



Accelerate SUNSHINE
SAVE YOUR BUILDING
BY SAVING ENERGY

Lessons learned from the execution of the investment projects in public buildings based on Energy Performance Contracting



PROJECT REPORT

TABLE OF CONTENT

1. INTRODUCTION	3
2. EnPC FOR PUBLIC BUILDINGS	5
2.1. An ideal process to EnPC procurement.....	5
2.2. Barriers to ideal processes	6
2.3. An alternative option to circumvent market inertia and regulatory barriers	7
3. THE EnPC PROJECTS IMPLEMENTED IN LATVIA.....	10
3.1. Project identification and development	11
3.2. Procurement documentation.....	14
3.3. Cooperation between municipalities and ESCOs.....	18
4. LESSONS LEARNED	20
4.1. The main barriers and positive outcomes	20
5. RECOMMENDATIONS	22

1. INTRODUCTION

The Accelerate SUNSHINE continued and complemented the work carried out in the SUNSHINE project supported by the Horizon 2020 programme of the European Union. The concept behind the projects is to deliver building deep renovation based on Energy Performance Contracting. SUNSHINE focused on multifamily buildings, while Accelerate SUNSHINE was also extended to public buildings. The projects delivered a financial instrument for Energy Service companies and aimed to increase the level of private funding in the building renovation industry.

Municipal procurement departments inviting tenders of which the estimated value exceeds the Latvian threshold values must in principle be put out to tender in accordance with the Public Procurement Law. The open procedures are standard and the most typical procedures used in Latvia. The negotiation procedures and competitive dialogue with and without prior notice are exceptional procedures and rarely used.

Energy Performance Contracting (EnPC) is “a contractual arrangement between the beneficiary and the provider of an energy efficiency improvement measure, verified and monitored during the whole term of the contract, where investments (work, supply or service) in that measure are paid for in relation to a contractually agreed level of energy efficiency improvement or other agreed energy performance criterion, such as financial savings”

In Latvia the incompatibility of the national legal and regulatory frameworks with EnPC in the public sector is a major barrier. Since 2016, the Energy Efficiency Law provides a theoretical framework for municipalities to sign up to 20 years energy performance contracts. The four municipalities partner in Accelerate SUNSHINE were the first in 2018 trying to introduce and sign long term EnPC for their building renovation projects. However, when trying multiple barriers arose. One of the most crucial barriers was the contradiction in the Latvian regulatory framework. Even if the Energy Efficiency Law allowed and indicated the use of EnPC, there were other laws preventing its use; for example, the Law on Public Procurement prohibits municipalities to sign service contracts longer than five years. Therefore, a municipality interested in long-term EnPC (longer than five years), should follow the procedure set in the Law on Public-Private Partnership (PPP). This, however, for small energy efficiency projects (€1-2m) is a very demanding, time consuming and costly procedure, which discourage any further undertaking for relatively small projects. Bundling of energy efficiency projects to reduce the fix costs related to PPP procedure would be a natural undertaking. However, bundling was not an option either because not contemplated in the regulation for the use of available grants.

Design & build”, “Design build and operate” and “Design build finance and operate” are the preferred project delivery models in which an Energy Service Company can be appointed under an EnPC for the deep renovation of a public building. These models encourages an Energy Service Company to develop a project with its long-term performance in mind from the outset, rather than just considering the lowest possible costs option. The Energy Service Company will follow the project from A to Z and will be able to guarantee all the results, including energy savings. During the last five years there have been a lot of discussions in Latvia about introducing these models for deep renovation of public infrastructure; however, no clear policies and guidance were developed. All subsidies’ programmes (85% grant using EU structural funds and state budget) were developed with an application process forcing municipalities to one building one project approach and using a design bid and build approach (first the municipality develops a project technical producing an engineering design company design and then bids for a contractor for civil engineering works based on the developed project design). These subsidies programme turned to be a major barrier to the use of energy performance

contracting, as project based on other approaches would not be eligible for subsidies. Municipalities applying for subsidies were scored based on the forecasted energy savings and readiness of the project, i.e., only projects with finalized technical design were awarded. At the same time the “*one building | one project | one application*” rule, excluded any opportunity for project bundling and therefore for bigger size contracts; which for example are more attractive for models like Design & build”, “Design build and operate” and “Design build finance and operate”.

Before the Accelerate SUNSHINE project, Energy Performance Contracting in Latvia was used exclusively in the private sector for the renovation of multifamily buildings or more rarely in the public sector for the modernisation of streetlighting systems.

As part of Accelerate SUNSHINE the first EnPC projects in the public sector were carried out in Ādaži, Jūrmala and Tukums municipalities. This report gathers the experience and the lessons learned from these projects based on interviews with representatives of the municipalities and an analysis of the projects.



2. ENERGY PERFORMANCE CONTRACTING

The development of an EnPC project in municipalities is often supported by a facilitator as municipalities often lack the capacity and expertise needed regarding energy performance contracting. Accelerate SUNSHINE set up a project implementation unit, which included a project facilitator helping with technical, financial, and legal aspects of EnPC.

2.1. An ideal process to procurement and implementation

Design & build”, “Design build and operate” and “Design build finance and operate” are the preferred project delivery models in which an Energy Service Company can be appointed under an EnPC for the deep renovation of a public building. This can be better achieved with procurement strategies based on negotiation or with a competitive dialogue. In general, the development of an EnPC project may then be organized in the following phases (see Figure 1):

1. Political commitment (at national and local level) to improve energy efficiency in public buildings is the most important pre-condition. A good and existing framework for EnPC is an important first step in the process,
2. Identification and selection of buildings, which take into consideration both political priorities and economic and technical aspects,
3. For each selected building a preliminary analysis of the conditions and saving potentials is required to gather information for the tender documentation,
4. Decision to use EnPC instead of implementing a project in more traditional way, like for example procuring an engineering design company to carry out a project design based on the specification decided by the Municipality and then to tender the works to a construction and installation company. This decision should be taken based on an economic assessment of all available options, also considering budget and financial constraints of the public authority,
5. The data and assumptions collected during the preliminary analysis and used for tender preparation must be verified at the first stage of EnPC contract implementation.
6. After verification the project continues with the implementation of the agreed measures. At the end of the implementation the project is commissioned and accepted by the Municipality.
7. The last phase is the guarantee period of the EnPC. Continuous monitoring and verification of achieved savings is carried out according to an agreed protocol and compared to the baseline. The verification of the energy savings must consider all external factors, like weather conditions, building use and changes in uses, user behaviour, newly installed equipment, etc...

