



**SUNSHINE**  
SAVE YOUR BUILDING  
BY SAVING ENERGY

# Renovation of multifamily buildings using Energy Performance Contracting

*Information, communication and best practices with residents  
during construction works*



PROJECT REPORT

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## INTRODUCTION

Most of the multifamily building stock in Latvia was built during the years 1960–1980 and needs modernization, which also provides the opportunity to combine renovation with energy efficiency measures. Common for many of these buildings is that deferred maintenance has led to technical and operational problems, such as high energy use, low indoor comfort, inefficient and dysfunctional engineering systems, and moisture damage due to leaking roofs and pipes.

The deep renovation of buildings is a complex and interdisciplinary process, which requires detail planning, engineering studies, and strict supervision. All these aspects are important for achieving the expected levels of energy savings. Working in this process together with apartment owners, is an additional challenge.

The renovation measures can be split into the following categories:

- Preventing heat loss out of the building envelope:
  - Adding outer wall thermal insulating,
  - Replacing windows and entrance doors,
  - Insulating the attic floor/roof and the basement slab ceiling;
- New space heating system;
- New domestic hot water system;
- New suitable ventilation system, preventing losses from the ventilation system and at the same time ensure appropriate indoor air quality;
- Preventing overheating in the apartments with suitable heating control strategy
- Repairs or improvement to halt and prevent structural problems;
- Improvements to the look, comfort and overall impression of the building.

The implementation of these renovation measures turns a multifamily building into a construction site. Depending from the size of the building, the construction works can take from 4 to 9 months.

These buildings are mostly owner-occupied; taking a common decision for a deep renovation project is already a complex process; dislocation the inhabitant during the construction phase is not an option as most of the owners would refuse it. Therefore, the construction and installation works are carried out in occupied buildings.

In Latvia, apartment owners are generally not well informed about the renovation process and construction works. This can be the root cause of future complaints and negativity toward the renovation projects. Delays can be a consequence of bad communication especially when plumbers and installers need access to private apartment.

As part of the SUNShINE project, ESCOs have been working for the deep renovation of more than 30 buildings in Latvia, of which five projects were completed by 2020. This report documents the most relevant issues that have emerged between apartment owners and ESCOs and the mitigation measures put in place.



Construction sites during deep renovation of multifamily buildings in Latvia

# 1. LIVING IN A BUILDING DURING DEEP RENOVATION

Staying in a home during renovation entails discomfort, and it is important that apartment owners and tenants are well informed on what to expect.

Living on site during renovation is not easy, but understanding the problems and the issues involved, will mentally prepare apartment owners and tenants. The ESCOs in SUNSHINE have informed apartment owners on the main problems and issues they may face. This chapter provides a list of the most relevant issues, where ESCOs needs to provide detailed information to apartment owners and tenants during the construction period.

## 1.1. The dust gets everywhere

Deep renovation of buildings, mean transporting material to the site, excavation works around the buildings, drilling and demolition, dry cutting, welding, sanding, mortar mixing, etc.



Preparing for replacing the heating system

Good housekeeping is the first step to mitigate the spread of dust. However, apartment owners and tenants must get use to a “dirty” place until the project is finished.

During the construction works the inhabitants must be instructed to more frequent cleaning (vacuuming cleaning or moist sweeping) and make sure to keep doors and windows closed, eventually also using additional plastic sheeting at the entrance door during renovation of the staircases. This can at least contain most of the dust, but never all of it.

## 1.2. Lie ins get difficult

Builders arriving at the construction site early in the morning, the incessant noise of digging, drilling, mixing and demolition works are not for late morning sleepers. At the same time disruption in space heating, replacement of windows and plumbers in the apartment may develop a challenging sleeping environment.

Additionally, sleeping can be disturbed by the constant worry on the results of the project, the dirty around, or the lower security of the building during the construction works.

