Annex 2

Long-Term Strategy for Building Renovation

Riga – 2014

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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 European Union Member State has to establish a long-term strategy for buildings for mobilising 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 first version of the Strategy shall be published by 30 April 2014 and updated every three years thereafter and submitted to the Commission as part of the National Energy Efficiency Action Plans. The Strategy has been developed as part of the Informative 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". The Member States shall update the Strategy every three years and shall submit every version to the Commission as part of the updated Energy Efficiency Action Plan of the Republic of Latvia.

1. An Overview of the Building Stock

a) Categories of main buildings surveyed in the framework of the overview

In the buildings sector, the consumed energy forms up to 40 % of the overall energy balance, therefore the buildings sector has a significant chance to reach the overall energy efficiency targets. The majority of the existing buildings have a high consumption of energy sources and significantly lower thermal performance than may be ensured with the technologies available today. Most of these buildings will still be used for a significant period of time; therefore the staged renovation of these buildings by improving their energy efficiency is important.

In the Information System of the National Real Estate Cadastre (hereinafter "NREC IS"), 1.35 million buildings are registered with a total area of 198 million m^2, including various auxiliary buildings. From the total number of buildings, in approximately 400 thousand buildings energy is used to adjust the microclimate of interior (heating), and from these 352.4 buildings with a total area of 86.9 million square meters[1] are residential buildings. The largest number and share (85 %) is formed by single-dwelling buildings (300.7 thousand), however, in terms of area, the share of single-dwelling buildings is only 39 %, and the largest share (58 %) is formed by multi-dwelling (three and more dwellings) buildings (50.4 million m^2), while by number their share is only 11 % (38.6 thousand).

In accordance with the data of population census 2011, there are 988 thousand dwellings in Latvia, of which 680 thousand (68.8 %) are multi-dwelling buildings, 285 thousand (28.9 %) are individual houses and 16 thousand are semi-detached or row houses. In the framework of the population census, building type has not been determined for 5 thousand dwellings and 1.5 thousand dwellings have been accounted for as non-residential buildings.

In the NREC IS, 997 thousand non-residential buildings are registered, which includes 934 thousand buildings with an insignificant energy consumption – various types of auxiliary buildings (560 thousand) and non-residential buildings of farms (317 thousand), as well as garages, warehouses, reservoirs and bunkers. In the context of energy efficiency of buildings, there are 34.3 thousand non-residential buildings with a total area of 27 million m^2 (Table 2), in which energy is necessary for maintaining the microclimate of premises, as well as 27.5 thousand industrial buildings with a total area of 17.2 million m^2, which also consume energy. At the same time these buildings are characterised by significant differences of energy consumption that are influenced by the various technologies of production processes.

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

[1] Areas of the residential buildings registered in the NREC IS differ from the residential building stock data of the Central Statistical Bureau (CSB) since the NREC IS accounts the total area of the registered residential buildings, while the residential building stock accounts the total or useful space of dwellings without the area of corridors, staircases, basements and other premises that are shared by all the owners of the residential or non-residential building. In accordance with the CSB data, in the end of 2009, the residential building stock was 61.1 million m^2.

[2] Informative Report "Financing Solutions for Building Renovation", approved by the Cabinet of Ministers on 04/06/2013, minutes No. 33#30.

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

Main type of utilisation	Number, thousand	Area, million m^2
Residential buildings		
Single-dwelling buildings	300.7	33.9
Two dwellings buildings	12.4	2.5
Three and more dwellings buildings	38.6	50.4
Buildings of various social groups	0.7	0.1
Total	352.4	86.9
Non-residential buildings		
Wholesale and retail buildings	11.4	6.1
Office buildings	7.3	6.6
Hotel buildings and other temporary accommodation buildings	4.8	2.3
School, university and scientific research buildings	3.9	6.6
Communications buildings, stations, terminals and related buildings	2.9	0.9
Medical or health care institution buildings	1.3	2.0
Mass entertainment events buildings	1.3	1.1
Sports buildings	1.0	1.1
Museums and libraries[3]	0.5	0.3
Total	**34.3**	**27.0**

b) Age categories of surveyed buildings

Age of residential and non-residential buildings can be divided in periods in accordance with their thermal characteristics. Characterisation of various periods of construction of buildings is summarised in Table 2.

Table 2. Period of building construction and thermal characteristics[2]

Period of building construction	Thermal characteristics of buildings
Until 1940	Pre-war constructions, mainly wooden in rural areas and brick wall in cities. Most of the buildings have up to two floors.
1941–1960	Post-war constructions, period characterised by good quality, mainly brick buildings, residential sector characterised by brick buildings of standard design of Stalin's time.
1961–1979	Extensive construction of standard design buildings; in the residential buildings sector, series 316 and 318 (so called Hrushchov's buildings) and series 464 designs were introduced; also construction of series 467, 103 and 104 buildings was begun; in the end of the period – series 602. For external walls, clay bricks, aerated concrete and ceramsite concrete were commonly used.
1980–1991	New requirements for design were stipulated by the USSR construction standard "Thermal Engineering of Building Envelopes"[4]. Construction of series 119 buildings was started, as well as a number of special designs was implemented; the construction sector is dominated by buildings of reinforced concrete and ceramsite concrete slabs.

[3] Including archive buildings.

[4] „СНиП II-3-79 Строительная теплотехника" (building thermal engineering), СНиП II-3-79 2. Теплоустойчивость ограждающих конструкций (Part 2 – Thermal Engineering of Building Envelopes).

1992–2002	Construction of standard design buildings practically stopped. With Order No. 68 of the Ministry of Architecture and Construction of the Republic of Latvia 12 September 1991, requirements for building envelopes were significantly increased.
Since 2003	LBN 002-2001 "Thermal Engineering of Building Envelopes"[5] comes into force stipulating thermal engineering requirements for building envelopes. In this period, buildings with large glass surfaces emerged; therefore, the respective buildings usually do not meet the requirements of the LBN. However, in the residential buildings sector, use of dominating glass surfaces in building's design is not typical.

Summary of breakdown of multi-dwelling residential buildings by number of floors and construction period of the building has been provided in Tables 3 and 4, on the basis of the NREC IS data. By number, wooden buildings built until 1941 form the largest proportion of multi-dwelling residential buildings, whereas, by the dwelling-space, 3 to 5 storey buildings built from 1961 to 1992 form the largest proportion[2].

Table 3. Breakdown of multi-dwelling residential buildings by number of floors (buildings with wooden exterior walls are accounted for separately), number[2]

	Until 1941	**1941–1960**	**1961–1979**	**1980–1992**	**1993–2002**	**After 2003**	**Total**
With wooden exterior walls	8,332	1421	440	59	17	8	**10,277**
1–2 floors	5,244	2,818	2,998	605	57	62	**11,784**
3–5 floors	2,514	903	5,294	3,373	226	196	**12,506**
6 and more floors	496	22	514	854	62	100	**2,048**

Table 4. Breakdown of multi-dwelling residential buildings by number of floors (buildings with wooden exterior walls are accounted for separately), million m^2 [2]

	Until 1941	**1941–1960**	**1961–1979**	**1980–1992**	**1993–2002**	**After 2003**	**Total**
With wooden exterior walls	2.29	0.33	0.11	0.017	0.004	0.005	**2.76**
1-2 floors	1.84	1.12	1.53	0.43	0.042	0.042	**5.00**
3-5 floors	2.98	1.50	14.13	9.27	0.53	0.56	**28.97**
6 and more floors	1.38	0.11	2.67	4.71	0.34	0.58	**9.80**

The breakdown of multi-dwelling residential buildings by number and area depending on their construction period is shown in Figures 1a and 1b. The largest number of multi-dwelling buildings has been built in the period until 1940 (38 %), which, in terms of area, is the second category (26 %), whereas the largest number of multi-dwelling buildings, in terms of area, has been built over the period from 1961 to 1979, i.e. 30 %, which, in terms of number, forms only 17 % of all the multi-dwelling buildings built. The

[5] The Cabinet of Ministers Regulations No. 495 of 27/11/2001 "Regulations on Latvian Construction Standard LBN 002-01 "Thermal Engineering of Building Envelopes""
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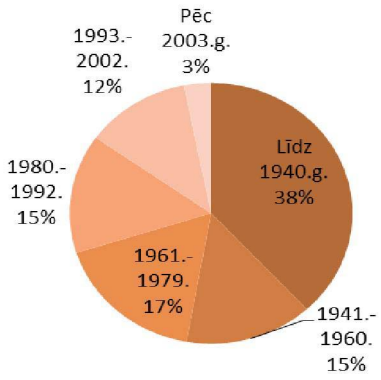
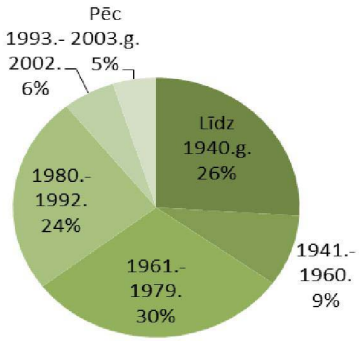
share of new buildings built after 2003 in terms of both number and area is the smallest, i.e. only 3 % of the number and 5 % of the area of the multi-dwelling buildings built.

Figure 1a. Breakdown of multi-dwelling residential buildings by number depending on their construction period (source – NREC IS)[2]



After 2003
Until 1940

Figure 1b. Breakdown of multi-dwelling residential buildings by area depending on their construction period (source – NREC IS)[2]



After 2003
Until 1940

The number and area of non-residential buildings depending on their construction period have been summarised in Table 5. In terms of number, the largest percentage of non-residential buildings consists of office buildings built in the period until 1941, in terms of area – wholesale buildings built in the period from 1961 to 1980.

Table 5. Breakdown of non-residential buildings by their construction period, their number and area in million m^2 [6]

Construction year	**Until 1941**		**1941–1961**		**1961–1980**		**1980–1993**		**After 2003**	
Building type	Number	Total area m^2	Number	Total area m^2	Number	Total area m^2	Number	area, m^2	Number	Total area m^2
Office buildings	*1,799*	*1,605,317.50*	*734*	*437,294.15*	*1,735*	*1,441,559.93*	*1,276*	*1,097,348.80*	*554*	*1,799.00*
Education and science buildings	*970*	*1,208,085.90*	*407*	*555,973.32*	*1,127*	*2,069,065.71*	*617*	*1,439,981.46*	*137*	*970.00*
Medical or health care institution buildings	*446*	*421,813.01*	*152*	*97,828.24*	*304*	*594,917.80*	*209*	*523,600.60*	*49*	*446.00*
Hotels and other temporary accommodation buildings	*539*	*329,375.44*	*227*	*156,056.00*	*1,092*	*508,342.85*	*965*	*485,575.88*	*523*	*539.00*
Sports buildings	*52*	*38,656.50*	*39*	*28,952.60*	*211*	*151,512.20*	*224*	*174,217.60*	*143*	*52.00*
Wholesale buildings	*1,329*	*586,931.70*	*688*	*201,075.76*	*1,447*	*759,636.53*	*892*	*468,670.30*	*1,325*	*1,329.00*

c) Climatic zones

The Latvian Construction Standard LBN 003-01 "Construction Climatology" defines climatological indicators applicable in construction, including engineering research, construction design, and in the performance of construction work, also the climatological indicators to be used in repair, renovation and reconstruction of buildings.

Climatological indicators of any geographical point in Latvia for the purposes of construction are determined using the climatological indicators of the closest geographical point included in the tables in Annex 1 of the above construction standard.

In accordance with LBN 003-01 "Construction Climatology", climatological indicators have been defined for the following agglomerations: Ainaži, Alūksne, Daugavpils, Dobele, Liepāja, Mērsrags, Priekuļi, Rīga, Stende, Zīlāni[7].

d) Combinations of types and age of buildings and climatic zones

No statistics are collected on the combinations of types and age of buildings and climatic zones with respect to residential and non-residential buildings in Latvia. See information on breakdown of buildings by their type, age and external walls material in Subsections a, b, c and g of this Section.

[6] Report for compliance with Article 5(2) of Directive 2010/31/EU on energy efficiency of the European Parliament and of the Council.

[7] Latvian Construction Standard LBN 003-01 "Construction Climatology".

e) Breakdown of buildings by ownership rights

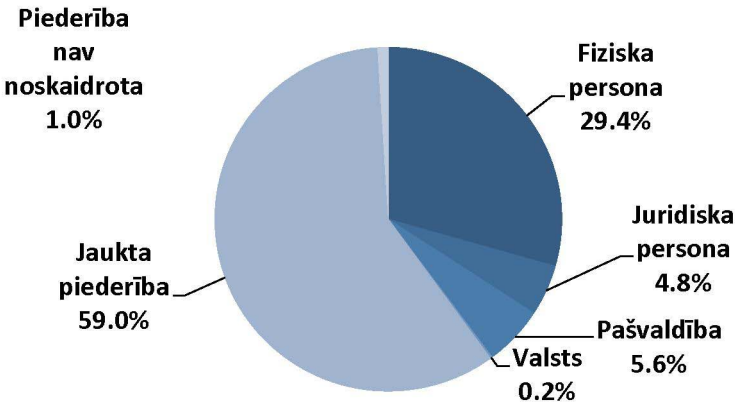
The breakdown of residential buildings by ownership shows that, in accordance with NREC IS data, the largest proportion of buildings – 303 thousand (86.1 %) – are owned by natural persons, 25.6 thousand (7.2 %) residential buildings are owned by owners with various statuses (mixed ownership), 7.7 thousand are owned by legal entities, 5.4 thousand (1.5 %) are owned by local governments and 0.37 thousand (0.1 %) are owned by the State, while the ownership status of 10.2 thousand (2.9 %) buildings has not been clarified[2].

Table 6. Breakdown of buildings by ownership status, number[2]

Owner / Type of residential building	Natural person	Legal entity	Local government	State	Mixed ownership	Ownership not clarified	Total
Single-dwelling buildings	282,380	5,257	2,447	163	832	9,617	300,696
Two dwellings buildings	9440	427	407	12	1919	160	12365
Three and more dwellings buildings	11348	1846	2170	73	22780	382	38599
Buildings of various social groups	79	150	325	125	14	13	706
Total	303247	7680	5349	373	25545	10172	352366

In the multi-dwelling residential buildings sector, the largest proportion, i.e. 59.0 %, is formed by buildings with a mixed ownership status, while 29.4 % are owned by natural persons. The percentages of multi-dwelling residential buildings by ownership are illustrated in Figure 2.

