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HANDBOOK

Deep renovation of multifamily residential buildings using Energy Performance Contracting

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SUNShINE: Save your bUildiNg by SavINg Energy towards 202020m2 of deeply renovated multifamily residential buildings. - Grant 649689

This project is funded by the Horizon 2020 Framework Programme of the European Union

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Editor: Ekodoma; www.ekodoma.lv

More Information: More details about the SUNShINE project are available online at: www.sharex.lv and from the project coordinators at Riga Technical University, Latvia.

ISBN: 978-9934-8058-6-8

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SAVE YOUR BUILDING BY SAVING ENERGY

INTRODUCTION

This handbook presents in a clear and simple manner both the theory and application for the renovation of multifamily buildings based on Energy Performance Contracting. The handbook addresses building built in series since the 50ies, corresponding to more than 50m m² in Latvia alone. It offers solid grounding on building renovation and advice on improving building energy performance.

Written by leading international academics and sector experts from the house owner point of view, and prepared under the auspices of the H2020 SUNShINE project, this handbook aims to be an essential resource for anyone interested in deep building renovation varying from planning building renovation to project financing under Energy Performance Contracting. If you are an ESCO[1] planning to use the SUNShINE platform for your project, then this handbook will help you to better understand your client's needs and requirements, taking you step by step through the process of a comprehensive building renovation.

At a first glance, Energy Performance Contracting is a complex contract. Indeed, the reader will need to familiarize himself with technical, financial and legal concepts. For this reason, facilitators and consultants are ready to help you in the process. Further information, including an electronic version of this handbook can be found online at www.sharex.lv.

This handbook endorses the concepts and the SUNShINE platform which includes the Latvian Baltic Energy Efficiency Facility (LABEEF), which has a single purpose: the deep renovation of multifamily residential buildings using Energy Performance Contracting. Therefore often in the handbook you will find references to the documentation prepared by LABEEF.

The time invested in reading this documentation will be fruitful: the concepts are all well known, the technology tested. By combining these concepts together and providing a guarantee creates some complexity. Managing the added complexity results in projects which demonstrate energy savings of over 50% while providing health, safety and comfort benefits.

The examples shown in this handbook are indicative only. For correct estimates for your building you should contact an ESCO. For this look at www.sharex.lv.

Riga, 2017

[1] An ESCO in this handbook means a legal entity which delivers building renovation using Energy Performance Contracting in a multifamily building. Generally speaking, every company, including house maintenance companies and utility companies, using Energy Performance Contracting is considered an ESCO in this handbook

1 WHAT IS A DEEP BUILDING RENOVATION?

Deep renovation is the idea of capturing the full economic energy efficiency potential of your building with focus on building fabric. It leads to remarkable energy savings. As nearly all of Latvia's stock of multifamily buildings continues to rapidly deteriorate due to harsh weather conditions and lack of proper maintenance, this idea is attractive.

In a deep renovation all elements of your building are addressed, leading to:

- Reduced energy consumption – you will need less energy to heat your home;
- Better temperature control – you will be able to control the temperature in each room of your apartment;
- Improved comfort life conditions – you will enjoy suitable temperature and indoor air quality. Also noise coming in from traffic and outdoor activities is reduced;
- Improved health: different studies shows that energy efficiency projects improving indoor comfort conditions translates in considerable savings on health bills;
- Lower capital expenditure – a more efficient, well-insulated building needs smaller or no emergency repairs;
- Good investment - as your building's value and attractiveness will increase.

Example of a building deep energy efficient renovation (before and after).
Achived energy savings are over 55%

Deep renovation also links to another important aspect: the long term preservation of the building. The implementation of an energy efficiency measures without taking care of all important building elements, like for example: roof, foundations, staircases, balconies, heating and domestic hot water systems is a short sighted plan.

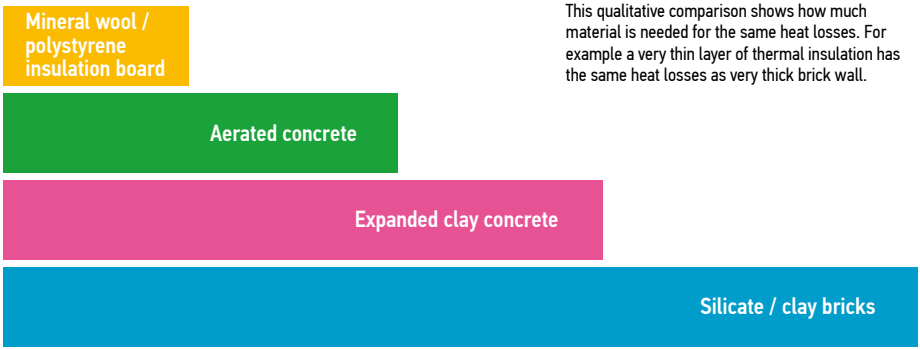
In simpler words, energy efficiency without deep renovation is a lost opportunity and sometimes also a waste of money. Therefore, this handbook only advocates deep renovation, where buildings are holistically assessed and renovated.

Energy efficiency alone cannot solve the structural problem affecting the majority of the multifamily buildings in Latvia. Internal heating networks, foundations, balconies, staircases and roofs needs to be addressed to provide good and acceptable living standards.

1.1. BUILDING FABRIC

The building fabric refers to the roofs, walls, windows, floors and doors of your building. It plays the leading role in the energy efficiency of a structure and must be carefully considered in the design and planning phase of a deep renovation. Building's heating requirements are greatly influenced by the building fabric choices and their heat transfer characteristics.

Realizing the full economic energy efficiency potential of your buildings requires designing, financing and implementing energy efficiency investments. Energy efficiency is measured by understanding the annual energy needs of your building, the thermal insulation and characteristic of the building fabric and the requirements for ventilation. The heat transfer coefficient (U-value) is a measure of thermal conductivity ; meaning the lower it is for a given construction material, the better the thermal insulation property are. So for example: a meter thick brick walls has the same thermal insulation properties than 10cm thermal insulation board.



This qualitative comparison shows how much material is needed for the same heat losses. For example a very thin layer of thermal insulation has the same heat losses as very thick brick wall.

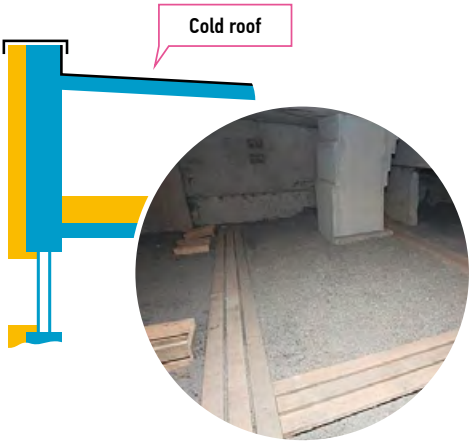
Currently, the U-value of the external walls of the first mass series building developments of the 1960s to 1995s in Latvia is in the range of 1 - 1.58 W/ K m^2 that is 3 to 5 times higher than the values specified in the regulatory requirements under the current building code. Thus, the thermal rehabilitation of existing buildings is a necessary measure, which can enable considerable energy savings.

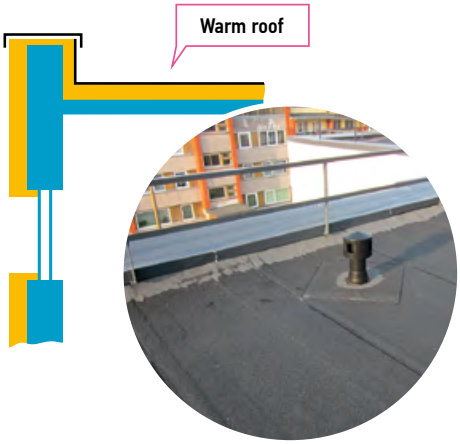
ROOF AND TECHNICAL ATTIC

Installing loft insulation in an uninsulated pitched roof or technical attics (cold roofs) is likely to be the most cost-effective way to improve the efficiency of your building fabric. Loose thermal insulation materials (like loose mineral wool or cellulose fibres) are typically the easiest options. For a walkable technical attic high density thermal insulation board protected with a concrete slabs is a good, but more expensive, solution.

[2] U-value: a measure of the rate of heat transmission through a building part (as a wall or window) or a given thickness of a material. U-value, is the rate of transfer of heat through a structure (which can be a single material or a composite), divided by the difference in temperature across that structure. The units of measurement are W/m^{2}K

Flat roofs with warm deck (warm roofs) in building without loft and technical attics is more difficult and expensive to insulate than cold roofs; however this measure is appropriate for uninsulated roofs.





Thermal insulation of the technical attic and roof

Before the implementation of this energy efficiency measure it is always important to ensure that the roof is in good technical conditions. In all cases the installation of thermal insulation has to be carefully designed and planned to ensure there are no thermal bridging problems (in particular between the wall studs and the attic slabs). For cold roofs it is imperative that the attic area is ventilated to prevent condensation.

WALLS

High energy losses occur through the fabric of the walls. Improving insulation here is an important measure, which help both to save energy and to protect your building from further deprivation. In deep renovation, façade walls and plinth are important influencer in the protection of a wall's structural components, the energy efficiency of the building and the health of its occupants.

The first step in deep renovation is the preparation of the exterior walls, which is called substrate. Therefore, before the application of thermal insulation, it is important that the substrate meets the necessary air tightness and mechanical strength requirements. This means that all joints between panels (like in the 464 series) and brick (like in the 103 series) are adequately refurbished (application of sealing membranes, special plasters, and mechanical reinforcement such as steel reinforcing cages).

In deep renovation, for the thermal insulation of exterior walls, two methods are the most common:

1. External Thermal Insulation Composite System (ETICS), is one of the most common ways to insulate a solid external wall by applying thermal insulation boards to the external fabric of the building and protecting it with a specialist render. An important details among other is the final finishing, which under LABEEF guideline has to be a silicon based finishing renders, which are very flexible and resistant to atmospheric agents (water, frost, temperature changes, UV).
2. Ventilated façade, is a high performance solution which takes advantage of mechanical anchoring elements. Thermal insulation boards are applied to the external fabric of the building and then protected with facades cladding mechanically fixed to the anchoring system. An air gap is placed between the facades cladding the thermal insulation, removing excess moisture.

