Long-term Strategy for Renovation of Buildings

Riga – 2017

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1. Introduction

Pursuant to Article 4 of Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC (hereinafter "Directive 2012/27/EU"), Latvia as a Member State of the European Union must establish a long-term strategy for buildings in order to mobilise investment in the renovation of the national stock of residential and commercial buildings, both public and private (hereinafter "the Strategy").

Article 4 of Directive 2012/27/EU stipulates that the Strategy shall encompass:

- an overview of the national building stock based, as appropriate, on statistical sampling;
- identification of cost-effective approaches to renovations relevant to the building type and climatic zone;
- policies and measures to stimulate cost-effective deep renovations of buildings, including staged deep renovations;
- a forward-looking perspective to guide investment decisions of individuals, the construction industry and financial institutions;
- an evidence-based estimate of expected energy savings and wider benefits.

The Member States shall publish the first version of the Strategy by 30 April 2014. Thereafter the Strategy shall be updated every three years and submitted to the Commission as part of the National Energy Efficiency Action Plans.

On 26 May 2014, the Cabinet of Ministers approved the Information Report "Progress towards the Indicative National Energy Efficiency Target in 2014–2016 in accordance with Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC", which was accompanied by the Long-term Strategy for Building Renovation as Appendix 2. The second version of the Strategy is updated in the sections below.

2. An Overview of the National Building Stock

2.1. Categories of the Main Buildings Surveyed in the Overview

The energy consumed by buildings constitutes 40 % of the total energy balance, therefore this sector has great potential in attainment of the overall energy efficiency targets. Most of the existing buildings have high energy consumption while their thermal performance is substantially lower than may be ensured by currently available technology. Most of these buildings will still be used for a significant period of time; therefore it is important to renovate them in stages by improving their energy efficiency.

In the Information System of the National Real Estate Cadastre (hereinafter "NREC IS"), 1.36 million buildings are registered with the total area of 204.74 million m^2, including various auxiliary buildings. In approximately 400,000 houses of the total number of buildings, energy is used to adjust the indoor climate (by heating), and 361,800 of them are residential buildings with the total area of 90.1 million square meters. The largest number and proportion (85 %) is made up of single-dwelling buildings (307,800), however, in terms of area, the proportion of single-dwelling buildings is only 39.7 %, and multi-dwelling buildings (with three and more dwellings) (50.4 million m^2) have the largest proportion (59.3 %) although there are only 14.7 % (53,300) of such buildings.

According to the NREC IS[2], there are 361,000 residential buildings in Latvia, where 53,000 of them are multi-dwelling houses, 307,000 are single dwellings and 663 are shared residential houses of various social groups.

In the context of energy efficiency of buildings, there are 30,000 non-residential buildings with the total area of 26.4 million m^2, in which energy is necessary for maintaining the indoor climate, as well as 32,900 production buildings with the total area of 18.1 million m^2, which also consume energy. At the same time these buildings differ significantly as regards energy consumption due to various technologies of production processes.

The number and area of energy consuming residential and non-residential buildings are summarised in Table 1[1].

Table 1. The number and area of energy consuming residential and non-residential buildings[2]

Main type of use	Number	Area, million m^2
Residential buildings		
Single-dwelling buildings	307,861	35.82
Two-dwelling buildings	13,861	2.17
Buildings with three and more dwellings	39,504	51.26
Buildings of various social groups	663	0.85
Total	**361,889**	**90.10**
Non-residential buildings		
Wholesale and retail trade buildings	8,097	4.92

[1] The data of the Information System of the Real Estate State Cadastre on 1 January 2017 as provided by the State Land Service.

Office buildings	7,144	6.51
Hotels	2,878	2.31
Other buildings of temporary accommodation	2,655	0.38
Schools, universities and scientific research buildings	3,830	6.94
Communications buildings, stations, terminals and related buildings	2,661	0.89
Medical or health care buildings	1,344	2.02
Buildings for mass entertainment	1,216	1.16
Sports buildings	1,047	1.20
Museums and libraries[2]	574	0.49
Ecclesiastical buildings	1,329	0.43
Cultural heritage objects	50	0.04
Garages	11,666	4.04
Production buildings	32,983	18.10
Reservoirs, bunkers, silos and warehouses	17,328	8.93
Non-residential farm buildings	84,706	22.98
Other buildings not previously classified	827,670	33.29
Total	**1,007,178**	**114.64**

2.2. Age Categories of the Surveyed Buildings

The age of residential and non-residential buildings can be divided into periods depending on their thermal performance. Characterisation of various construction periods of buildings is summarised in Table 2.

Table 2. Construction period and thermal performance of buildings[2]

Construction period of a building	Thermal performance of a building
until 1940	Pre-war buildings, mainly wooden houses in rural areas and masonry buildings in cities. Most of the buildings have up to two floors.
1941–1960	Post-war buildings of good quality, mainly built of brick; the housing stock is made up of masonry buildings built to standard designs during Stalin's rule.
1961–1979	Extensive construction of buildings to standard designs; the housing stock is supplemented with buildings of Series 316 and 318 (the so-called Khrushchev's houses) and Series 464; construction of buildings of Series 467, 103 and 104 also begins; at the end of this period, Series 602 is introduced. Clay bricks, aerated concrete and ceramsite concrete are commonly used for external walls.
1980–1991	New requirements for designing are stipulated in the USSR construction standard "Thermotechnics of Building Envelopes"[3]. Construction of buildings of Series 119 begins and a number of houses are constructed to special designs; the preferred construction material is reinforced concrete and ceramsite concrete slabs.
1992–2002	Construction of buildings to standard designs practically stops. Issuing Order No. 68 of 12 September 1991, the Ministry of Architecture and Construction of the Republic of Latvia significantly increases requirements for building envelopes.
2003–2014	LBN 002-01[4] "Thermotechnics of Building Envelopes" comes into force stipulating thermal performance requirements for building envelopes. In this

[2] including archive buildings

[3] "СНиП II-3-79 Строительная теплотехника" (Thermotechnics in Construction), СНиП II-3-79 2. Теплоустойчивость ограждающих конструкций (Part 2. Thermal Resistance of Building Envelopes).

[4] LBN 002-01

	period, buildings with large glass surfaces start appearing and they do not usually meet the requirements of the Latvian Construction Standard, however, large glass surfaces are rarely used in the architecture of residential buildings.
since 2015	LBN 002-15 "Thermotechnics of Building Envelopes" (amendments to LBN 002-01) comes into force laying down stricter thermal performance requirements for building envelopes. On 11 November 2015, amendments were made to Cabinet Regulation No. 383 of 9 July 2013 "On Energy Certification of Buildings", specifying the minimum permissible level of heating both for buildings to be renovated/rebuilt and for new buildings as well as requirements for a gradual transition of new buildings to nearly zero-energy buildings.
from 2019 onwards	From 2019 onwards all newly built state and municipal buildings and from 2021 onwards all new buildings should be nearly zero-energy buildings.

The distribution of newly built multi-dwelling buildings by number and area depending on their construction period is shown in Figures 1a and 1b. Viewing the statistics for the period since 1980, it can be concluded that by area most of multi-dwelling buildings were constructed between 2004 and 2009 (36 %) when in total 2,480,000 square meters were built, the second most active period of construction of new multi-dwelling buildings was between 1990 and 1995 when 23 % or 1,640,000 square meters were built.

New multi-dwelling buildings built (total area, thousand m^2)[5]

Figure 1a

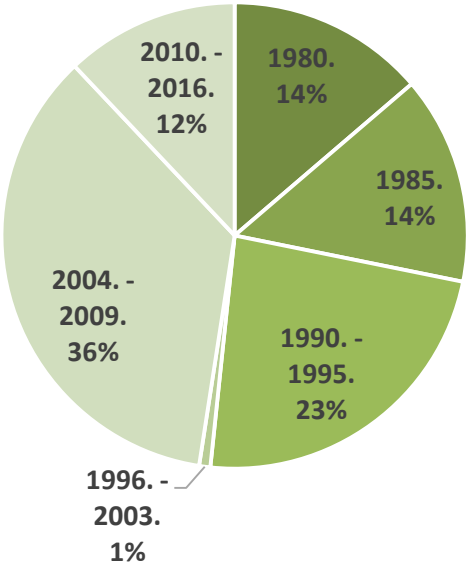
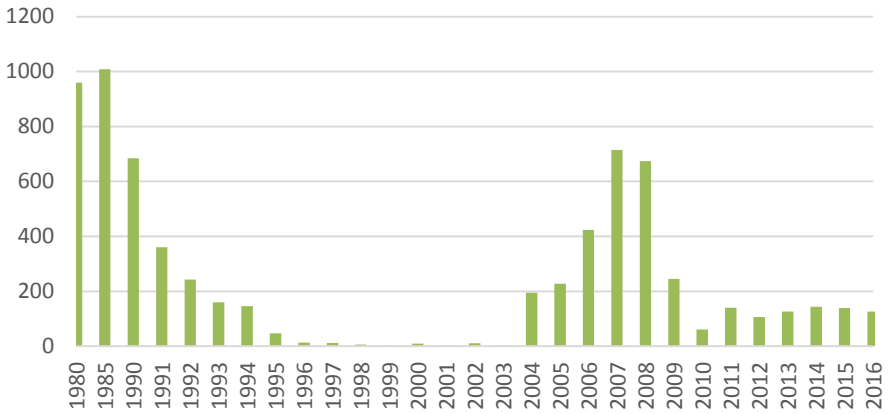
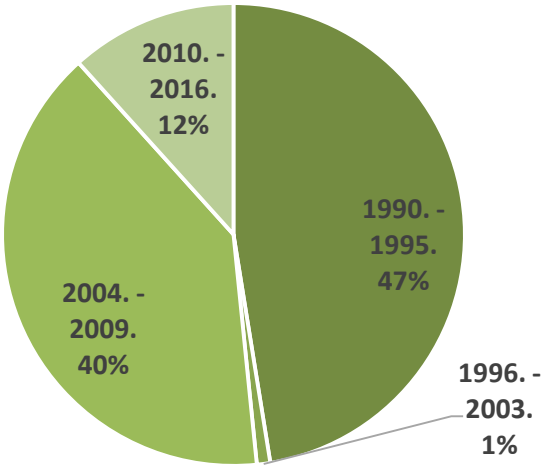
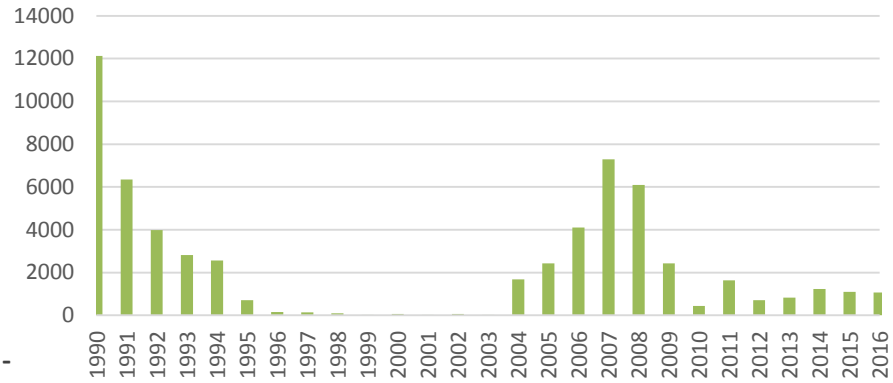


Figure 1b







The number of flats built in multi-dwelling residential buildings[5]

Figure 2a

Figure 2b

2.3.Climatic Zones

The Latvian Construction Standard LBN 003-15 "Construction Climatology" specifies climatological indicators applicable in construction, including engineering survey, designing, performance of construction work, as well as climatological indicators to be used in repair, renovation and reconstruction of buildings.

Climatological indicators of any geographical point in Latvia for the purpose of construction are determined using the climatological indicators of the closest geographical point included in the tables of Appendix 1 to this construction standard.

In accordance with LBN 003-15 "Construction Climatology", climatological indicators are defined for the following populated areas: Ainaži, Alūksne, Daugavpils, Dobele, Liepāja, Mērsrags, Priekuļi, Rīga, Stende, Zīlāni[5].

2.4. Distribution by Location

The housing stock in the statistical regions is summarised in Tables 3 and 4, while Table 5 gives information about newly built residential buildings in the statistical regions and cities of the republic.

According to Table 4, viewing the housing stock in the statistical regions, it can be seen that the total area of the housing stock in Latvia in 2015 was 74,670,000 m^2, while 49.8 % of the total area of residential buildings were in Riga Region (25.9 %, 19,350,000 m^2) and in Pierīga Region (23.9 %, 17,835,000 m^2). The largest total area of the housing stock per one permanent resident is in Pierīga Region (49 m^2) and Vidzeme Region (41 m^2).

Also, looking at the total area of newly constructed residential buildings in the statistical regions in 2016, it can be seen that the peak of residential construction was in Pierīga Region where 62.9 % (2,347,000 m^2) of all dwellings built in Latvia were constructed, i.e. 66.4 % (1,641,000 m^2) of the single-dwelling buildings built and 56.2 % (706,000 m^2) of the multi-dwelling buildings built.

Table 3. The housing stock in the statistical regions at the end of the year (total area, thousand m^2)[5]

	2010	**2011**	**2012**	**2013**	**2014**	**2015**
LATVIA	67,926	69,066	70,349	72,077	73,939	74,670
Riga Region	17,636	17,875	18,267	18,853	19,241	19,350
Pierīga Region	15,622	16,059	16,432	16,917	17,481	17,835
Vidzeme Region	7,658	7,743	7,831	7,963	8,100	8,130
Kurzeme Region	9,036	9,168	9,284	9,483	9,691	9,723
Zemgale Region	8,137	8,234	8,409	8,551	8,743	8,798
Latgale Region	9,837	9,987	10,127	10,309	10,682	10,834

Table 4. The housing stock in the statistical regions at the end of the year (total area per one permanent resident, m^2)[5]

	2010	**2011**	**2012**	**2013**	**2014**	**2015**
LATVIA	33	34	35	36	37	38
Riga Region	27	28	28	29	30	30
Pierīga Region	42	43	44	46	48	49
Vidzeme Region	36	37	38	39	41	41
Kurzeme Region	33	34	35	37	38	39
Zemgale Region	32	33	34	35	36	37
Latgale Region	32	33	35	36	38	39

[5] Latvian Construction Standard LBN 003-15 "Construction Climatology".

Table 5. New residential houses built in the statistical regions and in the cities of the republic (total area, thousand m²), 2016[5]

	Single-dwelling buildings	Multi-dwelling buildings	Built in total
Latvia			
LATVIA	247.3	125.6	372.9
Regions			
Riga Region	14	54.7	68.7
Pierīga Region	164.1	70.6	234.7
Vidzeme Region	13.1	0	13.1
Kurzeme Region	13.4	0	13.4
Zemgale Region	31.4	0.3	31.7
Latgale Region	11.3	0	11.3
Largest cities in the republic			
Riga	14	54.7	68.7
Daugavpils	0.6	0	0.6
Jelgava	11.6	0	11.6
Jūrmala	14	8.4	22.4
Liepāja	0.6	0	0.6
Rēzekne	0.8	0	0.8
Ventspils	3.6	0	3.6
Jēkabpils	1.9	0	1.9
Valmiera	1.3	0	1.3

2.5.Characteristics of Energy Use and Efficiency for Each Combination of Buildings

2.5.1. Type of Construction of the Main Elements of a Building and the U-value

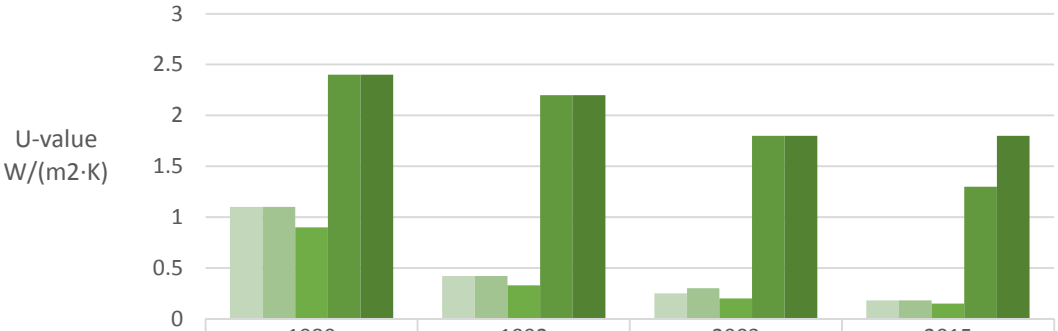
When characterising and analysing combinations of various parameters of a building during the construction, it is important to take into account legal requirements for thermal performance of building envelopes and changes in them.

Changes in legal requirements for thermal performance of building envelopes since 1980 have been listed in Table 6, and a comparison of individual requirements has been summarised in Figure 3.

Table 6. Standard U-values of a heat transfer coefficient for building envelopes of residential houses and energy consumption for heating in buildings constructed in compliance with the standard.

Structural elements		1980	1992	2003	2015
Roofs and ceilings that come into contact with outside air	W (m^2·K)	0.90	0.25 – 0.40	0.2 k*	0.15 k
Floors on the ground		-	0.5	0.25 k	0.15 k
External walls weighing less than 100 kg/m^2		1.1	0.33 – 0.50	0.25 k	0.18 k
External walls weighing 100 kg/m^2 and more				0.3 k	
Windows		2.4	1.9 – 2.4	1.8 k	1.30 k
Doors		2.4	1.9 – 2.4	1.8 k	1.80 k
Thermal bridges		-	-	0.2 k	0.10 k
*Temperature factor **k** = 19/($T_{int.}$ – $T_{ext.}$), depending on the climatic zone, **k** for residential buildings is from 0.95 (in Liepāja) to 1.09 (in Alūksne).					
Energy consumption for heating	kWh/m^2 per year	150 – 200	100 – 130	70 – 90	60 – 85

Figure 3. Changes in legal requirements for thermal performance of building envelopes since 1980.