*“There were times when a quiet dust-free room was all what I wished for. Living in a building under construction, plus the children, plus the husband, plus many workers coming and going felt too much. However, each finished work brought happiness”*

**A resident from a renovated building, Latvia**

## 1.3. Health and safety rules are important

A construction site must be safe, preventing injuries and health problems. Construction companies and subcontractors must comply with health and safety plan, or lately even with environmental and health and safety plan, to address all possible risks of a deep renovation project. These plans identify risks and indicate mitigation measures to undertake during the construction works. For example, they address the following risks:

- Falls from height
- Collapse of excavations

- Collapse of structures
- Exposure to dust
- Exposure to asbestos
- Electricity shocks
- Lack of site protection (security fences, net scaffolds, signpost, waste collection area, indicated pedestrians' path, etc...)

Even if the inhabitants of the building are not exposed to these risks, as the worker on the site, to understand health and safety practices is important; in particular, for families with children as the construction site cannot turn into a playground.

Safety is a primary concern when it comes to exposed wires, heavy machinery, possible unstable structures, a bank of debris, pile of leftover of thermal insulation or discarded pipes and radiators.

#### 1.4. Project planning is key - disruption of utility services occur

Construction planning is the process used to lay out how a construction project is managed and executed, from designing to ordering materials and deploying workers and subcontractors to complete various tasks. This process is complex enough for the construction and renovation of not occupied buildings.



Replacement of old sewerage pipes

The deep renovation of occupied multifamily buildings requires more planning and additional contingency plans to deal with inconveniences that may be caused by people living in the building. Some of the tasks, like for example replacement of windows and the installation of a new space heating system requires access to privately owned apartment. At the same time important utilities may be disrupted for specific periods, for example toilets may not be used during replacement of sewerage pipes, cooking and washing is limited during periods when water networks are replaced.

This project planning is effective only with good cooperation and understanding between the involved parties. Once the construction plan and schedule are prepared, communicated and agreed then respecting it is of paramount importance; the rule is simple: workers must not delay ringing the doorbell and the apartment owner must not delay opening the door.

#### 1.5. Construction works can take longer than expected

ESCOs design a project with the best knowledge of the building they can acquire during project development. However, there may always be unexpected latent condition to address, which become evident only during the construction phase. These conditions modify plans, extend the construction period and increase costs. It is critical that these issues are identified and appropriately controlled and notified. The extension of the construction period and cost aspects are among the most critical issues raised by apartment owners during deep renovation.



Latent structural problem of roof concrete slabs

## 1.6. The benefit of living on-site

Despite the fact that dislocating apartment owners to other locations during the construction works is not a practical option, a benefit of living on site is that the residents of the buildings can keep

*" A plus of living here during renovation is that now I know and appreciate how each corner of the building and how it has been put together. I am better informed of how each element works, why it is there and how it was built. The building now truly feels mine; I managed to change the colour of the staircases and get fixed few things I have seen"*

**A resident from a renovated building, Latvia**

track of the building progress, know what each worker is doing and be there to report unexpected or unpleasant situations. This can turn into an advantage for the ESCO, who has an additional critical eye on subcontractors, and for apartment owners who can feel more engaged with the process. This benefit needs open and quick communication channels between the project manager of the ESCO, the construction site manager and the residents of the buildings.



## 2. MITIGATION, MANAGEMENT AND ENHANCEMENT MEASURES

The ESCOs, working in the SUNShINE project, delivered deep renovation of multifamily buildings based on a 20-year energy performance contract. In such a long contract, the ESCO has interest to establish good relationships with all apartment owners; relationships which will continue for the whole contract period. Obviously, preventing accidents on the construction site is a priority of every contractors; accidents can turn to be very expensive to solve or even turn into tragedies in case of death.

This chapter includes revised general best practices to be used during construction works in occupied multifamily buildings, which SUNShINE strongly recommends for every ESCOs engaged with this type of projects. The list is not exhaustive, but rather focused on relevant aspects from the apartment owner's perspective.