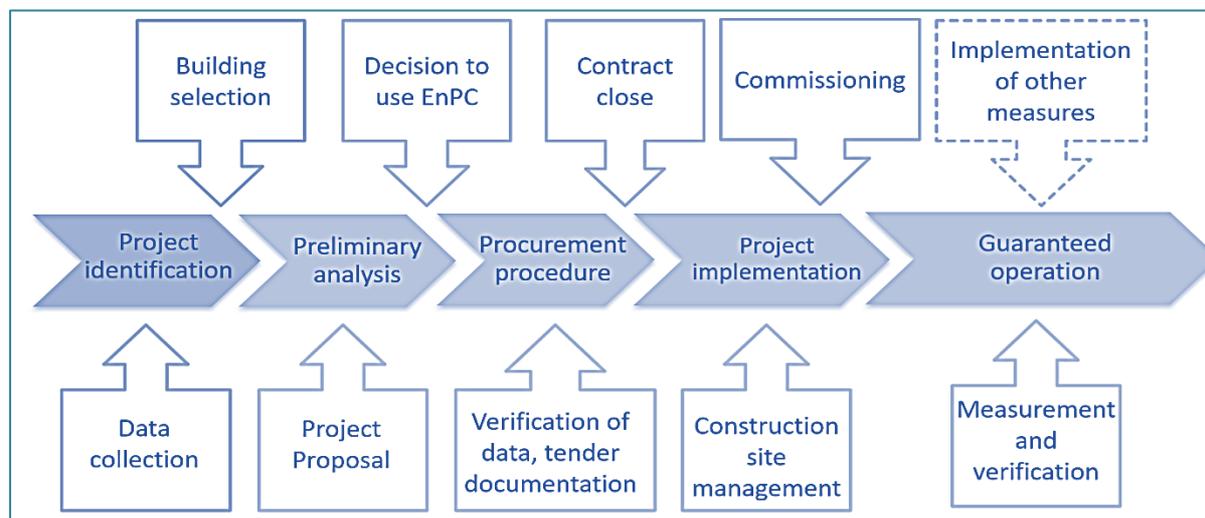


Figure 1. General development of an EnPC project

2.2. Barriers to ideal processes

The potential for EnPC is hampered by several barriers: market barriers, regulatory barriers, and financial barriers. On top of this, the lack of qualified human resources further impedes the use of EnPC.

The first problem is **market inertia**. Inertia in science is a term that describes the tendency of a physical object to resist change. In marketing, the term is used to describe a business that does not adapt or change its strategy to meet growing consumer concerns, changes in the marketplace or economic situations. In Latvia, Energy Performance Contracting has not been able to overcome the market inertia around energy efficiency projects. Latvian municipalities prefer conventional procurement supported for projects mostly financed with grants (most often national and EU grants) and there is a general lack of interest in EnPC for public building renovation. The political interest is to show a renovated building rather than the form of contract or mechanism used or the level of saving achieved. Municipalities have learned to use (or otherwise wait) for grants; renovating one building by one (one building one project approach), copying and pasting the process, the tenders, and the construction contracts. This process is not the most cost effective and entails multiple tenders with high administration costs; but it is the process used and tested in Latvia; supported by the Ministry of Finance, Ministry of Economics and Ministry of Environment and Regional Development and used by Latvian municipalities for building renovation. The introducing of new mechanism and options must face this strong inertia.

Regulatory barriers are the most troublesome. In Latvia the incompatibility of the national legal and regulatory frameworks with EnPC in the public sector is a major barrier. Since 2016, the Energy Efficiency Law provides a theoretical framework for municipalities to sign up to 20 years energy performance contracts. The four municipalities of Accelerate SUNSHINE were the first in 2018 trying to introduce and sign long term EnPC for their building renovation projects. However, when trying multiple barriers arose. One of the most crucial was the contradiction in the Latvian regulatory framework. Even if the Energy Efficiency Law allowed and indicated the use of EnPC, there were other laws preventing its use. For example, the Law on Public Procurement prohibits municipalities to sign service contracts longer than five years. This means that a municipality interested in long-term EnPC (longer than five years), should follow the procedure set in the Law on Public-Private Partnership. This, however, for small energy efficiency projects (€1-2m) is a very demanding, time consuming and costly procedure, which discourages any further undertaking for relatively small projects. Bundling of energy efficiency projects to reduce the fix costs for undertaking a PPP procedure would be a natural undertaking. However, bundling was not an option either because not contemplated in the regulation for the use of available grants.

“Design & build”, “Design build and operate” and “Design build finance and operate” are the preferred project delivery models in which an Energy Service Company can be appointed under an EnPC for the deep renovation of a public building. These models encourage an Energy Service Company to develop a project with its long-term performance in mind from the outset, rather than just considering the lowest possible costs option. The Energy Service Company will follow the project from A to Z and will be able to guarantee all the results, including energy savings. During the last five years there have been a lot of discussions in Latvia about introducing these models for deep renovation of public infrastructure; however, no clear policies and guidance were developed. All subsidies’ programmes (85% grant using EU structural funds and state budget) were developed with an application process forcing municipalities to one building one project approach and using a design bid and build approach (first the municipality develops a project technical producing an engineering design company design and then bids for a contractor for civil engineering works based on the developed project design).

These subsidies programme turned to be a major barrier to the use of energy performance contracting, as project based on other approaches would not be eligible for subsidies. Municipalities applying for subsidies were scored based on the forecasted energy savings and readiness of the project, i.e., only projects with finalized technical design were awarded. At the same time the “one building | one project | one application” rule, excluded any opportunity for project bundling and therefore for bigger size contracts; which for example are more attractive for models like Design & build”, “Design build and operate” and “Design build finance and operate”.

As a result of these regulatory barriers, public authorities do not have particular interest in Energy Performance Contracting. Figure 2 gives a comparison between the current approach used by public authorities and supported by available grants and the most critical issues for undertaking a project based on Energy Performance Contracting.

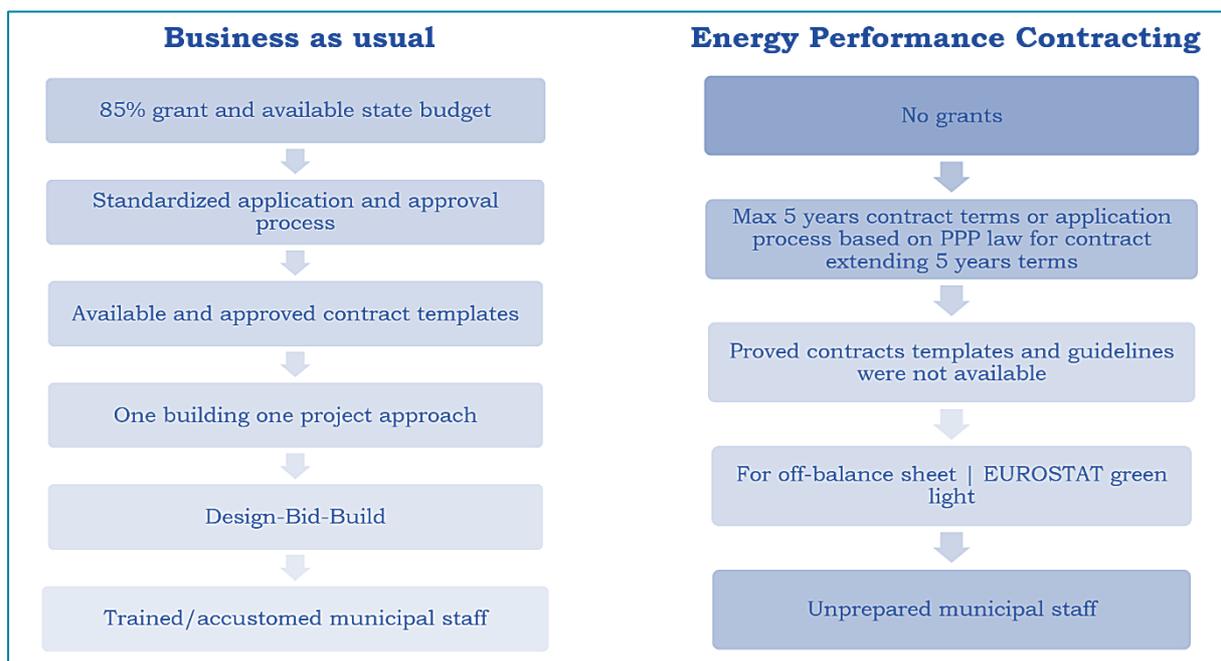


Figure 2. Comparing energy efficiency project in the public sector carried out as “business as usual” and based on “Energy Performance Contracting”