	1980	1992	2003	2015
Sienas (vieglas)	1.1	0.42	0.25	0.18
Sienas (masīvas)	1.1	0.42	0.3	0.18
Jumti/pārsegumi	0.9	0.33	0.2	0.15
Logi	2.4	2.2	1.8	1.3
Durvis	2.4	2.2	1.8	1.8

Latvian	English
Sienas (vieglas)	Walls (light)
Sienas (masīvas)	Walls (massive)
Jumti/pārsegumi	Roofs/ceilings
Logi	Windows
Durvis	Doors

For both pre- and post-war buildings, the properties of building envelopes are usually based on calculations of construction physics that were made for the purpose of preventing formation of moisture on the inside surface of external walls in order to prevent freezing through. If a building is constructed correctly, a U-value of heat transfer coefficients is usually at least 1.3 [W/(m^2 K)]. Studies show that thermal properties of building envelopes of buildings constructed to standard designs in the Union of Soviet Socialist Republics (USSR) usually range from 0.8 to 1.2, however, in some cases the actual U-values of external walls are up to 2.0 [W/(m^2 K)][6].

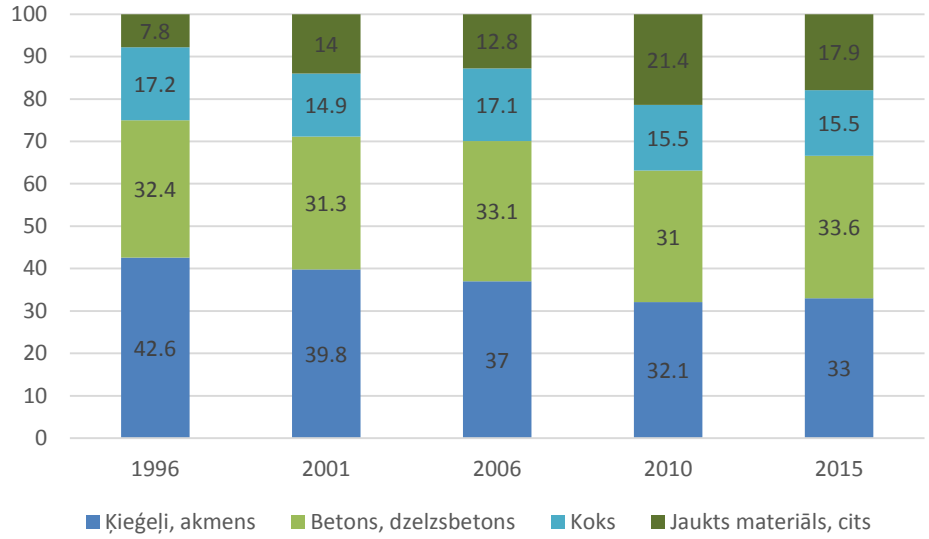
Considering the climatic conditions, buildings need to be heated in Latvia (4,035 heating degree days) much more often than on average in Europe (3,067 heating degree days)[7]. Only the buildings constructed after 2015 can be seen as the ones complying with the current requirements for thermal performance. The buildings constructed from 2003 to 2015 have only slightly lower thermal performance. At the same time, it should be noted that the legal requirements for thermal performance are not always met because of the low quality of construction works and because of errors in construction designs.

Analysing the houses built in 2015 by the type of material used in their external walls, the materials used most often are concrete, reinforced concrete (33.6 %) and brick (33 %). The dwellings where wood is used for external walls

[6] A. Jakoviès, S. Gendelis, H. Truemmann. Analysis of heat losses from typical buildings in Riga. International scientific colloquium 'Modelling for saving resources' – Riga, 2001, pp 190–197.
[7] http://appsso.*euro*stat.ec.*euro*pa.eu/nui/show.do?dataset=nrg_esdgr_a&lang=en

constitute only 15.5 %. (Figure 4). One of the reasons underlying such statistics is related to the fact that until now the use of wooden structural elements in construction of new buildings has been very limited, but on 1 May 2017, the amendments to Cabinet Regulation No. 333 of 30 June 2015 "On Latvian Construction Standard LBN 201-15 "Fire Safety of Structures"" will come into force, according to which in future it will be allowed to use wooden structural elements in Latvia in construction of new residential and public buildings rising 18 m (previously up to 8 m) high and having up to 6 floors (previously up to 3 floors) such as hotels, guest houses, offices and administrative buildings.

Figure 4. Distribution of dwellings by type of building material used for external walls (%)



Latvian	English
Ķieģeļi	Brick, stone
Betons, dzelzbetons	Concrete, reinforced concrete
Koks	Wood
Jaukts materiāls, cits	Mixed material, other

2.5.2. Maintenance Regimes (Mandatory Annual Safety Inspections/Maintenance Checks)

In accordance with the requirements of Section IV of Cabinet Regulation No. 383 of 9 July 2013 "On Energy Certification of Buildings", house owners must ensure regular inspection of heating and air-conditioning systems.

Inspection of heating systems is performed on accessible parts of heating systems of buildings (e.g. on a heat generator, a control system and a circulator pump or pumps) if the useful nominal output of heating boilers of these systems for heating of rooms exceeds 20 kilowatts.

Inspection of the heating system includes an assessment of efficiency and capacity of the heating boiler. The heating boilers are inspected in accordance with the standard LVS EN 15378:2009L "Heating Systems in Buildings – Inspection of Boilers and Heating Systems". An independent expert draws up the following documents after the inspection of the heating system:

- reports on the inspection of heating boilers of the heating system in accordance with Appendix D to the standard LVS EN 15378:2009L;
- a report on the inspection of the heating system in accordance with Appendix K to the standard LVS EN 15378:2009L.

Inspection of air-conditioning systems is performed on accessible parts of air-conditioning systems if the actual nominal output of the air-conditioning system exceeds 12 kilowatts. The air-conditioning systems are inspected in accordance with the standard LVS EN 15240:2009 L "Ventilation for Buildings – Energy Performance of Buildings. – Guidelines for Inspection of Air-conditioning Systems". A corresponding report is drawn up after the inspection of the air-conditioning system.

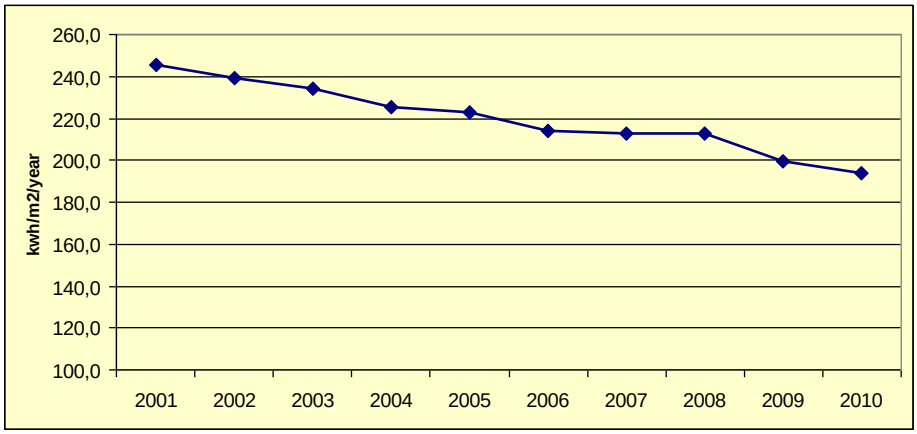
An air-conditioning system is inspected:

- at least once every six years where the air-conditioning system is equipped with operation and control devices that ensure monitoring and control of electronic systems;
- at least once every four years in other cases.

2.5.3. Energy Consumption in Buildings

In the Republic of Latvia, the household sector is the largest end-consumer of energy, and in 2015 it consumed 28.3 % of the total final energy consumption, 66.8 % of the total final consumption of thermal energy and 27.2 % of the total final electricity consumption. Fuelwood takes about 49.4 % and thermal energy [8]30.5 % of the household energy consumption.

Figure 5. Indicator of energy consumption for heating in households (adjusted with a climatic factor), kWh//m^2/per year



The indicator value for the consumption of heating energy calculated on the basis of energy consumption and the total dwelling space in households shows a positive development tendency over a 10-year period. This positive tendency is supported by the implemented energy efficiency measures which were funded by residents and also by various programmes promoting the increased energy efficiency of multi-dwelling residential buildings. However, it is also clear that the energy consumption for heating is also reduced by residents limiting their consumption of thermal energy due to their low paying capacity and a decreased level of comfort in dwellings.

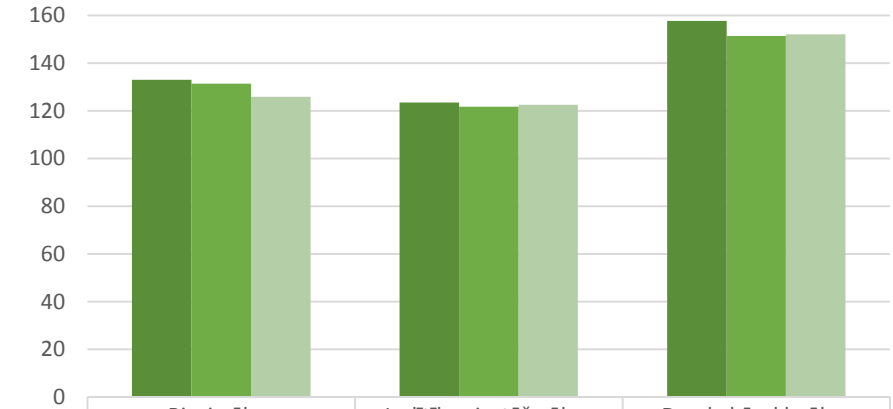
[8] The data of the CSB on 2 March 2017.

Since 2014, in accordance with Clause 16 of Cabinet Regulation No. 383 of 9 July 2013 "On Energy Certification of Buildings", once a year by 1 March, the Ministry of Economics (since 2017 – the State Construction Control Bureau of Latvia) obtains a statistically determined average figures of energy efficiency indicators and energy consumption for heating and publishes these figures on the homepage for at least the following types of buildings:

- multi-dwelling buildings;
- office buildings;
- buildings of educational establishments.

The data are obtained using the information provided by JSC "Rīgas siltums" and the data on the list of the national building stock. The summarised results are shown in Figure 6.

Figure 6. The average specific heating consumption in buildings, kWh/m^{2}per year



	Biroju ēkas	Izglītības iestāžu ēkas	Daudzdzīvokļu ēkas
2014	133.02	123.42	157.67
2015	131.39	121.73	151.36
2016	125.83	122.49	152.04

Latvian	English
Biroju ēkas	Office buildings
Izglītības iestāžu ēkas	Buildings of educational establishments
Daudzdzīvokļu ēkas	Multi-dwelling buildings

The results tend to decrease slightly gradually. The summarised data are used in energy certificates of buildings as reference values, allowing house owners, holders of energy certificates to make not only the assessment of the building, but also to see how the particular building differs if compared to the average consumption of a building in the country.

Since 2016, the Construction Information System (CIS)[9] has been introduced in Latvia with two new registers: a register of energy certificates of buildings and a register of independent experts. Until 1 March 2017, there were 3,003 documents (energy certificates, temporary energy certificates, inspection reports on boilers, air conditioning systems and heating systems) registered in the Register of Energy Certificates of Buildings. Among them, there were 676 energy certificates of

[9] The Construction Information System - www.bis.gov.lv

buildings which could be used to obtain statistical data on the energy performance of buildings. The results are summarised in Table 7.

Table 7. The number of new energy certificates registered in the Construction Information System

Data processed on 24 February 2017	**2016**	**2016**	**2017 (until 24 February 2017)**	**2017 (until 24 February 2017)**
	The number of energy certificates	Average figures of consumption for heating (kWh/m² per year)	The number of energy certificates	Average figures of consumption for heating (kWh/m² per year)
all types of buildings	676	157	200	140
a single-dwelling or a two-dwelling building of a different type	3	172	4	174
a multi-dwelling building	259	137	117	140
an office building	100	172	21	116
a building of an educational establishment	128	160	18	122
a building of an outpatient or inpatient treatment facility	42	163	4	186
a hotel and restaurant building	30	114	7	108
a sports building	6	161	2	140
a wholesale or retail trade building	4	172	9	71
other type of building consuming energy	104	198	18	215

The information of the CIS system, as the number of buildings with valid energy certificates will be increasing, may become an important source of statistical data. The number of the currently summarised results (the number of buildings) is not sufficient to fully reflect the situation in the country.

Although statistics show a tendency towards the decrease of energy consumption indicators, it is clear that the decrease rate is not sufficient to reach the goals set in policy planning documents, therefore additional incentives are necessary which would promote the improvement of energy efficiency of the housing stock.

2.5.4. Energy Carriers

2.5.4.1. Energy Resources

Tables 8 and 9 of the Strategy show the data on consumption of energy resources in households in 1996, 2001, 2006, 2010 and 2015. Analysing the summarised data on energy consumption in households, a significant drop in the total energy consumption can be observed, which in 2015, as compared to 2010, has decreased by 13,498 TJ. It can also be concluded that according to the data of the CSB the most widely used energy resources in 2015 are: firewood, the consumption of which constitutes 35.4 % of all energy resources (16,355 TJ) and thermal energy (for heating and hot water), the consumption of which is 30.5 % of all energy

resources (14,101 TJ). Electricity is the third most widely used resource of energy (6,332 TJ, 13.7 %).

Table 8. Consumption of energy resources in households, including consumption on farms and during other economic activities (TJ)[10]

	1996	2001	2006	2010	2015
Electricity	3,935	4,460	6,221	6,977	6,332
Natural gas	4,180	3,334	4,807	5,219	4,116
Liquefied petroleum gas	1,230	1,139	1,230	911	773
Petroleum products for heating and hot water	42	170	127	79	89
Coal	1,964	1,338	813	1,049	501
Firewood	31,349	23,388	27,986	23,256	16,355
Wood briquettes	…	69	187	340	375
Wood pellets	…	…	36	252	2,052
Wood residues	…	7,062	2,956	1,126	348
Charcoal	…	…	30	60	60
Other solid fuel	241	17	7	35	…
Petroleum products for other purposes (except transport)	…	1,087	2,701	2,825	1,151
Thermal energy (for heating and hot water)	28,310	19,627	17,816	17,622	14,101
Total energy resources	71,251	61,691	64,917	59,751	46,253

Table 9. Consumption of energy resources in households, including consumption on farms and during other economic activities (in physical units)[11]

	1996	2001	2006	2010	2015
Electricity (MWh)	1,093,112	1,238,669	1,727,979	1,938,167	1,758,800
Natural gas (thousand m^3)	112,503	89,401	128,957	155,019	118,040
Liquefied petroleum gas (t)	27,300.0	25,066.5	26,879.0	19,995.0	16,617.1
Petroleum products for heating and hot water (t)	942.1	3,675.5	3,389.7	1,889.3	2,093.3
Coal (t)	69,016.0	47,287.0	31,164.5	40,022.8	20,900.7
Firewood (thousand m^3)	4,678.7	3,485.8	4,176.7	3,471.0	2,440.7
Wood briquettes (t)	…	10,318.4	11,719.4	19,972.2	23,337.4
Wood pellets (t)	…	…	2,217.1	13,973.4	115,011.7
Wood residues (t)	…	737,749.8	309,236.2	117,600.0	36,253.9
Wood charcoal (t)	…	…	538.1	1,985.4	1,516.7
Other solid fuel (t)	16,652.7	1,092.2	426.7	2,438.2	…
Petroleum products for other purposes (except transport) (t)	…	25,453.6	63,471.4	66,331.9	27,157.5
Thermal energy (for heating and hot water) (GWh)	7,864	5,452	4,949	4,895	3,917

The number of households using fuelwood consuming equipment and the average age of the equipment (% of the number of wood consuming households; years) can be seen in Appendix 1[12].

Pursuant to the requirements of Article 5(5) of Directive 2012/27/EU of the European Parliament and of the Council on energy efficiency, every year the Ministry

[10] The data of the Central Statistical Bureau, epm3.4 Consumption of energy resources in households, including consumption on farms and during other economic activities (TJ) (11 January 2017).

[11] The data of the Central Statistical Bureau, epm3.3 Consumption of energy resources in households, including consumption on farms and during other economic activities (in physical units) (11 January 2017).

[12] The data of the Central Statistical Bureau, epm2.2 The number of households using fuelwood consuming equipment and the average age of the equipment (% of the number of wood consuming households; years) (11 November 2017)

of Economics (hereinafter "MoE") prepares a list of buildings with the total area exceeding 250 m^2 owned, possessed and used by State institutions. The updated list of State buildings is available here[13]. The data on the energy carriers used in 1,274 State buildings are summarised in Table 14, which shows that in 649 State buildings with the total area exceeding 250 m^2, the heat supply is provided from a centralised system without identifying the type of fuel, however, natural gas is the most popular type of fuel in other State buildings with the total area exceeding 250 m^2, thus, natural gas is used in 269 State buildings, wood – in 185 buildings, diesel fuel – in 38 buildings, mixed fuels (coal, wood) – in 47 buildings.