Figure 2. Breakdown of multi-dwelling residential buildings by ownership status[2]



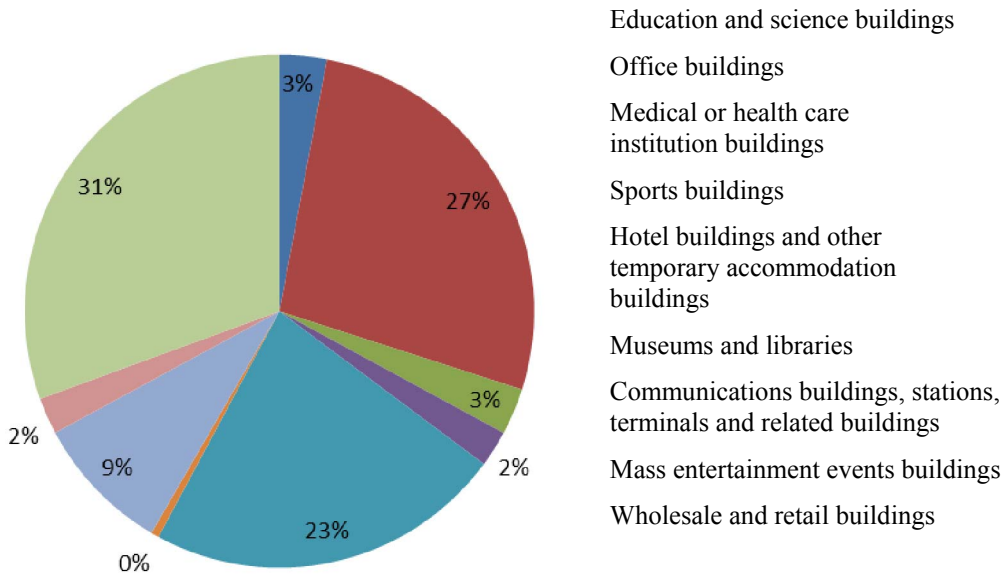
Ownership has not been determined 1.0 %
Natural person 29.4 %
Legal entity 4.8 %
Local government 5.6 %
State 0.2 %
Mixed ownership 59.0 %

In the context of non-residential buildings, there are 7,141 public buildings, including 2,174 State owned and 4,967 local government owned buildings (see the breakdown in Table 7). In terms of number and area, the main type of buildings owned by the State and local governments is education and science buildings - altogether 3,209 buildings with an area of 5,834,164 m^2. Breakdown of non-residential buildings owned by natural persons, legal entities or with mixed ownership by their main type of utilisation is illustrated in Figure 3.

Table 7. Number of public State and local government owned buildings by ownership status[2]

Main type of utilisation	**State owned**		**Local government owned**		**Total**	
	Number	**m^2**	**Number**	**m^2**	**Number**	**m^2**
Education and science buildings	638	1,333,617	2,571	4,500,547	3,209	5,834,164
Office buildings	633	694,188	1,055	741,035	1,688	1,435,223
Medical or health care institution buildings	310	601,290	375	349,618	685	950,908
Sports buildings	136	134,322	394	434,416	530	568,737
Hotel buildings and other temporary accommodation buildings	267	441,999	201	111,740	468	553,738
Museums and libraries	104	103,193	244	123,026	348	226,218
Communications buildings, stations, terminals and related buildings	86	25,377	127	33,701	213	59,078
Total	2,174	3,333,984	4,967	6,294,081	7,141	9,628,066

Figure 3. Number of buildings owned by natural persons and legal entities and of mixed ownership by their type of utilisation (%)[8]



f) Breakdown by location

Breakdown of buildings by their location has been summarised in Tables 8 and 9 for residential buildings and in Table 10 for non-residential buildings, including auxiliary buildings, as registered in NREC IS.

The breakdown of residential buildings by location in accordance with Tables 8 and 9 shows that the total area of residential buildings in Latvia is 87,006.4 thousand m^2, whereas 50.3 % of the total area of residential buildings is located in Riga (25,177.8 thousand m^2, 28,601 buildings) and Riga's suburbs (18,574.7 thousand m^2). Three and more dwellings residential buildings make up 58 % of the total area of residential buildings (50,447.5 thousand m^2, 39,106 buildings), one dwelling buildings – 39 % (33,516.7 thousand m^2, 299,866 buildings), two dwellings buildings and buildings without a division in dwellings form 3 % (respectively 1,895.2 thousand m^2 and 1,147.1 m^2) of the total area of residential buildings.

The number of non-residential buildings, in accordance with the State Land Service data of January 2014, is 997,913 buildings.

Table 8. Breakdown of total area of residential buildings by location (thousand m^2), 2009[8]

Location	Total area of residential buildings	Single-dwelling buildings	Two dwellings buildings	Three and more dwellings buildings	Without a division in dwellings
Latvia					
	87,006.4	33,516.7	1,895.2	50,447.5	1,147.1
Regions					
Riga	25,177.8	1,890.5	382.7	22,549.8	354.8
Riga's suburbs	18,574.7	10,860.9	509.2	7,044.2	160.3
Vidzeme	9,386.6	5,271.6	206.0	3,763.7	145.4

[8] Central Statistical Bureau data.

Kurzeme	11,587.1	4,615.9	309.8	6,490.3	171.2
Zemgale	10,066.5	4,822.9	149.0	4,902.7	192.0
Latgale	12,213.6	6,054.9	338.6	5,696.8	123.4
Republic importance cities					
Riga	25,177.8	1,890.5	382.7	22,549.8	354.8
Daugavpils	3155.6	643.1	136.2	2347.6	28.6
Jelgava	2080.2	721.4	7.6	1272.9	78.2
Jēkabpils	880.3	249.8	19.2	596.5	14.8
Jūrmala	2590.3	1155.2	124.2	1281.1	29.7
Liepāja	3084.7	358.3	68.1	2607.4	50.8
Rēzekne	1034.3	228.2	42.7	738.8	24.6
Valmiera	924.3	285.2	18.1	595.6	25.4
Ventspils	1346.7	326.7	68.5	945.9	5.6

Table 9. Breakdown of the number of residential buildings by location, 2009[8]

Location	Total number of residential buildings	Single-dwelling buildings	Two dwellings buildings	Three and more dwellings buildings	Without a division in dwellings
Latvia					
	352,087	299,866	12,320	39,106	795
Republic importance cities					
Riga	28,601	14,279	2,264	11,913	145
Daugavpils	9,780	6,965	1,248	1,556	11
Jelgava	7,964	7,204	54	681	25
Jēkabpils	3,042	2,495	147	391	9
Jūrmala	9,582	7,734	743	1070	35
Liepāja	5,409	2,871	402	2117	19
Rēzekne	2,994	2,109	371	506	8
Valmiera	2,669	2,074	118	453	24
Ventspils	4,761	3,377	549	828	7

Table 10. Breakdown of the number of non-residential buildings by location, 2014[8]

Latvia								
997,913								
Riga	Daugavpils	Jelgava	Jēkabpils	Jūrmala	Liepāja	Rēzekne	Valmiera	Ventspils
47,143	24,801	11,925	8,772	19,238	16,824	11,470	4,650	17,065

g) Energy use and efficiency characteristics of each building combination

i) Type of construction of the main elements of a building and U value

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

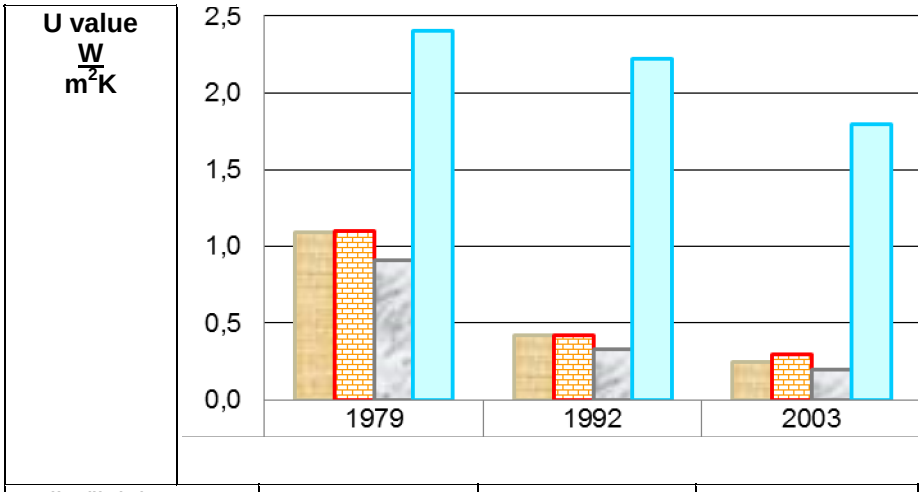
Changes to legal requirements for thermal engineering of building envelopes since 1979 have been listed in Table 11, and a comparison of individual requirements has been summarised in Figure 4.

Table 11. Heat transfer coefficient U standard values for residential building envelopes and energy consumption for heating in buildings constructed in compliance with the standard[2]

Construction elements	1980	1992	2003

Roofs and ceilings that come into contact with outside air	W/ (m^2-K)	0.90	0.25–0.40	0.2 k*
Floors on the ground		-	0.5	0.25 k
Exterior walls weighing less than 100 kg/m^2		1.1	0.33–0.50	0.25 k
Exterior walls weighing 100 kg/m^2 more				0.3 k
Windows, doors		2.4	1.9–2.4	1.8 k
Thermal bridges		-	-	0.2 k
*Temperature factor **k** = 19/($T_{int.}$– $T_{ext.}$); depending on the climatic zone, **k** for residential buildings is from 0.95 (Liepāja) to 1.09 (Alūksne).				
Energy consumption for heating k Wh/m^2/year		150–200	100–130	70–90

Figure 4. Changes to the legal requirements regarding for thermal engineering of building envelopes since 1979[2]



Walls (light)	1.1	0.42	0.25
Walls (solid)	1.1	0.42	0.30
Roofs/ceilings	0.9	0.33	0.2
Windows	2.4	2.2	1.8

For both pre- and post-war buildings, the properties of building envelopes are usually based on construction physics calculations that have been made for the purpose of preventing formation of moisture on the interior surface of the external walls in order to prevent freezing through. For correctly constructed buildings, the heat transfer coefficient U value is usually at least 1.3 [W/(m^2 K)]. Studies show that thermal characteristics of building envelopes of standard design buildings constructed during the Union of Soviet Socialist Republics (USSR) are usually in the 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)][9].

The stock of multi-dwelling residential buildings in Latvia consists of 38.6 thousand buildings with a total area of 50.4 million m^2, of which a majority (98 % by number and 95.5 % by area) were built by 1993, before the significantly higher requirements for thermal engineering of building envelopes were set and thus the buildings have a low energy efficiency level. Considering the climatic conditions, the needs of buildings related to heating in Latvia (4035 heating-degree days) are significantly higher than on average in Europe (3067 heating-degree days)[10]. Only 3 % by number and 5 % by area of the buildings were built after 2003 and may be considered to be compliant with the thermal engineering requirements applicable at the moment. Buildings constructed from 1993 to 2002 have only slightly lower thermal engineering properties. At the same time, it should be noted that the legal thermal engineering requirements are not always met due to both the low quality of construction works and errors in construction designs.

Among the earlier constructed buildings, the buildings fully reconstructed or renovated after 2003 should fully meet the thermal engineering requirements applicable at the moment. By examining the data of the Central Statistical Bureau (CSB) about the issued construction permits for reconstruction of residential buildings it may be concluded that since 2003, 2–3 % of one-dwelling buildings and 1–2 % of two and more dwellings buildings have

[9] A. Jakoviès, S. Gendelis, H. Truemmann. Analysis of heat losses from typical buildings in Riga. International scientific colloquium 'Modeling for saving resources' – Riga, 2001, pp 190–197.

[10] http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg_esdgr_a&lang=en.
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been renovated.

An analysis of the constructed multi-dwelling buildings by the material of their external walls shows that by both the number and area the majority are brick wall buildings (43 % by number, 40 % by area). 29 % of residential buildings are wooden buildings, whereas by area 26 % are reinforced concrete/concrete buildings and 20 % are brick/slab buildings. 1 % by area and 2 % by number are constructed of other materials (Figures 5a and 5b).

Figure 5a. Breakdown of multi-dwelling residential buildings registered in the NREC IS by number depending on the material of external walls[2]

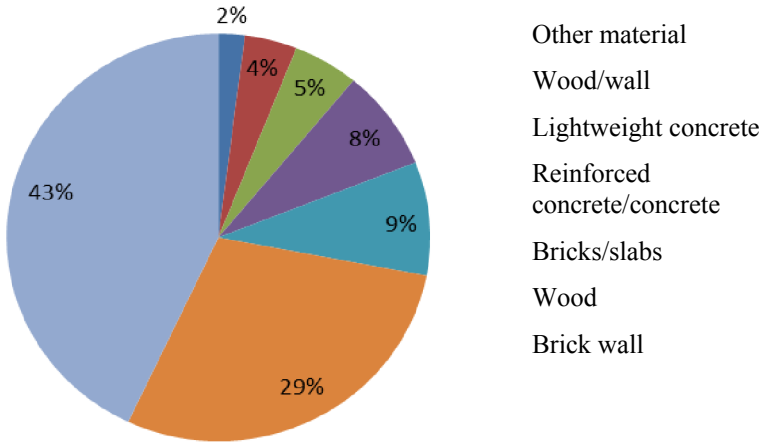
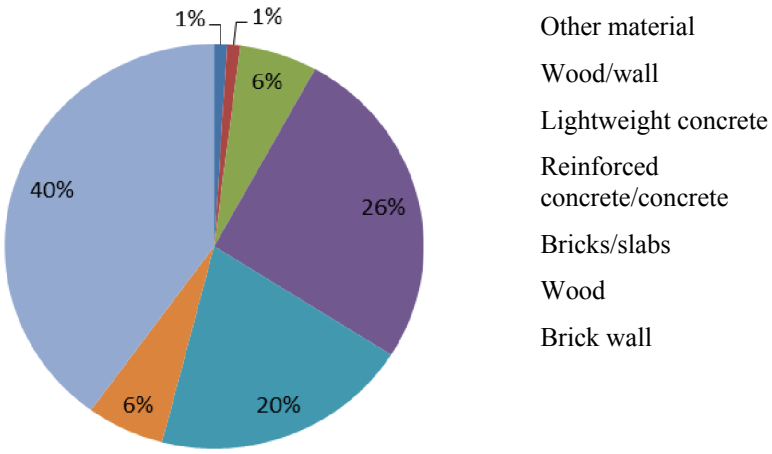


Figure 5b. Breakdown of multi-dwelling residential buildings registered in the NREC IS by area depending on the material of external walls[2]



ii) Air infiltration rate and

iii) Typical replacement life-cycles of energy systems

No statistics are collected in Latvia for residential and non-residential buildings regarding the air infiltration rate and typical replacement life-cycles of energy systems.

iv) Maintenance regimes (mandatory annual safety inspections/maintenance)

No statistics are collected in Latvia regarding inspections of heating systems (heating boilers) and air-conditioning systems in residential and non-residential buildings considering

that condition regarding mandatory inspections came into force rather recently, i.e. on 9 January 2013, when the new Law on the Energy Performance of Buildings and the Cabinet of Ministers Regulations No. 383 of 9 July 2013 "On Energy Performance Certification of Buildings" issued on the basis of the above Law came into force.