Other important barriers are:

- Lack of client trust, awareness, and understanding
- Competing contracts
- Availability of providers, facilitators, in-house capacity
- Off-balance sheet treatment
- Political commitment
- Limited access to financing for providers
- Competing and incompatible financing

A full description of these barriers identified during the Accelerate SUNSHINE project is available in the project report: ESCO market assessment and market monitoring, 2020 available at www.sharex.lv

2.3. Alternative option to circumvent market inertia and regulatory barriers

The Accelerate SUNSHINE project supported Deep renovations of Public Buildings and Multi-Family buildings using long term Energy Performance Contracting. Ideally the proposed concept In Accelerate SUNSHINE included deep renovation of public buildings in four municipalities using long term EnPC (20 years), including third party financing. Current market and regulatory barriers prevented the use of such sort of contracts within the time frame of the project; at the same time the availability of grants and “soft” loans to municipalities from the Latvian Treasury, did not live any open window of opportunities for third party financing.

One of the most crucial barriers was the contradiction in the Latvian regulatory framework. Even if the Energy Efficiency Law allowed and indicated the use of EnPC, there were other laws preventing its use; for example, the Law on Public Procurement prohibits municipalities to sign service contracts longer than five years. Therefore, a municipality interested in long-term EnPC (longer than five years), should follow the procedure set in the Law on Public-Private Partnership (PPP). municipalities as public building owners are obliged to go for the “*most economical option*”. Therefore, permitting of EnPC projects in public buildings is often depending on the proof of economic advantages of EnPC projects compared to traditional public investment projects. In Latvia the permitting authority is the Ministry of Finance, which would not take additional benefits of EnPC into consideration.

Although the benefits of EnPC projects have been proven in the Latvian private sector and have already been proved by the ex-post evaluation in many completed EnPC projects in Europe, still additional studies would be required in Latvia for to authorise a PPP investment and project implementation. This is mostly due to a lack of trust by the Ministry of Finance and Ministry of Economics in EnPC business models and a lack of experience in the comparative assessment of EnPC projects. On the top of this, projects are simply evaluated based on payback periods rather than on life-cycle-cost, which prevents to show up the full benefits of EnPC

All this additional studies and problems for relatively small energy efficiency projects (€1-2m) are a very demanding, time consuming and costly, which discourage any further undertaking for relatively small projects. Bundling of energy efficiency projects to reduce the fix costs related to PPP procedure would be a natural undertaking. However, bundling was not an option either because not contemplated in the regulation for the use of available grants.

Inverting market inertia needed initiatives with any small steps helping to move the market; the introduction of an energy efficiency guarantee in current building construction contracts, which are used by municipalities for building renovation project, was considered a valid alternative to be tested in Accelerate SUNSHINE. The template of construction contract, which is widely used in Latvia, was updated including as annex the description of an energy efficiency guarantee and the required operational and maintenance activities (mostly linked to the provision of training and energy monitoring). These construction contracts have five years terms, and they are backed up by a contract performance bond, which compensates the client (municipalities) in case of contract defaults. Figure 3 shows a comparison between the idea of Energy Performance Contract included in the original Accelerate SUNSHINE concept and the tested Energy Performance Contract developed amending a Construction contract.

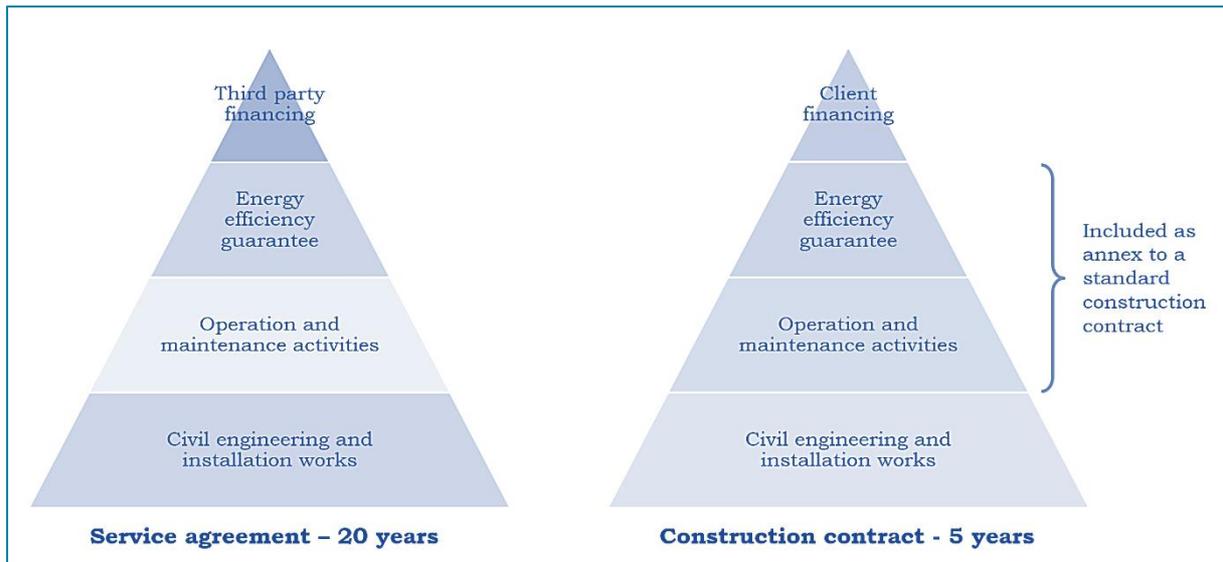


Figure 3. Elements of Energy Performance contracting – Left: the ideal case proposed by Accelerate SUNSHINE where Public Authority procure the implementation of building deep renovation using long term EnPC including third party financing. – Right: adding an energy performance guarantee in existing construction contracts which are included in the tender for building renovation projects.

By the end of Accelerate SUNSHINE, the option of adding an energy performance guarantee in the construction contract was tested in 7 projects implemented in Latvia. Two examples, one in Jurmala municipality and one in Tukums municipality are further described.



3. PROJECTS IMPLEMENTED IN LATVIA

The development of EnPC projects in the municipalities partners in Accelerate SUNSHINE was supported by the technical partners in the project working as facilitator helping with technical, financial, and legal aspects of EnPC.

For inverting market inertia, the solution worked out in Accelerate SUNSHINE was the introduction of an energy efficiency guarantee in current building construction contracts, which are used by municipalities for building renovation project.