### 2.1. Good housekeeping

To keep working areas clean and tidy is the pre-requisite to prevent possible complains from apartment owners and, also for to avoid accidents. To undertake general daily clean-up of the site, or immediate clean-up in case of accidents, like an oil or paint spill, is the best housekeeping practice.

Other good housekeeping practices on construction sites are:

- Secure loose materials that have the potential to fall or fly away,
- Keep aisles, stairways, passageways, ladders free of obstructions, materials, cables, etc.
- Keep materials and equipment away from the edge of excavations, trenches, roofs, scaffolding, etc.
- Cover and secure open trenches, holes and other openings,
- Avoid pools of stagnant water in working areas,
- Do not leave any sharp or dangerous objects unattended (knives, box cutters, scissors, broken glass, etc.), which may attract children's attention.



**Well secured materials to avoid potential fall**

### 2.2. Grievances

In the construction sector grievance mechanisms, accessible for workers, have become a common practice. In deep renovation of multifamily buildings, the ESCO must also establish and maintain a grievance mechanism accessible to all residents. This mechanism is a complaint and suggestion process, which can be used by residents affected from construction activities and operations.

## 2.3. Noise

Every measure, which an ESCO takes to reduce and contain noise, helps to improve the life of the residents during the construction period. The ESCO in developing the construction plan and schedule must limit the working hours, for example from 8am to 7pm. Working out of this time or during weekends and holidays should be avoided, or anyway properly notified to ensure that those affected by the work are aware of upcoming activities.

Other mitigation measures that the ESCO can undertake on the construction site are:

- Add specific limit on working hours for very noisy activities, for example demolition works only from 10am to 12 noon and from 3pm to 5pm,
- Turn off vehicles and lorries engines if not required,
- Keep the noise level to acceptable limits.

## 2.4. Dust

There are many tasks on a construction site that produce dust:

- Cutting construction materials (wood, boards, blocks, bricks, tiles, pipes, etc.)
- Chasing concrete and mortar,
- Dry sweeping site areas,
- Scabbling or grinding concrete or other construction materials,
- Demolition,
- Cutting and sanding wood,
- Sanding taped and covered board joints,
- Sanding and finishing walls,
- Unprotected waste disposal.

Dust cannot be eliminated from a construction site, but good practices include:

- Using building materials that do not require an excessive amount of preparatory cutting to size,
- Using less-powerful tools, such as a block splitter instead of a higher energy cut-off saw,
- Adopting a different working method, such as direct fastening/screws, or hand-cutting of tiles,
- Water suppression, like wet sweeping, wet cutting and wet drilling,
- On-tool extraction, like for example sander machine connected to vacuum suction line to remove dust as it is produced,
- Set specific and protected cutting and working area on the construction site,
- Using sheeting and temporary screens to enclose the work area,
- Spray unpaved roads nearby the building,
- Drive slowly not to generate dust nearby the building and in the construction site,
- Do not store cement, sand, excavated material without cover sheets or shelters.



Wet drilling reducing the release of dust

## 2.5. Waste management

Responsible waste management has many benefits for the ESCO and for keeping good relationship with the residents. Waste management is an essential aspect of the project. First, managing waste means eliminating, minimizing and reusing waste and materials. A waste management plan support ESCOs in this activity. Best practices include reduction, recycling, and reuse of wastes. Keeping this philosophy in mind, this is a list of measures that the ESCO can enforce during a deep renovation project:



Collected waste going to the construction site sorting area

- Good housekeeping is the first step for good waste management, keeping the working site clean and tidy and promptly collecting wastes from activity areas,
- If dealing with hazardous material (asbestos sometime is used on roof covers in Latvia), this waste must be stored using secondary containment and restrict access to prevent harm to the residents, workers and environment,
- Waste sorting on site, to separate liquid, organic, demolition material, hazardous and recyclables waste streams and identity the disposal pathway for each of them,
- Use waste containers, which are in good conditions (not damaged or leaking),
- Reuse the excavated soil as much as possible for backfilling and landscaping. Do not dump hazardous waste for backfilling excavated soil,
- Do not burn any type of waste, like wooden material, plastic, paperboards, etc.