External Thermal Insulation Composite System

Ventilated facades

Then, high energy performance industrially pre-fabricated modules, is a more innovative solution taking off for deep renovation of buildings. Compared to the traditional construction processes, prefabrication aims at reducing costs, increasing quality and facilitating installation. Accelerating the time for installation is particularly suitable for building renovation, as the building is occupied during construction works.

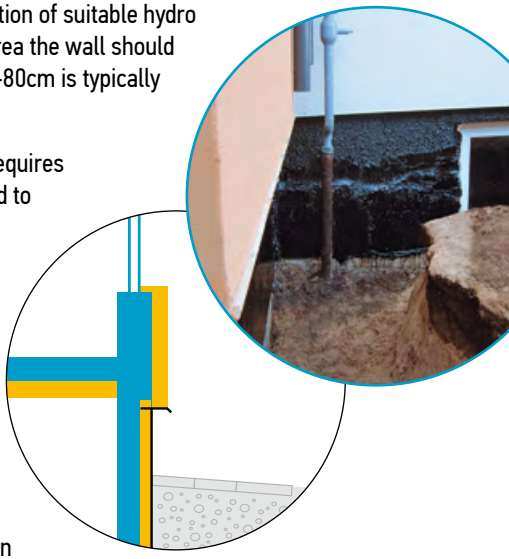
For all these construction methods, it is very important to avoid air gaps on the warm side of the insulation layer. Thermal insulation products must be mounted and mechanically fixed to the substrate. If the insulation does not fit well against the substrate wall, air can begin to circulate, starts a convection air flux that can decrease the intended insulation efficiency and moisture conditions.

While the energy savings of foundation and plinth wall insulation are less than that of above-grade wall insulation (for the same U-values), the effects of insulating an uninsulated foundation

Thermal insulation of exterior wall using industrially pre-fabricated modules

wall are important; in particular because this energy efficiency measure goes side by side with moisture management of the basement. After digging works around the building, the foundation walls have to be cleaned and if needed structural repairs have to be implemented. Before the application of thermal insulation the application of suitable hydro insulation is needed. When the basement is a heated area the wall should be insulated for the full depth, otherwise a depth of 50-80cm is typically sufficient.

The implementation of these rehabilitation measures requires specialised workforce and must be carefully supervised to ensure that all the manufacturer's specifications are taken into account (preparation of the substrate, installation of the insulation boards, anchor density, proper use of support profiles, application of reinforcing fibre glass mesh and application of base coating and final specialist render). The designer should pay particular attention to avoid thermal bridges, which are area with significantly higher heat losses than the surrounding materials. This results in an overall reduction of energy efficiency, but also can results in problem with water condensation and mould.



Thermal insulation of foundation walls

WINDOWS AND DOORS

The replacement of doors and windows are necessary measures, which requires particular attention to site supervision during the installation phase. This must ensure effective sealing between sills, jambs and window frames for proper air tightness.

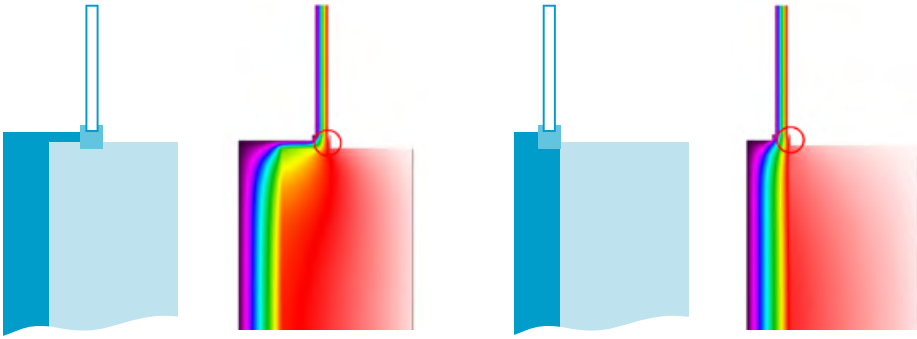
Window's performances then are:

- Number of panes of glass (double or triple);
- Specification of the glass used;
- Installation strategy.

Double glazing is now a minimum requirement when replacing windows, but specifying triple glazing on all building or on the North facing sides of a building can offer further comfort and energy savings.

High performance glass are recommended ('low-E' glass). This has a coating applied to it to improve insulation properties, which reflect heat either back into the room or prevents it from entering the space from outside.

The installation strategy of a window is also very important; this should aim at minimizing thermal bridges (Figure 1.7), which is an area with significantly higher heat losses than the surrounding. This results in an overall reduction of energy efficiency, but also can results in problem with water condensation and mould.

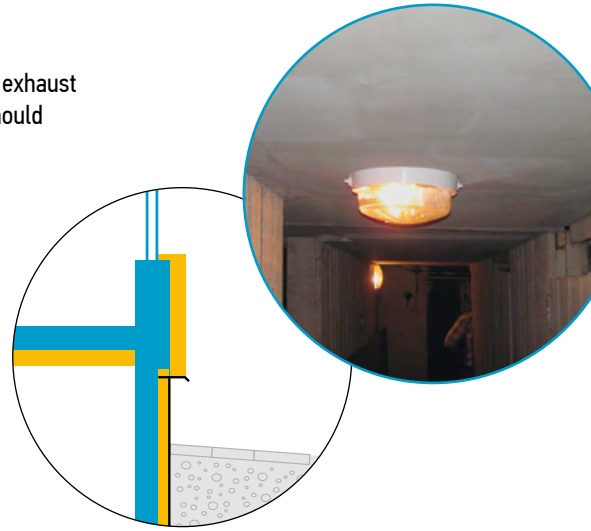


Left side - installation of new windows during a renovation project (Latvia).
Right side - analysis of windows installation options during the phase of project design to minimise thermal bridges.

For building with natural ventilation system or exhaust mechanical ventilation system, all windows should be equipped with trickle vents, which allow fresh air to ventilate the building.

BASEMENT

The thermal insulation of the basement ceiling is particularly relevant for cold unheated basements. For implementing this measure is very important to empty the cellar, so that the insulation boards can be freely installed on the substrate. Also electrical cable, lighting points and distribution pipes should not obstruct the application of insulation and be either removed or properly embedded in the insulation layer.



Thermal insulation of basement ceilings

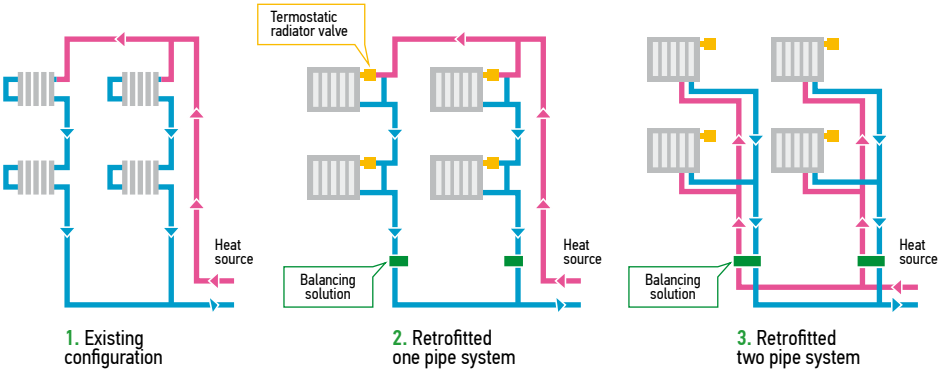
The most common construction method for this measure is the composite system by applying thermal insulation boards to the ceiling of the basement and protecting it with a base coating with emended fibre glass mesh.

1.2. THE HEATING SYSTEM

Most of the existing multifamily residential building in Latvia, which are targeted by this handbook, are equipped with one-pipe heating systems without by-pass for flow control. These systems are most of the time outdated and needs substantial improvements. For renovating these systems there are two main options:

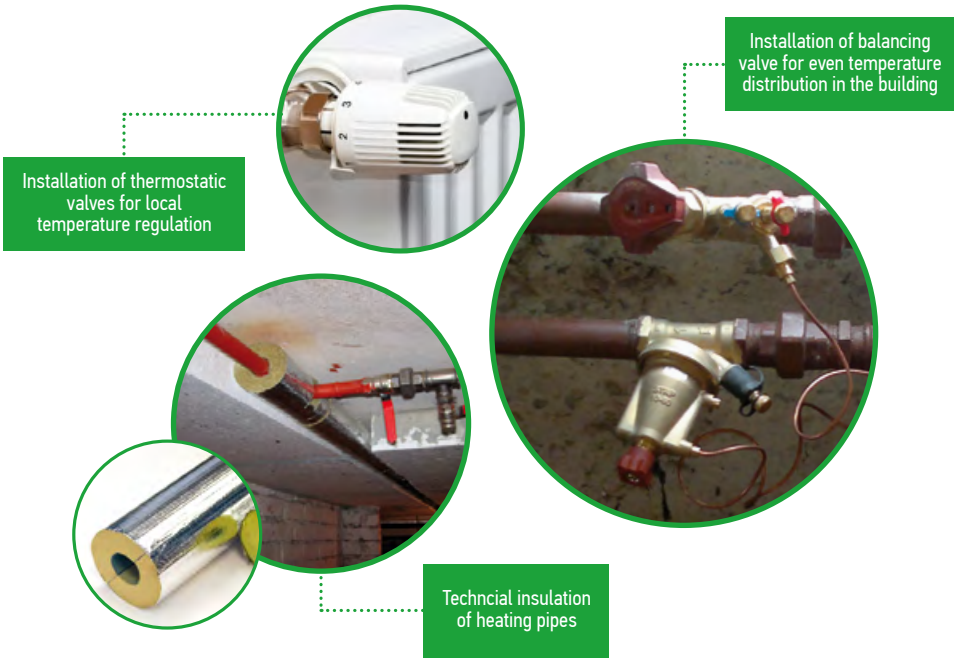
- The retrofit of the heating system using the same one pipe configuration,
- The installation of a two pipe systems with horizontal heat distribution to the flats.

In most of the case the retrofit of the heating system using a one-pipe configuration is recommended, because it enables good control and heat distribution with more affordable investment costs. The main limitation is metering, as individual heat metering by flats is not possible.