In general, the process was organized in the following phases (see Figure 4):

1. Identification and selection of buildings, including energy audits and structural survey,
2. Project development including the procurement of an engineering design company,
3. Decision to use EnPC instead of implementing a project in the traditional way. In this case the EnPC was the typical construction contract including additional annexes for including the provision regarding the energy efficiency guarantee, linked operational and maintenance activities and description of the measurement and verification protocol.
4. The project design is used for tender for the selection of an ESCO (typically a construction and installation company), which must verify and take over the project design documentation, which included the targeted energy consumption to be reached. This targeted energy consumption is reflected in the Construction contract and set as guaranteed value.
5. The ESCO implements the project. At the end of the implementation the project is commissioned and accepted by the Municipality.
6. The last phase is the guarantee period of the EnPC, which is however limited to 5 years due to the Latvian Procurement Law. In these five years the ESCO carry out operational and maintenance activities, typically linked to monitoring of energy consumption, warranty repairs and periodic inspections on the status of the installations. On yearly basis a third-party independent consultant carries out measurement and verification for the settlement of the accounts.

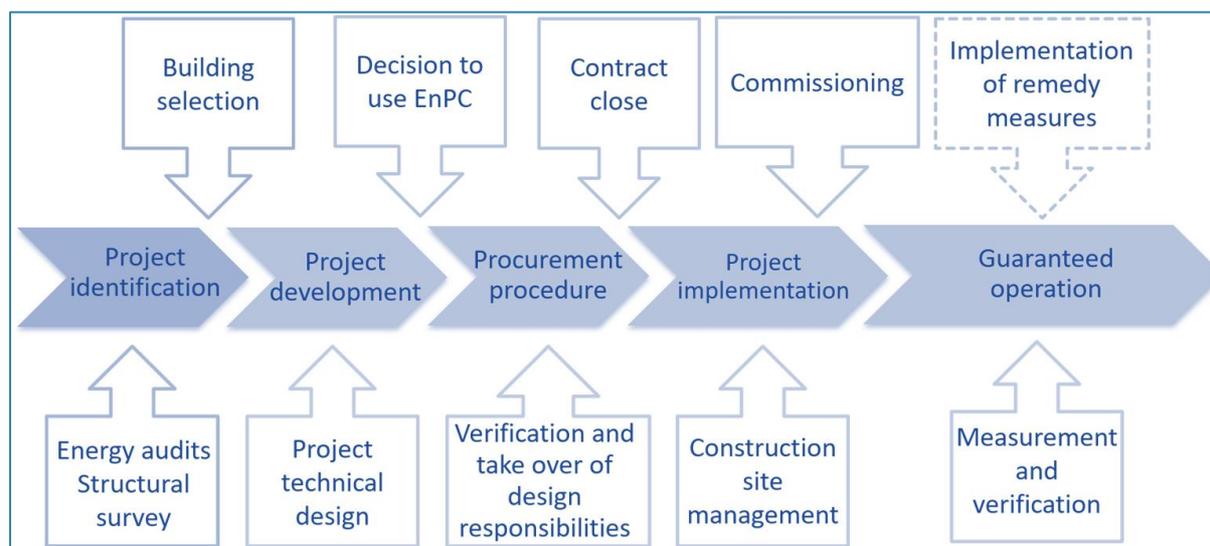


Figure 4. General process for EnPC project used in Accelerate SUNSHINE

The template of construction contract, which is widely used in Latvia, was updated including as annex the description of an energy efficiency guarantee and the required operational and maintenance activities (mostly linked to the provision of training and energy monitoring). These construction

contracts have five years terms, and they are backed up by a contract performance bond, which compensates the client (municipalities) in case of contract defaults.

As part of Accelerate SUNShINE, several renovation projects for public buildings have been implemented using this approach in Ādaži, Jūrmala and Tukums municipalities. Although, the basic principles of the EnPC used for renovation of public building in these municipalities were the same, the way how the projects were carried out was rather different. To obtain the different experiences and lessons learned, two interviews were conducted, and one in-depth questionnaire was completed by representatives of municipalities involved in the project implementation. Their experience and lessons learned is further summarised in the next paragraphs

3.1. Project identification and development

The renovation of buildings in Accelerate SUNShINE municipalities was based on EnPC developed starting from a construction contract and adding relevant annexes for energy efficiency guarantee, operational and maintenance services and measurement and verification. The process for procuring these EnPC followed current practices, namely: *design bid and build* using standard *open tenders*. This approach was selected because access to investment grants from EU structural funds required these procedures. Other more suitable tendering processes and approaches were therefore basically precluded.

The first step was project identification, where carried out preliminary studies (energy audits and structural surveys) for selected buildings. Regarding the renovation of public buildings, so far buildings were selected only if co-financing was available from EU structural fund or other State support programmes. The main criteria for the selection of buildings were compliance with the specific grant programme requirements; as second criteria the general technical condition of the building was used, prioritizing buildings with more urgent needs of interventions.

The municipalities prepared a priority list of potential buildings and the City Council based on this preliminary information made a final decision and approved priority investment plan. For one municipality, the amount of attracted funding also determined an important role in the selection of buildings.

As part of the “Accelerate SUNShINE” project, all municipalities decided to include the use EnPC for projects under the Operational Programme: “*Growth and Employment*” – programme Nr. 4.2.2. with Specific Support Objective “*Integrated development programme for Local Governments to promote the increase of energy efficiency and the use of renewable energy resources in public buildings*” (hereinafter – SSO). In addition to this criterion, the energy consumption and potential savings of the building were also assessed. Buildings with higher energy consumption and higher energy efficiency potential were prioritised, because they were also better scored by the SSO subsidy programme. In one of the municipalities, the amount of attracted subsidy also determined an important role in the choice of buildings.

The specific characteristics of the selected buildings are summarized in Table 1. Tukums municipality was the first municipality in Latvia to test the renovation based on EnPC for the renovation of the kindergarten called “Pasaciņa”.

Table 1. Selected public buildings with ENERGY EFFICIENCY GUARANTEE in each municipality

Municipality	Ādaži	Jūrmala		Tukums	
Building use	Kindergarten	Sports school swimming pool	Secondary School	Kindergarten	Secondary School
Planned construction works	Simplified renovation of the building envelope	Construction works for the reconstruction of the building and increase of energy efficiency	simplified renovation of the building envelope	simplified renovation of the building envelope	Construction works for the reconstruction of the building and increase of energy efficiency
Planned implementation time	March – December 2019	July 2019 – July 2020	June 2019 – February 2020	December 2018 – December 2019	February 2020 – June 2021
Total area of the building, m ²	4583.4	3020.20	5098.40	1838.7	7339.8
Specific energy consumption before renovation, kWh/m ² year	252.1	364.6	165.2	159.8	138.4
Guaranteed energy level, kWh/m ² year	119.5	83.9	66.0	89.4	77.4

Tukums municipality, initially planned for large number of buildings for renovation based on EnPC. However, not all projects were implemented because the municipality has limited financial resources to co-finance the projects granted with SSO support and the costs of building renovation projects were considered too high. The option of using third-party financing and tendering financial services as part of the EnPC process was excluded, because it would require the approval of a PPP process with the Ministry of Finance. The costs and time for this approval for a relatively small projects would not justify this undertaking. Additionally, the time required to set up a PPP project, blended with EU structural funds, would exceed the deadline for using the granted SSO funds.