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

Inspection of the heating system includes assessment of heating boiler efficiency and heating boiler capacity. The heating boilers are inspected in accordance with Standard LVS EN 15378:2009 "Heating systems in buildings – Inspection of boilers and heating systems". An independent expert draws up the following documents regarding the inspection of the heating system:

- reports on the inspection of heating boilers of the heating system in accordance with Annex D of Standard LVS NE 15378:2009;

- a report on the inspection of the heating system in accordance with Annex K of Standard LVS NE 15378:2009.

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 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 regarding inspection of the air-conditioning system.

An air-conditioning system is inspected:

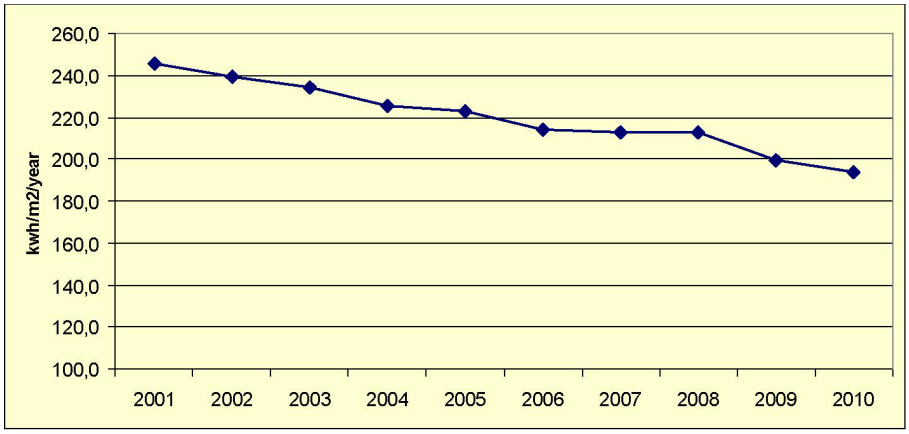
- At least once every six years where the air-conditioning system is equipped with operation and control devices that ensure monitoring and control of electronic systems;

- At least once every four years in other cases.

v) Energy consumption in buildings

In the Republic of Latvia, the largest end-consumer of energy is the household sector, which in 2010 consumed 35.5 % of the total final energy consumption. Of the energy consumption of households, approximately 85 % is used for heating and hot water generation.

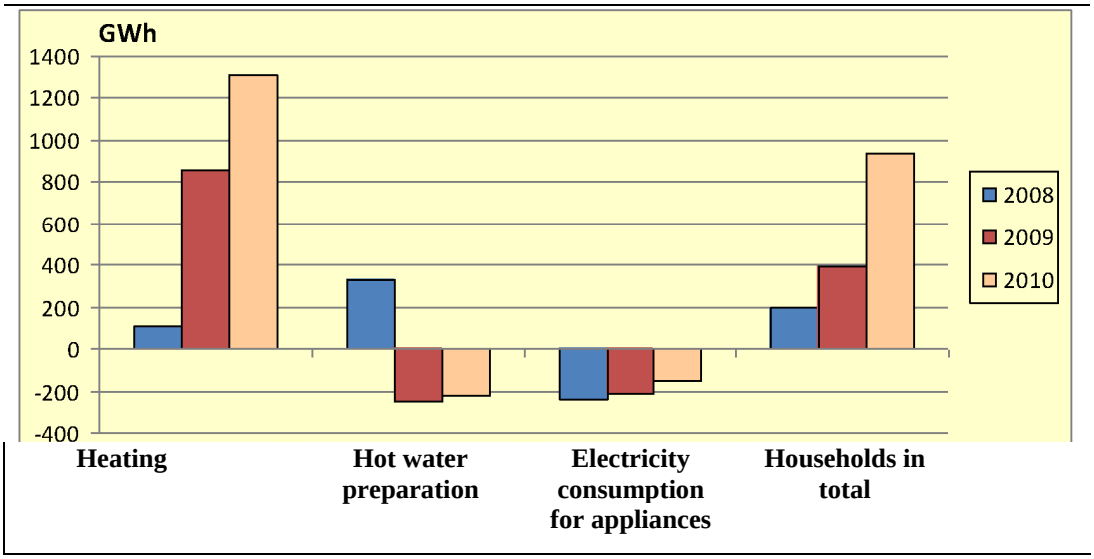
Figure 6. Indicator of energy consumption for heating in households (with climatic factor adjustment), kWh/m^2/year[11]



[11] Energy Efficiency Monitoring Report for 2011, http://www.em.gov.lv/em/2naV?cat=30173. EMZinoPielik2_150514_Buildings renovation strategy LV.docx; Ēku renovācijas ilgtermiņa stratēģija 2014. – 2020.gadam

The indicator value for the consumption of heating energy calculated on the basis of energy consumption and total dwelling-space in households shows a positive development trend over a period of 10 years. The energy efficiency measures implemented on the basis of both residents' own funds and various programmes supporting the enhancement of energy efficiency of multi-dwelling residential buildings have contributed to this positive trend. However, it is also clear heating energy consumption is also reduced by residents limiting their consumption of thermal energy which is related to the low paying capacity and the decreased comfort level in dwellings. Information regarding energy savings in households from 2008 to 2010 for heating, hot water preparation, electric appliances and households in total is provided in Figure 7.

Figure 7. Energy savings in households from 2008 to 2010, GWh[11]



Changes in the final energy consumption of the residential buildings sector since 2000 have been illustrated in Figure 8. In accordance with the Central Statistical Bureau data regarding energy consumption and area of the stock of residential buildings in 2009, the following indicators of final energy consumption of households have been calculated:

- Average total[12] consumption:
  - actual – 292 kWh/m^2;
  - adjusted with climate correction – 287 kWh/m^2;
- Average consumption for heating and hot water per dwelling-space:
  - actual – 250 kWh/m^2;
  - adjusted with climate correction – 244 kWh/m^2;
- Average consumption for heating per dwelling-space:

[12] Total consumption of thermal energy and electricity.

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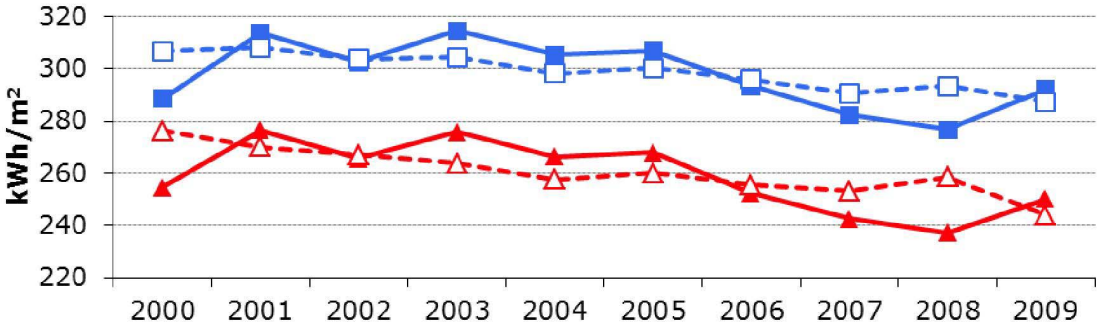
- actual – 197 kWh/m^2;

- adjusted with climate correction – 193 kWh/m^2.

Figure 8. Energy consumption of households per dwelling-space (kWh/m^2/year)[2]



Average final energy consumption of households per dwelling-space (actual)

Average final energy consumption of households per dwelling-space (adjusted with climate correction)

Average final energy consumption of households for heating and hot water per dwelling-space (actual)

Average final energy consumption of households for heating and hot water per dwelling-space (adjusted with climate correction)

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 that would promote enhancement of energy efficiency of the residential buildings stock[2].

No statistics are collected in Latvia regarding energy consumption of non-residential buildings.

vi) Energy carriers
(1) Gas
(2) Liquid fuels
(3) Solid fuels

Tables 12 and 13 of the Strategy show data on energy source consumption in households in 1996, 2001, 2006 and 2010. Analysis of the collected data on energy source consumption in households leads to a conclusion that the most used energy source in accordance with the CSB data in 2010 was wood, the consumption of which comprises 45 % of all energy sources (28,964 TJ), whereas the second was electricity (6,977 TJ, 11 %), and the third was natural gas (8 %, 5,219 TJ).

Table 12. Energy source consumption in households, including consumption in farms and other economic activities (TJ)[13]

	1996	2001	2006	2010
Energy sources	71,251	61,674	64,910	64,872
Electricity	3,935	4,460	6,221	6,977
Natural gas	4,180	3,334	4,807	5,219
Liquefied petroleum gas	1,230	1,139	1,230	911
Petroleum products for heating and hot water	42	170	127	79
Coal	1,964	1,338	813	1,049
Wood	31,349	23,388	27,986	28,964
Wood briquettes	…	69	187	340
Wood pellets	…	…	36	252
Wood residues	…	7,062	2,956	1,126
Wood charcoal	…	…	30	60
Other solid fuel	241	…	…	35
Petroleum products for other purposes (except transport)	…	1,087	2,701	2,825
Thermal energy (for heating and hot water)	28,310	19,627	17,816	17,035

Table 13. Energy source consumption in households, including consumption in farms and other economic activities (physical units)[14]

	1996	2001	2006	2010
Electricity (thousand m^3)	1,093,112	1,238,669	1,727,979	1,938,167
Natural gas (t)	112,503	89,401	128,957	155,019
Liquefied petroleum gas (t)	27,300	25,066.5	26,879	19,995
Petroleum products for heating and hot water (t)	942.1	3,675.5	3,389.7	1,889.3
Coal (t)	69,016	47,287	31,164.5	40,022.8
Wood (thousand m^3)	4,678.7	3,485.8	4,176.7	4,323
Wood briquettes (t)	…	10,318.4	11,719.4	19,972.2
Wood pellets (t)	…	…	2,217.1	13,973.4
Wood residues (t)	…	737,749.8	309,236.2	117,600
Wood charcoal (t)	…	…	538.1	1,985.4
Other solid fuel (t)	16,652.7	…	…	2,438.2
Petroleum products for other purposes (except transport) (t)	…	25,453.6	63,471.4	66,331.9
Thermal energy (for heating and hot water) (GWh)	7,864	5,452	4,949	4,732

The number of households using wood fuel consuming equipment and the average age of the equipment (% of number of wood consuming households; years) are shown in Annex 1[15].

[13] Data of the Central Statistical Bureau's database, epm3.4 Energy sources consumption in households, including consumption in farms and other economic activities (TJ) (25/11/2013).

[14] Data of the Central Statistical Bureau's database, epm3.3 Energy sources consumption in households, including consumption in farms and other economic activities (physical units) (25/11/2013).

[15] Data of the Central Statistical Bureau's database, epm2.2 Number of households using wood fuel consuming EMZinoPielik2_150514_Buildings renovation strategy LV.docx; Ēku renovācijas ilgtermiņa stratēģija 2014. – 2020.gadam

Pursuant to the requirements of Article 5(5) of Directive 2012/27/EU of the European Parliament and of the Council on energy efficiency, the Ministry of Economics drew up a list of buildings with an area over 500 m^2 owned, possessed and used by State authorities. The data collected on energy carriers used in 904 State buildings have been summarised in Table 14. Data in the table show that gas a fuel is used in 192 State buildings with a total area above 500 m^2, liquid fuel (diesel) – in 31 buildings, solid fuel – in 144 State buildings, mixed – in 23 buildings.

Table 14. Type of fuel in State buildings with a total area above 500 m^2 [16]

Type of fuel	Number
Gas	
Natural gas	192
Liquid fuel	
Diesel	31
Solid fuel	
Coal	6
Woods, pellets, woodchip, grain	107
Coal, granules	2
Wood, coal	29
Other types of fuel	
Electricity	5
Thermal pump	1
District heating	458
Mixed fuel	
Coal, natural gas	4
Natural gas, diesel	1
Diesel, natural gas, wood	1
Diesel, wood	2
Gas, district heating	1
Gas, grain	2
Wood, district heating	1
Petroleum gas, wood	4
Heating use little, lack of data	7

No statistics are collected in Latvia about energy carrier in non-residential buildings (except the State buildings).

(4) Renewable fuels

Tables 12 and 13 of the Strategy list information regarding energy source consumption in households, which allows for the conclusion that consumption of renewable energy sources (wood, wood briquettes, pellets, residues) in 2010 was 30,682 TJ or 47 % of all energy sources consumed, which in total is 4,323 thousand m^3 of wood and 457,056 tonnes of wood briquettes, pellets and wood residues.

Pursuant to the requirements of Article 5(5) of Directive 2012/27/EU of the

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equipment and average age of the equipment (% of number of wood consuming households; years) (25/11/2013).

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

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European Parliament and of the Council on energy efficiency, the Ministry of Economics drew up a list of buildings with an area over 500 m^2 owned, possessed and used by State authorities (list of buildings available at: http://em.gov.lv/em/2nd/?cat=30273). Results collected show that in total, out of 904 State buildings, 109 use renewable energy sources (RES) for heating.

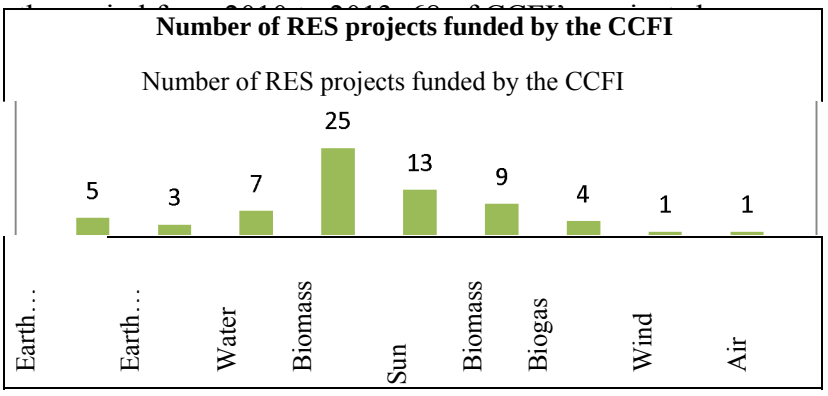
Table 15 summarises information about the types of RES used for heating in the State buildings with a total area above 500 m^2.

Table 15. RES utilisation for heating in the State buildings with a total area above 500 m^2 [16]

Type of RES fuel	**Number of buildings**
Pellets	6
Pellets/grain	1
Wood	89
Wood/district heating	1
Wood/pellets	2
Woodchip	9
Thermal pump	1
Total	109

No statistics are collected in Latvia about the utilisation of renewable energy sources in non-residential buildings (except State buildings), nor are statistics collected about the implemented projects using the funds of the Climate Change Financial Instrument (CCFI). With CCFI's support several project tenders have been in the framework of which support is provided to RES. Table in Annex 2 of the Strategy[17] summarises information about the implemented projects, funding volume, reduction of CO2 emission and the planned results of project monitoring.