## 2.6. Code of Conduct

Workers and residents will interact and see each other during the construction phase, which can take as long as nine months for deep renovation. The way workers behave on site affects the quality of life of the residents. The ESCO can establish a Code of Conduct for worker-community interaction and on-site behavior, requiring that all workers and subcontractors adhere to it.

## 2.7. Community Safety

Safety on the construction site is a priority for every contractor. Having residents walking around the site, makes this priority even more important. The ESCO must ensure community safety, first by securing the construction site, this with temporary bridges, traffic controls, barricades, signs and warning lights as necessary.



Delimitation of construction site

Then other important best practices are:

- To demarcate open trenches with high visible temporary fencing and prevent flooding of trenches during heavy rain,
- Inform relevant authorities immediately in case of damages on utilities,
- Establish appropriate site boundary and access controls to prevent unauthorized entry to construction or activity sites, and
- Do not leave any holes and openings without secure fencing.

## 2.8. Land use and water around the building

During the construction phase the area around the buildings become the construction site. Scaffolding, site office, workshops, material and waste storage area are settled around the building. During site preparation, best practices include:

- Prefer already disturbed areas for site office, storage, workshop, etc.
- Clearly mark the site areas, and delimit possible sensitive area, eventually with “*stop and not-go*” signs,
- Clean up the worksite and rehabilitate the site to its original condition at the end of the construction works,
- Rehabilitate all access roads and any other disturbed areas outside of the approved working areas to their original condition,
- If in the area around the building there are trees, cultivated lands or other valuable structures (like playgrounds), these must be protected and/or removed but not damaged,
- Additional fences of the construction site adjacent to sensitive areas, such as natural water courses must be planned.



### 3. COMMUNICATION WITH RESIDENTS

People are inevitably affected by the construction works. Communication and grievance mechanisms help to listen and provide remedy. Communication is also an important early warning system for ESCOs,

*” In few words, the main takeaway of working in the residential sector is that the relationship between the ESCO and apartment owners is a key ingredient for a successful project, especially once the construction works starts. To avoid misunderstanding, wasted materials and to deliver on time, the ESCO must engage actively with homeowners and their associations during this phase of the project”*

**ESCOs in SUNShINE**

as it provides critical information on the possible negligence of contractors and subcontractors. All ESCOs working in SUNShINE have opened several, direct and indirect, communication channels to communicate with residents of buildings under renovation. The used channels ranged from WhatsApp groups, to Facebook pages, email and phone list.

ESCOs' webpages were also used. A specific platform, developed by SUNShINE, will also standardize and support stakeholder's communication and project documentation during the construction phase ([www.sharex.lv](http://www.sharex.lv)),

Legally the decision for a deep renovation projects requires a qualified majority of 51% of all apartment owners to agree. Financial institutions (like ALTUM, commercial banks and the Latvian Baltic Energy Efficiency Facility - LABEEF<sup>1</sup>) have even stricter requirements, requesting a positive vote from 2/3<sup>rd</sup> of the apartment owners. Reaching this quorum and level of consensus for a deep renovation project is rather challenging, and even when reached, still a cluster of apartment owners were not fully convinced or in favor of the project. During the construction phase, these apartment owners requires specific attention from the ESCO.

#### 3.1. Commencement of construction works

During the project development process, the ESCO and apartment owners will decide on the total list of works to be carried out. As part of the LABEEF<sup>1</sup> Investment Guidelines, developed under the SUNShINE project, minimum packages of measures are well defined; however, further details need to be defined and additional measures can be added to the project. Apartment owners decides on the visual design of their building and on possible additional works; communication between the parties is key. In this phase, ESCOs communicates with apartment owners on regular basis, application like business WhatsApp, emails and telephone are today preferred methods. Apartment owners need to feel informed about the preparation phase; SUNShINE recommends appointing a project champion, or someone who is nominated to deal with communication, between residents and the ESCO. This can be a house elder or an active apartment owner. The same person can also help in communication when the works will start.