After building selection, the next step was the preparation of project design documentation based on technical specification developed from the energy audit and structural survey. The prepare clear design tasks is particularly important. The design task documentation list the measure and the specification of all measures to be included in the project design and provides information on the building. Based on the design task documentation, an engineering design company was selected with an open tender procedure for consultancy services.

The design tasks of the selected buildings were first prepared for the application to the SSO programme and only after that funding was granted the tender for construction work based on EnPC had to be prepared. This process needs specific attention. For example, one municipality mentioned that including an energy efficiency guarantee would requires stricter criteria and requirements in the design task documentation; in particular, regarding building space heating solutions. At the same time as energy audits were prepared for funding application (optimistic savings), their use for setting a performance guarantee may not be straight forward (more conservative figures on savings).

All municipalities mentioned that the technical design documentation used for tendering the renovation projects based on EnPC was a complicating factor in procurement.

The problem was related to the fact that public buildings must have an energy performance certificate in accordance with the Energy Efficiency Law. Consequently, municipalities before participating in SSO

programme had already carried out the energy audits of selected buildings and, based on these results, prepared the application for the programme with rather optimistic figure for energy savings. As most of these audits were carried out several years before participating in the programme, the information provided in the energy audits was no longer reflecting the actual situation. In addition, all municipalities mentioned that when commissioning energy audits, they trusted the author and his competences that the information prepared meets the requirements. However, in all cases it was necessary for the municipalities and Accelerate SUNSHINE to update, amend and improve existing energy audits. In addition, calculation mistakes or inaccuracies were in most cases detected during this phase, for the preparation of the tender documentation for construction works and for the determination of the right minimum energy efficiency guarantee to request. Based on the experience gained in the municipalities, to avoid mistakes in energy audits, the municipality should try to work with recognised companies or auditors with positive experience and feedbacks. This can be reached including stricter eligibility and quality criteria when procuring energy auditors. At the same time the experience of municipal employees is very important, specifically when reviewing energy audits. Training of municipal energy managers and employee on these aspects are therefore an important activity.

The second critical factor in this process was the quality of project design documentation. All municipality had to make changes in the construction project during the procurement process. However, the changes were not due to the requirement of an energy efficiency guarantee but rather on construction elements. Two municipalities informed that, in their opinion, this situation was caused by a surge in demand, whereas several municipalities simultaneously prepared their applications for the SSO programme. Consequently, procurements for design works were announced at the same time with short deadlines set by the SSO programme. As a result, the technical documentation was quickly prepared but with lower quality. Errors and inaccuracies in the design documentation were later found during the preparation of the tender documentation and contracting, and later even during the construction process. To improve the situation and detect mistakes in the technical design documentation at an earlier stage, construction expertise was requested for all buildings for the next projects. In the case of three buildings, no significant deficiencies or errors were identified, however, they were later identified within the construction procurement process. In addition, one of the municipalities informed that after receiving the conclusion of the construction expertise, there were concerns that it had been prepared superficially. In one of the municipalities, a supervisor was involved in the evaluation of the technical documentation, who controlled what has been planned in the construction project in completion with the construction works to ensure its implementation in accordance with the construction project.

Based on the information provided by the municipalities, when preparing the technical documentation for building renovation, the requirement for an energy performance guarantee did not create any additional burden compared to the current practices.



3.2. Tendering energy performance contracting



The preparation of tender documentation followed existing practices in municipalities used for procuring civil engineering works; the tenders were supplemented with the requirements regarding the energy performance guarantee.

The tender documentation is approved by the procurement commission of the municipality, which consists of representatives from various departments. The procurement regulations and the

draft contract are prepared by municipal lawyers and procurement specialists, but specific requirements for an individual projects are included by project managers, which are appointed by the municipality to specific projects. For the specific cases of the buildings renovated using EnPC, in two municipalities specific requirements regarding the energy efficiency guarantee were included by the project manager and in one case by the municipal energy manager. The annex of the EnPC contracts and the part of the tender documentation regarding the energy efficiency guarantee, operational and maintenance activities and measurement and verification were prepared by the technical partners in “Accelerate SUNSHINE”. All municipalities recognised that for this task, a project facilitator is needed. The following main requirements were included:

- The level of energy efficiency guarantees to be reached after the implementation of the measures, expressed in kWh/m² year and the related calculation methodology for adjustment.
- The guarantee period set at 60 months (5 years) and measurement and verification protocol.
- Requirements for air leakage tests.
- Requirement for building's energy efficiency guarantee plan prepared by the ESCO.
- Requirement for training of building management staff regarding maintenance of the engineering systems in the building.

As previously there was no experience of this type of EnPC in Latvia, extensive discussions and meetings were held in all municipalities between the Accelerate SUNSHINE project partners and the representatives of the procurement department. In two municipalities in the procurement department there were (and still there are) major concerns about the inclusion of an energy efficiency guarantee; in particular:

- The energy efficiency guarantee will only increase construction costs,
- Due to energy efficiency guarantee requirements, a smaller number of tenderers will apply,
- It is difficult to assess whether the inclusion of the energy efficiency guarantee bring better results and value.

Despite the requirements for an energy efficiency guarantee were provided to the municipalities from the Accelerate SUNSHINE project partner, the procurement documentation and organization of the process, as well as the experience gained during these processes, differed between municipalities. A summary of the procurement results for each of the buildings is shown in Table 2.

Table 2. Summary of the construction work procurement results

	Ādaži	Jūrmala		Tukums	
Building type	Kindergarten	Sports school swimming pool	Secondary School	Kindergarten	Secondary School
Time lapse from procurement to contract signing	2 months (2 nd time)	4 months	3 months	6 months (2 nd time)	7 months (2 nd time)
Control costs estimates EUR (ex-VAT)	721,484.86	Not available	Not available	1,269,466.94	6,194,777.00
Number of applicants	8	2	1	5	10
Average price, EUR (ex-VAT)	884,256.86	2,583,907.84	2,028,485.25	1,385,201.33	6,817,656.51
Winning tender EUR (ex-VAT)	870,796.70	2,373,383.85	2,028,485.25	1,280,677.10	6,194,811.17

Without the inclusion of energy efficiency guarantees, these procurements would not include the requirements to achieve a certain level of energy efficiency and most likely also requirements for blower door testing, delivery of operational and maintenance manual, or training of technical staff would not have been included. Table 3 include an overview regarding the relevant requirements requested by the municipality engaged in EnPC procurement. At the same time, thanks to these requests, the project design documentation was also reviewed much more carefully both by the municipalities and by potential contractors, with a substantial improvement in quality, resulting in better quality works.

According to the Municipalities, the inclusion of energy efficiency guarantee in the tender did not pose specific and significant difficulties in the procurement process, that would differ from the current practice in organizing similar types of tenders for civil engineering works.