Renovation of the heating systems – basic solutions

Independently from the system configuration, when renovating a heating system all main distribution pipes in the basement and technical attic have to be insulated using ad-hoc technical insulation solutions. Then the system must include the installation of thermostatic radiators valves and suitable balancing valves for even temperature distribution throughout the building.



1.3. DOMESTIC HOT WATER SYSTEM

Most of the existing multifamily residential buildings in Latvia are equipped with a centralised domestic hot water systems. The circulation loop of these systems are also used for space heating of the bathroom. The systems are often in rather poor technical conditions with substantial heat losses.

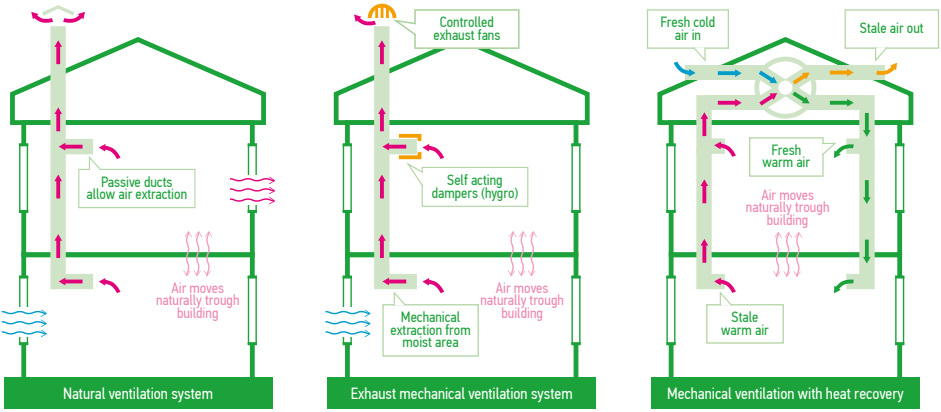
In a deep building renovation project this system is renovated; and there are possible solutions:

- The existing system is decommissioned. Bathroom towel heaters are connected to the space heating system and a new domestic hot water system is installed. The new system is planned minimising pipe diameters and length of the circulation loop. This aims at minimizing building energy consumption.
- The existing system is retrofit, replacing all distribution pipes, but using the same system configuration.

1.4. VENTILATION SYSTEM

Ventilation systems supply air to the space and extract polluted air from it. Ventilation systems vary widely in terms of size and the functions they perform. The ventilation system is very important, because proper ventilation avoids water condensation and mould in your flat.

The design and specification of a building ventilation system has a big impact on energy use. Sometimes natural ventilation provides the best solution, while in other cases mechanical ventilation with heat recovery is needed. This depends from building type, use and occupancy. The specific system suiting your building has to be decided by ventilation experts during energy auditing and project design; in particular looking at the different options ranging from a fully centralised balanced ventilation systems or a decentralised hybrid ventilation system.



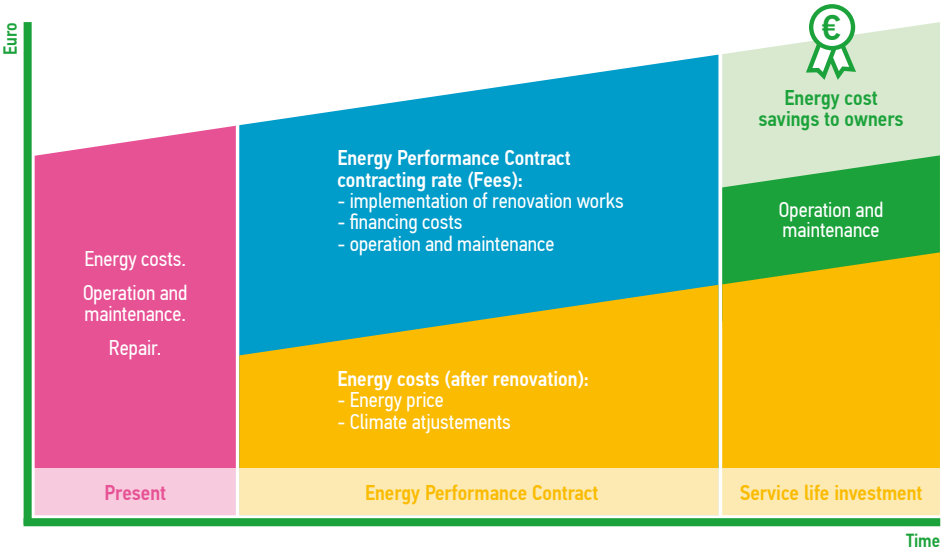
Basic solutions for building ventilation

WHAT IS AN ENERGY PERFORMANCE CONTRACT?

2.1. ENERGY PERFORMANCE CONTRACTING IN GENERAL

Energy Performance Contracting (EPC) is when a contractor (an energy service company - ESCO) is engaged to improve the energy efficiency of your building, with guaranteed energy savings covering all (or part of) the investment required for the renovation works. Under this form of contract the ESCO examines your building, evaluates the level of energy savings, and then offers to implement the project. During the Energy Performance Contract period, you will consume considerably less for energy. The beauty of an EPC is that the ESCO guarantees you the Energy Savings; therefore you can take this lower consumption for granted. If the savings are not reached, the ESCO will have to refund you for the missed part and take actions to fix the problem using its own funds.

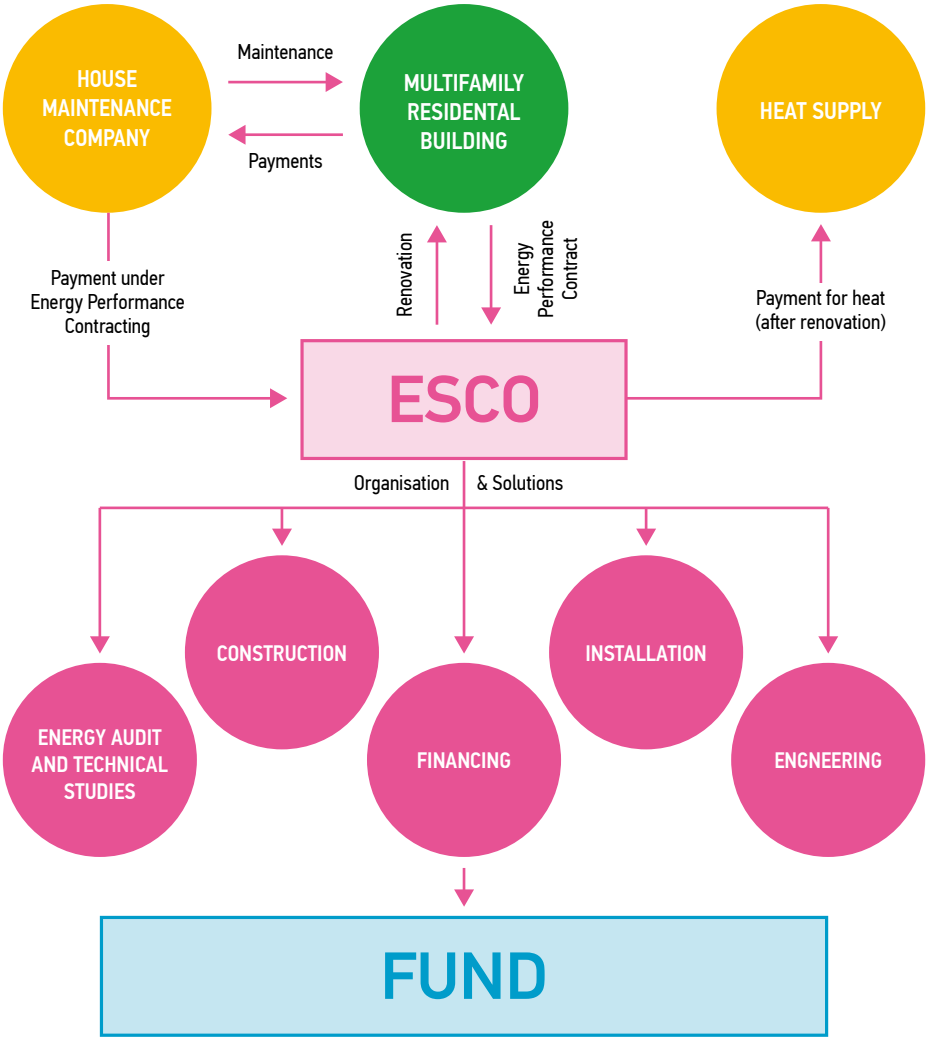
At the same time the EPC will clearly show you the contracting rates that the ESCO will charge you. These rates, also called fees, are charged because the ESCOs needs to cover the investment costs of the renovation works, the financial costs of the project, and also needs remuneration for operating and maintaining the measures implemented in your building (see Chart).



2.2. THE KEY CHARACTERISTICS

The key characteristics of an Energy Performance Contracting are the following:

- Turnkey service: The ESCO provides you all the services required to design and implement the deep renovation of your building, from the initial energy audit and engineering appraisals, to operation, maintenance, measurement and verification of the energy savings. All in one package;
- No need for up-front capital: the investment for the renovation of your building are repaid from the energy savings and related financial savings, so you do not need to up-front your money. The ESCO will arrange for the needed capital investment using available subsidies, financing from commercial banks and other specialized facilities or investors (Funds);
- Risks are minimised: the ESCO assumes the contractually agreed performance risks of the project. This is a very important aspect. If costs estimates are not correct this risk is taken by the ESCO;
- Guaranteed Energy Savings: The ESCO guarantees the achievement of the contractually agreed level of savings and is obliged to compensate savings shortfalls. The energy savings are determined with an agreed measurement and verification protocol for the full duration of the Energy Performance Contract.
- Quality of performance and results: the methodology of Energy Performance Contracting is results-driven ensuring quality of performance and results.