Table 10. Type of fuel in State buildings with the total area above 500 m^2 [14]

Type of fuel	**The number of buildings**
Fossil resources	
Natural gas	269
Coal	17
Diesel	48
Petroleum gas	6
Natural gas, diesel	1
Renewable resources	
Wood (firewood, pellets, briquettes, woodchips)	185
Grain, chaff	1
Mixed fuels (renewable and fossil resources)	
Coal, wood	47
Coal, wood, natural gas	2
Natural gas, grain	2
Natural gas, grain	11
Diesel, wood	4
Other sources of thermal energy	
Centralised heat supply (without identifying the type of fuel, heat supplied to the building locally or centrally)	649
Electrical heating	23
Heat pump	3
Heat pump, solar collector	1
Centralised heat supply, liquefied gas	1
Centralised heat supply, natural gas	2
Heat pump, solar collector, diesel	1
Wood, electrical heating	1
Total buildings	**1,274**

[13] The list of buildings with the total area above 250 m^2 owned, possessed and used by State institutions https://www.em.gov.lv/lv/nozares_politika/majokli/eku_energoefektivitate/no_direktivas_2012_27_es_par_energoefektivitati_izrietosas_prasibas/

[14] The list of buildings with the total area above 500 m^2 owned, possessed and used by State institutions, http://em.gov.lv/em/2nd/?cat=30273

No statistics are collected in Latvia about consumption of energy carriers in non-residential buildings (except State buildings).

As regards energy consumption, type of activity and location in the country, the national building stock has been analysed in more detail in the initial assessment of 4.2.1 measure "To promote improvement of energy efficiency in State buildings" of 4.2.1 specific objective "To promote improvement of energy efficiency in State and residential buildings"[15].

2.5.4.2. Renewable Energy Sources

Tables 8 and 9 of the Strategy provide the information about consumption of energy resources in households, leading to a conclusion that consumption of renewable energy sources (wood, wood briquettes, pellets, residues) in 2015 was 19,130 TJ or 41.4 % of all the energy resources consumed, which in total amounts to 2,400 thousand m^3 of firewood and 174,602 tonnes of wood briquettes, pellets and wood residues. The use of wood residues and wood pellets has changed more drastically since the use of wood residues has decreased by 101 thousand tons while the use of wood pellets has increased by 101 thousand tons.

According to the data of the State buildings list, the summarised results show that in total, out of 904 State buildings, 258 use renewable energy sources (hereinafter "RES") for heating.

Table 11 summarises information about the types of RES used for heating in State buildings with the total area above 250 m^2.

Table 11. At least partial use of RES in thermal energy in State buildings with the total area above 250 m^2 [16]

Type of RES fuel	**The number of buildings**
Coal/ **wood**	47
Coal, **wood**, natural gas	2
Natural gas, **grain**	2
Natural gas, **wood**	11
Diesel, **wood**	4
Grain, chaff	1
Wood (firewood, pellets, briquettes, woodchips)	185
Wood, electrical heating	1
Heat pump	3
Heat pump, solar collector, diesel	1
Heat pump, solar collector	1
Total	258

[15] https://em.gov.lv/files/es_fondi/2017-06-27_11_04_51_4212_Sakotnejais_izvertejums_18052016.docx
Sub-chapter 1.2 of Chapter1

3. Cost-Effective Approach to Renovation of Buildings

3.1. Cost-optimal Levels of Minimum Energy Performance Requirements

The requirement regarding calculations of cost-optimal levels of minimum energy performance requirements and submission of a report to the European Commission (hereinafter "EC") is stipulated in Article 5 of Directive 2010/31/EU on the energy performance of buildings, which stipulates that Member States shall calculate cost-optimal levels of minimum energy performance requirements for new and existing buildings and compare the results of this calculation with the minimum energy performance requirements in force.

Article 5 of Directive 2010/31/EU also stipulates that Member States of the European Union shall report to the EC all input data and assumptions used for those calculations of optimum level of minimum energy performance requirements and the results of those calculations. Member States shall submit those reports at regular intervals, which shall not be longer than five years.

On 17 December 2013, the MoE prepared and sent to the EC a report on energy performance requirements in Latvia for new buildings and buildings to be reconstructed in compliance with cost-optimal level, summarising study results with respect to the following categories of buildings: multi-dwelling residential buildings, single-family houses, offices, kindergartens, schools, hospitals and office buildings.

The report on energy performance requirements in Latvia for new buildings and buildings to be reconstructed in compliance with cost-optimal level pursuant to Article 5 of Directive 2010/31/EU on the energy performance of buildings is available on the website of the MoE[16].

3.2. Current Minimum Energy Performance Requirements

Calculations included in the Report showed that the minimum energy performance requirements in force did not meet optimum minimum energy performance requirements with respect to a part of the buildings and construction elements, as a result, on 8 April 2014 amendments were made to Cabinet Regulation No. 495 of 27 November 2011 "Regulations on Latvian Construction Standard LBN 002-01 "Thermotechnics of Building Envelopes"". In accordance with the new Construction Law, these provisions were republished[17], retaining certain optimal cost requirements. Changes in requirements are shown in Table 12.

[16] The report on energy performance requirements in Latvia for new buildings and buildings to be reconstructed in compliance with cost-optimal level pursuant to Article 5 of Directive 2010/31/EU on the energy performance of buildings.
https://em.gov.lv/files/majokli/PS_1.pdf

[17] Cabinet Regulation No. 339 of 30 June 2015 "Regulations on Latvian Construction Standard LBN 002-15 "Thermotechnics of Building Envelopes"".

Table 12. The comparison of the normative and maximum values of the heat transfer coefficients U_{RN} and U_{RM} W/(m^2 x K) of the structural element and the linear thermal bridge, and the comparison of the normative and maximum values of Ψ_{RN} and Ψ_{RM} W/(m x K) taking into account the requirements in 2003 and the requirements in 2015, and the cost optimal levels.

o.	Structural elements	Residential houses, old people's homes, hospitals and kindergartens				Public buildings except old people's homes, hospitals and kindergartens				Production buildings			
		2003		2015		2003		2015		2003		2015	
		U_{RN}	U_{RM}	U_{RN}	U_{RM}	U_{RN}	U_{RM}	U_{RN}	U_{RM}	U_{RN}	U_{RM}	U_{RN}	U_{RM}
1.	Roofs and ceilings that come into contact with outside air	0.20 k	0.25 k	0.15 k	0.20 k	0.25 k	0.35 k	0.20 k	0.25 k	0.35 k	0.50 k	0.25 k	0.35 k
2.	Floors on the ground	0.25 k	0.35 k	0.15 k	0.20 k	0.35 k	0.50 k	0.20 k	0.25 k	0.50 k	0.70 k	0.30 k	0.40 k
3.	Walls												
3.1.	weighing less than 100 kg/m^2	0.25 k	0.30 k	0.18 k	0.23 k	0.35 k	0.40 k	0.20 k	0.25 k	0.45 k	0.50 k	0.25 k	0.30 k
3.2.	weighing 100 kg/m^2 and more	0.30 k	0.40 k			0.40 k	0.50 k			0.50 k	0.60 k		
3.3.	Walls in traditional log houses without a heat insulation layer built into the wall				0.65 k				0.65 k				0.30 k
4.	Windows, doors and other glazed structures:	1.80 k	2.70 k	1.30 k	1.80 k	2.20 k	2.90 k	1.40 k	1.80 k	2.40 k	2.90 k	1.60 k	1.80 k
5.	entrance doors to buildings			1.80 k	2.30 k			2.00 k	2.50 k			2.20 k	2.70 k
		Ψ_{RN}	Ψ_{RM}	Ψ_{RN}	Ψ_{RM}	Ψ_{RN}	Ψ_{RM}	Ψ_{RN}	Ψ_{RM}	Ψ_{RN}	Ψ_{RM}	Ψ_{RN}	Ψ_{RM}
6.	Thermal bridges	0.20 k	0.25 k	0.10 k	0.15 k	0.25 k	0.35 k	0.15 k	0.20 k	0.35 k	0.50 k	0.30 k	0.35 k

Given that the construction standard LBN 002-15 does not specify an exact assessment value of energy efficiency and that the assessment of energy efficiency of each building is different since it depends on its shape, structural elements and the designed ventilation system, new requirements were laid down at the end of 2015 in Cabinet Regulation No. 383 "Regulations Regarding Energy Certification of Buildings" of 9 July 2013, which not only clarified the classification system but also set the minimum level of energy efficiency of buildings. Table 13 summarises the minimum levels of requirements for restored/reconstructed buildings and for new buildings.

Table 13. The minimum permissible level of energy efficiency for restored, reconstructed and new buildings

The minimum permissible level of energy efficiency, the energy efficiency indicator for heating, kWh/m^2 per year				
Restorations or reconstructions				
Period of application of requirements	For residential buildings		For non-residential buildings	
	For multi-dwelling buildings	For different types of single-dwelling	State-owned buildings in the	For other non-

		and multi-dwelling buildings	possession of institutions and in which state institutions are located	residential buildings
From 21 November 2015 onwards	≤ 90 kWh/m^2 per year	≤ 100 kWh/m^2 per year	≤ 110 kWh/m^2 per year	≤ 110 kWh/m^2 per year
New buildings				
From 21 November 2015 till 31 December 2016	≤ 70 kWh/m^2 per year	≤ 80 kWh/m^2 per year	≤ 100 kWh/m^2 per year	≤ 100 kWh/m^2 per year
From 1 January 2017 till 31 December 2017	≤ 60 kWh/m^2 per year	≤ 70 kWh/m^2 per year	≤ 90 kWh/m^2 per year	≤ 90 kWh/m^2 per year
From 1 January 2018 till 31 December 2018	≤ 60 kWh/m^2 per year	≤ 70 kWh/m^2 per year	≤ 65 kWh/m^2 per year	≤ 90 kWh/m^2 per year
From 1 January 2019 till 31 December 2020	≤ 50 kWh/m^2 per year	≤ 60 kWh/m^2 per year	Nearly zero energy building, ≤ 45 kWh/m^2 per year	≤ 65 kWh/m^2 per year
From 1 January 2021 onwards	Nearly zero energy building, ≤ 40 kWh/m^2 per year	Nearly zero energy building, ≤ 40 kWh/m^2 per year	Nearly zero energy building, ≤ 45 kWh/m^2 per year	Nearly zero energy building, ≤ 45 kWh/m^2 per year

The requirements of LBN 002-15 in Table 13 specify that these requirements must be applied depending on the climatic conditions (temperature factor k, which depends on the indoor and outdoor temperature). Thus the requirements for severe climate zones are stricter and less demanding for warmer climates. Outdoor temperatures are specified in LBN 003-15 "Building Climatology". Taking into account the gradual changes in the climate (winters have become warmer in recent years), the data provided in this construction standard should be reviewed periodically.

3.3. Planned Further Changes in the Requirements

In accordance with Article 5(2)(2) of Directive 2010/31/EU, Member States shall submit reports to the Commission at regular intervals which shall not be longer than five years. Latvia has to prepare the next report in line with the information provided by the European Commission by March 2018.

On 30 November 2016, the European Commission published a press release "Clean Energy for All Europeans"[18]. This Winter Package also includes proposals for amending Directive 2010/31/EU of the European Parliament and of the Council on the energy performance of buildings[19], planning to introduce changes in various

[18] http://*euro*pa.eu/rapid/press-release_IP-16-4009_en.htm
[19] http://eur-lex.*euro*pa.eu/legal-content/LV/TXT/?uri=CELEX:52016PC0765

requirements. Considering that the changed requirements include the requirements affecting the methodology for calculating the energy performance of a building, and in order to avoid excessive spending of public financial resources for preparation of such a report, a report on cost optimal levels should be developed either along with the changes in the methodology or after them rather than by the set deadline.

The proposals included in the Winter Package are discussed in more detail in Section 5 of the Strategy.

4. Policy and Measures for Promotion of Building Renovation

4.1. Policy Documents on Energy Performance

The policy on energy performance and the goals to be reached have been defined in the following policy documents:

- Latvia's National Development Plan for 2014–2020 (hereinafter "NDP") (approved with the decision of the Saeima of the Republic of Latvia of 20 December 2012);

- National Reform Programme of Latvia for the Implementation of the Strategy "Europe 2020" (approved with the Cabinet of Ministers Order of 26 April 2011 (minutes No. 27, § 34));

Informative Report "Long-Term Strategy of Latvia's Energy 2030 – Competitive Energy for the Society" (approved with the Cabinet of Ministers Order of 28 May 2013 (minutes No. 32, § 59));

Partnership Agreement for the 2014–2020 programming period of the European Union Funds (approved with the Cabinet of Ministers Order No. 1 of 2 January 2014);

- Operational Programme "Growth and Employment" for the 2014–2020 programming period (approved with the Cabinet of Ministers Order No. 71 of 17 February 2014);

- "Concept of the transposition into national law of the requirements of Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC" (approved with the Cabinet of Ministers Order No. 587 of 26 November 2013);

- Regional Policy Guidelines for 2013–2019 (approved with the Cabinet of Ministers Order No. 496 of 29 October 2013).

The above-listed policy documents underlie the policy measures for energy efficiency of buildings implemented and planned in the following sections.

4.2. Funding Available from Funds and Financial Instruments

4.2.1. The Use of the European Union Funds

The EU Funds can be deemed to have been the largest source of funding since 2009. The support for improvement of energy efficiency of buildings has been available for the 2007–2013 programming period of the EU Funds (European Regional Development Fund (hereinafter "ERDF") and for the 2014–2020 programming period of the EU Funds (funding from the ERDF and the Cohesion Fund (hereinafter "CF")).

The 2007–2013 programming period of the EU Funds

As part of the supplementing measure 3.4.4 "Energy Efficiency of Housing" of the Operational Programme "Infrastructure and Services" of the 2007–2013 programming period of the EU Structural Funds, the MoE administrated two activities, the implementation of which is ensured by the Latvian Investment and Development Agency (hereinafter "LIAA"):

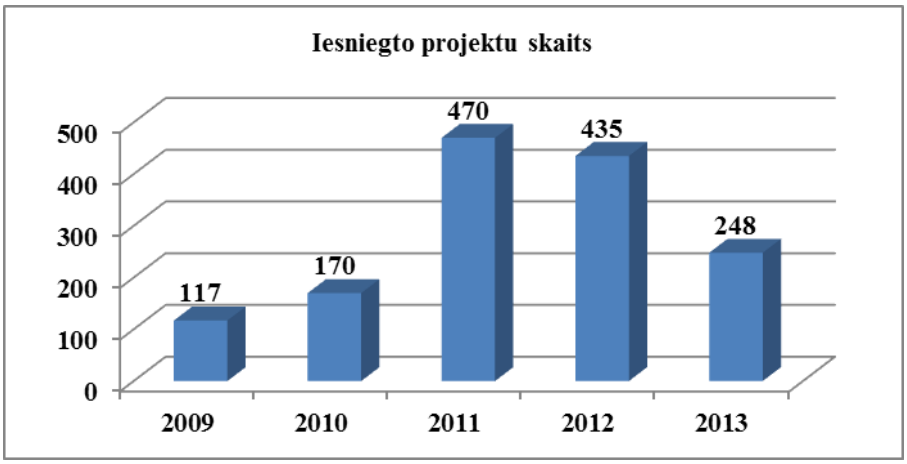
- 3.4.4.1 activity "Improvement of heat insulation of multi-dwelling buildings" (hereinafter "3.4.4.1 activity");
- 3.4.4.2 activity "Improvement of heat insulation of social residential buildings" (hereinafter "3.4.4.2 activity");

3.4.4.1 activity "Improvement of heat insulation of residential buildings".

As part of 3.4.4.1 activity, the support for the improvement of energy efficiency of residential buildings has been provided since 2009. The aim of this activity was to increase energy efficiency of multi-dwelling residential buildings in order to ensure sustainability of the housing stock and efficient use of energy resources.

Since the initiation of 3.4.4.1 activity on 14 April 2009, 1,440 project applications have been submitted. Although initially the number of projects submitted for 3.4.4.1 activity was small, namely, 117 in 2009, the number of projects submitted in 2011 was four times higher, i.e. 470 (see Figure 7).

Figure 7. The number of projects submitted every year for 3.4.4.1 activity between 2009 and 2013.



Note: The total number of projects submitted for 3.4.4.1 activity is 1,440.

Latvian	English
Iesniegto projektu skaits	The number of projects submitted

As part of 3.4.4.1 activity, 741 projects for improvement of energy efficiency have been completed, with the investments totalling EUR 149 million, i.e. EUR 63 million of the ERDF funding and EUR 86 million of the private co-funding. As a result of the completed projects, the savings of thermal energy reached 30-60 % of the previously consumed thermal energy (43 % on average) (see Table 14).

Table 14. The number of implemented and ongoing projects as part of 3.4.4.1 activity and the funding in the 2007–2013 programming period of the EU Funds.

Project status	The number of projects	ERDF funding (EUR)	Private eligible funding (EUR)	Ineligible costs (EUR)	Total investments (EUR)[20]
Completed	741	63,219,895.92	63,024,534.16	23,478,465.53	149,722,895.61

Since the initiation of 3.4.4.1 activity, the inhabitants of Kurzeme Region have used the support provided by the EU Funds for the renovation of residential buildings most actively. Overall, 232 projects for improvement of energy efficiency have been implemented in Kurzeme Region. A large number of buildings have been renovated also in Riga Region (163 projects) and in Vidzeme (168 projects). Only few of owners of multi-dwelling buildings in Riga and Latgale have used the opportunity to improve efficiency of their buildings (see Table 15).