Table 3. Additional criteria set by municipalities in the procurement regulations regarding energy efficiency guarantee

	Ādaži	Jūrmala		Tukums	
Building	kindergarten	Sport school and swimming pool	Secondary school	kindergarten	Secondary school
Requirement to tenderer	At least two similar projects delivered in the last 5 years	At least one similar project delivered in the last 5 years		At least two similar projects delivered in the last 5 years	
Requirement to construction site manager	Experience in at least two similar projects in the last 5 years	Experience in at least one similar project in the last 5 years		Experience in at least one similar project in the last 5 years	Experience in at least two similar projects in the last 5 years
Requirement for blower door testing	No requirement	At least 2 tests	Required	Required	Required
Building operational and maintenance manual	Required	Required	Required	Only for equipment	
Training requirement	Not required	Required	Required	Required	Required
Other specifications	€ 5000.00 security bond for energy efficiency guarantee	Additional requirement for individual specialists		Additional requirement for individual specialists	Additional requirement for individual specialists

Tukums experience

Tukums municipality was the first of the municipalities to start the procurement process based on EnPC for the Kindergarten (PII "Pasaciņa"). For this building a pre-tendering open meeting was organised with potential contractors with Tukums municipality and Accelerate SUNShINE technical partner to explain the clauses related to the Energy Efficiency Guarantee and why these requirements were included. When Tukums organised the tender for the secondary school, such a meeting was no longer held; instead, a contact person was indicated in the tender documentation for specific questions related to the energy efficiency guarantee. Tukums municipality explained that this decision was taken because during the former pre-tendering meeting, potential contractors had more questions about the construction project and technical solutions, rather than on the energy efficiency guarantee. For both tenders in Tukums, the procurement was carried out twice, because during the first announcement shortcomings were identified in the construction projects and the procedure terminated. For the second tender, a complain on the energy efficiency guarantee was also sent by a potential contractor to the State Procurement Monitoring Bureau. The potential contractor claimed that the municipality did not have the right to include this requirement in the tender and that the requirement was limiting fair competition. The Procurement Monitoring Bureau opened an investigation on the matter and ruled in favour of the municipality; concluding that the municipality had the right to include an energy efficiency guarantee as requirement and that this factor was not limiting competition. The Procurement Monitoring Bureau added that requirements on energy efficiency level are already part of all project designs used in building energy efficient renovation projects and that all contractors can price it in their tenders if a guarantee is required.

According to the Municipalities, this was a particularly important decision, not only for Tukums municipality, but in general regarding the inclusion of an energy efficiency guarantee in these sorts of tenders.

According to the municipality, an important activity is to encourage potential contractors to a throughout evaluation of all available tender documentation and to have at least on building inspection, as this can reduce the number of future disputes during the construction phase.

In one of the buildings, before the contract for civil engineering works was signed, the procurement for engineering supervision was already been concluded. In this case, the supervisor was very interested in getting involved during the procurement process for civil engineering works, e.g., by reviewing the submitted costs estimates and the choice and description of the proposed technical solutions. This substantially helped to achieve better results.

As mentioned above, most of the question raised by potential contractors were about the construction project and not about the energy efficiency guarantee. In deep renovation project this may be expected and linked to the fact that the financial exposure due to the energy efficiency guarantee for a period of only five years is rather small compared to the project investment costs.

The evaluation procedure of these EnPC tender did not differ from the usual practice in the municipalities and was carried out by the procurement commission. For the kindergarten PII "Pasaciņas" among the evaluation criteria without a lower price, other quality criteria were also included, but in the case of Tukums Secondary School, only the lowest price was used. When the tender includes already a detailed design of the measures to be implemented and there is not particular flexibility on the selection of technical solution, according to the municipality additional criteria, beside eligibility criteria of contractors, are not particularly useful because in most cases tenderers will anyway receive the maximum number of points for additional criteria and the winner

will anyway be determined based on the lowest price. If additional criteria are set too strict, then the tender may be cancelled by the Procurement Monitoring Bureau for unfair competition.

Jūrmala experience

Jūrmala municipality for the renovation using EnPC of the two selected buildings organised two tenders, one for each building at the same time. The same templates were used for the preparation of the procurement regulations. The tenders were supplemented including clauses about the energy efficiency guarantee. In Jūrmala, the procurement department was particularly concerned that including an energy efficiency guarantee would delay the process and the number of bids. According to the municipality, there were concerns because both buildings were included in the SSO programme with rather short deadlines for the implementation of projects. To address this issue, finally the energy efficiency guarantee was required, but the eligibility criteria for contractors' experience were reduced (see Table 3). The municipality informed that the energy efficiency guarantee complicated the construction supervision process, as significant deficiencies were identified both in the energy audit and project design documentation, which needed to be changed and corrected. To prepare the bids, the contractors had the opportunity to get acquainted with all available technical documentation, as well as to inspect the buildings. According to the municipality, many contractors visited the swimming pool of the sports school. Also, in the case of Jūrmala municipality, one of the potential contractors submitted a complaint to the State Procurement Monitoring Bureau regarding the fulfilment of the energy efficiency guarantee. As for the former case in Tukums, also in this case the Bureau rejected the complaint, and the procurement process continued. The decision on the winner was determined based on the developed methodology, where the main criterion was the lowest price.

Ādaži experience

The regulations prepared by Ādaži municipality and the process of its preparation did not differ from the usual practice. Several meetings were held with Accelerate SUNSHINE technical partners to discuss the need and level of energy efficiency guarantee. The Municipality later confirmed that the inclusion of the energy efficiency guarantee did not affect the procurement process. There were no difficulties with the inclusion of energy efficiency guarantee, and the procurement process was no different from other similarly organized procurements. Also, in the case of Ādaži municipality, potential contractors were offered the opportunity to get acquainted with the buildings. Compared to other municipality, Ādaži added specific clauses in the tender: a requirement for 5,000.00 EUR guarantee, deducted from the Contractor's offer price as performance bond for the duration of the contract against the verification of archived energy savings,

Air blower test were not required in Ādaži because the existing heating, ventilation and sewerage systems had to be reconstructed first.

To determine the winner, only the "lower price" was considered in the procurements, as the Public Procurement Law allows the use of the lowest price criterion if the prepared technical specification is detailed, and other criteria are not relevant in the selection of the tender.

3.3. Cooperation between municipalities and ESCOs

In all municipalities communication with selected contractor during the construction process took place according to the current practice in the construction industry. In all cases, in accordance with regulatory requirements, meetings were held at least on weekly basis between the representatives of the municipality, the construction supervisor and the construction site manager. During these meetings, the progress of the work and the identified problems and shortcomings were discussed, but in none of the cases there were specific issues related to the energy efficiency guarantee. The duration of the construction process in each of the projects is summarized in Table 4. In several projects there were delays in delivery of the works compared to the initial plans caused by latent conditions and additional works to be carried out. Delays were not caused or linked to the request of the energy efficiency guarantee.

Table 4. Planned and actual execution time of the construction process

	Ādaži	Jūrmala		Tukums	
Planned construction works	Simplified renovation of the building envelope	construction works for the reconstruction of the building and increase of energy efficiency	simplified renovation of the building envelope	simplified renovation of the building envelope	construction works for the reconstruction of the building and increase of energy efficiency
EnPC signed on	21/03/2019	15/07/2019	11/06/2019	14/12/2018	12/02/2020
Planned construction and installation period	9 months	12 months	8 months	12 months	16 months
Actual construction and installation period	14 months	13 months	9 months	18 months	16 months

Two municipalities emphasized that a significant influence on the fulfilment of energy efficiency guarantee requirements and communication with the contractor was determined by the contractor's own attitude towards the energy efficiency guarantee and understanding of it. Within the framework of these projects, both positive and negative attitudes from contractors were found. However, in all cases, the municipalities indicated that, due to the inclusion of energy efficiency guarantee, the contractor paid more attention to the implementation of energy-efficient measures and construction works. In the case of Jūrmala municipality, the attitude of the two contractors engaged with the two buildings under renovation towards the energy efficiency guarantee differed greatly. In one case, the contractor offered various solutions to achieve better performance. In the second case, the contractor sought various pretexts to waive or lower the energy efficiency requirements, as it considered this to be an additional risk and unnecessary action. Based on the experience of Jūrmala municipality, perhaps in this case, the human factor and the attitude of the person played an important role, rather than the conditions for meeting the energy efficiency guarantee requirements.