2.3. WHAT WILL YOU GET

What will you get in an Energy Performance Contract is described in the section "general scope of the agreement". By signing an Energy Performance Contract, as proposed by this handbook (also available at www.sharex.lv), you will hire a company that is able to organise engineering, procurement, supply, construction and installation, start-up, commissioning and financing for the renovation works of your building. Each of this step is an important phase of the project:

- Engineering: deals with the preparation of all technical documentation and project design documents for the renovation of your building. This includes the building energy audit, civil engineering appraisals, the architectural design, and the technical design for heating, ventilation and domestic hot water systems. All these activities must be performed by certified professionals and chartered engineers;
- Procurement and supply: deals with the selection of construction and installation companies and the purchase of equipment materials and the supply of services (like project supervision, coordination and management);
- Construction and installation: deals with the actual construction and installation works; in this phase of the project the planned measures are implemented according to the project design;
- Start-up and commissioning: these are the final stages of the project, where the installed equipment and systems are tested and fine-tuned (for example, pressure test for the space heating and domestic hot water systems). The project is commissioned to you providing a copy of the documentation and the exploitation statement from the municipal authority;
- Financing: deals with setting up a plan for fully financing your building renovation project. Based on the scheme proposed by this handbook, financing is 100% organised by the ESCO. In particular the ESCO takes care for the application to subsidies, deals with commercial banks for working capitals loans, and keeps the right to refinance the investment made in your building with long terms specialised facilities like the Latvian Baltic Energy Efficiency Facility (see Chapter 4 for more information on financing).

On top of this you get very important contractual guarantees for the full duration of the Energy Performance Contract:

- Guaranteed energy savings: where the ESCO guarantees a certain level of energy savings compared to pre-agreed climate conditions and energy consumption of your building (baseline).
- Guaranteed quality standard: the set of measures correspond to a deep renovation, where all necessary works are carried out on turnkey;
- Guaranteed comfort standards: where the ESCO clearly indicates indoor temperature levels, domestic hot water supply temperature and suitable indoor air quality standards;
- Guaranteed maintenance standards: a detailed maintenance plan is part of Energy Performance Contracting, which ensure that the measures carried out during the renovation project are properly operated and maintained for the full duration of the Energy Performance Contract;
- Energy supply: where the ESCO facilitates sufficient and efficient energy supply to the building.

2.4. WHAT WILL YOU PAY

BEFORE RENOVATION

Today, before renovation, you already pay for several services on monthly basis. These services are very important and are needed for using, operating and maintaining your building. Every month you get an invoice from your House Maintenance Company or Cooperative, which includes expenses like administration, waste collection, emergency repairs and heating. An example of such an invoice for the month of December may look something like this:

Client:
Ilze un Jānis
Address:
Latvia

Date invoice:
10.01.2016
Invoice number:
040576040478/12

Period:
December 2015

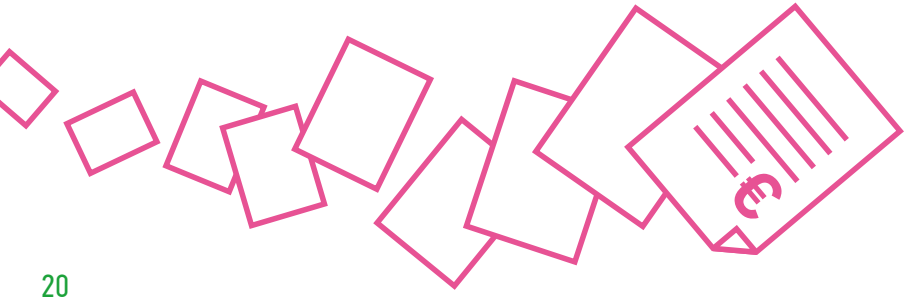
Issuer:
SIA "House Maintenance Company"

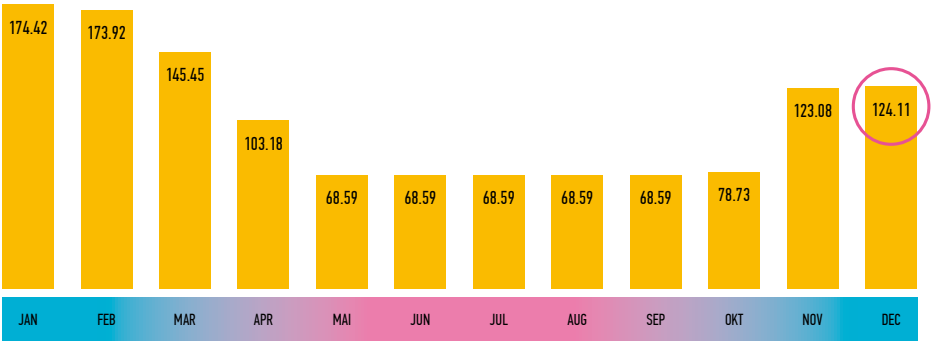
Services	Cost per unit	Number of unit	Sum	Discount	VAT 12%	VAT 21%	Total sum
Management							
Administration (maintenance)	0.49390	54,00 m²	26.67				26.67
Planned emergency repairs work	0.17500	54,00 m²	9.45				9.45
Waste	1.60568	3 person	4.82			1.01	5.83
Water and canalisation	1.28000	3.5 m³	4.48			0.94	5.42
Electricity for common area	1.56746	1 person	1.57			0.33	1.90
Heat energy							
Heating	0.91811	54,00 m²	49.58		5.95		55.53
Domestic hot water	4.70000	2.5 m³	11.75		1.41		13.16
Circulation losses	55.00	0.100 MWh	5.50		0.66		6.16
Total calculated sum			113.81		8.02	2.28	124.11

Thank you for your payment!

Due sum: 124.11 EUR

In one year period you will get 12 invoices. Each month the sum is different, mostly due to the payments for heating, which are very high in winter, lower in autumn and spring and zero in summer. (See Chart – in the red spot the month of December as from the above invoice).





Total payment for a flat of 54 m² before renovation - in one year 1265 EUR

An Energy Performance Contract affects the way and amount that you will pay for:

- heating
- domestic hot water and
- circulation losses.

Also after a deep renovation your expenditure for emergency repairs will be drastically reduced! No more leaking roof, leaking pipes and so on. You can and should still keep an open house maintenance fund, where now you can collect money for future investments in your buildings (for example a new lift, a children play ground or a bicycle rack). On the other hand, still after renovation you will pay for administration, waste collection, water and canalisation and electricity for common area.

AFTER RENOVATION WITH AN ENERGY PERFORMANCE CONTRACT

When you sign an Energy Performance Contract the ESCO will renovate the building and provide you the guarantees as described in paragraph 3.2 and 3.3 below. However, the ESCO also need to pay back the investment made for the renovation of your building and to get a fair remuneration for its services: this is what are called EPC contracting rates, which are articulated in specific Fees that you will have to pay to the ESCO. In particular there are three Fees:

- Energy Fee: this fee covers the costs for heating and circulation losses. The sum will now be much lower than before renovation, because the ESCO has implemented a lot of works with the aim to reduce energy consumption. Most important, you also get a guarantee, so that the ESCO will refund you part of the Energy Fee, if the promised savings are not reached. Every year energy saving are measured and verified.
- Renovation Fee: this fee covers the costs of the renovation works, including for example engineering, construction, installation, project management and financing costs.

- Operation and Maintenance Fee: this fee covers the costs which the ESCO will have for the operation and maintenance of the renovation works during the EPC contract period. For example replacement of filters for a new ventilation system, or a provision for repainting the façade.

In the proposed EPC there are also two important changes:

- Domestic Hot Water: in the Energy Performance Contract domestic hot water is charged one to one to the costs which are simply necessary to heat water; whereas currently different methodologies are used in Latvia to share the costs between heating, domestic hot water and circulation losses. In other words in most of the cases domestic hot water will get cheaper for you.
- Flat payments: likely you currently pay high bills in winter and lower bills in summer, although your salary tends to be the same all year around. An advantage of Energy Performance Contracting is that now the bills are all year around the same. A balance is calculated at the end of the year.

The new invoice for a December month after renovation based on Energy Performance Contracting (assuming same district heating tariff and weather conditions) may look like this now:

Client:
Ilze un Jānis
Address:
Latvia

Date invoice:
10.01.2018
Invoice number:
040576040478/12

Period:
December 2017

Issuer:
SIA "House Maintenance Company"

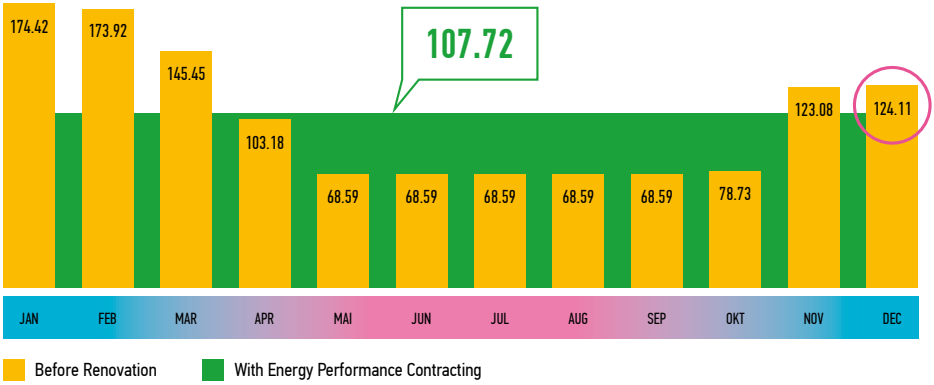
Services	Cost per unit	Number of unit	Sum	Discount	VAT 12%	VAT 21%	Total sum
Management							
Administration (maintenance)	0.49390	54,00 m²	26.67				26.67
Planned emergency repairs work	0.05000	54,00 m²	2.70			2.70	9.45
Waste	1.60568	3 person	4.82			1.01	5.83
Water and canalisation	1.28000	3.5 m³	4.48			0.94	5.42
Electricity for common area	1.56746	1 person	1.57			0.33	1.90
Energy Performance Contract							
Energy Fee	0.34765	54,00 m²	18.77		2.25	21.03	55.53
Renovation Fee	0.50375	54,00 m²	27.20			27.20	13.16
Operation & Maintenance Fee	0.13670	54,00 m²	7.38			1.55	8.93
Domestic hot water	2.87203	2.5 m³	7.18		0.86	8.04	8.93
Total calculated sum			100.77		3.11	3.83	107.72

Thank you for your payment!