Table 15. The number of implemented and ongoing projects as part of 3.4.4.1 activity in every region.

Project status	Kurzeme	Riga Region	Vidzeme	Zemgale	Riga	Latgale	Total
Completed	232	163	168	102	46	30	**741**

[20] ERDF funding and private funding

According to the data given in Table 16, the projects implemented in Liepāja and Ventspils will account for the largest number of renovated buildings in Kurzeme (167 projects). Considering the total number of buildings in the city, the implementation of 3.4.4.1 activity in Valmiera, has resulted in the most significant renovation of the housing stock with the support of the EU Funds. Despite Riga's great potential in the improvement of energy efficiency of buildings, during this period, its inhabitants were reluctant to use the support provided by the EU Funds and the municipality.

Table 16. The proportion of the buildings renovated as part of 3.4.4.1 activity in the most active municipalities as compared to the total number of residential buildings.

Project status	**Riga**	**Valmiera**	**Liepāja**	**Ventspils**	**Cēsis**
Completed	46	60	110	57	28
Total buildings (data of the State Land Service)	11,913	453	2,117	828	432
Insulated of the total number of buildings, %	**0.39 %**	**13.25 %**	**5.2 %**	**6.88 %**	**6.48 %**

3.4.4.2 activity "Improvement of heat insulation of social residential buildings".

3.4.4.2 activity "Improvement of heat insulation of social residential buildings" was initiated in May 2008. The aim of the activity is to improve energy efficiency of the social houses owned by the local government, while enhancing their quality and sustainability and providing socially disadvantaged groups of people with adequate housing. Project applications for the funding could be submitted for social residential buildings owned by local governments and assigned a status of a social residential house in accordance with a decision of a local government. After completion of renovation or reconstruction, at least 20 % of savings of thermal energy consumption must be achieved.

The maximum permissible intensity of the ERDF funding for the implementation of the activity was 75 % of the total eligible costs of the project. As part of the activity, one project application can receive no more than EUR 200,000 of the ERDF funding. The available amount of the ERDF funding for the implementation of the activity is EUR 6.9 million.

Using EUR 5.1 million of the ERDF funding and renovating about 50 % of social houses owned by local governments, 55 projects have been completed implementing the activity.

The 2014–2020 programming period of the EU Funds

In accordance with the 2014–2020 planning documents of the EU Funds, namely Partnership Agreement and OP, for the 2014–2020 period, in Latvia, for

energy efficiency of buildings and use of RES, indicative EUR 322.97 million are planned, including:

- for energy efficiency of industrial buildings and use of RES – EUR 32.56 million (responsible ministry – Ministry of Economics);
- for improvement of energy efficiency in State buildings and use of RES – EUR 97.86 million;
- for energy efficiency of residential buildings and use of RES – EUR 150 million (responsible ministry – Ministry of Economics);
- for improvement of energy efficiency in municipal buildings – EUR 46.9 million (responsible ministry –Ministry of Environmental Protection and Regional Development).

In the 2014–2020 programming period of the EU Funds the MoE ensures implementation of three support programmes for improvement of energy efficiency of buildings:

- 4.1.1 specific objective "To promote efficient use of energy sources, reduction in energy consumption and transition to RES in the manufacturing industry";
- 4.2.1.1 measure "To promote improvement of energy efficiency in residential buildings";
- 4.2.1.2 measure "To promote improvement of energy efficiency in State buildings";

In this period the Ministry of Environmental Protection and Regional Development (hereinafter "MoEPRD") administers one support programme for improvement of energy efficiency of buildings:

- 4.2.2 specific objective "To promote improvement of energy efficiency and use of renewable energy resources in municipal buildings in line with the integrated development programmes of local governments".

4.1.1 specific objective of the Cohesion Fund "To promote efficient use of energy sources, reduction in energy consumption and transition to RES in the manufacturing industry" (hereinafter "4.1.1 SO").

The aim of 4.1.1 SO is to promote improvement of energy efficiency and use of renewable energy sources in production buildings of manufacturing industry. The total available funding for implementation of 4.1.1 SO constitutes EUR 32.55 million, which is allocated in the form of grants to 65 micro, small, medium and large operators engaged in economic activity in sectors of manufacturing industry. The minimum available amount of public funding per one project application is EUR 50,000, and the maximum amount is EUR 600,000. Thus, the maximum permissible amount of eligible costs per one project is EUR 2,000,000.

Selection of project applications for 4.1.1 SO is organised in the period from 13 December 16 till 12 May 2017, and the implementation of projects will take place until 31 December 2020.

The eligible costs as part of SO 4.1.1 are:

- improvement of energy efficiency of buildings;
- improvement of energy efficiency in the existing technological equipment used in production;
- investments in transition from fossil to biomass-based heat production facilities;
- introduction of an energy management system (applicable only to SME);
- preparation of technical documentation;
- provision of management and supervision.

The main conditions of 4.1.1 SO:

- an energy certificate or an energy audit report of the company must be attached to the project application;
- the equity of the applicant should constitute at least 25 % of the eligible costs of the project;
- there must be at least 15 % of energy savings per year in the particular manufacturing process or in energy consumption of the building as a result of the implementation of the project;
- the planned thermal energy consumption for heating should not exceed 110kWh/m2 per year (if applicable).
- At least 5 years after the completion of the project:
    - the production building is used for production needs in the manufacturing industry;
    - every year a report is submitted on energy consumption in the building or in the particular production process.

4.2.1.1 measure of the European Regional Development Fund "To promote improvement of energy efficiency in residential buildings" (hereinafter "measure 4.2.1.1").

The aim of 4.2.1.1 measure is to promote improvement of energy efficiency, smart energy management and use of renewable energy sources in multi-dwelling residential buildings. The total available public funding for implementation of 4.2.1.1 measure constitutes EUR 176 million, i.e. EUR 150 million of the ERDF funding and EUR 26 million of the State budget funding. The support for the measures aimed at improvement of energy efficiency of multi-dwelling residential buildings will be provided by JSC "Attīstības finanšu institūcija Altum" (hereinafter "Altum"). Submission of projects was commenced in September 2016 and projects will be implemented until 31 December 2022.

To quality for this support, the conditions for the projects aimed at improvement of energy efficiency will be as follows:

- one owner does not own more than 20 % of the total number of dwellings or groups of residential spaces (this restriction does not apply to local governments);
- thermal energy consumption for heating does not exceed 90 kWh/m^2 per year after renovation;
- the amount of debts of a residential building for the received services that are related to the use of a dwelling (management, waste management, heat supply, water supply and sewage services) in the past year does not exceed 10 % of the total sum of the invoices for these services;
- investments must be economically justified, namely, the internal return rate (IRR) of the project is above 0 when calculating in a 20-year period.

Types of support as part of 4.2.1.1 measure are:

- grants;
- guarantees;
- a direct loan by "Altum";
- technical consultations in order to mitigate risks during the preparation and implementation stage of projects for improvement of energy efficiency.

The amount of grant is determined based on the source of project funding and on the planned energy efficiency level achieved after implementation of the project. If a funding of a commercial bank or any other private investor is attracted for the implementation of a project, the amount of the grant of the total project costs will constitute:

- 36 % if after renovation the planned consumption for heating does not exceed 89–90 kWh/m^2 per year;
- 43 % if after renovation the planned consumption for heating does not exceed 71–90 kWh/m^2 per year;
- 50% if after renovation the planned consumption for heating does not exceed 70 kWh/m^2 per year.

In cases when a commercial bank does not grant a loan for the implementation of a project, it will be possible to receive a loan from "Altum" at lower interest rates (planned: 2 % + EURIBOR), yet the amount of the grant will also be reduced. In this case the amount of the grant of the total project costs will constitute:

- 25 % if after renovation the planned consumption for heating does not exceed 89–90 kWh/m^2 per year;
- 30 % if after renovation the planned consumption for heating does not exceed 71–90 kWh/m^2 per year;
- 35 % if after renovation the planned consumption for heating does not exceed 70–79 kWh/m^2 per year.

4.2.1.2 measure of the European Regional Development Fund "To promote improvement of energy efficiency in State buildings" (hereinafter "measure 4.2.1.2").

The aim of 4.2.1.2 measure is to promote improvement of energy efficiency, smart energy management and use of renewable energy sources in buildings owned or used by state administration institutions or subordinated institutions, or by a public person who performs state delegated functions. 4.2.1.2 measure will be implemented in two selection rounds of project applications. The funding of 4.2.1.2 measure for improvement of energy efficiency of State buildings will be allocated in such a way as to renovate 3 % of the area of State-owned buildings each year between 2017 and 2025.

For the first limited selection of project applications the projects are submitted from 19 September 2016 till 31 December 2018. The total public funding available for the first round of selection of project applications as part of 4.2.1.2 measure constitutes EUR 82.61 million, namely, EUR 70.22 million of the ERDF funding and EUR 12.39 million of the State budget funding. The maximum intensity of the ERDF support is 85 % and 15 % -– of the State budget funding.

The public funding available for implementation of the second round of selection of project applications is EUR 32,507,612, including EUR 27,631,470 of the ERDF funding and EUR 4,876,142 of the State budget funding, which will be allocated to State-owned capital companies, associations and foundations.

The following indicators shall be achieved as a result of implementation of the first round of selection of project applications as part of 4.2.1.2 measure:

- thermal energy consumption for heating does not exceed 90 kWh/m^2 per year after implementation of the project;
- reduction of annual consumption of primary energy in public buildings constitutes 36,347,000 kWh/year;
- additional power generated from renewable energy sources is 4.8 MW;
- the calculated reduction of greenhouse gases is 22,039 tonnes of CO_2 equivalent.

In the first round of selection of project applications for 4.2.1.2 measure, projects are submitted by:

- a direct state administration body;
- a subordinated institution of a direct state administration body;
- a state university, a state scientific institute – a derived public person and a scientific institute – a derived public person that is under the auspices of a state founded university;
- a state capital company, which manages and administrates State-owned real estate properties under the delegation entrusted to it in accordance with the laws and regulations:
    - SJSC “Valsts nekustamie īpašumi”;
    - SJSC “Tiesu namu aģentūra”;
    - SJSC “Šampētera nams”;
    - SJSC “Zemkopības ministrijas nekustamie īpašumi”.

Eligible activities in the first round of selection of project applications for 4.2.1.2 measure are:

- improvement of energy efficiency of a building;
  - construction works in building envelopes;
  - renovation, reconstruction or construction of engineering systems of buildings;
  - purchase and installation of sources generating thermal energy from renewable energy sources;
  - purchase and installation of automated management and control systems of buildings;
- preparation of technical documentation of the project;
- restoration and interior finish works of a building;
- provision of project management and supervision;
- publicity campaigns promoting project implementation.

4.2.2 specific objective "To promote improvement of energy efficiency and use of renewable energy sources in municipal buildings in line with the integrated development programmes of local governments".

The MoEPRD administrates 4.2.2 specific objective "To promote improvement of energy efficiency and use of renewable energy sources in municipal buildings in line with the integrated development programmes of local governments" of the 2014–2020 programming period of the EU Funds (hereinafter "4.1.2 SO"). 4.2.2. The aim of SO 4.2.2 is to reduce consumption of primary energy, promoting improvement of energy efficiency and reduction of local governments' expenditure on heat supply, and investing in municipal buildings according to the priorities set out in development programmes of local governments. It is intended to achieve the following indicators as a result of the projects implemented by 31 December 2023 with the planned funding of EUR 55,289,876 allocated for SO 4.2.2 (including EUR 46,996,394 of the ERDF funding (including the funding of overcommitments in the amount of EUR 15,602,736) and national funding (funding of local governments, State budget grants to local governments) – at least EUR 8,293,482):

- reduction of primary energy consumption in public buildings – at least 20,536,239 kWh/year;
- the calculated reduction of greenhouse gases – at least 5,180 tonnes of CO_2 equivalent per year;
- additional power generated from renewable energy sources – at least 1.8 MW;
- the average thermal energy consumption for heating – no more than 120 kWh per one square meter per year.

4.2.2. Summary of the Use of the European Union Funds

Table 17 "The implemented and planned competitions of project applications for implementation of energy efficiency measures in the building sector"

Title of the competition of project applications	Target audience	Period of project implementation	Indicators to be achieved	Available funding from the EU Funds, million EUR
The 2007–2013 programming period				
3.4.4.1 activity "Improvement of heat insulation of residential buildings"	Owners of dwellings		• Construction of the building began before 1993 and it was put into operation until 2002. • The building is divided into flats, and one owner does not own more than 20 % of the total number of flats (this restriction does not apply to State-owned or municipal flats). • Non-residential areas of the building do not exceed 25 % of the total area of the building. • The minimum savings of thermal energy constitute 20 %. After renovation the consumption of thermal energy for heating may not exceed 100 kWh/m^2 per year (if the building has three or more floors) or 120 kWh/m^2 per year (if the building has one or two floors).	81.2
3.4.4.2 activity "Improvement of heat insulation of social residential buildings"	Local governments		After completion of renovation or reconstruction, savings of thermal energy consumption of at least 20% must be achieved.	6.9
The 2014 –2020 programming period				
4.2.1.1 measure "To promote improvement of energy efficiency in residential buildings"	Owners of residential buildings	Until 31 December 2022	After the implementation of measures for improvement of energy efficiency, the average consumption of thermal energy for heating in multi-dwelling residential buildings does not exceed 90 kWh/m^2 in the calendar year.	150

			Additional power generated from renewable energy sources is 2.90 MW. The calculated reduction of greenhouse gases per year is 13,338 tonnes of CO_2 equivalent.	
4.1.1 specific objective "To promote efficient use of energy resources, reduction in energy consumption and transition to RES in the manufacturing industry";	Micro, small, medium and large operators engaged in economic activity in sectors of the manufacturing industry	Until 31 December 2020	Energy intensity in manufacturing industry – 263.9 kg of oil equivalent per EUR 1,000. The percentage of renewable energy sources in the energy consumption of the manufacturing industry – 51 %. The number of operators who have received support – 65. Energy savings of the operators who received support – 4,395 MWh/year. Additional power generated from renewable energy sources – 5.4 MW. The calculated reduction of greenhouse gases per year – 6,757 tonnes of CO_2 equivalent.	32.5
4.2.1.2 measure "To promote improvement of energy efficiency in State buildings"	Owners and users of State buildings	Until 31 December 2020	Reduction of annual consumption of primary energy in public buildings constitutes at least 36,347,000 kWh/year. Additional power generated from renewable energy sources is 4.8 MW. The calculated reduction of greenhouse gases – at least 22,039 tonnes CO_2 equivalent per year.	70.2
4.2.2 specific objective "To promote improvement of energy efficiency and use of renewable energy sources in municipal buildings in line with the integrated	Local governments, municipal authorities, capital companies of local	Until 31 December 2022	• The average consumption of thermal energy for heating – no more than 120 kWh/m2 per year (consumption in 2012 – 150) • Reduction of primary energy consumption in public buildings – at least 20,536,239 kWh/year • Additional power generated	47

development programmes of local governments".	governments		from renewable energy sources – 1.8 MW.	

4.3. Support of the State and Local Governments for Implementation of Measures for Improvement of Energy Efficiency

So far the funding from the budgets of the State or local governments for the implementation of measures for improvement of energy efficiency of buildings has been rather insignificant in Latvia. This is due to budget restrictions, as well as to the fact that the budgets of the State and local governments are planned for periods of up to 3 years.

Local governments provide support for the implementation of measures for improvement of energy efficiency of buildings in accordance with the binding regulations issued pursuant to Sub-paragraph (2)(4) and (5) of Section 27 of the Law on Assistance in Solving Apartment Matters. Appropriate binding regulations have been adopted by the local governments of Daugavpils, Liepāja, Rēzekne, Riga and Ventspils.

In accordance with Cabinet Regulation No. 891 of 22 November 2011 "Regarding National Statistics Reports on Local Government Support in Solving Housing Issues" developed pursuant to the requirements of Law on Assistance in Solving Apartment Matters, local governments of cities and municipalities must provide reports on their support in solving housing matters, including the assistance of local governments provided for renovation and restoration of residential buildings and for improvement of plots of land. Full reports are available at the website of the MoE. Tables 19 and 20 show the data from the most recent report on the assistance provided by local governments in matters directly related to energy efficiency and renovation of buildings.

Since 2009, local governments have provided assistance to 1,014 buildings for implementation of measures for improvement of energy efficiency and 294 residential buildings have been renovated; the largest number of buildings was renovated in 2012 when municipalities were engaging most actively in renovation of social residential buildings (Table 21).

Table 19. Assistance of local governments for implementation of energy efficiency measures in residential buildings in 2016[21]

	The number of residential buildings	**Funding of local governments, EUR**
City of Daugavpils	5	27,310
City of Valmiera	2	23,846

[21] The website of the MoE http://www.em.gov.lv

City of Ventspils	21	10,118
Daugavpils Municipality	3	87,863
Kārsava Municipality	3	8,075
Kocēni Municipality	6	13,917
Ķegums Municipality	2	2,583
Ķekava Municipality	1	15,367
Ludza Municipality	2	8,249
Nereta Municipality	12	40,669
Preiļi Municipality	1	857
Tukums Municipality	6	26,700
Vecumnieki Municipality	8	15,020
TOTAL:	72	280,573

Table 20. Assistance of local governments for restoration/renovation of residential buildings in 2016[39]

	Multi-dwelling buildings
Aknīste Municipality	1
Daugavpils Municipality	3
Jaunjelgava Municipality	1
Kocēni Municipality	6
TOTAL:	11

Table 21. The assistance provided by local governments between 2009 and 2016 (the number of buildings)[22]

	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**Total**
Measures for improvement of energy efficiency in a residential building	258	57	97	169	160	86	81	106	1,014
Restored/renovated residential buildings	49	9	31	88	55	40	10	12	294

[22] https://www.em.gov.lv/lv/nozares_politika/majokli/petijumi__statistika/

4.4. Support Involving Tax Relief

The rules on the application of immovable property tax (incl. on buildings) are laid down in the Law on Immovable Property Tax.