**Meeting with apartment owners before the commencement date of the construction works**

<sup>1</sup> The Latvian Baltic Energy Efficiency Facility (LABEEF) was founded in 2016 as part of the SUNShINE project and aims to support energy service companies (ESCOs) that implement deep renovation of multifamily buildings based on energy performance contracting (EPC). In this case the EPC describes a financing mechanism, in which the receivables consist of the cost savings achieved through greater energy efficiency of buildings. The ESCO finances deep renovation through a commercial bank through an EPC contract with apartment owners. Once the renovation project is completed and its performance has been measured and verified, LABEEF forfaits the EPC contract. Through this mechanism, the execution risk stays with the ESCO while the financing risk is transferred to LABEEF.

Then, the ESCO must notify all apartment owners, at least ten days in advance, about the date of commencement of the construction works, giving the opportunity to clear the common areas of the building (stairways, basement space, technical attic, roof, storage areas, etc.) from personal properties, like bicycle, chairs, tables, other furniture or objects there located. Formally, the notification is sent in written form to each apartment owner. Informally, ESCOs also used other communication channels like showcases in entrance halls, emails, and social media.

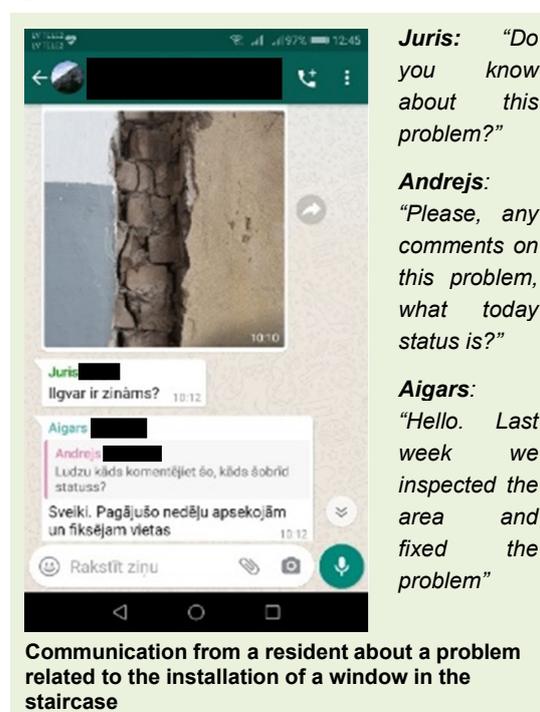
Before the commencement of the construction works, SUNSHINE also recommends organizing a meeting with apartment owners and explain the most important and best practices of living in a building during the construction works.

### 3.2. Construction phase

The construction phase is the most challenging for testing the relationship between the ESCO and apartment owners. In this phase, to maintain communication with residents is more essential than ever. During the construction works, regular communication, between the ESCO, the contractor, subcontractors and supervisors, is established, typically with weekly progress review meetings and inspections to monitor the project progress.

These site meetings are very important in order to understand whether the renovation works are implemented in accordance to plans, whether there are any unexpected deviations that may impact residents, or the work schedule.

Construction site management includes several functions; but in the relationship with apartment owners, scheduling and notifying are the most important. Apartment owners are not particularly interested in the full project time schedule and construction plan, but they need a timetable, which shows in an easy way what works are planned and when utility services are disrupted in their apartments. The ESCO must support the development and management of this detailed schedule. Generally, the schedule is agreed with each apartment owner, providing few optional time slots for selection. The schedule is then updated on daily basis; managing and reporting the progress of the works and developing contingencies plans, as for example some apartment owners may not show up, or a subcontractor may accumulate some delays (delay in supply of material and equipment or lack of workers are the most common causes).