Due sum: 107.72 EUR

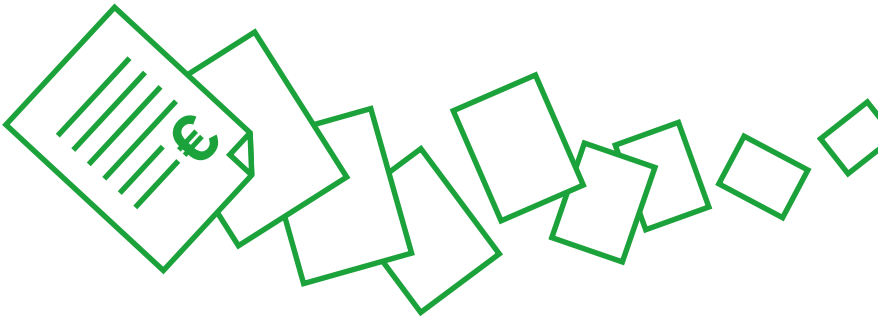
In one year period you will get 12 invoices, now all the same (see Chart blue columns). For this specific example, the yearly overall cost before and after renovation have not notably changed. However, this is strongly linked to the investment costs needed for the renovation works of your building and from the energy tariff in your city. For building in very bad technical conditions, the Renovation Fee may further push the payments up.

On the other hand, currently energy tariffs are very low, due to very low oils and gas commodity price (April 2016). Implementing an Energy Performance Contract will protect you from the volatility and possible future sharp increase of energy prices.



Total payment for a flat of 54 m² with Energy Performance Contracting - in one year 1293 EUR

Regarding the Fees in the Energy Performance Contract, please carefully note that the Renovation Fee is linked to the EURIBOR, which is a rate set by the central bank. This rate reflect the costs of money and is linked to the investment that was done in your buildings. The ESCO cannot affect this index in anyway. The Operational and Maintenance Fee is also reviewed on yearly basis. This review takes into account that salaries, and costs of spare parts also increase in time.



3 ENERGY PERFORMANCE CONTRACT OFFERS. HOW DO I EVALUATE THEM?

Getting different offers from different ESCOs? Look at their Energy Performance Contracts and compare the following important aspects.

3.1. FOR HOW LONG TIME AM I BINDED TO THIS ESCO?

The first thing you should look is the contract period of the EPC. Usually an EPC for comprehensive building renovation is 20 or more years long. This time is needed for covering the investment made in your building and at the same time to keep your monthly payments at a reasonable level. If the offered EPC contract has a shorter period, this means that either your monthly payments will be substantially higher than now, or the offer only includes fewer and most profitable measures. Also, an EPC contract with too short period may not well address all possible problems of your building. Look at the contract period, it should be around 20 years.

ENERGY PERFORMANCE CONTRACT

Article III, comma I

www.sharex.lv

LABEEF

3.2. WHAT DOES THE CONTRACT INCLUDE?

The Energy performance contract is a turnkey contract. It must deliver you a renovated building from A to Z and the ESCO must operate and maintain the investment made for the full length of the contract.

So after the length of the contract, take a careful look at what the contract includes. Hence, find information about the scope of renovation works and the budget. The contract has to provide you with detailed information on:

- Project development and management;
- Construction and installation costs;
- Project supervision.

ENERGY PERFORMANCE CONTRACT

Article II, comma I & IV

Annex 1 & 4

www.sharex.lv

LABEEF

The description of the renovation works will tell you what kind of measures will be carried out for your building. For a deep renovation the offer should not only include energy efficiency measures, such as thermal insulation of walls, the replacement of old windows and the thermal insulation of pipes; but also more structural repairs: the replacement of old heating pipes, repairs and retrofit of the ventilation system, balconies/loggias, walls and roof (See Chapter 1).

The energy performance contract must also clearly indicate the timetable of the construction works, in particular the dates when these works will start and finish. This information is very important for all people living in the building, so that you can get ready. For example you will get information when the road may be blocked and you will have to park your car somewhere else. The detailed execution timetable shall be provided by the ESCO upon the start of the works. This will also give you the possibility to control the implementation of the works.

ENERGY PERFORMANCE CONTRACT

Article III, comma II

Annex 5

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LABEEF

Payment terms is a very important information. This information will tell you what will be your future payments and how they are structured. The new bills shall include three components as it was shown in Chapter 2: Energy fee, Renovation Fee and Maintenance Fee. Additionally domestic hot water preparation will be billed based on consumption. Here, you should understand if the proposal is affordable for your pockets. If the level of payment is similar to what you are paying now (a bit more or a bit less), then this offer is affordable and is a good deal. The Energy Performance Contract must provide clear information about the way these fees are calculated; so that you can check the correctness of the proposed Fees.

The contract must also inform you about what will happen when payments are not made or delayed. What is the level of penalties and how will be enforced. Also there should be an explanation what will happen to payments when contract period is over (Energy Performance Contract at www.sharex.lv: General Terms and Conditions).

3.3. WHAT GUARANTEES DOES THE CONTRACT INCLUDE?

Energy performance contracting is about guarantees, which like an umbrella protects you and your building against uncertainty of the results and possible problems, which are always part of a building renovation project. The ESCO has the necessary experience to deal and to address all project technical and financial risks; therefore it can provide you with these guarantees. It has implemented several projects and renovated similar buildings like yours; so the ESCO knows how to deal with all possible situations in the best possible way. Based on this experience the offer for your building should address all these guarantees, which you need to carefully evaluate and understand:

ENERGY PERFORMANCE CONTRACT

Annex 2

Annex 3

Annex 4

www.sharex.lv

LABEEF

1. Comfort standards: ask to the ESCO about the indoor temperature and how they will ensure sufficient ventilation and air exchanges in your flat;
2. Energy savings: look at the higher energy saving guarantee (for example a 55% guaranteed energy savings is better than 50% guaranteed energy savings). However, be very careful here. The guaranteed energy savings are provided based on a pre-agreed levels of conditions and energy consumption of your building: the Baseline. The baseline proposed by the ESCO must be a fair representation of the situation of your building before renovation. Check if the figures used by the ESCO are in line with your information about the building. If you have some doubts ask for clarifications to the ESCO, or to your house maintenance company or seek for some help from an independent facilitator or consultant (www.sharex.lv);
3. Quality standard: look at the ESCO with experience in the sector. Ask for project references and examples, who are its cooperation partners, who are its suppliers of material and technologies for the proposed solutions, you can also visit the www.transparense.eu web page and find out about ESCOs working according to the European Code of Conduct (see also paragraph 3.5.);
4. Maintenance standards: ask to the ESCO for a detailed maintenance plan, which fully justify the requested payment for operation and maintenance. This must be included in the Energy Performance Contract (Energy Performance Contract at www.sharex.lv: Annex 4).

5. Energy supply: ask to the ESCO how will manage the heating system, what relationship has with the local district heating company, how they will react in case of possible disruptions.

Energy Savings are the main guarantee of an Energy Performance Contract; the contract must include a quantifiable guarantee on energy savings based on a clear understanding of your building's energy consumption (called baseline). Along with the offered amount of energy savings, the EPC contract must include a detailed description on how these savings are measured and verified. This should be based on well-known protocol and procedures, for example the IPMVP [http://evo-world.org/en/]. If the ESCO does not reach the guarantee energy savings, the EPC contract must indicate the ways how the ESCO will refund you the difference!

Quality standards are very important. This is natural in EPC, because the contractor provides you a guarantee on the energy savings, this translates in renovation works carried out to a level that the proposed savings and all other guarantees are met. The ESCO should assure the quality of the renovation works and present a schedule by which it will maintain all implemented measures for the building during the contract period. This should include the description of the maintenance activities and works done during the contract period and which works are not the financial responsibility of the ESCO (for example in case of vandalism, scratches done by residents passing the walls).

ESCO also endures that the works comply with safety and health standards. This means that the renovation works also include: the ventilation system to provide the necessary air exchange, improving outdoor lighting and repair the roof and the balconies/loggias or fixing fire exits.

Warmth and comfort is another guarantee that the ESCO should assure you. This could mean that ESCO guarantees for example a specific average temperature in your room. This should be clearly defined in the offer as well as the verification method of this measure.

The contract should also specify the terms and the time for the ESCO to fix any possible defects under guarantee. These terms include the description who to inform about noticed defects and how to notify the provider. This term should also clearly describe what is fixed by the provider.

3.4. HOW LONG AND SPECIFIC ARE THESE GUARANTEES?

In Energy Performance Contracting guarantees have to match the length of the contract. They should be as long as the contract period. In other word if the contract period is 20 years, all guarantees have also to be for 20 years.

Ensure also that each guarantee is clearly and specifically described. If there are amounts and specific numbers mentioned, then you have proof and references in case of a conflict. If there is nothing specified then you cannot argue for example about room temperature being 17 or 18 °C.

3.5. EUROPEAN CODE OF CONDUCT FOR EPC

The European Code of Conduct defines the basic values and principles that are considered fundamental for the successful, professional and transparent implementation of projects based on Energy Performance Contracting in European countries. It defines principles and behaviours that professional ESCOs shall comply with. At the webpage of the Latvian National Administrator, which is the Building Energy and Conservation Bureau, you can find ESCOs that has signed and shares the principles of the Code [http://ekubirojs.lv/en/epc/#header-epc-certifier].

The European Code of Conduct is also an integral part of the LABEEF template of Energy Performance Contract at www.sharex.lv: General Terms and Conditions.

EPC FINANCING. WHAT SHOULD I KNOW?

4

4.1. WHAT IS A FINANCIAL PLAN?

The deep renovation of your building will cost money, which are used for developing the project (engineering design, audits, etc.), construction works (purchase materials, equipment to pay workers) and manage the project. A financial plan presents the key economic figures of an Energy Performance Contract and it explains where this money come from.

ENERGY PERFORMANCE CONTRACT

Annex 1

www.sharex.lv

LABEEF

4.2. HOW DOES AN ESCO FINANCE YOUR PROJECT?

Financing is always a major barrier for multifamily residential buildings. By selecting an EPC contract, the ESCO will take care of this aspect. The ESCO is responsible for finding the necessary source of funding for the renovation works. You will not be asked upfront investment for project development or other issues (energy audits, technical inspections, project design, etc.), which the ESCO will organize. However, if you change your mind during the process even before starting the renovation works, the ESCO has the rights to ask you a compensation of the occurred development costs. These, however must be clearly indicated in the offered EPC and be part of a written agreement.

But then, where the money come from? Well, a part of the investment can be covered by subsidies. Currently (as of April 2016) Latvia has an ongoing support programme, which will be part of the financial plan.