Analysis of the data in the table shows that in Latvia over



The measures implemented using RES are mainly related to the transition from fossil energy sources to renewables using biomass, as well as to setting up solar collectors for hot water preparation using solar energy. Water as RES is being used in the framework of modernisation measures project of a hydro-electric power plant thus increasing the generated electricity capacities, while earth heat is being used for thermal energy generation as a result

[17] Data provided by the Environmental Investment Fund regarding renewable energy sources in the framework of projects implemented by the CCFI's tenders, 11/12/2013.
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of reconstruction of a boiler room.

(5) District heating

A modern heat supply company normally is a multifunctional energy company that relies on cogeneration and sometimes even on trigeneration and provides heat supply services[18].

District heating is especially actively introduced in countries such as Latvia where there is a sufficiently long heating period and where all or part of fuel for heat supply has to be imported.

Depending on the type of energy generation and the technological solution, energy sources are used with a different efficiency factor that affects the effectiveness of the utilisation of such sources. Fuel is most effectively used at a cogeneration plant where simultaneous generation of heat and electricity takes place. Effective utilisation of fuel is also ensured by boiler rooms of district heat supply systems with woodchip boilers, while the lowest effectiveness is typical for furnaces and boilers in autonomous heating systems of private houses and apartments that use wood as fuel.

Taking into account the efficiency factor of technological equipment, not all energy contained in primary energy sources can be converted into thermal energy and electricity. Therefore losses in energy generation and transmission have to be taken into consideration, and the volume of energy supplied to the consumers will be smaller.

Improved effectiveness of district heat supply systems also plays a crucial role in ensuring competitiveness of district heating supply companies, which, in its turn, is a prerequisite for utilisation of opportunities and advantages provided by district heat supply systems both in electricity generation and reduction of environmental impact, as well as improving comfort and quality of life for the thermal energy consumers.

Collected data shows that since 2010, in all cities of republic importance, measures to improve energy efficiency of district heat supply systems have been implemented every year, including in both the generation cycle and routes, as a result of which the effectiveness of thermal energy sources and transmission system has been increased so that, in its turn, it allows for reducing the growth rate of thermal energy costs.

With respect to local governments of counties, it may be concluded that comparatively fewer measures to improve energy efficiency of district heating supply systems have been implemented in a group of local governments with up to 50 users; this may be explained by the fact that these heat supply companies are small and therefore resources to implement the measures to improve energy efficiency are restricted.

Amongst the groups of county local governments, measures to improve energy efficiency of district heating supply systems have been most actively carried out in a group with over 500 users, where, during the heating season of 2012/2013, in half of local governments or county territorial units, measures to improve energy efficiency of district heating supply systems have been implemented in both the generation cycle and routes.

Table 16. Measures to improve energy efficiency of district heating supply systems implemented by local governments (%)[19]

Number of users	**Time period**		
	01/10/2010-	01/10/2011-	01/10/2012-01/09/2013

[18] Possibilities of increasing energy efficiency of heat supply companies, Rîgas Siltums, Riga, 2009.

[19] Informative report on situation with respect to heat supply services in 2013, http://em.gov.lv/em/2nd_print/?lng=lv&cat=30702&id=0&m=0&d=0&y=0&days=0.
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			In generation cycle	In routes
Number of users up to 50	14 %	23 %	32 %	3 %
Number of users from 50 to 500	33 %	40 %	31 %	22 %
Number of users above 500	55 %	56 %	49 %	49 %

2. Cost-Effective Approach in Building Renovation

The requirement regarding calculations of cost-optimal levels of minimum energy performance requirements and submission of a report to the European Commission 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 Commission 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 Ministry of Economics prepared and sent to the European Commission (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 building categories: multi-dwelling residential buildings, single-family houses, offices, kindergartens, schools, hospitals and office buildings.

Calculations included in the report show that the minimum energy performance requirements in force do not meet optimum minimum energy performance requirements with respect to a part of the buildings and construction elements. Taking into account that Article 5(3) of Directive 2010/31/EU on the energy performance of buildings stipulates that "If the result of the comparison performed in accordance with paragraph 2 shows that the minimum energy performance requirements in force are significantly less energy efficient than cost-optimal levels of minimum energy performance requirements, the Member State concerned shall justify this difference in writing to the Commission in the report referred to in paragraph 2, accompanied, to the extent that the gap cannot be justified, by a plan outlining appropriate steps to significantly reduce the gap by the next review of the energy performance requirements as referred to in Article 4(1)", the Ministry of Economics in the report sent to the EC, noted that Latvia, by 1 July 2014, is planning to propose amendments to the Cabinet of Ministers to the Cabinet of Ministers Regulations No. 495 of 27 November 2011 "Regulations on Latvian Construction Standard LBN 002-01 "Thermotechnics of Building Envelopes"" (hereinafter "LBN 002-01"), in order to approach the cost-optimal levels of minimum energy performance requirements.

On 8 April 2014, the Cabinet of Ministers adopted amendments "Amendments to the Cabinet of Ministers Regulations No. 495 of 27 November 2001 "Regulations on Latvian Construction Standard LBN 002-01 "Thermotechnics of Building Envelopes"" that came into force on 22 April 2014. The approved amendments to LBN 002-01 with respect to changes of normative U values for construction elements of buildings approximate the normative U values to the cost-optimal levels of minimum energy performance requirements for the calculated U values[20].

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 Ministry of Economics' website, which may be accessed by following this link:

[20] 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.
EMZinoPielik2_150514_Buildings renovation strategy LV.docx; Ēku renovācijas ilgtermiņa stratēģija 2014. – 2020.gadam

http://www.em.gov.lv/images/modules/items/Cost%20optimal%20December%202013%20public.pdf.

3. Policy and Measures for Promotion of Building Renovation

a) Evaluation of existing measures and policy

i) Regulation

The enhancement of energy performance of buildings plays a significant role in reaching the goals set in the field of energy efficiency in the policy documents of the EU and Latvia.

The energy performance of buildings policy and goals to be reached has been defined in the following policy documents:

- Energy Development Guidelines for 2007–2016 (approved with the Cabinet of Ministers Order No. 571 of 1 August 2006, amended with the Cabinet of Ministers Order No. 246 of 8 May 2008);

- Second National Energy Efficiency Action Plan of the Republic of Latvia for 2011–2013 (approved with the Cabinet of Ministers Order No. 460 of 16 September 2011);

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

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

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

- Operational Programme "Infrastructure and Services" for 2007–2013 (approved with the European Commission's Decision K(2007)6381) of 10 December 2007 and Programme Supplement "Infrastructure and Services" for 2007–2013 (approved with the Cabinet of Ministers Order No. 236 of 29 April 2008);

- Partnership Agreement for the European Union Funds 2014–2020 programming period (approved with the Cabinet of Ministers Order No. 1 of 2 January 2014) and Operational Programme "Growth and Employment" for 2014-2020 programming period (approved with the Cabinet of Ministers Order No. 71 of 17 February 2014) (hereinafter "OP");

- "Concept of the transposition into national law the requirements of the 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);

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

Point 149 of the Energy Development Guidelines for 2007–2016 defines goals of the policy to be reached in the field of energy performance of buildings... "over the period until 2016, the average specific consumption of thermal energy[21] in buildings from 220-250 kWh/m^2/year to 195 kWh/m^2/year. Implementation of measures for improvement of energy performance in buildings will have to be continued also after the end of the period of these guidelines and, by 2020, a target of average specific consumption of thermal energy of 150 kWh/m^2/year will have to be met." In order to reach the policy goal, Point 163 states that „Support for investments in improvement of energy efficiency in the residential buildings sector and for wider utilisation of renewable energy sources in all types of heat supply must be available irrespective of property form and consumer group (households, merchant, public sector). Support to investments in the improvement of energy efficiency in the residential buildings sector will be provided in accordance with the building's energy performance improvement measures plan developed as a result of the building's energy audit."

A goal of the Second National Energy Efficiency Action Plan of the Republic of Latvia for 2011–2013 is to increase energy efficiency in the sectors of final energy consumption and energy conversion. The plan summarises energy efficiency measures directed towards rational use of energy and environmental conservation. In the Second National Energy Efficiency Action Plan of the Republic of Latvia for 2011–2013, a goal was defined, namely to ensure availability and sufficiency of energy for all residents by improving the energy supply infrastructure and extensively implementing energy efficiency measures in the consumers sector thus meeting a target of energy savings of 1,896 GWh in 2013. The Second National Energy Efficiency Action Plan of the Republic of Latvia for 2011–2013 also set a goal to introduce energy efficiency improvement measures in the services sector by implementing energy efficiency improvement measures in tertiary education buildings and local government buildings, by implementing complex solutions for reduction of greenhouse gas (GHG) emissions in the State and local governments buildings of vocational education institutions and by building at least 20 low energy consumption buildings.

In accordance with the direction of action "Energy Efficiency and Generation" of the NDP's goal of priority "Sustainable growth of Latvia's economy with increasing national competitiveness in international markets", several goals for the improvement of energy performance of buildings have been defined. These include support to energy performance measures in the sector of State and local governments public buildings, energy performance of residential buildings and the transition to renewable energy sources.

Improvement of energy performance and the reduced energy consumption of buildings play a significant role in the National Reform Programme of Latvia for the

[21] Thermal energy for heating and hot water preparation.
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Implementation of the "Europe 2020" strategy for reaching the interrelated sustainable development targets by 2020 defined therein. The goals defined in the programme are increased energy efficiency, increased percentage of renewable energy and reduction of greenhouse gas emissions. Improvement of energy performance and reduced energy consumption of buildings play a significant role for reaching the interrelated sustainable development targets defined in the "Europe 2020" strategy and the European "Energy 2020" strategy. European Union has defined the quantified targets for the Member States for 2020, namely to reduce greenhouse gas emissions by 20 %, increased energy efficiency by 20 % and ensure percentage of 20 % of renewable energy sources in the overall gross final energy consumption. On 10 November 2010, the European Commission adopted Communication ""Energy 2020" – a strategy for competitive, sustainable and secure energy" that defines energy priorities for the coming years and action necessary for energy savings, creation of a secure and competitive market, technology development and effective cooperation with international partners. In accordance with the conditions of the "Europe 2020" strategy, Member States approve national programmes. To meet the conditions, at the sitting of the Cabinet of Ministers of 16 November 2010, the National Reform Programme of Latvia for the Implementation of the "Europe 2020" strategy was approved (minutes No. 64, § 57) defining the following goals: increasing energy efficiency, increasing percentage of renewable energy and reduction of greenhouse gas emissions[2].

Latvia's Energy Long-Term Strategy 2030 defines the main energy policy goals and directions of action, including improvement of the energy performance of public and residential buildings. As one of the policy performance indicators to be met, the Strategy 2030 envisages that by 2030 the average consumption of thermal energy for heating will be reduced by 50 % against the current indicator, which is approximately 200 kWh/m^2/year with climate correction (in 2009 – 202 kWh/m^2).

The Partnership Agreement approved by the Cabinet of Ministers On 17 December 2013 and the OP approved on 4 February 2014 envisage goals to be met for EU Fund investments and funding allocation stipulating that, in the 2014–2020 programming period, Latvia will have access to EU Fund investments in order to help introduce the EU Council's recommendations related to energy efficiency, greenhouse gas emission and renewable energy sources. In the 2014–2020 programming period, support is envisaged in the buildings sector for thermal insulation of multi-dwelling buildings, public buildings and industrial buildings and for the utilisation of renewable energy sources. The OP envisages that, in the public and multi-dwelling buildings sector, with EU Fund investments, the average thermal energy consumption for heating of 120 kWh/m^2 will be achieved by 2023.

The concept for the transposition into national law of the requirements of the 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 defines that, with a view to implementing Directive 2012/27/EU, Latvia has to achieve the indicative national energy efficiency goal in the framework of which two binding targets have to be met: 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 State owned building areas must be renovated. Since State owned buildings form a part of the country's final energy consumption, meeting the target of renovating 3 % of the central government buildings[22] contributes to reaching the overall savings of 1.5 % of final

[22] A central government building is a building owned or possessed by a direct public administration authority or its subordinated authority, where the functions of the direct public administration authority or its subordinated authority are being carried out. The definition of the central government buildings does not include buildings EMZinoPielik2_150514_Buildings renovation strategy LV.docx; Ēku renovācijas ilgtermiņa stratēģija 2014. – 2020.gadam

consumption. The requirements of Directive 2012/27/EU are, overall, directed towards building a national energy efficiency system that allows the country to gain energy savings in all fields of the energy sector, i.e. energy generation, transmission and end users.

Use of European Union Funds

EU funds can be considered the largest source of funding since 2009. In the framework of these funds, more than EUR 4 billion were made available in Latvia over the period until 2013, 11 % of which was allocated to the energy sector, including the promotion of energy efficiency. Although the total amount of funding in the energy sector was large, it is rather small for energy efficiency measures in the framework of which the renovation of buildings is permitted.

In the EU's 2007–2013 programming period, EU Fund financing is available in Latvia in the framework of the Programme "Infrastructure and Services" Supplement's Activity 3.4.4.1 "Improvement of heat insulation of multi-dwelling buildings" with total funding of EUR 89.29 million, including EUR 67.96 million of ERDF funding and EUR 21.43 million of overcommitments funding, and Activity 3.4.4.2 "Improvement of heat insulation of social residential buildings" with total funding of EUR 6.9 million.

The main benefits of the programme are thermal energy savings and cost savings, as well as improvement of energy performance of the stock of residential buildings.

The goal of Activity 3.4.4.1 "Improvement of heat insulation of multi-dwelling buildings" is to increase energy performance of multi-dwelling residential buildings in order to ensure sustainability of the stock of residential buildings and effective utilisation of energy sources. Until 30 May 2014, 902 contracts have been concluded for ERDF funding of EUR 79.44 million, of which 387 projects have been completed using ERDF funding of EUR 28.66 million. In total, 1,440 projects have been submitted. Analysis of the number of submitted projects by regions leads to a conclusion that the most active region with 401 submitted projects is Kurzeme Region, followed by Vidzeme Region with 314 project submissions. Average activity is maintained by two regions – Riga region with 307 project submissions and Zemgale Region from which 229 project submissions have been received. The smallest number of project submissions has been received from Latgale Region, i.e. 57 project submissions. Taking into account the number of residents and dwellings in Riga, the activity of this city with 132 project submissions can be considered to have remained low.

Due to the fact that applications for all available funding within the framework of the "Improvement of heat insulation of multi-dwelling buildings" Activity had been submitted by the middle of 2013, the acceptance of project submissions was halted on 31 July 2013. A sum of EUR 81.14 million has been allocated and earmarked (90 %).

The average thermal energy savings achieved as a result of the implementation of the renovation measures is in the range of 30 %, all the way up to 57 %; thus, thanks to the implementation of the activity, a significant increase in the energy performance of multi-dwelling residential buildings was obtained. Additionally, the stock of residential buildings was improved, an improvement which would not have happened if it were not for such a support.