Section 3(1) of the Law on Immovable Property Tax stipulates that immovable property tax from 0.2 to 3 per cent of the cadastral value of the immovable property shall be imposed by a local government in its binding regulations, which it shall publish by 1 November of the pre-taxation year. An immovable property tax rate exceeding 1.5 per cent of the cadastral value of the immovable property shall be imposed by a local government only where the immovable property is not maintained in accordance with the procedures specified in regulatory enactments.

Also, in determining the immovable property tax rate or rates, a local government may choose to apply the following principles:

1) The principle of support to entrepreneurship, according to which the local government uses the tax as a means for improving the competitiveness of entrepreneurs in its territory or of specific types of entrepreneurship, complying with the conditions of Commission Regulation (EC) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty to *de minimis* aid (Text with EEA relevance).

2) The principle of spatial development and improvement of the territory, according to which the local government shall use the tax rate for the promotion of development and arrangement of the territory thereof.

The Law on Immovable Property Tax stipulates that in determining the immovable property tax abatements in conjunction with the tax rate or rates, a local government shall comply with the principle of social responsibility, according to which it shall particularly take into account the impact of the tax on the groups of socially disadvantaged and poor inhabitants.

Therefore, local governments have been granted the powers of granting immovable property tax reliefs. Local governments, by issuing their binding regulations and applying the principles stipulated in the Law on Immovable Property Tax, are authorised to grant immovable property tax reliefs to persons residing within their territory.

The immovable property tax shall be calculated from the cadastral value of the object of the immovable property tax according to the situation on 1 January of the taxation year. If the immovable property tax object has been registered in the National Real Estate Cadastre Information System during the taxation year, the tax shall be calculated from the cadastral value of the object at the moment of its registration. The minimum immovable property tax payment for each taxpayer in each local government shall be EUR 7.

In accordance with the existing immovable property tax policy, when a building is renovated or reconstructed, its cadastral value increases and therefore in some cases also the immovable property tax rate. Reconstruction and renovation require significant investments, and in most cases it is necessary to undertake financial liabilities towards creditors.

Sub-paragraphs 3–5 of Section 5 of the Law on Immovable Property Tax stipulate conditions in accordance to which local governments may grant abatements to certain categories of immovable property tax payers by adopting binding regulations. Binding regulations of local governments come into force in accordance with the procedure defined in the Law on Local Governments. Local governments may grant abatements to certain categories of immovable property tax payers with a rate of 90, 70, 50 or 25 per cent of the amount of the immovable property tax.

Efficient immovable property tax policy could promote reconstruction and renovation of buildings, thus, in certain cases, also fostering tax income from commercial activity. Moreover, it must be taken into account that in their binding regulations local governments are entitled to determine such immovable property tax reliefs or an applicable rate that would increase the interest of owners of buildings to implement measures for improvement of energy efficiency.

4.5. Awareness Raising Campaigns

4.5.1. The Awareness Raising Campaign "Let's Live Warmer" (Dzīvo siltāk!)

In February 2010, the MoE in cooperation with partners, launched an awareness raising campaign "Let's Live Warmer" with an aim of informing residents about opportunities available through involvement in 3.4.4.1 activity "Improvement of heat insulation of multi-dwelling buildings" of the 2007–2013 programming period of the EU Funds. As part of the awareness raising campaign, since 2016 the MoE in cooperation with "Altum" also informs about basic conditions of 4.2.1.1 measure "To promote improvement of energy efficiency in residential buildings" and about commendable implementation of projects.

Over a period of six years, during the awareness raising campaign, more than 250 awareness raising events have taken place all over Latvia – seminars, conferences and exhibitions that brought together more than 11,200 participants. Some of the seminars were also broadcast online on the Internet, and video materials are available at www.youtube.com/siltinam. The themes of the events were varied, namely, the necessity to improve the technical condition of one's building, how to take a decision at general meetings of flat owners, how to carry out a high-quality renovation of dwellings, and the experience was shared about the already renovated buildings, etc.

There is ongoing active communication in social media at www.twitter.com/siltinam, www.facebook.com/dzivosiltak, www.draugiem.lv (page "Siltinam", a group of like-minded people "Dzīvo siltāk!") about the events taking place during the campaign, all presentations are available at www.slideshare.net/siltinam. Almost 2,800 customers and cooperation partners receive regular information about the current events.

Since 2011, as part of the awareness raising campaign, the competition "The Most Energy Efficient Building in Latvia" (www.energoefektivakaeka.lv) has been taking place in order to promote the best practice in the area of energy efficiency of buildings by constructing, renovating and reconstructing energy efficient buildings and thus reducing the amount of carbon dioxide emissions (hereinafter "CO_2") in the

atmosphere and raising public awareness of heat insulation of buildings, as well as of the importance and possibilities of reducing greenhouse gas emissions in order to create a high-quality and architecturally appealing living space.

The MoE has also created an e-map of the renovated buildings where the information about the renovated buildings can be found as part of 3.4.4.1 activity "Improvement of heat insulation of multi-dwelling buildings". Five brochures entitled "Step by Step to Renovation of Your Home" have also been issued[23].

4.5.2. The Energy Efficiency Centre of JSC "Latvenergo"

The Energy Efficiency Centre of JSC "Latvenergo" has been established to provide consultations to electricity users about the options for utilising electricity in a safer and more efficient manner when using various electrical appliances for their convenience.

The Energy Efficiency Centre offers a large exhibition of electrical appliances. All the electrical appliances are connected to the power network, water supply and sewerage and are demonstrated in operation. The Centre is open to both individual visitors and organised groups.

The Energy Efficiency Centre provides recommendations to businesses on the most effective solutions for reducing electricity consumption, as well as consultations on the available tariff types. Elementary school pupils are taught about the comfort, economy and technical advantages provided by electricity. Children from kindergartens and pupils up to Grade 4 are told by the employees of the Energy Efficiency Centre about electrical safety and matters that must be taken into account when using an electrical appliance to protect oneself and others from electricity-related injuries.

Considering that private customers are increasingly interested in the use of energy generated from renewable sources in households, a round of seminars is organised allowing the customers to learn about the possibilities of using heat pumps, solar collectors, solar batteries and wind generators in Latvia's climatic conditions.

The seminars organised for legal entities include subjects related to establishment of an energy efficient lighting system in a company, establishment of an energy efficient micro-climate, conditions of high-quality power supply and so on.

4.5.3. The Competition for the Climate Change Financial Instrument "Raising of Public Awareness of the Importance and Possibilities of Greenhouse Gas Emission Reduction" (Stages I and II)

The goal of the competition for the climate change financial instrument (hereinafter "the CCFI") "Raising of Public Awareness of the Importance and

[23] The website of the MoE http://www.em.gov.lv/em/2nd/?id=33352&cat=621

Possibilities of Greenhouse Gas Emission Reduction" is to foster awareness of the public of the importance and possibilities of greenhouse gas emission reduction by promoting informed decision making and environmentally friendly action. The following activities have been defined as eligible for the project competition: organising a creative competition for the best publications in newspapers, magazines and on websites that reach a maximum number of readers and increase the general public awareness of the need to prevent climate change, promote measures for energy saving and use of renewable energy sources.

During Stage I of the competition "Raising of Public Awareness of the Importance and Possibilities of Greenhouse Gas Emission Reduction", 16 projects were implemented with the total CCFI's funding of EUR 636,965.17, whereas during Stage II, 5 projects were implemented with the total CCFI's funding of EUR 100,604.45.

Results and a list of approved projects of Stage I of the competition are available on the website[24] of the MoEPRD.

Results and a list of approved projects of Stage II of the competition are available on the website[25] of the Latvian Environmental Investment Fund.

4.5.4. Involvement of the Public in the Development of Long-term Renovation of Buildings

On 17 February 2017, in Riga, in the National Library of Latvia, the final conference "Participation and Involvement of the Public: a Basis for a Long-term Strategy for Building Renovation in Latvia" of the project BUILD UPON took place. During the conference the Declaration on the Improvement of Latvia's Long-term Strategy for Building Renovation for 2014–2020 was approved which was elaborated as part of the BUILD UPON project of the EU scientific research programme Horizon 2020.

More than 60 participants attended the conference "Participation and Involvement of the Public: a Basis for a Long-term Strategy for Building Renovation in Latvia". It was organised by the Latvian Sustainable Construction Council (LIBP) as the sixth and final event of the BUILD UPON project in Latvia, aimed at profound renovation and improvement of energy efficiency.

[24] http://www.varam.gov.lv/lat/darbibas_veidi/KPFI/projekti/?doc=10875
[25] http://www.lvif.gov.lv/?object_id=33067

The Declaration on the Improvement of Latvia's Long-term Strategy for Building Renovation has the following objectives:

1. To promote high-quality and cost-efficient renovation of buildings on a large scale which complies with high energy efficiency standards, thus ensuring high-quality restoration of Latvia's stock of residential, commercial and public buildings.
2. To improve the quality of a construction process starting from the procurement till the moment when a building is put into operation and achievement of the planned energy efficiency.
3. To raise the standard of living in Latvia by improving the quality of buildings and increasing energy efficiency, along with a more active engagement of the public in renovation and management of buildings while also raising public awareness of the advantages of energy-efficient and sustainable buildings.
4. To encourage application of new models and initiatives for funding of renovation, including by attracting private investments as a source of additional financing in order to promote targeted investments in renovation of buildings in Latvia for at least the next 10-20 years and to implement a successful energy efficiency policy in the long run.
5. To achieve a considerable increase in energy efficiency and quality of buildings in order to comply with the EU goals for 2030, to reduce gaps in energy costs between Latvia and other Baltic Sea countries and to ensure stable energy prices and power supply in the long term, thus increasing Latvia's energy independence.
6. To foster more active participation of the State in renovation processes by developing and introducing a specific action plan for the implementation of Latvia's Long-term Strategy for Building Renovation and by providing a simple and understandable legislative basis for an efficient realization of renovation.

As part of the BUILD UPON project, recommendations were made and the Declaration was prepared aimed at raising the self-esteem of the population and the standard of living by improving the condition of buildings, their energy efficiency and sustainability. It means that our children would study in schools where the air is of good quality, that our inhabitants would have to pay less for heating and that the quality of indoor environment would improve, which certainly has an effect on everyone's health. Thus, we would consume fossil energy resources less and, as a result, it would strengthen Latvia's energy independence and reduce the impact on the environment. These aspects are particularly important now when Latvia has just ratified the Paris Agreement, which is an important step within the framework of the United Nations, with all the countries taking responsibility for mitigating the climate change.

The Declaration was supported by 46 participants attending the conference, i.e. experts from the construction-related sectors, representatives of local governments, financial institutions, universities, non-governmental organisations and others. Electronically, the Declaration was supported by 28 people. Recommendations for the improvement of the national strategy have been prepared not only by the LIBP but also by other partners of the BUILD UPON project, e.g. from Bulgaria, Croatia,

the Czech Republic, Finland, Ireland, Italy, Poland, Romania, Slovakia, Slovenia, Spain, Sweden and Turkey. They are being summarised and will be available on the project website: www.buildupon.eu, and they will also be submitted to the European Commission.

As part of the BUILD UPON project, two meetings of the BUILD UPON working group and six forums have been held on various topics related to renovation. Altogether more than 300 participants have taken part in these events and public consultations. At each of these events, we have discussed topical issues related to the improvement of Latvia's Long-term Strategy for Building Renovation (2014–2020), have invited participants and experts to express their views about the recommendations for the improvement of the strategy and have conducted surveys. At the end of this work, 43 recommendations were prepared which are summarised in 10 thematic sections and incorporated in the unified Declaration on the Improvement of Latvia's Long-term Strategy for Building Renovation. The full text of the Declaration is available on the website of the Latvian Sustainable Construction Council[26].

4.6.Labelling

No statistics are collected in Latvia regarding indication of the consumption of energy and other resources on products, however, considering the important role of information on the market and the need to introduce a uniform and harmonised labelling for all products of the same type so that buyers would have unified information about the consumption of energy and other important resources of these products, the EU has adopted Directive 2010/30/EU of the European Parliament and of the Council on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products. The Energy Labelling Directive is of horizontal nature, namely it does not set certain requirements for products, but introduces conditions and criteria how to set requirements for characteristics, e.g. an energy consumption level, of products affecting the environment, and establishes conditions for fast and efficient implementation of these requirements.

This Directive was transposed into the laws and regulations of the Republic of Latvia with Cabinet Regulation No. 480 of 21 June 2011 "Regulations on the Procedure for Labelling of Energy- and Other Resource Consuming Products, and on Their Advertising and Monitoring".[27] The regulations define the procedure for labelling with a label and special marking the products related to the consumption of energy and other important resources, as well as requirements for advertising of such products, the procedure for their market supervision and the responsible supervisory authority. The regulations stipulate that, in order to provide additional information to an end user about a product, a supplier labels products intended for sale, rent, lease or demonstration with a label and special marking. The label and special marking are also added if the products are offered through information society's services or

[26] http://ibp.lv/files/download/393
[27] The website of the MoE http://www.em.gov.lv/em/2nd/?cat=30641

distance contracts. The label and special marking consist of a standard information table including data on the energy consumption of a product and, if applicable, consumption of other important resources, as well as additional information about the product[28].

[28] Cabinet Regulation No. 480 of 21 June 2011 "Regulations on the Procedure for Labelling of Energy- and Other Resource Consuming Products, and on Their Advertising and Monitoring".

5. Long-term Prospects for Renovation of Buildings which would Facilitate Decision-making on Investments

5.1. Possible Sources for Renovation of Buildings

5.1.1. Private Capital of Owners

Self-financing of renovation by residents is accumulated from regular payments made by the residents and intended for repairs.

In order to create such a reserve, a general meeting of flat owners must agree on the necessity of such payments and on their purpose and amount. The amount of payments ranges from 15 to 30 santims per m^2/month, depending on the decision made by the residents and the planned repairs. This approach is suitable for financing a specific and small renovation-related activity, e.g. payment for an energy certificate, replacement of a roof or reconstruction of a heating system, but it is not suitable for a complex renovation of a building. This is due to the small financial reserve formed every month.

Depending on the chosen model of funding, self-financing additionally allows decreasing the amount of loans, ensures better transparency of the flow of funds and increases responsibility for the results to be achieved immediately after completion of the work. At the same time it must be noted that the accumulation of a reserve increases the amount of monthly payments, therefore it is not particularly popular; moreover, if only self-financing is used, a significant result in terms of renovation of the building may be obtained only over a longer period of time which would reduce the life cycle of the building.

5.1.2. Public Funds (including the European Union Structural Funds and Innovation Funds)

According to the Long-term Strategy for Building Renovation for 2014–2020, elaborated by the Ministry of Economics, there are about 1 million dwellings in Latvia and 69 % of them are located in multi-dwelling buildings. Most of these houses were built before the restoration of Latvia's independence. Their structural elements and engineering systems usually show considerable wear and tear and their heat insulation is poor. The energy consumed in the building sector (in multi-dwelling houses and public buildings) accounts for up to 40 % of the national energy balance. Consequently, renovation of multi-dwelling buildings and improvement of energy efficiency is one of the goals of the Latvian national housing and energy policy.

Despite the progress made, the impact of the implemented measures for the improvement of energy efficiency is still relatively small compared to the total amount of thermal energy consumed by multi-dwelling buildings. Only about 6 % of Latvia's multi-dwelling buildings comply with the requirements for energy performance specified in the laws and regulations. Thus, the Latvian State continues to provide support for improvement of energy efficiency of multi-dwelling buildings

also during the 2014–2020 programming period of the EU Funds. The support is provided in the form of a grant and a financial instrument.

The information about the funds intended for improvement of energy efficiency of buildings for the 2014–2020 programming period of the EU Funds is summarised in Section 4 of the Strategy.

5.1.3. Banks and Other Investment Funds of Private Persons

5.1.3.1. Financial Products of Latvia's Credit Institutions

When issuing an investment loan for the renovation of a multi-dwelling residential building, the future money flow of the multi-dwelling residential building and how timely flat owners make payments for management services are taken into account. For the issue of an investment loan, no mortgaging of flats or personal guarantee of a flat owner is required. In addition, it must be noted that in the event of a renovation loan, flat owners' timely payments for management services, i.e. debtors' debts, are the only security. Thus, in terms of security, such loans pose an increased credit risk. Therefore, banks take great caution when evaluating the ability of flat owners of the respective building to make loan payments over a longer period, however, thanks to the co-funding from the EU Funds as part of the activity "Improvement of heat insulation of multi-dwelling buildings", the credit risk of building renovation projects is significantly reduced, since after the completion of the project the residents can reduce the loan amount by up to 50 %, and the period of the project pay-off is also reduced. On average, the co-funding from the EU Funds allows reducing the repayment period of the loan almost two times. Without the co-funding from the EU Funds the repayment periods of loans may reach up to 30 and even 40 years.