ID	Task	Start	Finish	Duration	Progress	Priority	Resources	August, 2019			
								5-Aug-2019	12-Aug-2019	19-Aug-2019	26-Aug-2019
1	Apartment 1	5-Aug-2019	7-Aug-2019	1d	73.8%	1	-----	█			
1.1	Space heating	5-Aug-2019	5-Aug-2019	6h	100%		-----	█			
1.2	Domestic hot water	5-Aug-2019	5-Aug-2019	4h	100%		-----	█			
1.3	Ventilation	6-Aug-2019	6-Aug-2019	1.5h	95.0%		-----	█			
1.4	Windows	7-Aug-2019	7-Aug-2019	7h	0.0%		-----		█		
2	Apartment 2	5-Aug-2019	13-Aug-2019	1d	0.0%	2	-----		█		
2.1	Space heating	8-Aug-2019	8-Aug-2019	7h	0.0%		-----		█		
2.2	Domestic hot water	9-Aug-2019	9-Aug-2019	4h	0.0%		-----		█		
2.3	Ventilation	9-Aug-2019	9-Aug-2019	1.5h	0.0%		-----		█		
2.4	Windows	13-Aug-2019	13-Aug-2019	8h	0.0%		-----			█	

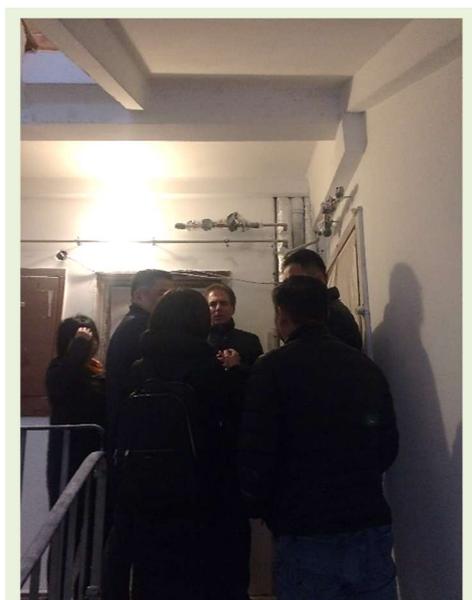
Example of scheduled tasks by apartment

Despite all efforts and plans, based on the experience gained in SUNSHINE, ESCOs will always get questions and complains from apartment owners. These are the most frequently asked questions and received complains:

1. Questions in relation to delivery and installation of windows, windows quality, refurbishment of windows sills and sides, schedule and required time for the works;
2. Complains on site housekeeping, like for example: too much dust in the staircases or too much noise in the morning are rather common;
3. Complains about parking lots used by workers;
4. Questions and complains about security; in particular, when entrance doors are removed people fear that thieves may enter the building;
5. Questions regarding the execution of the works; in particular, apartment owners with a technical background may ask specific questions on selected technical solutions.

The ESCO has always the duty to reply, and if possible, to solve any problem brought to its attention. This involve a conversation with the concerned apartment owner to clarify the issue and/or misunderstanding that might have occurred. If, in the event of confusion, a documented proof is requested, the apartment owner has the right to receive copies of relevant documentation and proofs, like extracts from the design documentation and energy performance contract.

From the ESCO perspective, the main problem in cooperating with apartment owners is access



**Meeting in the staircases with apartment owners during construction works**

to their private properties. There were cases, when apartment owners did not cooperate, and few of them were not letting workers in their apartments. In this case the ESCO can first take the following soft actions: 1. Formal notification letters, referring to the common decision of the general assembly and underling its legal value, which contains proof of enforceable rights, 2. Involve other active apartment owners in a constructive dialogue, having them to explain, for example, that the space heating system can only be connected with access to all apartments in the building. For all the ESCOs in SUNSHINE these solutions were enough to convince the most stubborn apartment owners, and there was no need to process to more expensive legal enforcement solutions.

During this construction phase, SUNSHINE recommends organizing regular meetings, where all apartment owners are invited for discussing the progress of the project, the schedule of the planned activities and for questions and answers sessions on apartment owners' problems and viewpoints.