The renovation process of buildings has also had a significant effect on the establishment of apartment owners' associations and apartment owners' cooperative associations, since in most cases, residents of a building want to deal with management issues of the building themselves when they agree on its renovation. According to the Ministry of Economics' estimates, taking

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owned or possessed by a public limited liability company, public joint stock company or capital company with a State share, if no public administration task is being carried out in the respective building.

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into account the total costs of completed projects and projects for the implementation of which contracts have been concluded, the construction sector has so far received approximately EUR 196 million from the implementation of this activity[2].

The goal of Activity 3.4.4.2 "Improvement of heat insulation of social residential buildings" is to increase the energy efficiency of the stock of social residential buildings of local governments by improving its quality and sustainability and by providing appropriate housing for groups of residents subjected to social exclusion risk.

Project submissions to receive funding can be submitted regarding social residential buildings owned by local governments and assigned a status of a social residential building in accordance with a decision of a local government. Funding was granted for the preparation of project documentation, project construction supervision and author supervision, reduction of the building's energy sources consumption, as well as renovation or reconstruction of the building (included if necessary for adjustments for functionally impaired persons). After completion of renovation or reconstruction, savings of thermal energy consumption of at least 20 % must be achieved.

Since the launch of the activity in May 2008, contracts for implementation of 55 projects have been concluded, of which 51 projects have been completed.

Climate Change Financial Instrument

The Climate Change Financial Instrument (CCFI) contains funds obtained by selling the State owned greenhouse gas emission units in compliance with the procedure stipulated in Article 17 of the Kyoto Protocol to the United Nations Framework Convention on Climate Change, that are used to eliminate climate change correspondingly to the principles and priorities defined in the Law "On Participation of the Republic of Latvia in the Flexible Mechanisms of the Kyoto Protocol".

The objective of the CCFI is to promote the prevention of global climate change, adjustment to the effects of climate change and reduction of greenhouse gas emission (for example, by implementing measures for improvement of energy performance of buildings in both public and private sectors, by developing and deploying technologies that use renewable energy sources, as well as by implementing integrated solutions for reduction of greenhouse gas emission). The Ministry of Environmental Protection and Regional Development is the discharge authority of the CCFI's budget programme.

Operation of the CCFI was launched in 2009 after, in the framework of the international emission trading, the first contracts were signed for the sale of assigned amount units (AAU). In total, by the end of 2013, in the framework of sale transactions, funding of approximately EUR 200 million was obtained, of which approximately EUR 126 million were allocated to project submission tenders for implementation of energy performance measure sin buildings.

The CCFI's funding has been allocated in accordance with the Cabinet of Ministers (hereinafter "the Cabinet") protocol decisions and used by organising project submission tenders in compliance with the approved Cabinet's regulations. CCFI's project submission tenders implemented in the buildings sector have been summarised in Table 17.

Table 17 CCFI's project submission tenders in the buildings sector for implementation of energy performance measures[23]

[23] Ministry's of Environmental Protection and Regional Development website. EMZinoPielik2_150514_Buildings renovation strategy LV.docx; Ēku renovācijas ilgtermiņa stratēģija 2014. – 2020.gadam

Name of the CCFI's project submission tender	Target audience	Project implementation term	Available CCFI's funding, EUR
Increasing energy performance of local governments' buildings[24]	Local governments of cities or counties of the Republic of Latvia	By 1 December 2010 (an extension by 1 year is possible)	33,810,935.91
Increasing energy performance of tertiary education institutions' buildings[25]	Tertiary education institutions accredited in the Republic of Latvia	By 1 December 2011 (an extension by 1 year is possible)	10,000,000
Complex solutions for reduction of greenhouse gas emissions in vocational education institutions' buildings[26]	State or local governments vocational education institutions	By 1 December 2011 (an extension by 1 year is possible)	16,988,821.92
Complex solutions for reduction of greenhouse gas emissions in production buildings[27]	Merchants established in the Republic of Latvia	By 1 December 2011 (an extension by 1 year is possible)	11,561,177.79
Complex solutions for reduction of greenhouse gas emissions in local governments' buildings[28] (Stage II)	Local governments of cities or counties of the Republic of Latvia	By 1 December 2011 (an extension by 1 year is possible)	24,909,124.02
Low energy consumption buildings[29] (project results are summarised in Annex 3)	Direct or mediated administration authorities, councils of local governments of cities or counties of the Republic of Latvia, merchants established in the Republic of Latvia and natural persons	By 1 November 2012 (an extension by 1 year is possible)	10,332,499.53
Utilisation of renewable energy sources in households sector (Stage II)	Owner of the residential building, association established by apartment owners of a multi-dwelling residential building	By 1 November 2012	5,879,586.02
Transition of technologies from fossil to renewable energy sources	Local governments and education institutions of cities or counties of the Republic of Latvia. Micro, small and medium merchants established in the Republic of Latvia, as well as scientific institutions registered in the register of scientific institutions	By 1 December 2011	11,423,307.21

[24] Cabinet's Regulations No. 645 of 25/06/2009.
[25] Cabinet's Regulations No. 1 of 05/01/2010.
[26] Cabinet's Regulations No. 417 of 05/05/2010.
[27] Cabinet's Regulations No. 521 of 08/06/2010.
[28] Cabinet's Regulations No. 542 of 21/06/2010.
[29] Cabinet's Regulations No. 1185 of 28/12/2010.

Utilisation of renewable energy sources in households sector	Owner of the residential building, association established by apartment owners of a multi-dwelling residential building	By 1 July 2012	16,220,000.17
Complex solutions for	Stage I: merchants established	By 30 April 2013	Stage I:
Development of technologies reducing the greenhouse gas emissions and implementation of pilot projects	Direct or mediated administration authority of the Republic of Latvia, derived public entity or a merchant established in the Republic of Latvia	By 1 December 2012	3,975,000.14

State and local governments support for implementation of measures to increase energy performance

Until now, involvement of the State or local governments budget funding for the implementation of energy performance measures of buildings has been rather low. This is due to budget restrictions, as well as the fact that the State and local government budget is programmed for periods of up to 3 years.

From 2009 to 2010, the Ministry of Economics implemented a national support programme for the improvement of energy performance of residential buildings. Programme funding was LVL 698 thousand and in the framework of the programme, support was granted for[31] the evaluation of energy performance of a multi-dwelling residential building (preparation of energy audit), evaluation of the technical condition of the building, preparation of construction design documentation of up to 80 % of the costs, as well as renovation of a multi-dwelling residential building of up to 20 % of the renovation project costs.

In some local governments of Latvia individual measures are being implemented, mainly related to the preparation of energy performance documentation of buildings. Local governments provide support for the implementation of energy performance measures of buildings in accordance with the binding regulations issued pursuant to Subparagraph (2)(4) and (5) of Section 27.[2] 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 the Cabinet of Ministers Regulations No. 891 of 22 November 2011 "Regulations on the national statistics review regarding assistance of local governments for solving housing matters" developed pursuant to the requirements of

[30] Cabinet's Regulations No. 559 of 14/08/2012.

[31] In accordance with the Cabinet of Ministers Regulations No. 59 of 05/08/2008 "Regulations on amount of State budget co-funding and its allocation procedure for energy performance measures in residential buildings". EMZinoPielik2_150514_Buildings renovation strategy LV.docx; Ēku renovācijas ilgtermiņa stratēģija 2014. – 2020.gadam

Law "On Assistance In Solving Apartment Matters", local governments of cities and countries must provide a review regarding the assistance of local governments for solving housing matters, including the provided assistance of local governments for renovation and restauration of residential buildings and for improvement of plots. Full reviews are available at the Ministry of Economics' website: www.em.gov.lv.

Table 18. Assistance of local governments for implementation of energy performance measures in residential buildings in 2012[32]

	Number of residential buildings	**Funding of local governments, EUR**
Riga city	13	101,979.43
Daugavpils city	18	34,933
Jēkabpils city	4	70,243
Jūrmala city	2	1,652,873.80
Liepāja city	5	5,586,808.03
Cēsis county	1	26,251
Ilūkste county	1	32,044
Kandava county	5	402,836.44
Mālpils county	1	74,736
Nīca county	1	53,497
Ogre county	1	140,622
Pļaviņas county	1	14,229
Salaspils county	4	590,889.51
Skrandas county	2	34,845
Tukums county	1	62,862
Ventspils county	1	11,274
Viļaka county	3	185,054.64
TOTAL:	64	9,075,977.85

ii) Taxes

The rules on the application of immovable property (incl. buildings) tax 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.

In determining the immovable property tax rate or rates, a local government shall comply with the following principles:

1) The principle of objective classification, according to which taxpayers or tax objects are grouped according to objective criteria;

2) The efficiency principle, according to which a local government commensurates tax administration expenditure with tax revenue;

3) The principle of responsible budget planning, according to which a local government balances the duties thereof with the resources necessary for the implementation thereof;

[32] Ministry of Economics' website: http://em.gov.lv/em/2nd/?cat=30270.
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4) The principle of predictability and stability, according to which tax rates are specified in a timely manner for a taxation period of at least two years, if the increase or reduction in the base value of the immovable property in comparison with the base values in taxation period and pre-taxation period is less than 20 per cent.

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 1998/2006 of 15 December 2006 on the application of Articles 87 and 88 of the Treaty to de minimis aid, valid until 30 June 2014. Local governments may grant tax benefits as *de minimis* aid in compliance with the conditions of Commission Regulation (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis* aid (Text with EEA relevance);

2) The principle of spatial development and improvement of 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, the local governments have been granted the powers of granting immovable property tax benefits. 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 benefits to persons residing within their territory.

If the local government has not issued the binding regulations by the defined deadline, immovable property tax rate for residential buildings and parts thereof is:

1) 1.5 per cent of the cadastral value of the immovable property for land, for engineering structures and buildings or parts thereof, excluding the immovable property tax objects referred to in Clause 2 and Paragraph $1.^2$ of Section 3 of the Law "On Immovable Property Tax";

2) For residential houses irrespective of whether they are or are not sub-divided into apartment properties, residential house sections, groups of premises in non-residential buildings whose functional utilisation is residential, as well as groups of premises whose functional utilisation is associated with living (for garages, car parking spaces, cellars, storage and utility rooms) if they are not being used for the performance of economic activities:

- 0.2 per cent of the cadastral value, that does not exceed EUR 56,915;
- 0.4 per cent of the cadastral share, that exceeds EUR 56,915, but does not exceed EUR 106,715;
- 0.6 per cent of the cadastral share, that exceeds EUR 106,715.

The immovable property tax shall be calculated from the cadastral value of the immovable property tax object according to the situation on 1 January of the taxation year. If

the immovable property tax object has been registered in the Immovable Property State Cadastre Information System during the taxation year, the tax shall be calculated from the cadastral value of the object at the moment of 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.

Subparagraphs 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 the local governments come into force in accordance with the procedure defined in Law "On Local Governments". The 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 the local governments have the power to determine such immovable property tax benefits or an applicable rate that would increase the interest of owners of the buildings to implement energy performance measures.

iii) Awareness raising campaigns

*Awareness raising campaign "Let's Live Warmer" (*Dzīvo siltāk!*)*

In February 2010, the Ministry of Economics in cooperation with partners, launched an awareness raising campaign titled "Let's Live Warmer" with the aim of informing residents about opportunities available through involvement in Activity 3.4.4.1 "Improvement of heat insulation of multi-dwelling buildings" of the Operational Programme.

Over a period of four years, in the framework of the awareness raising campaign, more than 186 awareness raising events have taken place throughout Latvia – various public discussions, seminars, conferences and exhibitions that brought together more than 8,500 participants. Some of the seminars were also broadcast online on the Internet, and video materials are available at www.youtube.com/siltinam and www.vimeo.com/dzivosiltak. The themes of the events were varied, including the necessity to improve the technical conditions of one's building, how to take a decision at general meetings of apartment owners, how to carry out a quality renovation of buildings, exchange of experience about already renovated buildings, etc.

Active communication in social media www.twitter.com/siltinam, www.facebook.com/dzivosiltak, www.draugiem.lv (page "Siltinam", Group "*Dzīvo siltāk!*"), takes place regarding the current events in the framework of the campaign, all presentations are available at www.slideshare.net/siltinam. Almost 2,000 customers and cooperation partners receive regular information about current events.

Since 2011, in the framework of the awareness raising campaign, a competition "Most Energy Efficient Building in Latvia" (www.energoefektivakaeka.lv) is taking place with the aim of promoting good practice in the field of energy performance of buildings by constructing, renovating and reconstructing energy efficient buildings and thus reducing the amount of carbon dioxide emissions in the atmosphere and promoting understanding of the public about heat insulation of buildings, as well as about the importance and possibilities of reducing greenhouse gas emissions in order to create a quality living space with architectural

aesthetics.

The Ministry of Economics has also created an e-map of renovated buildings that provides information about renovated buildings in the framework of the ERDF's Activity „Improvement of heat insulation of multi-dwelling buildings". Three brochures entitled "Step by step to renovating your home" have also been issued[33].

Energy Efficiency Centre of JSC "Latvenergo"

The Energy Efficiency Centre of JSC "Latvenergo" has been established with the aim of consulting electricity users about the possibilities of using electricity in a safer and more efficient manner when using various electrical appliances for their convenience.

The Energy Efficiency Centre houses a large exhibition of electrical appliances. All the electrical appliances are connected to the power network, water supply, sewage 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. Lower secondary school children are taught about the comfort, economy and technical advantages provided by electricity. Whereas to kindergarten children and pupils up to the 4th grade, employees of the Energy Efficiency Centre provide information about electrical safety and matters that must be taken into account when using an electrical appliance to protect oneself from electricity-related injuries.

Considering that amongst private customers, active interest exists regarding using energy generated from renewable sources in households, a seminar cycle is being organised in the framework of which customers can learn about the opportunities of using thermal pumps, solar collectors, solar batteries and wind generators in conditions existing in Latvia.

The seminars organised for legal entities include subjects such as establishment of an energy efficient lighting system in a company, ensuring energy efficient microclimate, conditions of quality power supply and others.

Energy Efficiency Information Centre of the Riga Energy Agency (REA)

The Energy Efficiency Information Centre (EEIC) of the of REA provides free information and consultations to its visitors – natural persons and legal entities – in accordance with the EU, Republic of Latvia and Riga City Municipality guidelines in the field of energy efficiency, including the provision of consultations to residents and assistance with the preparation of applications for renovations, organising of energy audits, open door days at the renovated buildings, discussion club seminars about quality of renovation and provision of other types of advisory support to residents (http://www.rea.riga.lv/par-mums/rea-eeic).

Society "Zemgale Regional Energy Agency"

Zemgale Regional Energy Agency provides advisory, informative and training services to residents in the field of energy. The Agency develops and maintains an energy database. The Agency also develops regional and local government planning documents in the field of energy and coordinates their implementation. The Agency attracts investments for improvement of energy performance.

And the Agency fosters cooperation in the field of energy with legal entities and natural persons at local, national and international level (http://www.zrea.lv/lv/).