But what about the rest of the money? ESCOs rarely will use only equity (in simple words their own money), or they will use it as less as possible. The use of equity limits their capability of implementing projects on a sustainable basis; because as your wallet is limited, also the wallet of an ESCO is limited. Therefore, ESCOs, most of the time will look for debt financing. In this case your project is financed by a third party, for example a financial institution (FI), like a commercial bank and not from internal funds of the ESCO, unless what the FI will require. The financial institution will probably ask the rights to the energy savings or may ask other collaterals from the ESCO. It will also charge financial fees for financing and an interest rate on the money they lend.

When the ESCO is the borrower, you are safeguarded from the financial risks of the renovation project, because the guaranteed energy savings provided by the ESCO is either coming from the building renovation itself or is on the balance sheet of the ESCO; hence the debt resides on someone else's books; not yours!

4.3. HOW THE ESCO DOES PAY BACK THE BANK?

Most of the ESCO will borrow money from a financial institution (for example a commercial bank), so that they can buy the material, equipment and pay the workers to renovate your building. However, the bank expect its money back, in time and with the agreed interest. The ESCO is sure of the energy savings it can make, and for paying back the bank it counts on your timely payments. Therefore, for ESCO paying back the bank, needs you to pay the Fees, which were discussed in chapter 2, in particular the Renovation Fee.

4.4. WHAT IS THE ROLE OF SUBSIDIES?

The subsidy or grant is like another source of finance. The amount and type of subsidy depends on the regulation set under the specific programme. A grant can help to decrease the amount of money that will be necessary to implement the renovation project of your building using energy performance contracting, compared with the scenario without grants. This means that the payback period will be shorter or you can include more measures into the project.

4.5. WHAT IS FORFAITING, WHY IS IT INCLUDED?

In very simple words forfaiting means that a financial institution (typically a Fund) buys from an ESCO your future payments, which were agreed in the Energy Performance Contract. The ESCO will get enough money to repay the debt made with financial institutions for renovating your building. The Fund will now receive your monthly payment.

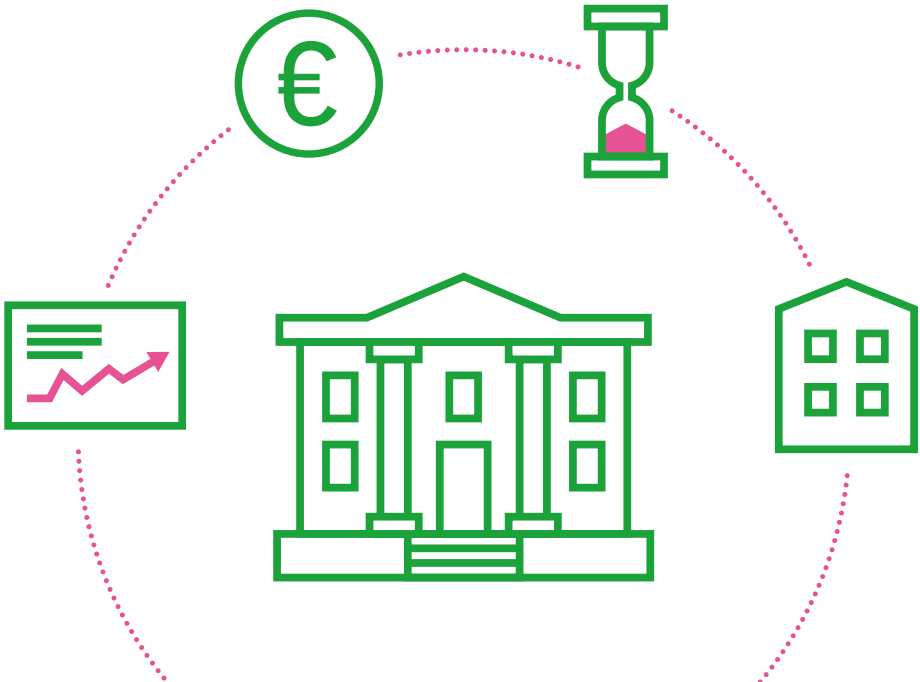
This transaction, which may look quite complex, has some important reasons:

1. With this transaction the ESCO can pay back the borrowed money from the commercial bank. This is important because a commercial bank will typically like to lend money to a company for short time, but the energy performance contract is 20 years long. With this transaction the ESCO takes the investment in your building off its books (off-balance) and put it on the book of the Fund. Now, after this transaction the ESCO can renovate your neighbour building using the same principle as it did for yours. Without this transaction the ESCO should wait 20 years to renovate your neighbour building.

2. With this transaction the Fund buys a long term revenue stream. The Fund will do this with several ESCOs and several buildings, not only for your building. At a certain point all these energy performance contracts, which were purchased in Latvia from different ESCOs, can be handed to a Pension Fund. This is very good for Latvia, the fund invests in Latvia through your payments, and your building in few years from now may pay some Latvian pensioners!

However, from the practical point of view, you will not actually notice the effect of a forfaiting transaction. Each month you will just keep getting the bills, with or without forfaiting. However, if the transaction will occur, the ESCO will have to inform you.

Also, and very important, with or without forfaiting all the obligation and guarantees of the Energy Performance Contract do not change!



WHAT DO I ASK FROM A DEVELOPER OFFERING BUILDING RENOVATION?

Before you start, you and all apartment owners in your building, must have a clear consensus of what is it that you would like to achieve. Is it simply the renovation of the building using energy savings and grants? Are you actually looking for something more? Are there any additional works which you deem to be essential? (An elevator refurbishment or even installing an elevator) and whether there is consensus to pay for these.

Once you have a consensus and an idea about in what sort of building you would like to live; it is time to get started and get the project ongoing.

If you want to renovate your building there are a lot of ways you can do that: for example the process can be organised by your house maintenance company, or maybe the elder of your building will take the lead and hire a consultant and a development company to help with the process. Or as endorsed in the handbook you can ask for an Energy Performance Contract. At this point there are few important things that you need to take care:

5.1. REGARDLESS OF THE MODELS

Regardless of the way that you will chose for the renovation of your building, you must ask that all companies hired in the process will:

- Develop a long-term, fair and transparent relationship with you, including clear and regular communication about the progress of the project and any issues you may rise;
- Conduct all steps in the process of the renovation safely and lawfully;
- Deliver economically efficient projects;
- Ensure qualified staff for project development and implementation;
- Focus on high quality and care in all phases of project implementation.

5.2. ADDITIONALLY FROM A COMPANY OFFERING ENERGY PERORMANCE CONTRACTING

You need to ascertain that the ESCO has the necessary experience to prepare projects (permits at the municipality, good collaboration with your heat supplies and Maintenance Company) as well as to execute the job properly such as conducting all steps in the process of the renovation safely and lawfully and finally to support you throughout the life of the contract. Also ask for business and banking references.

It has to be clear that the ESCO will deliver economically efficient projects and truly assume the performance risks.

The ESCO has to be in a position to make an overview of the condition of the building, provide a thorough analysis of energy use and expenses, prepare the technical solutions for improving the current conditions, calculation of energy and costs savings and feasibility (economics) of the project.

This includes a clear explanation of his understanding of the guarantees, but are to protect your health, your safety, your comfort and your money by providing the best service for an affordable costs including financing and long term maintenance under guaranteed savings using accepted standards of measurement and verification.

Energy Performance Contracting is based on cooperation, communication and trust between you and the ESCO. If any of these ingredients are missing, it will lead to misunderstanding and disputes. You are looking for a long term partner. The ESCO must share your goal of a building and home that you want to be proud of. And at the same time it must be able and willing to commit to an enduring relationship: the ESCO will be responsible for your building for the next 20 years!

A good indicator is how open the ESCO will be about challenging projects and times when things do not go as planned. Nothing ever goes as planned either during delivery of the project or during the measurement and verification and maintenance of the savings phase. This is when you need an ESCO who will put your interests first.

You are looking for sense of how good communication will be with an ESCO. You want to know how often they will communicate, how they will communicate and who will be responsible for coordination with your building.

You want to know what the ESCO experience with deep renovation is. How will they assess the best options for your building renovation and what methodology are they using? Can the ESCO provide references?

And then go to other buildings, in your city or in other municipalities and ask! Here are some sample questions:

- ☐ Would you hire this ESCO again?
- ☐ Were you satisfied with the quality of the works?
- ☐ How did the ESCO handle clean-up each day?
- ☐ Was the ESCO easy to talk to?
- ☐ How did the ESCO handle differences and work changes?
- ☐ Was the job completed on time and at the bid? If not, why not?

I AM CONVINCED. WHAT'S NEXT?

6

If you are convinced about the deep renovation of your building and the use of Energy Performance Contracting: here few tips for the next steps!

6.1. CONTACT THE ESCO

An ESCO after is contacted will come back to you with some basic questions and requests. For example the ESCO will ask your building energy data, will visit and pre-assess your building, will take a look to the payment discipline (if your building has very high debts, it is time to pay them before talking about renovation). The ESCO could also ask the contact details of active flat owners (e.g. representatives of building or flat owners cooperative), maintenance organisation and heat supplier.

Based on this preliminary information an ESCO will prepare a non-binding project proposal for your building including: the estimated energy savings, the guarantees it is willing to give, a full list of proposed building renovation measures, a preliminary cost estimates, and a draft Energy Performance Contract to check.

An ESCO could be reached by phone, via web-based contact-form, e-mail or arranged visit at its office.

6.2. ORGANISE A FIRST GENERAL MEETING

A first general assembly meeting has to be organised for presenting the idea to all apartment owners. It is important that all apartment owners get informed and invited. Ideally each house owner should get preliminary information about the ESCO, the draft proposal and an invitation to the general assembly meeting in the mail-boxes. An informative poster in the building hall bulletin board, eventually accompanied by door-to-door calls to every apartment can also be arranged. For better outreach of all building flat owners, also the use of other information distribution platforms and media – e.g. web-page, e-mails and social networks (e.g. draugiem.lv, Twitter, Facebook etc.) are useful.

It is recommended to contact and inform all residents to the first general assembly, because it is the first opportunity to open a wider conversation and learn about specific challenges within the building. And if building does not have an official council of apartment owners to represent the building, this is the best opportunity to nominate for the election of a council at least three members with one chairperson (the house elder). The number of members in a council could vary based on number of apartments and sections of particular building.