The requirements for conducting air blower tests, conducting training, and preparing instructions caused greater difficulties in communication with the contractors. In the case of Tukums municipality, the contractor had not performed an air blower test, and the municipality was forced to refer to the terms of the contract and force the contractor to do so. A similar situation was in Jūrmala municipality with the contractor of Kauguri Secondary School. As a result, the requirements were met, and the specified air blower test results were achieved. However, due to the negative attitude of the

contractors, the municipalities were concerned that the results of the air blower test could not be met.

Based on the opinion of two municipalities, the training of the technical staff of the building was carried out, but not of sufficient quality as expected. The training was held for one day, which, is not long enough for the technical staff of the building to be able to learn the principles of operation of all new equipment and systems. In some cases, the training was not provided by the contractor, but subcontracted. Therefore, instead of training, standard practice was performed - setting up the system and information about its operation. Therefore, if the local government needs to make any changes in the operation of the system or needs additional information, an additional payment is required. Representatives of both Tukums and Jūrmala municipalities informed that in the future this aspect shall be improved and addressed in the procurements adding more specific requirement for instructions on the installed engineering systems to the technical staff.

One of the respondents emphasized the importance of preparing a building management manual for technical staff, which was also one of the requirements added in the tender and related to the energy efficiency guarantee. Unfortunately, contractors perceived this activity as an additional burden, so the manuals or management plans were more like a set of instructions. In the case of Ādaži municipality, the contractor engaged his expert - an energy auditor, who developed a plan for maintaining the building's energy efficiency guarantee.

Based on the information provided by the municipalities, it is not yet possible to assess whether the level of energy efficiency set by the energy efficiency guarantee has been achieved, as in none of the cases the full heating season has ended since the renovation. Nevertheless, one municipality indicated that energy efficiency guarantee requirements will continue to be included in similar types of construction projects, especially if building renovations are carried out under support programs. On the other hand, the representatives of the other two municipalities are currently not convinced about the further inclusion of energy efficiency guarantee requirements in similar types of construction procurement.



4. LESSONS LEARNED

4.1. The main barriers and positive outcomes

According to the information provided by the municipalities, during the implementation of the first building renovation projects, which include the requirement for energy efficiency guarantee, the municipalities faced the following main problems:

Technical:

- It is not possible to carry out building renovation projects in several educational institutions at the same time, because it is necessary to provide for the relocation of existing students, lecturers, administration, and technical staff to other premises suitable for the educational process,
- Training for technical staff was too short, which did not ensure sufficient knowledge transfer and information in the long run for the building to continue to be managed qualitatively.

Financial:

- the municipality does not have sufficient financial resources to carry out renovation projects of several public buildings at the same time, even in cases when co-financing is available for the implementation of energy efficiency measures. However, Latvia lacks a suitable framework for accessing third party financing, and for off-balance sheet options related to EnPC.

Social:

- there was too much reliance on the competence and responsibility of the involved specialists to provide quality services because the municipal employees did not have experience and sufficient knowledge in the implementation of building renovation (energy efficiency measures) projects,
- there was no understanding and consensus among municipal employees about the need to include energy efficiency guarantee and their requirements. Often municipal employees cared more about the additional burden of potential contractors to fulfil an energy efficiency guarantee, rather than about the own interest of the municipality,
- there is no communication between the involved specialists and a general lack of integrate design approach (energy auditor, architect, civil engineer, etc.) and certain responsibilities.
- contractors were reluctant to change their usual practices and take on additional responsibilities and obligations regarding compliance with energy efficiency levels.

Market

- application for building renovation projects to the SSO programme had very short project application deadlines. At the same time, many municipalities applied to the SSO programme and there was a surge in demand regarding energy audits and preparation of technical design documentation. Considering the limited number of available specialists in Latvia, the same specialists and consulting engineering companies applied for several projects simultaneously. This resulted in documentation prepared in short time and often with low-quality.

Others

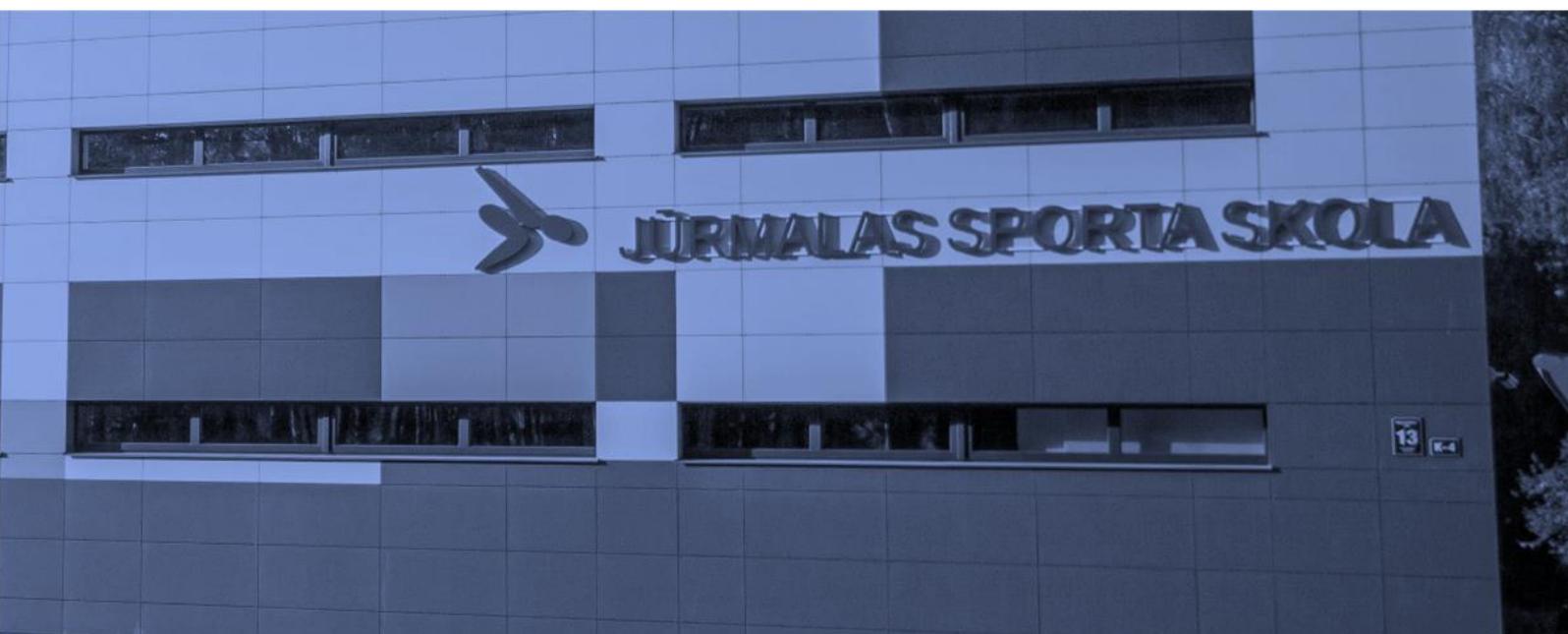
- according to legal requirements, public buildings must have an energy performance certificate, which in Latvia is based on energy audit. Municipalities use the information from existing energy audits when preparing project applications to the SSO support programme, even though some of the audit was outdated, poorly implemented or overoptimistic regarding expected energy savings.