[33] Ministry's of Economics' website: http://www.em.gov.lv/em/2nd/?id=33352&cat=621. EMZinoPielik2_150514_Buildings renovation strategy LV.docx; Ēku renovācijas ilgtermiņa stratēģija 2014. – 2020.gadam

Climate Change Financial Instrument's tender "Raising of public awareness regarding the importance and possibilities of greenhouse gas emission reduction" (Stages I and II)

The goal of the Climate Change Financial Instrument's tender "Raising of public awareness regarding the importance and possibilities of greenhouse gas emission reduction" is to foster awareness of the public about 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 tender's support: organising a creative competition for the best publications in newspapers, magazines and websites that reach a maximum number of readers and increase the general public awareness about the need to prevent climate change, promote energy savings measures and use renewable energy sources. The legal framework of the tender is the Cabinet of Ministers Regulations No. 789 of 17 August 2010 "Regulations of Climate Change Financial Instrument funded projects open tender "To promote public awareness of the importance and possibilities of greenhouse gas emissions reduction"".

In the framework of Stage I of the tender "Raising of public awareness regarding 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 in the framework of Stage II, 5 projects were implemented with the total CCFI's funding of 100,604.45.

Results and list of approved projects of Stage I of the tender are available at the website of the Ministry of Environmental Protection and Regional Development at: http://www.varam.gov.lv/lat/darbibas_veidi/KPFI/projekti/?doc=10875.

Results and list of approved projects of Stage II of the tender are available at the website of the Latvian Environmental Investment Fund at: http://www.lvif.gov.lv/?object_id=33067.

iv) Labelling

No statistics are collected in Latvia regarding indication of energy and other resource consumption on products, however, considering the important role of information in the market and the need to introduce a uniform and harmonised labelling for all products of the same type so that buyers would be provided unified information about energy and other important resources consumption of these products, the European Union 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 of how to set requirements for characteristics, e.g. energy consumption level, of products affecting the environment, as well as provides for conditions for fast and effective implementation of these requirements.

In the normative acts of the Republic of Latvia this Directive has been transposed with the Cabinet of Ministers Regulations No. 480 of 21 June 2011 "Regulations on procedure of labelling of energy- and other resource consuming products, as well on advertising and monitoring"[34]. The Regulations define the procedure for labelling with a label and special marking products related to energy and other important resources consumption, 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 the end user about a product, a supplier labels products envisaged for sale, rent, lease or demonstration with a label and special marking. The label

[34] Ministry of Economics' website: http://www.em.gov.lv/em/2nd/?cat=30641.
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and special marking are also added if the products are offered through information society's services or distance contracts. The label and special marking consist of a standard information table including data of the product's energy consumption and, if applicable, consumption of other important resources, as well as additional information about the product[35].

b) Analysis of barriers

Assessment of the effect of energy performance of buildings allows for the conclusion that, in the context of current measures and policy, the main barriers to stimulate cost-efficient renovation of buildings are as follows:

1) High costs (loan interest rates) of attracting financial resources from commercial banks;

2) Debts of building owners for utilities and credit obligations for the purchase of a dwelling which restrict the ability to undertake new obligations or to receive a loan from a bank;

3) Insufficient number of professionally trained specialists (building managers, energy auditors, designers, construction workers);

4) Lack of qualified workforce;

5) Low quality of construction works and lack of control with respect to construction. If works are carried out by insufficiently professional workers, the possibility exists of failing to obtain the planned energy savings.

Barriers related to activity "Improvement of heat insulation of multi-dwelling buildings"

1) Apartment owners in charge of reaching the project results are not sufficiently competent to ensure quality decision-making and monitoring of the project. Lack of project management groups that would ensure experts such as energy auditors, designers and construction supervisors which within the scope of their competency would ensure that an energy efficiency project is prepared and implemented according to the wishes of apartment owners and requirements of normative acts in the field of construction and energy performance of buildings, as well as the fact that the planned energy savings would be obtained after completion of an energy efficiency project of a multi-dwelling building. A solution would be to entrust this to professionally trained specialists, including ESCO, envisaging the EU Funds or other financial support.

2) In the context of monitoring projects of the activity "Improvement of heat insulation of multi-dwelling buildings", it is related to the fact that monitoring that is performed by the Investment and Development Agency of Latvia is directed more towards control of the process (verifications of procurement documentation, amending of contracts, etc.) and less towards the planned and achieved project results.

3) For pre-financing of projects of the activity "Improvement of heat insulation of multi-dwelling buildings", financing of commercial banks must be obtained, which is available only to those multi-dwelling buildings that meet the requirements set by the commercial banks. A part of multi-dwelling buildings do not meet the requirements set by the commercial banks and cannot receive loans, therefore they cannot receive ERDF support event if the project has been approved by the Investment and Development Agency of Latvia. Commercial banks, when assessing the credit standing of apartment owners of a multi-dwelling residential building, evaluate the amount of payment debts of residents of the multi-dwelling building, measures implemented by the manager of the multi-dwelling building to decrease amount of debt obligations of the residents, number of buildings

[35] Cabinet of Ministers Regulations No. 480 of 21 June 2011 "Regulations on procedure of labelling of energy- and other resource consuming products, as well on advertising and monitoring".
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managed by the management company and number of renovation projects implemented, capacity and reputation of the construction company that will carry out the reconstruction/renovation works. At the same time, however, the commercial banks evaluate the development trends (migration, unemployment, infrastructure development, etc.) of the territory where the specific multi-dwelling building is located, immovable property value of the multi-dwelling building, its size and the number of apartments therein.

Barriers related to activity "Improvement of heat insulation of social residential buildings"

1) Several projects envisage high renovation costs (even more than LVL 300 per square meter of a building), since basic conditions of the activity do not set cost limits, investments in such projects are high and the period for their repayment is disproportionally short; additionally, considering the specific conditions for support from the activity, according to which the eligible costs include adjustment costs of interior for persons with mobility impairment, rather low thermal energy savings were obtained after renovation, namely for each LVL 1,000 invested from the ERDF's funding, a savings of approximately 0.57 MWh/year was obtained.

2) During the project monitoring period, certain local governments want to change status of the renovated social building, which creates a risk that the initial goal of the project – to provide support to residents of the social building – will not be reached as a result of the project implementation.

3) In the project implementation phase, several problems can be observed related to low quality technical documentation of the project and problems with ensuring appropriate procurement procedure. This is partially related to the prohibition to include in the eligible costs the project administration costs.

4) The project submission selection criteria of the activity do 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 has been defined.

c) Assessment of importance of policy implemented in other territories

Data regarding importance of policy implemented in other territories are not available.

d) Plan of the new policy

The main source of funding of energy performance of building projects for the 2014-2020 programming period is the EU Funds financing supplemented with State, local governments and private funds.

Assessment of experience with implementation of projects of 2007–2013 EU Funds in the field of buildings renovation allows for the conclusion that the future goals in the field of energy performance of buildings are as follows:

1) Funding availability for economically justified projects throughout the territory of Latvia, including regions;
2) Management and monitoring of quality projects;
3) Focusing monitoring of activities on obtaining results, including energy savings;
4) Reaching high energy efficiency and quality construction;
5) Improving selection procedure of construction merchants;
6) Reducing costs of resources.

In order to ensure reaching the above goals in the EU Funds 2014–2020

programming period, the following activities need to be developed:

1) In 2014, a rotation fund should be established for implementation of sustainable financial investments projects by ensuring loans for project financing with interest rates of up to 2 % per year and by combining them with other support instruments that are granted depending on the achieved energy saving in the specific project after its completion.
2) Attracting EU Funds financing should be promoted – creating a group of energy consultants (a project management group that ensures management of an energy efficiency project of a multi-dwelling building by providing the following experts: energy auditor, designer and construction supervisor which within the scope of their competency ensure that an energy efficiency project is prepared and implemented according to the wishes of residents and requirements of normative acts in the field of construction and energy performance of buildings, as well as that the planned energy savings are obtained after completion of the renovation project). An energy consultant with a bank's guarantee or insurance policy would be liable for the level of energy efficiency to be reached in the framework of the project. The energy consultant would compensate losses caused to residents of a multi-dwelling building if the defined level of energy savings is not reached after completion of the project. Advisory support is planned in the framework of the National Energy Efficiency Fund (NEEF).
3) Training should continue for potential project applicants and project implementers in the framework of the awareness raising campaign "Let's Live Warmer", including organising educational seminars and conferences in the field of energy efficiency not only in the sector of multi-dwelling buildings, but also in the public sector. Methodical materials should be provided about matters of project preparation and implementation, as well as about utilisation of a building after completion of a, energy efficiency project.

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

1) In 2014, the minimum building energy performance requirements (for construction elements of external building envelopes and building engineering systems) should be reviewed. Minimum building energy performance requirements will be set in order to obtain a cost-optimal balance between financial investments and energy costs savings during the life cycle of a building.
2) Support instruments should be developed and implemented for construction of nearly zero-energy buildings in compliance with Article 10(1) of Directive 2010/31/EU, which stipulates that in view of the importance of providing appropriate financing and other instruments to catalyse the energy performance of buildings and the transition to nearly zero-energy buildings, 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 lifecycle of the building shows that that is economically justified.
3) Conditions should be developed for using tax revenues (for example excise tax for fossil energy sources, natural resources tax, etc.) for the improvement of energy

performance of buildings and utilisation of renewable energy sources in buildings. Normative acts do not stipulate individual tax benefits with respect to reconstructed or renovated buildings; however, the immovable property tax policy implemented by local governments could serve as an instrument for both promotion of energy performance of buildings and utilisation of renewable energy sources in buildings. Financing resources should be envisaged for development and implementation of measures and conditions.

4. Long-Term Perspectives in Building Renovation

a) Total annual investments demand

In accordance with the 2014–2020 planning documents of the EU Funds, namely Partnership Agreement and OP, for 2014–2020 period, in Latvia, for energy performance of buildings and utilisation of RES, indicative EUR 322.97 are planned, including:

— for energy performance of industrial buildings and utilisation of RES – EUR 32.56 million (responsible ministry – Ministry of Economics);

— for increasing energy performance in the State's buildings and utilisation of RES – EUR 97.86 million;

— for energy performance of residential buildings and utilisation of RES – EUR 150 million (responsible ministry – Ministry of Economics);

— for increasing energy performance in local government buildings – EUR 42.56 million (responsible ministry – Ministry of Environmental Protection and Regional Development).

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 State owned building areas must be renovated. Since the State's buildings form a part of the country's final energy consumption, meeting the target of renovating 3 % of central government buildings contributes to reaching the overall savings of 1.5 % of final consumption. Renovation of 3 % of the area of government buildings using EU Fund financing will ensure total energy savings of 0.016 Mtoe (0.67 PJ, 186 GWh) (maximum estimates – in total 678,460 m^2) over the entire 2014–2020 period.

In Latvia, over the 2014–2015 period, implementation of the activity "Improvement of heat insulation of multi-dwelling buildings" of the Operational Programme "Infrastructure and Services" of the EU Structural Funds for 2007–2013 must be continued. It is planned that in the 2014–2015 period, 200–300 renovation projects of multi-dwelling residential buildings will be implemented every year, thus the planned cumulative savings from projects implemented in the 2014–2015 period will be 1,050 GWh. Until 2020 it is envisaged to continue educating owners of buildings or parts thereof about various possibilities and practices of increasing energy performance in compliance with Article 20 of Directive 2010/31/EU.

By implementing Stage III of the CCFI's project tender "Complex solutions for reduction of greenhouse gas emissions" (project implementation deadline: 30 June 2014), it is envisaged to implement up to 168 projects.

Latvia's energy efficiency target structure in compliance with the requirements of the Directive has been described in Table 19.

Table 19. Latvia's targets with respect to the energy performance of buildings[23 36 37 38]

Goal	Indicators to be obtained	Indicative	Impleme
Mandatory renovation of 3 % of the area of central government buildings, renovation of local governments, industrial and multi-dwelling residential buildings (2014–2020 programming period of EU Funds)	Savings of 1,690 GWh/year, average thermal energy consumption for heating: 120 kWh/m^2 (maximum area estimates with respect to the State buildings – together 678,460 m^2) (for 2023). Number of households with improved energy consumption: 10,700 (2023). Primary reduction of energy consumption per year: 52,000,000 kWh. Energy consumption for creation of gross domestic product: 280 kg of oil equivalent per EUR 1,000 from GDP (production buildings for 2023).	Total funding of EUR 384 million that includes EUR 323 million of EU Funds financing and EUR 57 million of public financing of Latvia	2014–2023
In the framework of multi-dwelling building renovation activity "Improvement of heat insulation of multi-dwelling buildings" (2007–2013 programming period of EU Funds)	Savings of 1,050 GWh/year, 200-300 renovation projects of multi-dwelling residential buildings every year.	Funding of EUR 54.9 million from EU Funds[39]	2014–2015
Promotion of energy efficiency and utilisation of local renewable energy sources in district heating. Percentage of renewable energy in gross final energy consumption – 40 % (2014–2020 programming period of EU Funds)	Increase of energy generated from renewable energy sources – 70 MW. Reconstructed heat supply network – 70 MW (in 2023)	Funding of EUR 53 million from EU Funds	2014–2023
Raising public awareness about various possibilities and practice of increasing energy efficiency (2014–2020 programming period of EU Funds)	50 awareness raising events a year (publicity events envisaged in the framework of the campaign "Let's live more warmly")	Technical assistance funding of EUR 260 thousand from EUR Funds	2014–2023
Complex solutions for reduction of greenhouse gas emissions, Stage III	Saving of 386 GWh	EUR 19.361 million (CCFI, public and private funding)	2014–2015

[36] Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency.
[37] Operational Programme "Growth and Employment" for 2014–2020 programming period.
[38] EU Funds website: http://esfondi.lv/page.php?id=346.
[39] Funding available in the framework of activity 3.4.4.1 is EUR 89.29 million. The Report indicates EUR 54.9 million because: 1) Funding in the framework of activity 3.4.4.1 has been paid out since already 2010, whereas this Report concerns 2014–2015 period. Considering these time periods, the Report does not take into account the ERDF funding of EUR 25 million paid out until 2014; 2) In in the framework of activity 3.4.4.1, project implementation has been terminated and financial corrections have been applied. Total amount of such "free" funding is EUR 9.3 million.
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Development and implementation of support instruments for construction of nearly zero-energy buildings		Public and private funding	2014–2020
Development and implementation of immovable tax benefits scheme for building owners		Public financing	2015

b) Sources for renovation of buildings

i) Private capital of owners

Self financing of residents for renovation comes from an accumulation of regular payments made by the residents and envisaged for repairs.

In order to create such a reserve, a general meeting of apartment owners must agree on the necessity of such payments as well as their purpose and amount. The amount of payments ranges from 10 to 20 santims per m^2/month, depending on the decision made by the residents and the envisaged repairs. This approach is suitable for financing a specific and small renovation-related activity, e.g. payment for energy audit, replacement of a roof or reconstruction of a heating system, but it is not suitable for renovating a complex building. This is due to the small financial reserve formed every month.