The ESCOs working in SUNSHINE organized between 21 and 47 meetings with apartment owners during the construction phase. The number of meetings depends on the size of the buildings (the building in 2 Daugavas Street is the larger of the five in the chart) and on possible problems occurring during the construction works. For example, in case of latent conditions requiring the execution on unforeseen works, or delays in the delivery of material and equipment, additional meetings with apartment owners may be required. The last variables, which determine the number of meetings, are: 1. The personality of the apartment owners living in the building. A single troublemaker may double the number of meetings; 2. The quality of the ESCO's communication strategy to inform apartment owners (good information at the beginning reduces the number of meetings after).

At the same time, SUNSHINE also recommends inviting leading apartment owners, or selected representatives to the weekly construction site meetings with the ESCO, project supervisor and construction site manager. These owners can then further communicate with their neighbors on the status of the works and grievance solutions taken by the ESCO in response to complaints.

ESCOs working in the residential sector must remind that during the construction works, fear of negative outcomes can prevail among apartment owners. Experts, technicians, contractors and workers, having experience in construction, do not suffer from great anxiety about carrying out the works. On the other hand, apartment owners, some of which was even against the project, are wearied by the process, which can also create great anxiety. There are apartment owners that pounce on any perception of doubt, or disorganization, or small events. Even a simple answer from the ESCO such as: “we don’t know yet when...” will be met critically: “What do you mean: you do not know when! Then, who should know about it?”. These conversations can become volatile or even rude; patience and preparedness are the most important tools for such occasions.

### 3.3. End of the construction works

The completion of a deep renovation project is generally not a single event but takes place in

*” We have gone through months of wet weather [November and December], stress, feeling unsettled and the ups and downs of this renovation project, but once is finished this building becomes a home again, I realise that it was all worth it. I appreciate every corner of the building and I know the effort that was put into achieving these results. I am looking forward to invite my guests for dinner.”*

**A resident from a renovated building, Latvia**

several stages, ensuring that all the works described in the contract documents have been carried out as specified, and that all appropriate payments have been executed. The process includes a final inspection of the buildings reporting defects and remedies to be undertaken before final commissioning and handover of the building. The technical and legal process is managed by the ESCO.

Another important aspect to cover in this last phase of the construction works is training of apartment owners. SUNSHINE recommends to provided information regarding operation and maintenance on specific measures implemented during the project:

- Use of thermostatic radiator valves (TRV), as the new space heating system is equipped with TRVs on each radiator;
- Use of the new domestic hot waters system (information on the location of water consumption meters, shut-off valves, operation of towel heaters);
- Use of the ventilation system;
- Periodic maintenance and operation of new windows.

An inauguration ceremony may also be a good opportunity for starting the service period of the Energy Performance Contract, which will go on for 20 years.



Inauguration ceremony at the end of the construction works- 7 Meza Street (Salaspils, Latvia)

## 4. CONCLUSION

- Communication with apartment owners and residents is very important. The process is time-consuming and takes dedication, but without it, the risk of having future disputes with apartment owners is very high. Lack of communication can, sooner or later, delay the execution of the works.
- ESCOs need to develop and implement communication strategies to work with apartment owners during the construction phase. Available toolkits include a wide range of communication channel. From direct face to face meetings, to formal notification letters and posters in showcases, to leaflets in the mailbox and the use of social media and email list. The ESCO should also identified active apartment owners, which can help and be part of the communication strategy.
- The ESCO must respect all apartment owners and have in place a Code of Conduct to ensure that this is also reflected on the construction site. This also means an appropriate level of meaningful information is provided throughout the phase of construction works to apartment owners. And most of all that follow-ups are detailed and within the given deadlines.



**SUNSHINE:** Save your bUildiNg by SavINg Energy towards 202020m<sup>2</sup> of deeply renovated multifamily residential buildings. - Grant 649689



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