It is important to note that a building renovation loan is different from a standard investment loan, which a company receives for construction or renovation of its production buildings, for investments in business development and similar purposes where the assets owned by a person taking the loan, i.e. immovable property, fixed assets, etc. – are normally used as the loan security.

According to the banks, when analysing the potential of projects to be financed, the goals of the regional development of Latvia, concentration of entrepreneurship, employment and mobility of the population (accessibility of work and home) and the impacted areas of development centres must be taken into account.

Until 2009, when the improvement of energy efficiency of multi-dwelling buildings began using the financial means of the European Regional Development Fund (ERDF), taking loans from a bank was, in fact, the only way to finance a renovation of a building, with the exception of individual foreign donations[29].

In 2001, the Mortgage Bank of Latvia (Hipotēku banka) began issuing loans for the renovation of multi-dwelling buildings and improvement of energy efficiency in Latvia. This State bank kept issuing mortgage loans until 2009 when it ceased its operations in this market segment due to the planned restructuring of the bank (the

[29] The project "Energy Efficient and Balanced Urban Planning (UrbEnergy)", a financial concept for energy efficient renovation of buildings in the neighbourhood of Jugla, SIA "Rīgas pilsētbūvnieks", 2010.

sale of commercial assets and establishment of the JSC "Attīstības finanšu institūcija" (hereinafter "AFI")). In December 2014, "Altum" had issued only four loans for renovation of multi-dwelling buildings, while under the Programme of Mortgage Loans for Housing Development (mortgage loans for purchase or construction of housing) 156 loans were issued.

The total annual interest rates on loans issued by the Mortgage Bank ranged from 5 % to 8 %, the average amount of the loan per one multi-dwelling house was up to EUR 20,000. Loans were issued for the implementation of the minimum necessary measures for renovation and improvement of energy efficiency, e.g. replacement of windows and repair of the building façade.

Following the lead of the Mortgage Bank, other commercial banks started issuing loans for renovation and improvement of energy efficiency of multi-dwelling buildings. In 2004, the JSC "Swedbank" (then the JSC "Hansabanka") and in 2005, the JSC "SEB banka" (then the JSC "SEB Unibanka") began issuing loans.

Initially, Latvia's credit institutions funded the projects for the renovation of multi-dwelling buildings without the financial support from the State, therefore, the average amount of a loan issued per one building was small. For example, the average amount of the loan issued by the JSC "Swedbank" per one project in 2005 was approximately EUR 49,000, while in 2014, it was approximately EUR 192,000 or four times more.

Credit institutions have been actively issuing loans for multi-dwelling buildings since 2011 when the funding was available for the measures for the improvement of heat insulation of multi-dwelling buildings as part of 3.4.4.1 activity.

Loans for the renovation of multi-dwelling buildings are issued by the JSC "Swedbank", JSC "SEB Banka", JSC "DNB banka", JSC "Citadele banka" and the Latvian branch of the JSC "Nordea Bank". The JSC "SEB Banka" and JSC "Swedbank", which have developed credit portfolios for the renovation of multi-dwelling buildings, are the most active market participants. The JSC "SEB Banka" has the largest credit portfolio. The JSC "DNB banka" is rather active, too. Other credit institutions issue loans to multi-dwelling buildings relatively selectively, after verifying pilot projects, and intensive issuing of loans to multi-dwelling buildings is not on the agenda of their strategic development plans.

Table 22 below summarises the information available to the authors of the Ex-ante Evaluation of the Availability of Funding for the Improvement of Energy Efficiency of Multi-dwelling Buildings[30] (hereinafter "the Assessment") ("Altum", MoE) about the loans issued by Latvia's credit institutions for the renovation of multi-dwelling buildings until 2015.

The Association of Latvian Commercial Banks does not collect statistics on the loans issued by credit institutions to the multi-dwelling buildings. The LIAA also does not have such information for the 2007–2013 programming period of the EU Funds, since the issue of grants and loans are two separate processes. According to the information provided by the Latvian Guarantee Agency (LGA), in 2014, LGA issued 96 loan guarantees to three credit institutions for crediting of multi-dwelling buildings with the average annual interest rate on loans being 4.45 % (fixed rate + EURIBOR 3- or 6-month floating rate).

[30] https://em.gov.lv/files/es_fondi/Ex%20ante%20izvertejums.pdf

Table 22. Information about the loans issued by Latvia's credit institutions for the renovation of multi-dwelling buildings

Credit institution	The number of agreements in 2005–2014	Annual interest rates on loans	Average loan amount per project (EUR)	Average repayment period of the principal amount
JSC "SEB Banka"	n/a	n/a	n/a	n/a
JSC "Swedbank"	302	2.79 % - 7.50 % + 3M EURIBOR	174,000	11
JSC "DNB banka"	n/a	n/a	n/a	n/a
JSC "Citadele banka"	4	3.5% - 4% + EUR 6M EURIBOR; LIBOR	191,000	18
Nordea Bank AB	5	4% - 5% + 3M EURIBOR	120,000	15

Notes:

1. N/a - this information is not available to the authors of the assessment ("SEB Banka" had not provided the requested information on the date when the *Ex Ante* evaluation was prepared).

2. The number of contracts is smaller than the number of borrowers and the number of buildings. For example, the JSC "Citadele banka" has issued 3 loans to SIA "Renesco" for renovation of 15 buildings and 1 loan to a building manager for renovation of 1 house.

3. The average amount of loans and repayment period of the principal amount is given for the period from 2011 to 2014.

4. The number of contracts issued by the JSC "Swedbank" between 2011 and 2014, when the public funding as part of 3.4.4.1 activity was available, is 169. Interest rates are given for the period from 2013 to 2014.

Source: Authors of the assessment on the basis of the information provided by credit institutions

It can be concluded from the data provided in Table 27 that interest rates on loans greatly vary. It is clearly evident from the data of the JSC "Swedbank", as this credit institution has a relatively large number of the loans issued, besides, this credit institution has issued loans in 27 cities and towns.

The interest rates on loans depend on the location as well as on the size of the multi-dwelling building (the number of flats). The renovation costs per 1 m^2 are larger in a building with, for example, 18 flats than in a building with 60 flats. Thus, commercial banks regard such buildings as more risky and interest rates are higher in such cases.

Given 105 loan agreements of the JSC "Swedbank" for which the credit institution has provided information for the period between 2013 and 2014, the arithmetic average annual interest rate is 4.70 %. Interest rates that are equal to or lower than 3 % are only for 5 loans or to only 5 % of the size of the sample set.

5.1.3.2. International Banks

During the 2007–2013 programming period of the EU Funds, the international financial institutions (the European Bank for Reconstruction and Development (hereinafter "EBRD"), the European Investment Bank (hereinafter "EIB"), the Nordic Investment Bank (hereinafter "NIB") etc.) have not issued loans for the measures for improvement of energy efficiency of multi-dwelling buildings in Latvia.

The advantage of the international financial institutions is long-term loans up to 20 years which they can offer at relatively low fixed interest rates (up to 2 %). The international financial institutions can offer such loans to financial intermediaries in Latvia (AFI, commercial banks), which then would issue loans to end-borrowers for the improvement of energy efficiency of multi-dwelling buildings. Since financial intermediaries must assume credit risks of end-borrowers, the interest rate on loans should cover these risks and include the costs of loan servicing, which increase the interest rate by 2 to 4 percentage points. In the case of the AFI, in order to receive a loan from an international financial institution, a State guarantee is usually required, which must be included in the State budget, and it is required to carry out the activities specified in the laws and regulations. In addition to traditional long-term loans (of Latvian credit institutions and/or AFI), international financial institutions consider a possibility of offering financial products aimed at financing the projects for improvement of energy efficiency in the market segments where currently Latvian credit institutions cannot offer equivalent financial products.

The number of renovation projects implemented by an ESCO is limited by the size of the equity, therefore the EBRD offers a solution to the problem: to set up a special purpose vehicle (hereinafter "SPV") of the ESCO, which borrows long-term financial resources from the EBRD (or other credit institutions) and re-credits ESCO's loans to credit institutions, thus removing long-term creditors' liabilities from the balance sheet of these companies.

The EBRD is interested in commercially viable projects, therefore ESCO projects are purposefully selected because financial investments are to be repaid from the savings of thermal energy. Besides, an ESCO's staff must have appropriate qualifications in order to be able to control properly the process of document preparation and construction works, thus ensuring long-term savings of thermal energy.

After transferring credit obligations to the SPV, an ESCO would continue to improve energy efficiency and provide heat supply services during the entire validity period of the Energy Services Agreement (hereinafter "ESA"). It means that the SPV must also have an appropriate qualification in order to be able to make a selection of viable ESCO projects and to ensure proper monitoring of an ESCO's operation over a longer period.

Standard requirements set by the EBRD to the SPV are: experienced and qualified staff, a positive business history (i.e. a loan is not likely to be issued to a start-up company), previous experience in projects for improvement of energy efficiency of appropriate scale and a sufficiently large share capital (corresponding to the minimum requirements set by the bank).

The minimum size of a loan that the EBRD is ready to issue to one SPV is EUR 10 million (for the sake of comparison, the credit portfolio of SIA "Renesco"

(ESCO) for improvement of energy efficiency of 15 multi-dwelling buildings is EUR 3.089 million). The maximum amount of loans is not limited and it depends on the market conditions.

The total amount of the money required for the improvement of energy efficiency in the country is several billion *euros*. So that the SPV could exist in the long run and attract large amounts of funding, it is necessary to consider the issue of securities. By accumulating experience and a sufficiently large project portfolio (> EUR 50 million), the SPV may get a credit rating from at least two of the Big Three rating agencies (Moody's, S&P, Fitch). In this way, it would be possible to access, for example, international markets of bonds at competitive rates in order to continue financing future ESA projects, while Latvian pension funds could purchase bonds of the fund, thus making investments in their national economy rather than supporting the economy of other countries, as is currently the case. For the time being, pension funds cannot make investments in Latvia because of the lack of stable and safe investment instruments.

5.1.4. Municipal Energy Services Company (MESCO)

A municipal energy services company (MESCO) is an enterprise owned by a local government, which operates according to the principles of an energy services company using the local government's funds and the attracted funding for its operation. Usually the objective of the local government is not to make profit but to manage its public and residential buildings in the region if due to any reason this cannot be done by the residents themselves or an ESCO. A MESCO can also renovate such multi-dwelling buildings which are not renovated by an ESCO or the residents themselves due to the risks related to pay-off.

So far Latvia has not had much experience in work with the MESCO model. Nevertheless, SIA "Rīgas namu pārvaldnieks" has tried introducing such a model by offering residents to conclude ESCO contracts. Other cities also have similar experience in this area. However, the development of such a model at the level of local governments could be possible if financial resources for the development of MESCOs are offered.[37]

5.1.5. Energy Services Company (ESCO)

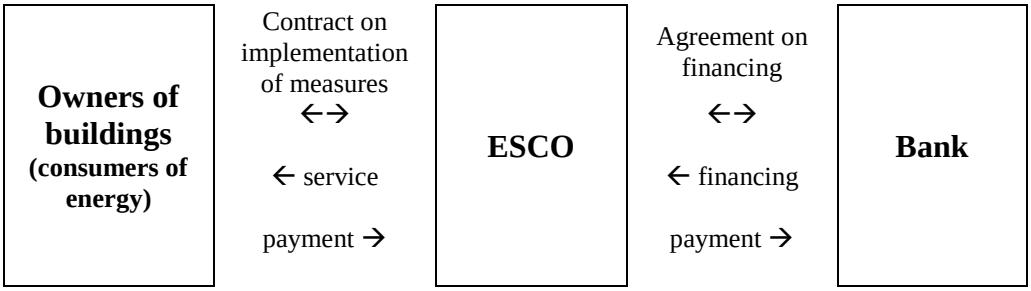
The provision of energy services as a commercial activity is popular in the so-called old EU Member States, the USA and elsewhere in the world, while at the same time it is still developing and is not widely used in all countries. It is important to note that this approach is mainly suitable for non-residential (public and commercial) buildings and it is less used in residential buildings.

An energy services company (ESCO) is a type of entrepreneurship that, by attracting funds from the private sector, e.g. from commercial banks, provides a wide range of services related to the energy sector, including the implementation of projects for energy saving, provision of outsourced services of energy infrastructure, generation and supply of energy and management of risks. Therefore an ESCO's operation allows renovating immovable properties, for the renovation of which the State or local government lacks funds. Since an ESCO has a financial interest in achieving the best possible energy efficiency indicators, its operation does not pose a

significant risk to the customer. As a result of the renovation of a residential building carried out by an ESCO, a city acquires an appealing cityscape with a renovated stock of residential buildings, while residents can benefit from a renovated immovable property with an increased market value. Due to these reasons the EU makes efforts to stimulate a wider involvement of ESCOs in the implementation of projects for the improvement of energy efficiency in order to attract additional funds and ensure an efficient return of investments.

An ESCO can be an enterprise or a group of enterprises of any sector with an access to free financial funds and possibilities to guarantee cheap loans, which is interested in operating in the area of energy efficiency.

Figure 8. Financing scheme of an ESCO model[2]



An ESCO performs an in-depth analysis of objects (buildings, systems of energy transfer, production objects or processes) in order to find the most rational energy efficiency solution, organises the renovation of the immovable property related to the object and maintains the object during the repayment period of the invested funds, which may last from 5 to 20 years. This ensures recovery of the funds with a difference arising as a result of the implementation of energy efficiency measures. In order to have a successful and mutually profitable cooperation, an ESCO concludes a fixed-term contract with a recipient of a service (in the event of joint ownership, with a manager of a building), during the validity of which an ESCO undertakes all obligations related to the preparation, financing and implementation of energy efficiency measures by guaranteeing the expected energy efficiency result and ensuring management of the object during the validity period of the contract. At the end of the validity period of the contract, all benefits gained as a result of renovation are transferred to the ownership of the service recipient, i.e. the residents.[2]

When concluding an ESCO contract, two approaches may be used:

1) As a result of the contract, a service provider gets a certain percentage of the saved funds over the entire validity period of the contract. This motivates the service provider to achieve maximum savings immediately after completion of the project and to maintain this level till the end of the validity or repayment period of the contract, even increasing the savings through additional measures. This approach may have the following solutions:

- the contract stipulates the guaranteed savings and the ESCO undertakes all risks related to their achievement;
- the contract includes conditions for distribution of the achieved savings between the ESCO and the customer – in such a case risks are shared between the contracting parties in accordance with the terms and conditions of the contract.

2) As a result of the contract residents pay a fixed monthly payment per square meter corresponding to the dwelling-area.

The successful operation of ESCOs has gained recognition of several local governments of the EU Member States, since, by involving a private cooperation partner, local governments have managed to improve the energy efficiency of their buildings, even in such cases when they lack their own budget resources.

An ESA is an agreement between a recipient of energy services (e.g. a multi-dwelling building) and a provider of energy services (e.g. an ESCO or a MESCO) on the implementation of certain measures for improvement of energy efficiency, provided that the investments in these measures are repaid by the achieved improved energy efficiency.

The provision of energy services within the framework of an ESA must comply with the following principles:

a) the agreement must define precisely the expected final energy consumption and the measures for the improvement of energy efficiency guaranteed by the provider of energy services;

b) the provider of energy services fully finances the measures for the improvement of energy efficiency from his/her and/or third party's financial resources (this does not exclude a possibility that financial sources are attracted by owners of multi-dwelling buildings themselves, while the provider of energy services assumes the risk of financing the ESA);

c) the investments made are fully paid-off by the energy savings resulting from the introduction of the energy services (for which the agreement is concluded);

d) the provider of energy services fully or partially assumes the financial, technical and commercial risks of the project;

e) the agreement must comply with standard terms and conditions approved and made public by the responsible ministry of the sector (MoE; currently no officially approved template of an agreement is developed and approved).

In the EU Member States, the ESCO model is quite rarely used for the renovation of multi-dwelling buildings. The ESA is more widely used for the renovation of public buildings in Germany.

According to the current practice, under the ESA, the provider of energy services must fulfil the following obligations:

- heating, hot water supply and ventilation services (elimination of mould and excessive moisture);
- ensuring the functioning of heating, hot water supply and ventilation engineering systems during the entire validity period of the agreement;
- the indoor temperature in the flats of the building during the heating season complies with a certain daily schedule ($18^{o}C–22^{o}C$), the limits of the indoor temperature in commonly used spaces are determined separately;
- the minimum temperature of hot water supply is $50+/-2^{o}C$;
- renovation of the building complies with the measures agreed upon by the contracting parties (cost positions) and the laws and regulations;
- fixed tariffs for heating and hot water supply during the entire validity period of the agreement, complying with the tariff adjustment criteria set out in the agreement (see below);
- flat owners pay to the provider of energy services a basic tariff (separately for heating and hot water supply), which is composed of the following parameters:

- energy consumption of the building before the improvement of energy efficiency (MWh/year);
- a tariff of thermal energy approved by the regulator (EUR/MWh);
- the average outdoor air reference temperature;
- the average indoor reference temperature;
- the total heated area of flats;
- the number of months in the heating season on average per year.

During the heating season the basic tariff of the provider of energy services is adjusted each month reflecting the changes in the outdoor air temperature and the thermal energy tariff.

The ESA concluded by ESCOs in Latvia are tripartite contracts where the contracting parties are the customer (the co-operative society of flat owners), the ESCO and the manager of the building. The ESCO concludes a separate loan agreement with the financier (a credit institution) on the attraction of funding for the renovation of a multi-dwelling building.

The manager of the building ensures that the energy services provider receives the payments made by the flat owners.