Depending on the chosen financing model, self-financing additionally allows for a decrease in the amount of loans, ensuring better transparency of the flow of funds and better responsibility for the results to be achieved and to be immediately available after completion of the work.

At the same time it must be noted that the creation 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 long period of time which would reduce the life cycle of the building.

The local government of the city Riga already has several positive examples of quality utilisation of self financing. Since 1996, JSC "Rīgas siltums", by using the funds earmarked for repairs in the thermal energy tariff paid by the residents, has renovated heating networks thus reducing heating network losses and thermal energy consumption; another important measure to be noted is the replacement of heating units in all multi-dwelling buildings with modern, automated heating units with an independent connection in Riga which allows a building to control its individual thermal energy consumption (1998–2003) and which was fully financed by the residents, whereas SIA "Juglas nami", since 2009, has been installing heat insulation in the side walls of multi-dwelling buildings[40].

ii) Public funds (including European Union Structural Funds and innovation funds)

Thanks to Latvia joining the European Union in 2004, it has access to large financial support resources of the European Union for fostering its growth and competitiveness. Implementation of energy efficiency measures in production companies and public and residential buildings has been set as one of the priority directions for attracting funding at a national level.

EU Funds are to be considered the largest funding attraction source since 2008. In the framework of these Funds, in Latvia, over the period until 2013, more than EUR 4 billion were available, 11 % of which was allocated to the energy sector, including the promotion of energy efficiency. Although the total amount of funding in the energy sector was large, it is rather small for energy efficiency measures in the framework of which renovation of

[40] Financial concept for energy efficient renovation of Jugla buildings, 2010.
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buildings is permitted.

Over the next 2014–2020 programming period, it is also planned to use funding of the European Union Structural Funds for reaching the defined national energy efficiency goals. The planned energy efficiency goals and the planned funding source and amount have been summarised in Table 19 in Section 4a and in Table 20 in Section 4d.

iii) Banks and other private person investment funds

Commercial banks established in Latvia

For energy efficient renovation of buildings two crediting models are used:

1) Investment loans for buildings divided in apartment properties;
2) Mortgage loans for buildings owned by a natural person or legal entity.

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 apartment owners make payments for management services are taken into account. For issuance of an investment loan, the mortgaging of apartments and the personal guarantee of apartment owners are not necessary. Additionally it must be noted that in the event of a renovation loan, timely payments for management services by the apartment owners, 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 apartment owners of the respective building to make loan payments over the long-term, whereas, thanks to co-funding of European Union Funds in the framework of activity “Improvement of heat insulation of multi-dwelling buildings”, the credit risk of building renovation projects is significantly reduced, since after project completion residents can reduce the loan amount by up to 50 %, as well as the fact that the period within which the projects pay off is reduced. Co-funding of European Union Funds allows on average a double reduction of the payback period of the loan. Without a co-funding of European Union Funds the payback periods of loans may reach up to 20 and even 30 years.

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

In accordance with the information provided by the Association of Latvian Commercial Banks, and on the basis of the financing experience of building renovation gained up to now and the specifics of these projects, the main criteria for a building renovation to be supported are as follows:

1) Amount of debts of apartment owners for management services, heating and water supply may not exceed 10 % of the total of issued invoices on average per year;
2) Location of the building to be renovated, i.e. when evaluating the financing possibilities of a specific project, geographical location of the building is extremely important, and this aspect is evaluated in the context of the economic development potential of the respective location since financing is issued for a period of 15–20 years.

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

For buildings not divided into apartment properties, renovation measures are normally financed with a mortgage loan – a long-term loan secured with the immovable

property mortgage and envisaged for the purchase, improvement, repairs to and construction of a dwelling.

Until 2009, when energy efficient renovation of multi-dwelling buildings was started using financial funds of the European Regional Development Funds (ERDF), taking loans from a bank was in fact the only way to finance a building renovation, with the exception of individual foreign donations[41]. Now pre-financing of building renovation projects is also ensured using loans, since ERDF funds are issued only after completion of the project.

Depending on the quality of the submitted building renovation project, as well as the indicators of the listed criteria, the loan's floating interest rate ranges from 3.8 to 5.0 + EURIBOR, fixed rate – 4.0 to 6.0 %. Residents must contend with ensuring a security from the bank – a money flow of monthly payments, as well as a deposit in the amount of one (for low risk customers) to three loan payments. Loan may be granted for a period of up to 15 years[39].

International banks

A row of international banks that support development projects around the world and Europe has defined energy savings and energy efficiency oriented measures as one of the priorities of their operation. Funds provided by these banks are also available in Latvia. However, unlike the banks operating in Latvia, the international banks support the implementation of large projects or investment programmes, therefore a national level programme for using the respective funds must be developed.

The European Bank for Reconstruction and Development (EBRD) supports energy efficiency measures in the framework of the Sustainable Energy Initiative by financing activities with the goal of improving energy efficiency of local government infrastructures, including heating and water supply systems of residential buildings, and the goal of production infrastructure. Funding is secured by issuing a loan with low interest rates to the local banks for granting loans to projects related to the promotion of energy efficiency.

Up to now, Latvia has not used the EBRD's assistance available in the framework of the Sustainable Energy Initiative.

The European Investment Bank (EIB) issues loans with low interest rates to the EU Member States and developing countries for dealing with matters related to environment quality, including with energy efficiency, as well as for implementation of EU policy guidelines.

Over the 2008–2012 period, the EIB in Latvia supported energy related matters with EUR 0.19 billion[42].

The Nordic Investment Bank (NIB) issues loans for energy efficiency measures in the framework of the Environmental Improvement Initiative, the aim of which is to promote the reduction of and the prevention of environmental pollution. The NIB supports activities directed towards the reduction of CO_2 emission, the utilisation of renewable energy sources and the introduction of environment friendly technological solutions. The bank mainly finances projects exceeding EUR 50 million by supporting 50 % of the project costs. Similar to the EBRD and EIB, the NIB focuses on financing activities through local banks.

Considering that this bank was formed by 8 countries (Denmark, Estonia, Finland, Ireland, Latvia, Lithuania, Norway and Sweden), its operation is primarily directed toward

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[41] Project "Energy efficient and balanced city planning (UrbEnergy)", Financial concept for energy efficient renovation of Jugla buildings, SIA "Rîgas pilsçtbûvnieks", 2010.

[42] http://www.eib.org/infocentre/publications/all/the-eib-in-latvia-in-2008-2012.htm.

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supporting activities in its participating states[43].

KfW Bankengruppe (KfW[44]) is a development bank of the German government, which provides significant support to matters of environmental and climate protection, including the renovation of buildings, with the aim of improving energy performance, by issuing medium- and long-term loans to its cooperation partners.

Cooperation with the European Commission and the Council of Europe Development Bank, the KfW is one of the sponsors of the European Energy Efficiency Programme thus promoting reduction of CO_2 emissions.

In cooperation with other banks, KfW has developed several initiatives to support less developed countries. For example, together with the EIB, KfW has established the Southeast Europe Energy Efficiency Fund, in the framework of which support is provided to countries of the region for increasing energy efficiency and promotion of utilisation of renewable energy sources. The bank has also developed a special renewable energy and energy efficiency programme, in the framework of which loans are granted to developing countries.

c) Analysis of investment barriers

The implementation of any investment project faces possible risks or objective barriers. Project implementers have identified several risks in the building renovation practice applied up to now, 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 about matters of energy performance of buildings and benefits from improved energy performance;

- insufficient awareness of residents about financial instruments for improving of energy performance of buildings;

- inability of apartment owners to agree on common decisions;

- time-consuming decision-making practices in multi-dwelling residential buildings;

2) Risks and barriers related to documentation of renovation projects:

- lack of a professional management group of a renovation project;

- incorrectly prepared (also deliberately) energy performance assessments of buildings (energy audits);

[43] http://www.nib.int/news_publications/1269/nib_lends_for_upgrade_of_east-west_railway_corridor_in_latvia.
[44] KfW - Kreditanstalt für Wiederaufbau (in German), in Latvian – kredītiestāde rekonstrukcijai. EMZinoPielik2_150514_Buildings renovation strategy LV.docx; Ēku renovācijas ilgtermiņa stratēģija 2014. – 2020.gadam

- inaccuracies in the preparation of technical documentation (technical surveying of a building, documentation of construction plan, construction estimates);

- project progress administrative procedures that are difficult to understand for unprofessional project implementers;

3) Risks and barriers related to the quality of construction works:

- lack of a professional management group of a renovation project;

- incompliance with normative acts in performance of the construction works;

- low quality (insufficient) construction supervision;

- often insufficient qualifications of construction work performers;

4) Financial barriers and risks:

- decreasing the paying capacity of residents;

- mistakes in project budget calculations;

- increase of costs during the project implementation (the construction sector is recovering from the consequences of the crisis, therefore the construction market is becoming more active and the price of construction services and materials have increased);

- debts for services related to the utilisation of apartment property, which prevents the apartment owners of the residential building to receive a loan for building renovations;

- high risk level of the financial investment in territories with low economic activity that increases the loan interest rates which make longer the periods of investment payoff.

Taking into account the risks and barriers identified in the building renovation practice, as well as the previous experience of the commercial banks of Latvia with financing of building renovation, it has been concluded that, considering the different paying capacity of owners of 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 – buildings where the owners have a sufficient paying capacity and could potentially undertake financial obligations, including co-financing a building renovation project;
2) Social projects – buildings where it will be difficult to attract financing for renovation under commercial conditions.

In addition to the above, with respect to possible financial model solutions for residential building renovation 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 experience of Lithuania. Namely, when support programme conditions changed (the initial 50 % support was replaced by 15–30 % support), the willingness of apartment owners to renovate dwellings under the new support instrument conditions was significantly reduced.

Among investment barriers, other barriers which prevent successful implementation of energy services contracts must be noted:

- Insufficient availability of information about ESCO and poor awareness about ESCO contracts;

- Deficiencies in normative acts in the field of public procurement that are often not suitable for conclusion of long-term services contracts;

- Distrust of customers in the complicated ESCO contracts that include conditions for construction design, construction works, management services, as well as financial conditions;

- Low interest of ESCO in risky projects giving preference to objects that present a clear benefit.

A guarantee system in the framework of a rotation fund could be a possible solution for expansion of ESCO's operations. Therefore proposals for expansion of ESCO's operations should be viewed together with evaluation of legal aspects regarding establishment of a single development authority.

Lower loan interest rates

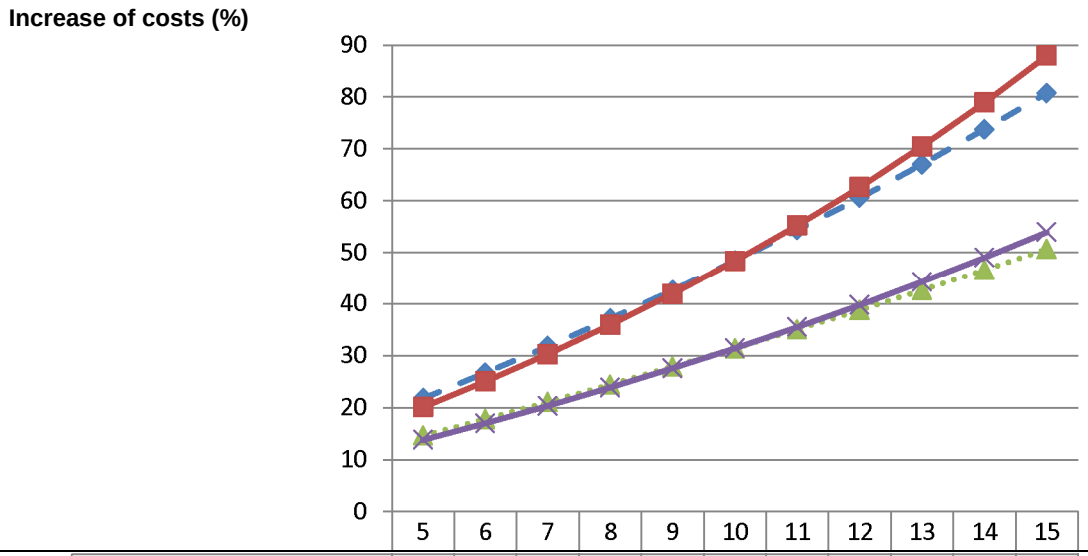
Previous experience with installing heat insulation for residential buildings in Latvia allows for the conclusion that in almost all cases, a bank loan has been necessary to cover the expenditure related to the renovation of the building. Depending on various factors, for example the paying capacity of apartment owners, the cost of loan resources, etc., the annual interest rate for loans at the moment can be approximately 5–7 %. Therefore, the interest payment for the loan forms a significant part of the building owner's payment.

Figure 10 illustrates an increase in investment costs depending on the co-financing share (D), loan share (K) and annual interest rate of the loan (P). The figure shows that over a 10 year period, a loan with 5 % rate and co-financing share of 50 % is equivalent to a loan with a 2.77 interest rate, whereas a loan with 7 % rate and co-financing share of 50 % is equivalent to loan with a 4.025 rate. Under the above financing conditions, for a period

exceeding 10 years, a lower interest rate will be more favourable, while for a shorter period, there will be a higher interest rate with a co-financing share's component.

In order to choose an optimal solution, the actual possibilities must be evaluated, i.e. under which conditions it is possible to attract loan resources.

Figure 10. Increase of investment costs depending on co-financing share (D), loan share (K) and annual interest rate of the loan (P)[2]



	5	6	7	8	9	10	11	12	13	14	15
K(100%+P4.025%)	21.8	26.7	31.8	37.1	42.6	48.4	54.4	60.6	67.0	73.8	80.7
D(50%)+K(50%+P7%)	20.1	25.0	30.3	35.9	41.9	48.4	55.2	62.6	70.5	78.9	88.0
K(100%+P2.77%)	14.6	17.8	21.1	24.4	27.9	31.4	35.1	38.8	42.6	46.6	50.7
D(50%)+K(50%+P5%)	13.8	17.0	20.4	23.9	27.6	31.4	35.5	39.8	44.3	49.0	53.9

d) Possible financing sources and mechanisms

Municipal energy service company (PEKO)

Municipal energy service company (PEKO) is an enterprise owned by a local government, which operates according to the principles of an energy service company using funding from the local government and attracted financing for its operations. Usually the objective of the local government is not to make a profit but to organise the public buildings and stock of residential buildings of the region owned by the local government, if due to any reason this cannot be done by the residents or ESCO. PEKO can also ensure renovation of multi-dwelling buildings that are not renovated by ESCO or the residents due to risks related to payoff.