At this meeting the main principles of Energy Performance Contracting and the preliminary offer of the ESCO should be discussed and explained. The possibility to establish a home owners association, if not already in place, shall also be discussed at this first meeting.

After the end of this meeting, you should expect a number of very active flat owners, typically few of them, will try to stop the project. After this meeting you should not be influenced by the negative activities of few, but rather take your own decision. If you have doubt seek information from independent entities, like in your municipality, in your local energy agency, or from the Building and Energy Conservation Bureau – ESEB [www.ekubirojs.lv/]. These entities will be able to provide you with the right level of information.

6.3. ORGANISE A SECOND GENERAL MEETING

After the first meeting, where the basic information about the project were explained and provided, a second meeting is called. At this second general assembly meeting, it is time for decisions, in particular:

- A decision for comprehensive renovation of the building should be taken;
- A mandate to the legal representative of the building and to the ESCO to implement the building renovation project using the proposed Energy Performance Contract should be given.

The elected representative of the building (supported by the council) will have the duty to formalise all small details in the Energy Performance Contract which was drafted and included a no-bounding proposal (estimated energy savings, the proposed guarantees, the full list of proposed building renovation measures, preliminary cost estimates etc.).

Based on the Latvian residential Law (Dzīvokļa īpašuma likums) this can be achieved by direct voting during the meeting or via a follow up survey questionnaire.

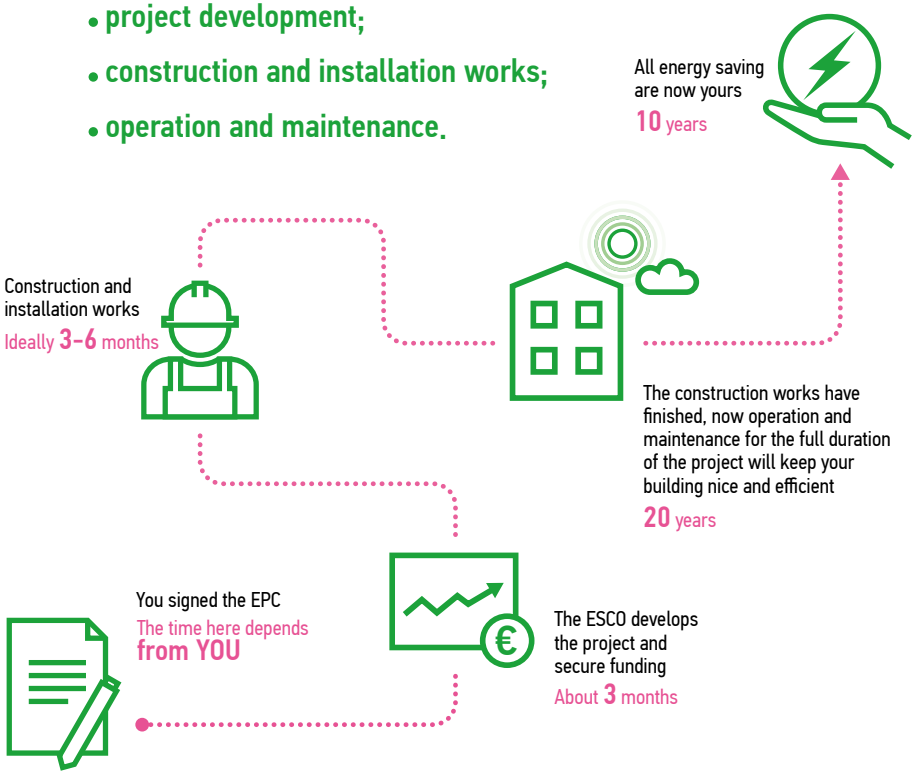
A legal review has to be performed for the signature on the protocol issued at the general meeting with the Land Property Register. This activity is necessary for assuring that the persons at the general assembly had the right power of attorney to sign the protocol.

As apartment owner, please be sure that the protocol of general assemblies, or surveys are signed by the same persons as in the Land Property Register! Only the apartment owners indicated in the Land Property Register can vote.

I HAVE SIGNED IT. WHAT SHOULD I EXPECT NOW?

After you have agreed with the terms of the Energy Performance Contract and you have signed it the project will take off at full speed. At this point there are 3 main phases:

- **project development;**
- **construction and installation works;**
- **operation and maintenance.**



7.1. PROJECT DEVELOPMENT. WHAT IS IT?

The deep renovation of your building is a complex and interdisciplinary process, which requires the attention of several specialists and experts: engineers, economists, lawyers and an experienced project manager to ensure results. The project development phase is very important, because it sets project ambitions and identifies the most optimal physical and technical solutions to reach the set goals for your building. In this phase the ESCO also secures suitable financial resources for the renovation of your building. For the ESCO this phase already started at the first general assembly meeting by preparing your offer. In this project phase, the ESCO shall provide you, as minimum, with the following documentation: the Building energy audit, a civil engineering appraisal, a land plan, a building fabric design (architectural design), a space heating design, a domestic hot water system design, as well as heating substation and ventilation proposals. In addition, most importantly, estimates of costs and a proposed schedule for the works. In detail, this means:

- Building energy audit: which provides all necessary information of planed energy efficiency measures and the input data for the Baseline of the Energy Performance Contract. The energy audit implemented by an ESCO is typically based on more detailed studies compared to the minimum requirement set by Latvian regulations. Remember that based on this document the ESCO will understand what sort of guaranteed energy savings can be included in the Energy Performance Contract. Therefore, it typically includes more advance building physic models for better matching the metered data, the characteristics of the building envelope and indoor and outdoor temperatures. This information is necessary for the development of a fair and transparent Baseline. It is recommended to use at least three years of metered data for the baseline study;
- Civil engineering appraisal/assessment: which shows the depreciation of the building construction elements and engineering networks. It also identify critical building elements which need specific attention (cracks in foundations or walls, leaking roofs, rousted rod bars in basement slabs, dangerous balconies etc.);
- Land plan and Topography (if necessary). The Land plan shows building `s related land area and ownership of it. Topography shows under and over ground engineering networks and communications;
- Detailed building fabric design, which provides detailed layout of construction elements and joints (e.g. connection place of roof and facade, roof construction, windows, plinth, pilasters etc.). There should be integrated not only energy efficiency measures, but also measures that conserve the building and protect it from further weatherization thereby securing the existence and usage of particular building for another one or two generations (structural measures).

- Detailed design for the space heating system, which provides detailed layout of space heating system configuration (one-pipe or two-pipe system, vertical or horizontal heat distribution etc.), size and capacity of radiators, pumps, valves and balancing equipment. As well as temperature requirements (indoor, supply and backflow);
- Detailed design for domestic hot water system, which gives detailed layout of domestic hot water system configuration and specifications (diameters, designed flow, displacement of individual hot water meters etc.). The rule of thumb is to reduce required numbers of raisers and circulation losses by providing a reliable domestic hot water system;
- If required, detailed design for the heat substation, which gives detailed layout of heat substation and specification of heat exchangers for domestic hot water and/or space heating system, as well as control units and energy management equipment;
- Detailed design for building ventilation system, which shows detailed layout of proposed solutions for building ventilation. There are multiple options for a ventilation system, the selection of which depends from the technology selected by the ESCOs and the specific building conditions;
- Control cost estimate, which gives the first impression on costs of comprehensive renovation, including breakdown costs by positions;
- Detailed project schedule, which describes the timeline of full renovation project cycle.

7.2. CONSTRUCTION PHASE

The construction phase for the renovation of your building is the specific period, which is stipulated in the Energy Performance Contract (beginning from the date stated in the Notice to Proceed), during which the ESCO must complete construction and all renovation works, subject to the conditions of the contract.

CONSTRUCTION PLAN

Before the construction phase begins (that is, before the construction site is set up), the ESCO will draw up a construction phase plan. This plan records arrangements for managing significant health and safety risks associated with the renovation of the building and is the basis for communicating those arrangements to those involved in the construction phase, in particular you and your neighbours. The plan outlines the health and safety arrangements and site rules taking into account any construction activities taking place on site, and, where applicable, must include specific measures concerning any work involving the particular risks, like for example:

- Works which put workers at risk of falling from a height;
- Work which put workers at risk from chemical or biological substances (removal of asbestos, use of paints and solvents, exposure to dust, etc.);
- Work near high voltage power lines.

Alongside with workers safety, the plan aims at keeping the site safe and secure for you, your family and members of the public in general.

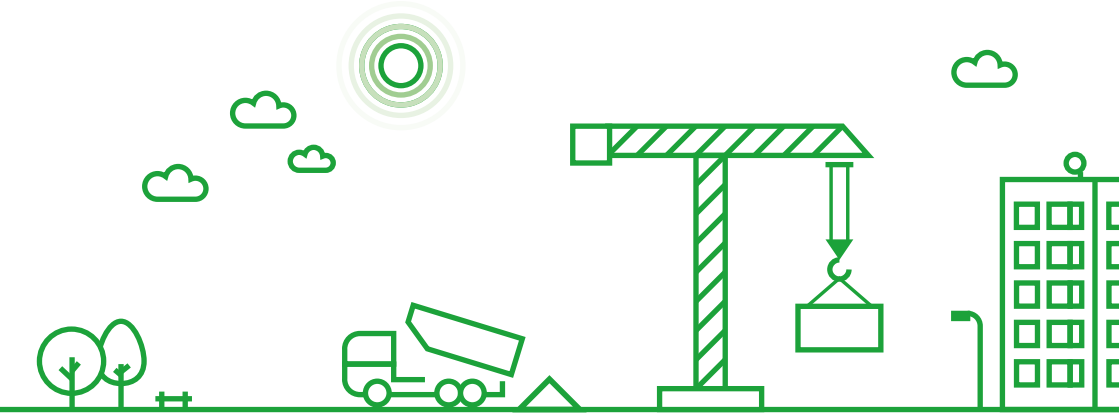
The ESCO should inform you of these identified risks during the construction phase and take the necessary measures to prevent that you or your neighbours can get injured. A person responsible for ensuring the job runs safely will be assigned by the ESCO.

At this stage the ESCO will identify all work areas that would be needed for safe construction (office, storage, etc.).

