibilities for property managers and increased their competence on the job market. Another goal of the project was to decrease the housing companies' environmental impact by enhancing the property managers' and housing company boards' knowledge on the new technical systems and energy efficiency related solutions for the housing companies. The CARE project was funded by the European Social Fund (ESF) [17].

2.1. COLLECTING THE REQUIREMENTS

The learning demand was verified with the questionnaire made among the ca. 160 property managers in December 2019. It was received 54 responses to the questionnaire. The results of the questionnaire gave a solid overview of the target group's background. The acquired background data is shown in the Figure 1. The responses showed small majority, 61 %

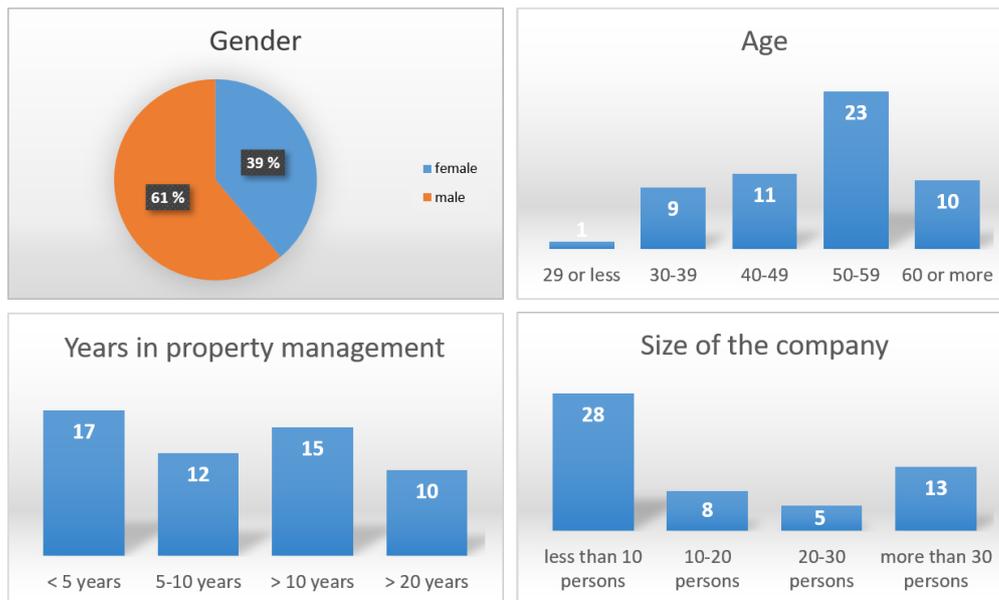


FIGURE 1. Property managers' background based on questionnaire ($n = 54$).

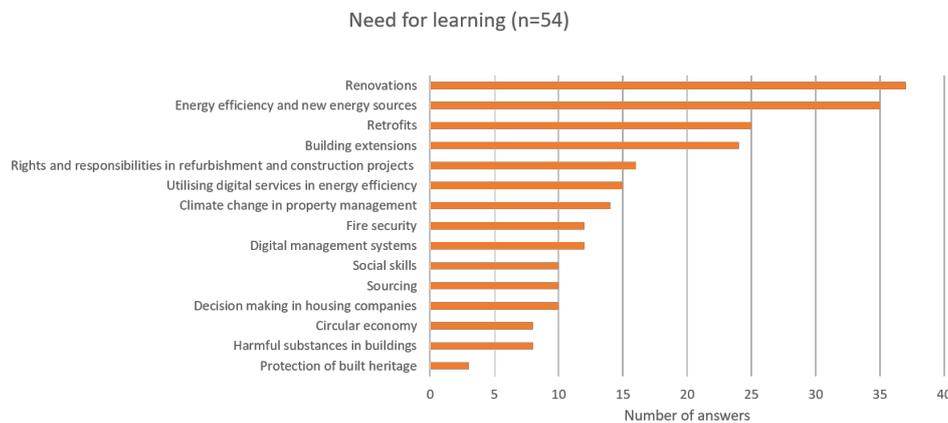


FIGURE 2. Survey results on learning theme prioritization among property managers.

against 39%, of male participants. The age division of respondents was clearly biased to ages over 50 years. However, the work experience of property managers was quite uniformly divided from short (less than 5 years) to very long careers (over 20 years). The survey results also strengthened the fact that majority of property management companies are small size in terms of number of employees (less than 10 persons).

The survey results were also clearly confirming the need for the CARE project. Based on the answers, the top three most interested learning themes included renovations, energy efficiency and new energy sources, and retrofits. The given responses are shown in the Figure 2 and they indicate obviously that over 50% of the respondents feel they will need additional education in the top ranked themes.