According to current practice of ESA, taking of the commercial risk is the main contribution of the energy services provider, ensuring that the measures for improvement of energy efficiency and heat supply services he/she has provided during the validity period of the agreement comply with the basic tariff of thermal energy in accordance with the above-mentioned conditions for tariff adjustment (i.e. if during the entire validity period of the ESA the outdoor air temperature and the thermal energy tariff would remain unchanged, then after implementation of the measures for improvement of energy efficiency, residents would not have to pay more for heating and hot water than before the introduction of energy efficiency measures).

Consequently, energy services are beneficial to flat owners of multi-dwelling buildings who want to live in a house with properly functioning engineering systems at an acceptable level of comfort, a reasonable fee for thermal energy (the amount of payments prior to the renovation of the building, which increases in proportion to the increase of the thermal energy tariff) and who have no capacity or willingness to renovate and maintain the building themselves (or if the manager of the building does not have an appropriate professional experience). At the same time, there is a risk for flat owners of multi-dwelling buildings that the payment for the provided services can increase significantly if the thermal energy tariff rises, since a flat pays for the energy consumption of the building which it had before the improvement of energy efficiency. In such a situation, the owners have a limited ability to reduce their expenses.

Energy efficiency projects have a long repayment period of investments and they are not financially profitable without grants. Thus, the ESA business model is based on the assumption that grants are available for the renovation of multi-dwelling buildings and that heating tariffs will continuously increase during the validity period of the agreement (in some agreements the expected rate of tariff increase is 6 % per year). The energy services provider benefits from the tariff increase since the recipient of the service has to pay the basic tariff and cover the tariff increase as well. Consequently, energy services providers are more interested in municipalities where heating tariffs are relatively higher.

To promote the development of the ESCO market, three types of support programmes for ESCOs are needed at different stages of development: 1) support for the establishment and initial launch of an ESCO; 2) support for the functioning of the

existing ESCOs; 3) a fund for refinancing of ESCO loans. Taking into account that at present it is most difficult to access financing for those ESCOs that have already started their operation but no longer can attract resources of the private sector, the Ministry of Economics has amended Cabinet Regulation No. 1065 of 15 September 2009 "Regulations on Loans for Promotion of Development of Small-scale (Micro), Small and Medium-sized Economic Operators and Co-operative Societies of Agricultural Services" (hereinafter "Cabinet Regulation No. 1065") to allow the ESCOs already operating on the market to expand their activity.

The company "Altum" will make a decision on issuing a loan on the basis of the business plan submitted by the economic operator, incl. ESCO, which contains a description of the business project to be implemented and the energy efficiency measures, of the planned cash flow of the economic operator and other information specified by the company "Altum". In order to implement the energy efficiency measures, the calculations how the loan will be repaid from the payments made by the customers of the energy services providers from the money saved as a result of the implemented project for improvement of energy efficiency will also have to be submitted to the company "Altum". The following conditions will apply to the loans issued by the company "Altum":

- the amount of the loan: up to EUR 2.85 million per operator. If an energy services provider has several subsidiaries, each of them may receive a loan of up to EUR 2.85 million;
- the minimum co-financing of an economic operator, incl. ESCO, which is not related to any commercial support, in the amount of 10 %;
- an interest rate on a loan: from EURIBOR + 3%;
- the maturity of a loan up to 20 years;
- issue of a loan in accordance with the attraction of ESCO's clients;
- 80 % of guarantee of the loan amount can be attracted.

Besides, in the future it will be necessary to focus on expanding the operation of the fund for refinancing of ESCO loans, which would buy out from the ESCO the already established customer portfolios (a right to claim customers' future payments). Thus, the ESCOs actively implementing energy efficiency measures would reduce their burden of credit liabilities and would be able to receive new loans from commercial banks and the company "Altum" for the implementation of new projects. One of the options is for the public and the private sectors to join efforts and to establish the refinancing fund as a public-private partnership. This would comply with Article 18 of the Energy Efficiency Directive, namely, that the Member States should promote the energy services market, including the use of financial instruments, and thus, encourage the attraction of private investments.

According to the Ministry of Economics, a new Fund for Refinancing of Energy Efficiency Projects (*EPRF*), where public funding is invested (up to 25 % of the Fund's capital), could be now created in the financial market.

It is intended to select:

1) investors (min. 75 % of the amount of the *EPRF*);
2) a company managing the *EPRF*.

The EPRF refinances ESCO's projects by purchasing the customer portfolio made by the ESCO (claim rights). Thus, the ESCO can repay the existing credits and take on new obligations for the creation of another customer portfolio.

The advantage to this approach is the fact that all decisions regarding refinancing of ESCO's projects are taken on the basis of a private initiative. However,

disadvantageous is the long start-up period – new Cabinet Regulations should be drawn up, the *EPRF* investors and the company which would manage the *EPRF* should be selected. In Latvia, the fund of this type has already been established in 2016 following the initiative of the private sector. Therefore, in order to ensure the complementarity of all support measures, it is useful to invest the EU Funds in development of another (missing) support instrument.

5.2. Analysis of the Barriers to the Renovation of Buildings

Assessing the effect of energy performance of buildings, it can be concluded that the main barriers to cost-efficient renovation of buildings are as follows:

1) High costs (loan interest rates) of attracting financial resources from commercial banks.
2) Debts of owners of buildings for utility services and credit obligations for the purchase of a dwelling which restrict their ability to undertake new obligations or to receive a loan from a bank.
3) The insufficient number of professionally trained specialists (building managers, independent energy auditors, designers, construction workers).
4) The lack of qualified workforce.
5) Poor quality and the lack of control of construction works. If the works are carried out by insufficiently qualified workers, the planned energy savings may not be achieved.

5.2.1. Barriers to the Activities of the EU Funds

Barriers to 3.4.4.1 activity:

1) Unclear time limits for repayment of investments made in the projects for improvement of energy efficiency. According to the estimates made by the MoE, on average, the repayment period of investments in the projects for improvement of energy efficiency is 22-23 years (not taking into account the costs of attraction of the funding). As part of the support programme of the 2007–2013 programming period of the EU Funds, the LIAA approved the project and only then a commercial bank reviewed possibilities for granting a loan. Consequently, it was not known beforehand whether the project would pay off because the interest rate on the loan was not known.
2) High costs (loan interest rates) of attracting financial resources from commercial banks.
3) Limited availability of financing from commercial banks for individual groups of buildings with economically justified projects (in Latvia's regions, for buildings with a small number of flats, for building managers with a relatively large loan portfolio).
4) The guarantees from the Latvian Guarantee Agency (hereinafter "LGA") are required for commercial banks to issue loans for a large part of energy efficiency projects of multi-dwelling buildings. At the same time, they only rarely help to receive loans for the groups of buildings listed in the previous paragraph, and thus, they do not really promote the issue of loans in the territory of Latvia (the guarantees provided by the LGA were not the guarantees given by the State but rather by the State capital company).

5) Debts of flat owners for utility services and credit obligations for the purchase of a dwelling which restrict their ability to undertake new obligations or to receive a loan from a bank.
6) The insufficient number of professionally trained specialists (building managers, energy auditors, designers, construction workers).
7) The lack of qualified workforce for performance of construction works.
8) Poor quality and the lack of control of construction works.
9) If an energy services company (hereinafter "ESCO") is involved, the cash flow of flat owners is unclear, i.e. the price for the service is not clear, and in cases when flat owners assume the risk that heating tariffs may change, there is a risk of cost increases due to possible changes in heating tariffs. Such risks are higher in the projects implemented by an ESCO (compared to the projects implemented by building managers) since after the completion of the project flat owners pay for the consumption of thermal energy which the building had before the implementation of the energy efficiency project.

Barriers to 3.4.4.2 activity:
1) Implementation of several projects involved high renovation costs (even more than EUR 400 per square meter of a building), since basic conditions of the activity did not set cost limits. Investments in such projects were high and the period for their repayment was disproportionally long; besides, considering the specific conditions for support from the activity, according to which the eligible costs included costs of the adjustment of the interior for persons with reduced mobility, thermal energy savings obtained after the renovation were rather low, namely for each EUR 1,400 invested from the ERDF's funding, savings of approximately 0.57 MWh/year were obtained.
2) During the project monitoring period, certain local governments wanted to change a status of the renovated social building, which created a risk that the initial goal of the project, namely, to provide support to residents of a social building, would not be achieved as a result of the project implementation.
3) During the project implementation phase, there were several problems related to the poor quality of technical documentation of the project and ensuring of appropriate procurement procedure. This was partially related to the prohibition to include project administration costs in the eligible costs.

The selection criteria of project applications of the activity did not include a criterion regarding thermal energy savings obtained during the project implementation against the investments made, and no economically justified period within which the investments made should pay off was defined.

Barriers to 4.1.1 SO:
1) Little experience and limited knowledge about the implementation of energy efficiency measures of the operators in the manufacturing industry.
2) Capacity of the construction sector and increase of construction costs.
3) The small number of supported operators (65) compared to the number of the existing operators in the manufacturing industry.
4) Operators aim to replace the equipment rather than to carry out targeted energy efficiency measures in production buildings.

Barriers to 4.2.1.1 activity:

1) The public sector cannot completely reduce all credit risks related to loans and influence the costs of credit resources of credit institutions. Consequently, interest rates on loans will continue to vary significantly in the market for crediting of multi-dwelling buildings, therefore, financial resources will not be equally accessible to all residents of Latvia (owners of flats in multi-dwelling buildings).

2) A complicated procedure for provision and monitoring of the State aid, since the amount of the State aid should be assessed at the level of each household (flat). In this case, the company "Altum" must obtain the information about each flat, what is a significant bureaucratic burden not only for "Altum" but also for the authorised persons of flat owners. Introducing changes to the conditions of the programme, the Ministry of Economics has determined that the company "Altum" assesses applications for grants after the receipt of the information from another financing agency or from the provider of energy efficiency services about the planned conditions of financing. After the assessment made by the company "Altum", another financing agency or the provider of energy efficiency services decides on the financing of the measures for the improvement of energy efficiency, while the owners of the flats agree on the approval of the financing conditions of another financing agency. The company "Altum" makes a decision on the issue of a grant after the receipt of the relevant information. If the company "Altum" receives *de minimis* forms from the owners of the flats together with a grant application, the administrative burden is reduced. Declarations of flat owners and *de minimis* forms should be requested to be prepared only once in order to avoid tracing the changes on the list of flat owners several times.

3) In the current situation when construction costs have started to rise but historically heating tariffs have been low in a large part of Latvia's territory because of the low prices on oil and natural gas, there is a risk that a number of houses in cities with particularly low heating tariffs will not be eligible for support. Already on 1 November 2016 the Cabinet of Ministers approved the proposal of the Ministry of Economics to apply an inflation rate of 1.8 % to the thermal energy tariff in order to allow the buildings located in the municipalities where at present there are atypically low heating tariffs to receive support as part of the programme.

4) The poor quality of the technical documentation of construction submitted to the company "Altum". Taking into account that the Competence Centre of "Altum" carries out a detailed evaluation of all technical documentation, it has been established that the documents prepared by independent experts working in the area of energy efficiency, designers and other specialists are of poor quality, therefore the company "Altum" has to ask them several times to rewrite or clarify technical documentation. Therefore, the beginning of the construction is delayed. However, considering that there are only few specialists who can prepare the technical documentation for improvement of energy efficiency of residential buildings and the efforts of "Altum" to establish a good cooperation with these specialists, it is expected that this obstacle will be significantly reduced.

5) Capacity of the construction sector and increase of construction costs. Taking into account that most of support programmes of the EU Funds involving construction works are currently open, there is a risk that construction companies will choose to provide services in larger objects (commissioned by the State and local governments). Besides, the fact that several support programmes involving construction works are open at the same time leads to the increase of construction prices, which may also affect the economic return of the project.

Barriers to 4.2.1.2 activity:

1) The data submitted by the ministries may be erroneous, thus, the buildings with the most inefficient energy performance would not be renovated. Yet, for the energy certification of all buildings, it is necessary to have additional procurement, additional funding (approx. EUR 1 million – on average EUR 1,000 for the energy certification of one building * 1,000 buildings) and time – approx. 3 years (because the capacity of qualified experts is limited).

2) There is no guarantee that it is most efficient to renovate the buildings on the list (the energy savings achieved compared to the investments – the building may be in a very poor condition and very large investments need to be made which are not related to energy efficiency. Thus, a large amount of public funds would be spent as part of the project while the energy savings achieved would not be sufficient compared to the investments made as could have been achieved in other projects).

3) The projects submitted under the auspices of the ministries are of poor quality, including technical documentation of construction, as a result, they need to be clarified repeatedly what impedes the implementation of the measure.

4) The applicants of the projects and the public administration lack knowledgeable experts in the areas of energy efficiency and construction what prevents preparing the projects of sufficient quality.

5) Due to the price increase in the construction sector the applicants of the projects exceed the initial limit of EUR 200/m^2. Because of this, the Ministry of Economics has raised the cost limit up to EUR 250/m^2 and has made changes in the evaluation criteria of project applications by relaxing requirements for cost effectiveness.

Barriers to the development of ESCOs:

Among the investment barriers, there are other barriers which prevent successful implementation of energy services agreements:

1) Both energy services providers (existing and potential) and representatives of the EBRD admit that the current practice of ESA did not ensure energy savings by the residents. The payment for thermal energy does not depend on the flat owners' behaviour, besides, the ESA set strict requirements for the population regarding the operation of the building (e.g. during the heating season, windows must not be left open for more than 15 minutes per day). A different understanding of the requirements for the operation of a building of the recipients of the energy services and the energy services provider leads to disagreements.

2) The ESAs concluded so far are quite complicated and flat owners cannot understand them without specialist knowledge. Although the energy services agreement contains information about the forecast of the energy services provider's cash flow, it does not provide a sufficiently clear and detailed picture of the actual benefits to the inhabitants after the improvement of energy efficiency, about the benefits of the energy services provider and about the fairness of the proposed scheme or the distribution of the benefits between the flat owners and the energy services provider.

3) Although theoretically the energy services provider assumes the risk of the improvement of energy efficiency and thermal energy supply, partly this risk is distributed between the energy services provider and the building manager. According to the energy services agreements used so far in Latvia, payments for the energy services are collected by the building manager who

thus assumes the risk of debtors' obligations. In addition, the maintenance of heating, hot water supply and ventilation systems is one of the functions of building management which in practice creates conflicts between the energy services provider, the building manager and the inhabitants (who for years have received services from the building manager and who are not used to solving the issues related to the heating supply directly with the ESCO, therefore they continue to apply to the building managers in such cases). For these and other reasons, "Renesco" has established a building management company – SIA "Renesco pārvaldnieks".

4) Energy services providers are interested in increasing their profit by disconnecting from the centralised heating system and constructing local sources of heat supply. Thus, the daily thermal energy is provided by the local source, and the building buys the thermal energy from the centralised heating supply system when it is cold outside. It negatively affects other customers of the centralised heating supply system as they subsidise the costs of the peak heat load capacity exceeding the approved tariffs of heating supply.

5) The ESCO does not have collateral for loans (investments are made in the properties not owned by the ESCO and the prospects for recovery of the particular investment are questionable – illiquid market, limited access to the place of investments).

6) ESCOs have not yet operated for a sufficiently long period, and as a result, banks have no established practice how to work with the respective projects.

7) The potential customers are not aware of the ESCO's model of operation.

8) The level of development and capitalisation of ESCOs is relatively low.

9) As a rule, potential customers of ESCOs focus on the expansion of their basic business activity (acquisition of new products and markets) and the implementation of energy efficiency measures is not the primary target of the owner of the relevant object. This enables the ESCO to provide energy efficiency services to the owners of the relevant objects, reducing their costs of the use of energy resources. At the same time, these transactions contribute to the achievement of the national goal for the improvement of energy efficiency. Therefore, it would be necessary to implement measures for the establishment and initial growth of ESCOs. However, taking into account the fact that ESCOs constantly need additional resources for the provision of services to new clients, it is also necessary to have additional instruments for obtaining new loans.

5.2.2. Analysis of Barriers to Investments

The implementation of any investment project involves possible risks or objective barriers. Project implementers have identified several risks in the current practice of building renovation, which may affect both the launching of the project and its implementation. Renovation of residential buildings may be affected by the following risks and barriers:

1) risks and barriers related to accessibility of information:

- insufficient awareness of residents of the matters related to the energy efficiency of buildings and benefits from the improved energy performance;
- insufficient awareness of residents of the financial instruments for improving of the energy performance of buildings;
- inability of flat owners to agree on joint decisions. A process of making positive decisions should be encouraged, raising public awareness and creating a sense of shared ownership through regular seminars, campaigns and positive examples of building renovation;
- time-consuming decision-making practices in multi-dwelling residential buildings;

2) risks and barriers related to documentation of renovation projects:
- the lack of a professional management group of a renovation project;
- incorrectly prepared (also deliberately) energy performance assessments of buildings (energy audits);
- inaccuracies in the preparation of technical documentation (technical surveys of a building, documentation of a construction plan, construction estimates);
- administrative procedures of project progress which are difficult to understand for unprofessional project implementers;

3) risks and barriers related to the quality of construction works:
- the lack of a professional management group of a renovation project;
- non-compliance with laws and regulations on construction in performance of construction works;
- poor (insufficient) supervision of construction;
- insufficient qualification of the workforce performing construction works;

4) financial barriers and risks:
- declining paying capacity of residents;
- errors in calculations of the project budget;
- increase of costs during the project implementation (as the construction sector is recovering from the consequences of the crisis, the construction market has become more active and the prices of construction services and materials have increased);
- debts for services related to the use of flats, what prevents the flat owners of a residential building from receiving a loan for the renovation of a building;
- a high level of risk of financial investments in the territories with low economic activity what increases loan interest rates which make longer the repayment periods of investments;
- a long repayment period of investments which, in combination with high interest rates on loans results in negative cost-efficiency of projects.