SITE PREPARATION

Time to go! The ESCO, before starting the renovation works for your building, needs to prepare the construction site. All permits are in place and the ESCO has got the Notice to Proceed from the building department of your municipality. Site preparation involves a number of important activities. And a well prepared site is a prerogative for good quality of the construction works. What an ESCO should do as a minimum is:

- Clearing the area around the building, this involve cutting brush and tree branches which may obstruct the site, remove fences or objects installed against or on the facades walls and ensure access road for trucks;



- Fence off and secure the construction area, including the installation of construction plaques. The main plaque should include important information like: project identification, building address, general contractor (the ESCO), the construction company, name and contact details of the project manager, name and contact details of the building supervisor, contact details for the authors of the technical designs. Additionally, information and logos about funding sources may be displayed; Also safety plaques should be installed as required by safety standards on construction sites;
- Ensure water and electricity supply;
- Ensure waste collection;
- Equipped site office, typically a container type movable office;
- Movable toilets for workers;
- Storage area for construction material, eventually protected from rain;
- Implementing of fire protection measures, in particular if welding works are necessary.

YOUR ROLE IN THIS PHASE

This phase is the most troublesome for you and your neighbours, because for a few months you will have to bear and tolerate typical hardships resulting from construction and installation works. Scaffolding will cover your windows, workers will come early in the morning and unfortunately noise and dust are part of the job. A good ESCO will try to minimize all these drawbacks as far as possible, but the first of your roles is to be patient. Remember that the goal of this project is to renovate and save your building.

In addition to patience, there are few other issues you need to be ready:

- Move obstructing or valuable things and objects from your cellar and common premises, also remove everything that you fixed on the facade walls (e.g. cables, satellite TV, etc.). Talk to the site manager if you need some help for this;
- Your building has signed an Energy Performance Contract with an ESCO. At the general assembly, whether you voted in favour or against, you reached a majority, meaning a legal obligation that now you must respect. Now is time for everybody to be constructive!

Try to cooperate and help the ESCO and construction companies working on your building – it will be better for everyone;

- As part of this cooperation, to grant assess to all premises and flats is important. This as far as it is needed for the implementation of the renovation works;
- If your neighbour is still against the renovation of your building, and is turning into a trouble maker; try to limit and talk to him/her for finding common sense. Remember that this renovation is about making your building a comfortable home for the next 20 years.

WHAT TO EXPECT

Construction is synonymous of dust, noise, smoke and vibrations, which are created by many construction jobs. These include sweeping, soft-strip demolition, hand-sanding of plaster joints and welding. The most common also involve the use of power tools such as cut-off saws, grinders, demolition hammers and compressors. All of these create dust, noise, smoke and vibrations, especially if the works are indoor.

Another issue to get ready is the general access to your building. The installation of scaffolding and delimiting building site fences can create some inconveniences to enter your building. Also some of the parking lots may be used by the construction company, and therefore not be any more available for your car.

Workers coming to work early in the morning will be also something you need to get acquainted during the construction works, in particular because plumbers will have to enter your flat for planned works on the heating, ventilation and domestic hot water system. Obviously, the ESCO has an obligation to inform you about its plan and need to access your flat.

WHAT TO GET

As mentioned there are obvious drawbacks to bear during the construction phase. However, the ESCO can do a lot to mitigate them. Here few things you should expect and demand:

- Detailed time schedule of the construction works. These will help you to understand when and where the works will occur. Most of all, you will know when do you need to grant access to your flat;
- Professional workers on site;
- Contact details of the ESCO, site manager, supervisor and responsible persons from construction and installation companies working on the site;
- Invitation to the weekly construction management meetings;
- Regular information about the advance of the works;
- Periodic information meeting to all inhabitants.

LATENT CONDITIONS

During the construction phase the ESCO may discover new problems which could affect the completion of the renovation works, like for example a hidden structural defect of the roof slab.

Here you need to pay some attention to the following points:

- First of all what a latent condition is? This should be clearly defined in your Energy Performance Contract. Typically it is a physical condition of the building about which the ESCO was not informed by you or your house maintenance company, and at the same time could be not seen or understood by typical building inspection practices (energy audits and civil engineering appraisal)
- If there is a latent condition, this typically will be an important issue to solve (like the roof structural defect). Remember that here you can take two decision:
    - Agree with the ESCO to solve the problem,
    - Call another company and your house maintenance company to solve the problem.
- Unfortunately in both cases this will result in:
    - The ESCO to eventually asking for a extension of the time needed for the construction phase
    - Additional budget for to solve the discovered problem. However with the ESCO you can ask to include the additional budget in the Energy Performance Contract.

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7.3. TIME TO ENJOY YOUR NEW BUILDING. WHAT DO I LOOK FOR?

At the end of the construction phase you will get:

- A renovated building according to the proposed technical designs, which will consume much less energy;
- A clean site from all construction material, dust, mortar and wastes;
- A informative training about all equipment installed in your building and how to operate them (the valve installed on your radiator, the ventilation system and the domestic hot water system);
- Commissioning reports (building fabrics, space heating, domestic hot water and ventilation systems);
- End of works Notice.

Then, you should be ready that for the ESCO can take some additional time to regulate the new systems installed in your building. Therefore, the first year of exploitation the ESCO will keep making adjustments and fine tuning to the heating, ventilation and domestic hot water systems. Also remember that the operation time of towel dryers could be changed, if they were connected to space heating system.

At this point your building enters the so called exploitation phase, which last for the next 20 years of the Energy Performance Contract and will also include operation and maintenance of all renovation works carried out by the ESCO. And remember your bills will look slightly different (see Chapter2.4).

OPERATIONAL AND MAINTENANCE

This is an important cornerstone of Energy Performance Contracting. The ESCO has carried out all renovation works providing you with important guarantees. But for keeping these guarantees the ESCO needs to properly operate the system it installed in the building and to make ad-hoc planned maintenance. The Operational and Maintenance manual must be part of the Energy Performance Contract. It includes a description of all planned maintenance activities, the frequency and resources needed. For example the ESCO has to explain when they will inspect the building, replace filters, check valves, clean heat exchangers, etc.

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Annex 4

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As a part of this activity the ESCO should also provide you with good information and instructions about optimal operation of the space heating system, domestic hot water system and ventilation system. And useful tips about energy savings in general.

MEASUREMENT AND VERIFICATION OF ENERGY SAVINGS

In the Energy Performance Contract the ESCO provided you with a guarantee on energy savings; and the contract must also explain how these savings will be measured and verified. This should be based on well-known protocol and procedures, such as the IPMVP [http://evo-world.org/en/]. If the ESCO does not reach the guaranteed energy savings, the Energy Performance Contract must indicate the ways how the ESCO can refund you!

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Annex 5

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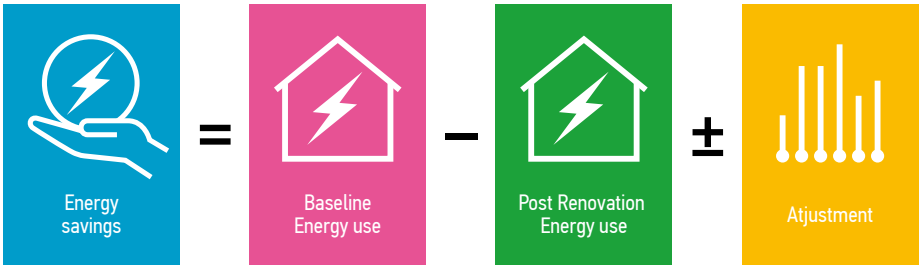
Energy savings are determined by comparing measured energy use before and after the renovation of your building; in general using a formula like:



Where:

- Baseline Energy use: is the yearly energy consumption measured before the renovation of your building under determined climate conditions, like temperatures and the length of the heating season (for example +19°C indoor temperature, +1°C outdoor temperature and 200 days of heating season).
- Post Renovation Energy Use: is the yearly energy consumption measured after the renovation of your building under determined climate conditions (for example +21°C indoor temperature, -1.2°C outdoor temperature and 190 days of heating season).

Adjustments are then made in order to more realistically compare Post Renovation Energy use to the Baseline Energy use (weather that differ or different indoor temperatures). If these factors were not accounted for, it is possible that savings would be improperly calculated too low or too high. For this reason Adjustments may be positive or negative. For detailed explanation of this process please visit: www.sharex.lv.

7.4. WHAT TO DO IF THERE IS A CONFLICT?

If you have a conflict or dispute, no matter at which phase of the contract, the first thing to do is to discuss the issue with the ESCO. In most of the cases a good face to face talk may solve the problem and avoid lengthy procedures that could delay the project and waste money.

However, sometime things do not go well and even after a meeting with the ESCO, misunderstanding or disagreements might not be solved. This means that you and ESCO face a dispute or conflict. The Energy Performance Contract (EPC) is the first legal documents which will tell you how to proceed and it includes specific clauses for addressing such possible conflicts.

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If you used the EPC template, proposed by this Handbook, the first step in case of dispute is to fill out the Mediation Form available at web page of the Building and Energy Conservation Bureau (ESEB) [www.ekubirojs.lv/lv/mediacija/]. ESEB is a non-profit organization, which has developed Mediation Rules, governed by Latvian Law and in line with best international practices in the field of Fact-Finding procedures and Mediation. Mediation is a procedure to solve disputes between two or more parties outside the court faster and easier. It involves fact finding and private and joint meetings.

Before (and/or instead of) resorting to court proceedings, you can have ESEB initiate a Fact-Finding procedure, during which information about the specific problem would be collected independently. This procedure concludes with a report (and optionally with a recommendation) that would bring the clarity required for finding ways to solve the conflict.

Once the necessary data is gathered, you could discuss it face to face with the ESCO or with the other parties intrinsic to the specific problem. This discussion would be facilitated by a Mediator – an independent expert, typically a lawyer, who will support both parties on their way to amicable conflict resolution. If this Mediation procedure is successful (as in most cases), this would mean that the dispute is settled out of the court room, which undoubtedly would save both you and the ESCO precious time and money. In the unlikely scenario where the conflict perspires regardless of the mediation that was conducted, the conflict could then be referred to the court to find its final solution.

Always contact ESEB at the first sign of trouble, in particular if:

- The ESCO goes bankrupt
- The ESCO is not doing a good job
- The ESCO did not finish the job

Finally, remember to ask to the ESCO for everything in writing or it does not exist! Use e-mail for questions. Do not hesitate to ask for guidance and help at www.sharex.lv. That's why it is there!

NOTES

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