2.2. PLANNING AND IMPLEMENTING THE COURSES

In early 2020 CARE project team analysed the questionnaire results and selected four main themes for

more careful planning. The selected themes included

- (1.) energy efficiency and renewable energy sources,
- (2.) renovations,
- (3.) digital systems and
- (4.) climate change impacts on buildings.

17 course topics were recognised to be implemented for these themes in the beginning.

During the selection and planning process it was considered especially the differences in the background of potential participants. The level of the selected courses was targeted to cover both the basics and more advanced topics to also satisfy the needs of more experienced property managers. The targeted course participants were all in working life and easy participation was important factor while implementing courses. Each course was designed to contain two half day sessions of lectures and group studies, and in between there were four weeks period for self-study and homework. The scope of each course was estimated to

correspond one ECTS credit. The participation fee of the courses was set to very low level to enable easier access and wider participation especially among the self-employed property managers.

In early 2020 the CARE project was marketed in different occasions like trade fairs and the potential participants were approached also via professional magazines and social media. The local organisations of Finnish Real Estate Federation and Finnish Real Estate Management Federation were also supporting by informing their members. Multiple information sessions were organised for marketing the courses to property managers. The registration of the courses started in March 2020 and the first courses were held in autumn 2020. The first eight courses in August and September 2020 were arranged at campus of Tampere University of Applied Sciences enabling physical meeting of the participants. After October 2020 all courses were conducted entirely on digital online platforms like Microsoft Teams and Moodle.

2.3. BUILDING PASSPORT – MODEL

One of the tasks in the CARE project was to create Building passport operating model to help the property managers and Board of directors in the housing companies in timing and planning of energy renovations. Building passport is a part of the European commission's Energy performance of the buildings directive Article 2a (EPBD). Operating model was created by means of service design and it supports housing companies in renovation process. Product is a web page [18] where property manager or housing company can get the information what should be considered when planning renovations and how to proceed.

3. RESULTS AND DISCUSSION

During two years of operation CARE project arranged 32 courses consisting 17 different topics. The courses were conducted in three sets: 13 courses during the second half of 2020, 14 during the first half of 2021 and 5 courses during autumn 2021. The topics covered mainly renovation projects and retrofits related to MEP, HVAC systems, but also, for example, charging systems for electric vehicles, solar power systems, demolitions and building extensions, sourcing of design services, and contracting. Each course had minimum five participants and the most popular course topics gathered 20–30 participants.

There were in total 70 participants from 22 companies attending in the courses. The number of participants was slightly lower than estimated in the beginning of the project. The reduction was caused partially by the pandemic situation and the restrictions to arrange on-site courses. On average each participant were attending more than 3 courses totally producing 223 course participations. Course-specific, voluntary, and anonymous feedback was collected after each course and it was used for improving the course

implementations. The generic feedback from participants was mainly positive and 32 of 34 responses indicated the participants had got useful information for renovation projects.

In September 2021 project team interviewed representatives of four attended property management companies to get a deeper understanding of their opinions on the impacts of CARE project. According to the interviews the property managers are facing more and more projects aiming to energy efficiency improvements. Especially renovations, but also retrofits of the heating systems like replacing oil heating with heat pumps are popular among housing companies. Furthermore, solar energy and charging of electric vehicles have become new topics within the housing companies. Therefore, the interviewed persons found the CARE project and its courses very valuable and welcome. In their opinions the courses supported their work most in renovation projects management. Some of the participants commented the course contents could have been technically more demanding and including more specific examples.

4. CONCLUSIONS

New requirements on buildings and deployment of alternative energy sources and technologies require lifelong learning from people working with the residential buildings. This has been recognised also in the national renovation strategy promoting measures to increase the offering of education in the fields of renovation and energy efficiency to support lifelong learning and the acquisition of new competencies.

In an ideal case, the buildings are managed and renovated systematically throughout their whole life cycle. Bases is the execution of the housing company's own strategy, which ensures that there are always up-to-date condition surveys made by professionals and long-term planning and budgeting based on them. Property managers can provide help to the housing company, but it means they must keep their know-how updated.

The short adult educations enable professionals to update their knowledge and keep up in the rapidly changing working life. There is need for short educations but at the same time they are quite challenging for educational institutions to organize. The training model created in CARE project was designed together with the property managers by interviews, but it was still very challenging to get participants to the trainings.

Fostering the energy efficiency and mitigating the climate change requires latest information on technical solutions. CARE project is an example of a measure targeting to increase the availability of continuous learning opportunities for professionals. It tackled the regional competence development needs regarding housing companies and property managers by arranging short courses on multiple topics. CARE project also developed the Building Passport model

for housing companies and fostered the energy efficiency awareness among them. Although it is difficult to estimate the long-term influence of a project like CARE, the number of participants and the received good feedback are indicators to verify the short-term positive impact. The courses developed for CARE project are creating a foundation for new open UAS course.

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