However, most of the problems described above are not really related to the inclusion of energy efficiency guarantee in the tenders, but in general to previous experience in organizing building

renovation and construction processes in municipalities (development of technical documentation, organization of construction procurement and construction process).

As a main conclusion, the advantages of including an energy efficiency guarantee for the renovation of public buildings in municipalities in building renovation projects outweigh the burdens of dealing with it. Of course, it must be considered that it is currently not possible to assess whether the required level of energy efficiency has been achieved in buildings and how the further process with the contractor will work.

The inclusion of energy efficiency guarantee encouraged the contractors to be more actively involved and more responsible in implementing energy efficiency measures compared to experience from equivalent projects. This provided a sense of security that the municipality will also be able to meet the requirements of the energy efficiency guarantee in the SSO programme. In addition, it promoted the increase of knowledge of municipal employees on energy efficiency issues, which will ensure the implementation of higher quality projects in the future.



5. CONCLUSION AND RECOMMENDATIONS

Given that only few projects including and energy efficiency guarantee projects have been implemented so far, there is still much room for improvements. Based on the experience gained by the Municipalities partner in Accelerate SUNSHINE, this set of recommendation can further improve the framework for energy performance contracting:

Regulatory barriers for long term EnPC in public buildings and use of PPP

- Accelerate SUNSHINE has introduced an energy efficiency guarantee as annex to the template used for construction contracts, which are contracts with maximums 5 years term. This is in line with the time limits set by the public procurement law and it also backed up by the performance bond included in the agreement. Such guarantee was tested in several public building renovation contracts. In parallel with the energy efficiency guarantee, the contract also include training for building users, tuning and regulation of installed heating systems and monitoring activities to enable the contractor to reach the guarantee savings. Measurement and verification of the energy saving by an independent third party is contractually planned on yearly basis at settlements of the accounts.
- Based on the existing legal framework, this was the most suitable solution for pushing a transition toward longer terms service contracts. Accelerate SUNSHINE received wide resistance from different stakeholders, including representatives of municipalities, public institutions like Ministry of Economics and construction companies. The implementation of these projects including an energy efficiency guarantee triggered a constructive dialogue on Energy Performance Contracting and all stakeholders are now aware that for introducing long term EnPC (>5 years), there are concrete regulatory barrier to be removed. The Ministry of Economics and the Ministry of Finance shall develop guidelines and EnPC templates for municipalities, to be used for building renovation projects. Subsidy programme shall not be a barrier to EnPC, but rather an incentive for mechanism which better ensure the achievement of results and quality.

Persuading and aligning everyone interest

- Accelerate SUNSHINE has come across different barriers. Beside the major regulatory barriers, the most taxing and time-consuming challenge throughout the whole project has been persuasion of municipal staff. All the involved municipal staff acknowledged the importance of energy efficiency, of quality of construction works, of the achievement of energy savings and even the advantages of Energy Performance contracting to reach these targets. However, when the time for decision arrives, the time for preparation is past [Thomas S. Monson] and all got impossible. For example, considering that most of the public buildings in Latvia have so far been renovated using EU structural funds with an obligation to report achieved energy savings, and a penalty for missing planned energy efficiency targets, the idea of an energy efficiency guarantee was supposed to be attractive. However, the procurement departments of the municipalities were not cooperating with the development departments and were extremely against the idea of including any sort of energy efficiency guarantees in the tenders for public building renovation. Often the municipal staffs started to care more about the additional 'burden' of a potential contractor rather than about the economic, technical, and social interest of the municipality.
- Consortium of Accelerate SUNSHINE throughout the project has used different persuasion methods, including meetings with all ministries at different levels (minister, state secretary, deputy state secretary etc.), individual meetings with municipalities (at different level), Union of Local Governments, discussions with State Audit Office etc. Effective and persistent stakeholder communication is essential to contrast market inertia on EnPC.

Preparation and organization of procurement:

- The municipality must develop a more unified awareness and understanding of the need for energy efficiency guarantee to achieve quality results. If a municipality buy an energy efficiency measure, to ask for an energy efficiency guarantee shall become the common praxis. This is important in the implementation of all future processes, from the energy audit to the commissioning and long-term use of the building.
- Most of the municipalities do not have experience with EnPC projects or the necessary technical capacities to develop tenders for EnPC projects. To involve qualified and experienced local facilitators acting at all stages of EnPC project development, implementation, monitoring, and verification supporting municipal staff is proved to be very important for the implementation of this type of projects. The cost for the services provided by local facilitators is not included in the EnPC contract but paid by municipalities based on separate service contracts or covered by technical assistance programme (Project development assistance like Accelerate SUNSHINE or ELENA). This allows the contracted facilitators to act, independently from and ESCO, solely to pursue the interest of the municipality.
- Local facilitators support all process steps of EnPC project development. Local facilitators are typically local or regional energy agencies, engineering consulting companies or legal advisers. The most important factor is that a local facilitator should have experience and knowledge of energy efficiency in buildings, public procurement procedures, concepts and business models for energy performance contracting and on project financing. Contracting of local facilitators has usually to follow standard procurement procedures for consultancy services.
- For the municipality to better define the requirements regarding energy efficiency it is also necessary to hold several meetings between project managers, civil engineers, architects, and technical staff of the selected building. Support from local facilitator in this dialogue is often necessary.
- Specialists in a specific field (e.g., architect, civil engineer, energy manager) with appropriate knowledge and competence in the evaluation of projects, especially engineering solutions, could be involved as employees in municipal development or construction project departments.
- The energy auditor/specialist must be involved and take responsibility for the entire project implementation period, from the energy audit to the commissioning of the building. It would be important for municipalities to be able to evaluate and determine what energy efficiency indicators could be achieved by implementing certain measures.
- Additional criteria in the procurement of energy auditors regarding experience and quality requirements is necessary to avoid the delivery of low-quality reports. Adding even possible financial liabilities on the preparation of poor-quality energy audits will improve the quality of the documentation and have a positive impact on the full process. Such requirements should be proportionate to the cost of the service.
- It is important to include as condition on-site inspection of potential contractors to the buildings included for tender.
- It would be desirable to involve the developers of the construction project in the preparation of the construction procurement. The design and execution of the construction work should be linked and not two separate processes, as shown by current practice.

In any case, the inclusion of stricter energy efficiency guarantee requirements will not bring the expected benefit if municipalities, from the top management to the individual employees involved in the project implementation, are not convinced of its need

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