Taking into account the identified risks and barriers that are related to building renovation, as well as the previous experience of Latvia's commercial banks in financing the building renovation, it has been concluded that, considering the different paying capacity of flat owners in multi-dwelling buildings, which affects the ability to attract funding, buildings should be divided into the following groups depending on the paying capacity of their owners:

1) commercial projects in buildings where the owners have a sufficient paying capacity and could potentially take on financial obligations, including co-financing a building renovation project;
2) social projects in buildings where it will be difficult to attract financing for renovation on commercial conditions.

In addition to the above-mentioned, with respect to possible financial models for renovation of residential buildings in the future, a medium-term risk exists that people will become accustomed to the remarkable (50 %) co-financing, and this will make the introduction of other financial models more difficult, which is implied by the Lithuanian experience. Namely, when conditions of the support programme changed (the initial 50 % of support were replaced with 15-30 % of support), the willingness of flat owners to renovate their dwellings under the new conditions of the support instrument significantly diminished.

Among the investment barriers, there are other barriers that prevent successful implementation of energy services agreements:

- insufficient availability of information about ESCOs and poor awareness of ESCO contracts;
- distrust of customers in the complicated ESCO agreements that include conditions for construction design, construction works, management services, as well as financial conditions;
- low interest of ESCOs in risky projects giving preference to objects that present a clear benefit.

Evaluating possibilities of providing support to ESCOs, "Altum" has interviewed commercial banks, venture capital funds and ESCOs. As a result of the interviews, "Altum" has prepared several proposals for the implementation of State support programmes. Therefore, it would be necessary to implement measures for the establishment and initial growth of ESCOs. However, taking into account the fact that ESCOs constantly need additional resources for the provision of services to new clients, it is also necessary to have additional instruments for obtaining new loans.

6. Long-term Goals Regarding the Energy Performance of Buildings in Latvia and Expected Energy Savings

6.1. Planned Obligations for the Energy Performance of Buildings in Latvia

On 30 November 2016, the European Commission published a press release "Clean Energy for All Europeans". This Winter Package includes amendments to the following documents related to the energy performance of buildings:

Section 6.1.1 summarises the main objectives and amendments to Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings;

Section 6.1.2 summarises the main objectives and changes to the amendments to Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC.

6.1.1. Directive 2010/31/EU on the Energy Performance of Buildings

The purpose of the proposal is to decarbonise the building stock until 2050, proposing that each Member State itself determines the intermediate target for decarbonisation of the building stock until 2030 and the final target for 2050, including them in the long-term strategies for renovation of buildings. Along with Directive 2010/31/EU, the following amendments are proposed:

1) the definition of technical building systems has been extended and also applies to on-site electricity generation;
2) Article 4 on building renovation of Directive 2012/27/EU on energy efficiency has been moved to Directive 2010/31/EU for greater consistency, and will include additionally the consideration of energy poverty issues, support for smart financing of building renovations and a vision for the decarbonisation of buildings by 2050, with specific milestones in 2030. The long-term building renovation strategies will become part of (and annexed to) the integrated national energy and climate plans and will be notified by Member States to the Commission by 1 January 2019 for the period post 2020. The strategy covers the renovation of the national stock of residential and non-residential buildings;
3) article on new buildings is simplified by limiting it to the provision identified in the impact assessment as the most useful, i.e. the general obligation for new buildings to meet the minimum energy performance requirements. Other provisions that were more cumbersome are deleted;
4) Article 8 is updated to take into account the revised definition of technical building systems. A new paragraph introduces requirements as regards:

a. infrastructure for electro-mobility; new non-residential buildings with more than ten parking spaces, and non-residential buildings undergoing major renovation (restoration) with more than ten parking spaces (a parking space refers to those located in the building and to those located physically next to it) will have to equip one parking space per ten for electro-mobility. New residential buildings with over ten parking spaces, and those undergoing major renovation, will have to put in place the pre-cabling for electric recharging to be installed in future for every parking space. The requirements will not apply to those buildings that had received a building permit before entering into force of the amendments to the Directive. The EU Member States will be able to choose to exempt buildings owned and occupied by SMEs, as well as public buildings covered by the Alternative Fuels Infrastructure Directive;

b. reinforcing the use of building electronic monitoring, automation and control in order to streamline inspections;

c. the introduction of a 'smartness indicator' rating the readiness of the building to adapt its operation to the needs of the occupant and of the grid, and to improve its performance;

5) Article 10 is updated to include a new provision on using energy efficiency certificates to assess savings from renovations financed with public support; they are to be assessed by comparing energy efficiency certificates before and after renovation; in addition it is allowed to use other equivalent mechanisms to achieve the set objectives;

6) Articles 14 and 15 on inspections are streamlined, implementing more effective approaches to regular inspections, and they could be used to ensure that energy performance of a building is maintained and/or improved;

7) Annex I is updated to improve transparency and consistency in the way energy performance is determined at national or regional level and to take into account the importance of the indoor environment.

These amendments are mostly of technical nature, yet they will oblige Latvia to develop the infrastructure for electric charging of electric vehicles in the building sector and to improve the methodology for calculation of the energy performance of buildings, adapting it to the new standards.

6.1.2. The Goals to Be Included and Set in the Strategy for 2030 and 2050

In order to meet the requirements of the amended Directive 2010/31/EU, Latvia should set an intermediate target for decarbonisation of the building stock until 2030 and the final target for 2050. The overall decarbonisation objective of all sectors of Latvia is defined in the "Roadmap for moving to a competitive low carbon economy in 2050". The said document states that the EU has been pursuing a comprehensive climate policy since 2013, aiming to reduce GHG emissions to at least 80 % by 2050 compared with the levels in 1990. As a result, Latvia should set

quantitative, achievable targets that would be included in the next updated long-term strategy for renovation of buildings.

6.2. The Current Goals and Obligations Regarding Energy Efficiency of Buildings in Latvia

The current targets in the area of energy efficiency of buildings are:

1) availability of funding for economically justified projects in the entire territory of Latvia, including regions;
2) high-quality management and monitoring of projects;
3) focusing of monitoring of activities on obtaining results, including energy savings;
4) reaching a high level of energy efficiency and high quality of construction;
5) improving a selection procedure of construction companies;
6) reducing costs of resources.

In order to achieve the energy efficiency goals during the 2014–2020 programming period of the EU Funds, the following activities should be implemented:

1) It is necessary to create a financial instrument for cases when a multi-dwelling residential building needs investments for its maintenance or implementation of energy efficiency measures, but the accumulated reserve from the payments is not sufficient (or there is no such reserve at all). "Altum" could be entrusted with the maintenance of such a reserve.

2) It is necessary to facilitate the development of the ESCO service (a project management group that manages energy efficiency projects of multi-dwelling buildings and includes the following experts: independent experts in the area of energy efficiency of buildings (energy auditors), designers and construction supervisors who within the scope of their competency ensure preparation and implementation of an energy efficiency project according to the wishes of the flat owners and requirements of the laws and regulations governing the construction and energy performance of buildings, and achievement of the planned energy savings after completion of an energy efficiency project of a multi-dwelling building). The ESCO with a bank's guarantee or an insurance policy is responsible for the level of energy efficiency to be reached as part of the project. The ESCO compensates for the losses caused to residents of multi-dwelling buildings if the defined level of energy savings is not reached after completion of the renovation project.

3) Training should continue for potential project applicants and project implementers during the awareness raising campaign "Let's Live Warmer", including organisation of educational seminars and conferences on energy efficiency not only in the sector of multi-dwelling buildings, but also in the public sector. Methodical materials should be provided about the issues related to the project preparation and implementation, as well as about the use of a building after completion of an energy efficiency project.

In addition, in order to promote energy performance of buildings, the following policy measures will have to be implemented:

1) The minimum requirements for energy performance of buildings (for structural elements of external building envelopes and building engineering systems) should be regularly reviewed. The minimum requirements for energy performance of buildings are set in order to obtain a cost-optimal balance between financial investments and savings of energy costs during the life-cycle of a building. These calculations should not only cover the cost-optimal levels of typical buildings, but also cases of energy efficient buildings with a very long repayment period of investments, in order to promote the development of reasonable minimum energy performance requirements.

2) Support instruments should be developed for construction of nearly zero-energy buildings in compliance with Article 10(1) of Directive 2010/31/EU, which stipulates that Member States shall take appropriate steps to consider the most relevant such instruments in the light of national circumstances and to ensure implementation of Article 9 of Directive 2010/31/EU. Namely that after 31 December 2018, new buildings occupied and owned by public authorities are nearly zero-energy buildings and by 31 December 2020, all new buildings are nearly zero-energy buildings, where the cost-benefit analysis over the life-cycle of the building shows that that is economically justified.

A structure of Latvia's energy efficiency target in compliance with the requirements of the Directive is shown in Table 23.

Table 23. Latvia's long-term targets with respect to energy performance of buildings

Objective	Indicators to be obtained	Indicative funding, EUR	Implementation period
Mandatory renovation of 3 % of the area of central government buildings, renovation of municipal, industrial and multi-dwelling residential buildings (the 2014–2020 programming period of the EU Funds)	Savings of 1,690 GWh/year, the average thermal energy consumption for heating: 120 kWh/m^2 The number of households with improved energy consumption: 14,286 (in 2023) Primary reduction of energy consumption per year: 52,000,000 kWh. Energy consumption for generation of GDP: 263.9 kg of oil equivalent per EUR 1,000/GDP (for production buildings for 2023)	Total funding of EUR 384 million, including EUR 323 million funding of the EU Funds and EUR 57 million of public funding of Latvia	2014–2023
Promotion of energy efficiency and use of local RES in the centralised heating. Percentage of renewable energy in the gross final energy consumption – 60 % (the 2014–2020 programming period of the EU Funds)	Increase of energy generated from renewable energy sources – 70 MW. Reconstructed heat supply networks – 70 MW (in 2023)	Funding of EUR 53 million from the EU Funds	2014–2023
Raising public awareness of various possibilities and practices of increasing of energy efficiency (the 2014–2020 programming period of the EU Funds)	50 awareness raising events a year (publicity events planned during the campaign "Let's Live Warmer")	Technical assistance funding of EUR 260 thousand from the EU Funds	2014–2023

With a view to implementing Directive 2012/27/EU, Latvia has to reach the indicative national energy efficiency goal in the framework of which two binding

targets must be fulfilled: every year savings of 1.5 % must be achieved with respect to the energy supplied to the country's end users and every year 3 % of the area of State-owned buildings must be renovated. Since State-owned buildings form a part of the country's final energy consumption, savings of 1.5 % of the final consumption of central government buildings contribute to the meeting of the overall target. Renovation of 3 % of the area of government buildings using the funding from the EU Funds will ensure total energy savings.

Table 24 shows the current performance of commitments. The table shows that the targets resulting from the Directive are met, there is a balance forming which will be included in the renovation targets of the following years. On 1 January 2017, the area of the buildings meeting the minimum energy efficiency requirements (new buildings and renovated buildings) amounts to 656,456.34 m^2 or 21.3 %, the area of the buildings not meeting the minimum energy efficiency requirements (non-renovated buildings) comprises 1,999,336.83 m^2 or 65.0 % and the area of the buildings that are cultural heritage monuments owned, possessed and used by State institutions amounts to 421,851.56 m^2 or 13.7 %.

Table 24. A summary of the requirements set out in Article 5(1)(1) of Directive 2012/27/EU.

Target period	The publication date of the list	The underlying data	Total area according to the annual data of the list of the national building stock (buildings not meeting the minimum energy efficiency requirements)[31]	Aim of renovation, total area, m^2	Renovated area, m^2	The balance to be included in the targets in any of the three previous or next years[32], m^2
2014	01.01.2014.	data from 2008–2012 (buildings above 500 m^2)	2,589,322.00	77,679.66		
2015	01.01.2015.	data from 2009–2013 (buildings above 500 m^2)	2,496,955.81	74,908.67	232,635.36[33]	80,047.03
2016	09.07.2015.	data from 2010–2014 (buildings above 250 m^2)	2,205,846.99	66,175.41		13,871.62
2017	09.07.2016.	data from 2011–2015 (buildings above 250 m^2)	1,999,336.83	59,980.10	136,155.30[34]	90,046.82
2018	09.07.2017.[35]	data from 2012–2016 (buildings above 250 m^2)				90,046.82

[31] Buildings with the total area above 250 m^2 owned, possessed and used by State institutions in accordance with Article 5(5) of Directive 2010/27/EU of the European Parliament and of the Council on energy efficiency (prepared in accordance with the information provided by State institutions).
[32] According to the requirements of Article 5(3) of Directive 2012/27/EU.
[33] Renovated area in 2014.
[34] Renovated area in 2015.
[35] It will be published on 09.07.2017.

Although so far Latvia has been fulfilling its commitments (the renovation target of 3 % according to the requirements of Article 5 of Directive 2012/27/EU), both using the co-financing from the EU Funds and the State budget funds, the pace at which the State-owned building stock is renovated is insufficient. In the long-term, renovating only 3 % of the building stock every year, their complete renovation would be possible only in 40-50 years (given that each year 3 % of the target area in absolute values diminishes proportionally), and after that period it is more likely that financial resources will have to be invested for a repeated renovation of a large part of the renovated buildings. Taking into account the above-mentioned and the fact that the final deadline for the implementation of 4.2.1.2 measure is 2025, it is necessary to develop and plan a separate long-term solution for the renovation of the State-owned building stock.

Along with economic benefits, as a result of the implementation of measures for improvement of the energy performance of buildings, both the public in general as well as owners of buildings will achieve social, environmental and energy system goals as summarised in Tables 25 and 26.

Table 25. Direct benefits to owners of buildings resulting from measures for improvement of the energy performance of buildings[36].

Type of benefit	Benefits
Economic	Reduced energy purchase costs
	Increased property value
Social	Improved health condition
	Increased level of comfort
	Increased productivity of work
	Improved air quality

Table 26. Benefits to the public resulting from measures for improvement of the energy performance of buildings.[46]

Type of benefit	Benefits
Economic	Stimulating the economy, by saving funds and using them for investments in other sectors and areas
	Reduced unemployment in project management, construction and other sectors
	Growth of gross domestic product
	Export growth
	Increased competitiveness of the industry by developing more and more effective methods of reducing energy consumption in buildings
Social	Improved social conditions
	Improved health condition
Environmental	Reduction of CO_2 emissions
	Reduced air pollution
For energy systems	Security of energy supply
	Reduced energy dependency
	Reduced load on the energy supply system

[36] A guide to developing strategies for building energy renovation, Building Performance Institute Europe, February 2013.

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7. Appendices

1. Appendix

The number of households using fuelwood consuming equipment and the average age of the equipment (% of the number of wood consuming households; years)[37]

Equipment consuming fuelwood	Firewood								Wood residues								Wood briquettes								Wood pellets							
	% of number of wood consuming households				Average age, years				% of number of wood consuming households				Average age, years				% of number of wood consuming households				Average age, years				% of number of wood consuming households				Average age, years			
	2001	2006	2010	2015	2001	2006	2010	2015	2001	2006	2010	2015	2001	2006	2010	2015	2001	2006	2010	2015	2001	2006	2010	2015	2001	2006	2010	2015	2001	2006	2010	2015
Central-heating boilers	5.1	5.3	8.6	8.8	15.5	11.3	14.2	14.5	1.2	0.9	0.4	0.6	17.5	14.5	0.4	0.6	0.1	0.1	0.6	1.1	13.6	7.7	0.6	1.1	-	0.1	0.2	2.0	-	3.9	0.2	2.0
Hot-water boilers	2.9	3.3	3.9	2.5	15.2	13.5	15.4	14.2	0.8	0.7	0.2	0.2	18.2	16.3	0.2	0.2	0.1	0	0.1	0.1	9.8	18.7	0.1	0.1	-	0	0.0	0.3	-	1	0.0	0.3
Combined central heating and hot water boilers	1.6	3.7	7.2	8.4	11.8	9.6	11.4	10.6	0.4	0.3	0.2	0.5	14.8	10.7	0.2	0.5	0.1	0.6	0.5	2.6	19	5	0.5	2.6	-	0.1	0.3	3.8	-	2	0.3	3.8
Room heater stoves	33.4	34.7	35.6	30.4	-	-	29.4	26.9	10.1	6	2.6	2.4	-	-	2.6	2.4	1.1	0.9	1.1	2.8	-	-	1.1	2.8	-	0	0.0	0.1	-	-	0.0	0.1
Economical stoves	0.6	2.2	5.0	4.3	3.5	5	7.7	8.8	0.1	0.3	0.3	0.3	3.4	7.7	0.3	0.3	0.1	0.2	0.6	0.7	4.4	3.6	0.6	0.7	-	0	0.0	0.1	-	0	0.0	0.1
Stoves for cooking	30.5	33.5	29.8	24.8	-	-	25.4	24.5	11.4	7	2.3	1.8	-	-	2.3	1.8	0.4	0.3	0.5	1.2	-	-	0.5	1.2	-	0	0.0	0.2	-	-	0.0	0.2

[37] The data of the Central Statistical Bureau, epm2.2 The number of households using fuelwood consuming equipment and the average age of the equipment (% of the number of wood consuming households; years) (11 January 2017).