This institutional model for renovations is mainly used by local governments in Germany. For example, Freiburg has obtained a 17 % reduction of CO_2 emissions using PEKO over a period of 10 years (1990–1999). It has also been defined that PEKO is used for building energy consumption, which is up to EUR 50,000 per year, applying the ESCO model for other buildings and ensuring a reduction of annual energy consumption payments by EUR 40,000. In the framework of PICO Light project, a pilot project was implemented in 3 buildings in Düsseldorf, Velbert and Wuppertal, by calculating that a full renovation of thereof would cost EUR 170,500, thus reducing energy consumption payments by EUR 36,000/year and recovering the invested funds in less than 5 years.

The PEKO scheme is also becoming more commonly used in the new EU Member States. For example, in Jordanów (Poland), the PEKO model became a cornerstone of modernisation of the entire energy system by envisaging that all savings of maintenance expenditure gained as a result of building renovation will be used to improve the energy system. By renovating the town hall and kindergarten of the city, a savings of EUR 3,900 of the energy consumption payment per year was achieved.

These examples show that PEKO is most effective if long-term goals and result indicators are determined at a national or local government level that must be reached in the field of energy efficiency – it may be an annual reduction of carbon dioxide (CO_2) or a reduction of a building's energy consumption and maintenance costs, thus ensuring a savings of the budget funds.

Latvia does not have much experience with the PEKO model. Nevertheless, SIA "Rīgas namu pārvaldnieks" has experience with introducing such a model by offering the residents the opportunity to conclude ESCO contracts. Other cities also have some experience. However, the development of such a model at a local government level would be possible in the case that financial resources for the development of PEKO are offered[37].

Rotation fund

Development of a rotation fund is presently one of the most visible tendencies of an energy efficiency funding model in the European Union, especially in the EU Member States which joined after 2004.

A rotation fund is a long-term financial instrument that is established for the implementation of profitable investment projects by providing their financing with low interest rates. Equity capital of such funds consists of co-financing from the respective State and its local governments, funds of donor institutions, as well as, in certain cases, financing from the European Union support financing. In the framework of a rotation fund, only projects that can ensure payback of funds within a certain period of time are financed, and the repaid funds are used to finance future projects. This is a widely used financial scheme around the world for the promotion of various activities (for example, development of small and medium enterprises, modernisation of water supply or waste management systems); however, one of the most visible directions is the promotion of energy efficiency in the State and local government properties, as well as private properties.

In the case of the renovation of a multi-dwelling residential building, the recipient of a loan granted by the fund may be apartment owners that use the loan to cover their co-financing share of building renovation and ESCO or PEKO[45] to implement a renovation project. Loans are issued for a specific period of time with a fixed interest rate. The loan is repaid after completion of the renovation project by gaining an economy of funds.

Estonia and Lithuania may be mentioned as an example of the operation of a rotation fund at a national level. In these countries such funds operate by attracting State budget funds in addition to financing from Structural Funds and long-term loans with low interest rates from international banks. In Lithuania loans are issued for a term of up to 20 years with a fixed interest rate of 3 %, and in certain cases an additional co-financing of 15 % is provided from the State budget or from climate change programmes.

"Concept of the transposition into national law the requirements of the 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", as adopted by the Cabinet of Ministers on 26 November 2013, defines that in compliance with Article 20(5) of Directive 2012/27/EU, a National Energy Efficiency Fund (NEEF) will be established with the aim of supporting national initiatives in the field of energy efficiency. NEEF will be based on EU Funds financing envisaged for energy efficiency in the 2014–2020 programming period of the EU Funds. NEEF will grant financing in the form of both loans and grants ensuring the functions necessary to implement the requirements of Directive 2012/27/EU. The Fund will need to promote the use of new or existing mechanisms for energy efficiency improvement measures in order to increase the benefits provided by various financing flows as much as possible.

Energy services

Provision of energy services as a commercial activity is common in the so-called old EU Member States, the US and other places around the world, while at the same time it is developing and not widely used in all countries. It is important to note that this practice is mainly suitable for non-residential buildings (public and commercial) sectors and is not common in residential buildings sectors.

An energy service 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 energy sector related services, including the implementation of energy savings projects, provision of outsourced services of energy infrastructure, generation and supply of energy, as well as management of risks. Therefore ESCO's operation allows for renovating immovable properties, for the renovation of which the State or local government lacks funds. Since 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 ESCO, a city benefits from an organised city environment with a renovated stock of residential buildings, while residents benefit from a renovated immovable property with increased market value. Due to these reasons the EU is applying efforts to stimulate a wider involvement of ESCOs in the implementation of energy efficiency projects in order to ensure the attraction of additional funds and an efficient return of investments.

ESCO can be an enterprise or a group of enterprises of any sector with access to free financial funds and possibilities to guarantee cheap loans, as well as an interest in operating in the field of energy efficiency.

[45] ESCO – energy service company; PEKO – municipal energy service company.
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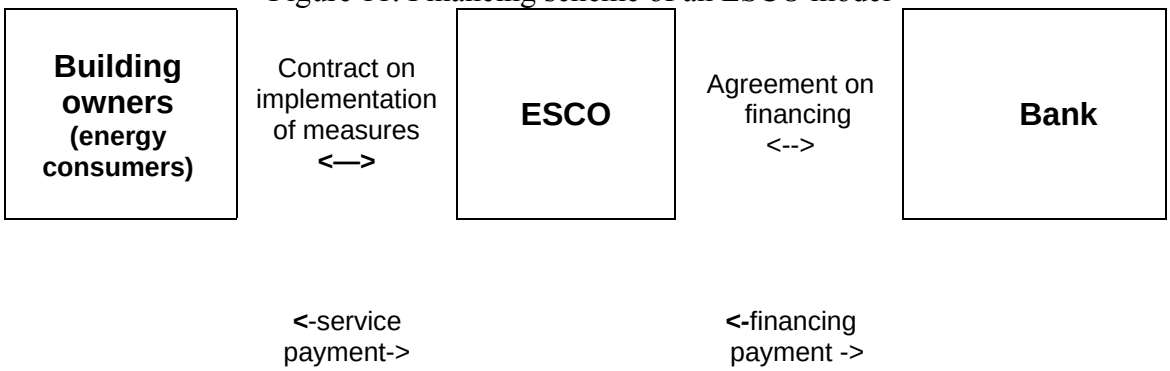
Figure 11. Financing scheme of an ESCO model[2]



ESCO performs an in-depth analysis of the object (building, energy transmission system, production objects or process) with the aim of finding the most rational energy efficiency solution, organises the renovation of immovable property related to the object and maintains the object over the period of repayment of the invested expenditure, which may range from 5 to 20 years. This ensures recovery of the funds with a difference that arises as a result of the implementation of energy efficiency measures. In order to ensure a successful and mutually profitable cooperation, ESCO concludes a fixed-term contract with a service provider (in the event of joint ownership, with the manager of a building), during the validity of which ESCO undertakes all obligations related to the preparation, financing and implementation of energy efficiency measures by guaranteeing the envisaged energy efficiency result and ensuring management of the object during the validity of the contract. At the end of contract validity, all benefits achieved as a result of renovation are transferred to the ownership of the service recipient – the residents[2].

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

1) As a result of the contract, the service provider gets a certain percentage of the saved funds over the entire validity if the contract. This stimulates the service provider to achieve a maximum savings immediately after completion of the project and to maintain it to the end of contract validity or repayment by increasing the savings with additional measures. This approach may have the following solutions:

- The contract stipulates the guaranteed savings and ESCO undertakes all risk related to its achievement;

- The contract includes conditions regarding how to distribute the achieved savings between ESCO and the customer – in such a case risks are shared between the contracting parties in accordance with the contract conditions.

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

ESCO has successfully gained the 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 buildings that belong to them even in the cases their budget lacks funding.

In Latvia, the provision of energy services is governed by Section 14 of the

Energy End-use Efficiency Law that stipulates conditions for provision of energy services, including the requirement for the contract to contain information about the energy efficiency improvement measures guaranteed by the energy service provider and their assessment, project financing scheme and the planned type of payment. The Law also stipulates that investments made in accordance with the contract have to pay off from energy savings made as a result of implementation of the energy service and agreed upon in the contract.

Provision of energy services in Latvia in accordance with the ESCO principle in the field of energy performance of buildings is in its developmental stage.

Assessment of suitability of financing sources and instruments

Information contained in this section has been prepared in accordance with the Informative Report "Financing Solutions for Building Renovation" of the Cabinet of Ministers of 4 June 2013, which provides an overview about the possible alternatives, including the potential financing sources and instruments that may be used in the building renovation process (see Table 20).

Table 20. Summary of financing sources and support instruments[2]

Financing sources **Financing instrument or model**	**State**	**Local government**	**EU budget and international financing sources**	**Commercial banks**	**Building owners**
Co-financing	National programmes	Local government programmes	EU Funds, CCFI	Loans to renovation	Owners cover a share depending on the amount of co-financing
Cheaper credit resources	Rotation fund	Rotation fund	EU Funds and other financial resources	Operates with financial resources from	Owners cover the measures fully but profitability of
Tax policy and tax benefits	Has defined a tax rate corridor (from 0.2 to 3 %) and has defined powers of the local governments to impose appropriate tax rates by adopting binding regulations	By adopting binding regulations and observing the principles of the Law "On Immovable Property Tax", have powers to impose immovable property tax benefits and define the applicable tax rates			Owners are applied immovable property tax benefits after renovation
Energy service contract	ESCO/PEKO operates in the framework of the existing support programmes by undertaking obligations in the energy services contract with respect to reaching of goals				Owners receive energy services that do not increase the amount of monthly payments

However, when choosing the most suitable solution, the amount of necessary financing for implementation of the building renovation measures, previous experience with heat insulation of buildings and EU Funds financing conditions of the next programming period must be taken into account.

The number of buildings to be potentially renovated and the amount of financing necessary for their renovation (see the necessary financing estimates) in order to reach the goals defined in policy planning documents significantly exceed the amount that can be provided from the funds of the State budget. In Latvia, like in Lithuania[46], there is a risk that the number of renovated buildings will significantly decrease, since the new support instruments will not create sufficient interest in heat insulation of buildings. Therefore, in order to prevent such a risk, two types of support schemes need to be established:

1) A loan with a reduced interest rate issued to achieve a certain level of energy savings;
2) Covering the principal amount of a loan if a certain level of energy efficiency is achieved.

Financial incentives for achieving higher requirements of energy performance of buildings are a common instrument for the promotion of energy efficiency in many EU States (Germany, Austria, Denmark, Estonia), since it fosters achievement of the common national goals in the field of energy efficiency. Buildings with a higher energy performance level serve as an example in demonstrating good practice and foster a general public interest and awareness about saving energy, utilisation of renewable energy sources and reduction of greenhouse gas emissions.

As regard activities related to planning the renovation of a building (evaluation of building's energy performance, technical assessment of a building and preparation of documentation of renovation plan), the most appropriate type of support could be co-financing by local governments which stimulates activity of building owners in launching the respective measures. The powers to grant support to apartment owners for the implementation of energy efficiency measures as stipulated in the Law "On Assistance In Solving Apartment Matters" should be maintained[39].

5. Envisaged Energy Saving and Broader Benefit Estimates

a) Direct benefits to building owners
b) Benefits to the public from the full renovation of buildings
c) External benefits

In accordance with the requirements of Directive 2012/27/EU on energy efficiency and the mandatory goal of final energy consumption savings of 1.5 % by 2020, Latvia must renovate 3 % of State owned and used building areas each year (maximum estimates – in total 678,460 m^2), so that, by using EU Funds financing together with local government renovation, energy savings of 0.016 Mtoe (0.67 PJ, 186 GWh) over the 2014–2020 period will be achieved. In order to reach this 3 % goal, a total area of 678,460 m^2 of State buildings will have to be renovated.

By implementing the energy efficiency project "Complex solutions for reduction of greenhouse gas emissions, Stage III" financed by the Climate Change Financial Instrument by 30 June 2014, it is planned to implement 275 projects, achieving a cumulative saving of

[46] In Lithuania, when co-financing conditions of multi-dwelling buildings changed (initially 50 % co-financing, but, in accordance with the EU Funds 2007–2013 financing conditions co-financing of 15–30 % is granted to construction works depending on the achieved savings), renovation practically stopped.
EMZinoPielik2_150514_Buildings renovation strategy LV.docx; Ēku renovācijas ilgtermiņa stratēģija 2014. – 2020.gadam

386 GWh.

Along with economic benefits, as a result of the implementation of building energy performance improvement measures, both the public in general as well as building owners will achieve social, environmental and energy system goals as summarised in Tables 21 and 22.

Table 21. Direct benefits to building owners as a result of building energy performance improvement measures[47]

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

Table 22. Benefits to the public as a result of building energy performance improvement measures[46]

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

[47] A guide to developing strategies for building energy renovation, Building Performance Institute Europe, February 2013.
EMZinoPielik2_150514_Buildings renovation strategy LV.docx; Ēku renovācijas ilgtermiņa stratēģija 2014. – 2020.gadam

Annexes

Annex 1

Number of households using wood fuel consuming equipment and average age of the equipment (% of number of wood consuming households; years)[48]

Wood fuel consuming equipment	Wood						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	2001	2006	2010	2001	2006	2010	2001	2006	2010	2001	2006	2010	2001	2006	2010	2001	2006	2010	2001	2006	2010
District heating boilers	5.1	5.3	8.2	15.5	11.3	14.4	1.2	0.9	0.4	17.5	14.5	16.4	0.1	0.1	0.9	13.6	7.7	8.8	-	0.1	0.2	-	3.9	5.4
Hot water boilers	2.9	3.3	3.7	15.2	13.5	15.7	0.8	0.7	0.2	18.2	16.3	22.1	0.1	0	0.1	9.8	18.7	6.5	-	0	0	-	1	3.
Combined district heating and hot water boilers	1.6	3.7	6.7	11.8	9.6	11.6	0.4	0.3	0.2	14.8	10.7	10.9	0.1	0.6	0.6	19	5	12.4	-	0.1	0.4	-	2	5.7
Room furnaces	33.4	34.7	35.4	-	-	29.9	10.1	6	2.6	-	-	30.9	1.1	0.9	1.5	-	-	39.3	-	0	0.1	-	-	17.4
Economic furnaces	0.6	2.2	4.8	3.5	5	7.6	0.1	0.3	0.3	3.4	7.7	5.6	0.1	0.2	0.8	4.4	3.6	7.8	-	0	0	-	0	-
Stoves for cooking	30.5	33.5	29.8	-	-	25.9	11.4	7	2.4	-	-	28.6	0.4	0.3	0.6	-	-	26.2	-	0	0	-	-	5

Annex 2

Renewable energy sources in projects implemented in the framework of the CCFI's tenders[17]

Tender name	Project name	Type of the RES to be used	Planned reduction CO2 emission (t/year)	Total amount of eligible expenditure LVL)	CCFI's funding (LVL)	Conclusion date of project contract	Actual end date of project implementation *	Project monitoring results	Other information
2	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
Transition of technologies from fossil to renewable energy sources	Transition of technologies from fossil to renewable energy sources of the social care centre "Venta" of Kuldīga County	Biomass	61.61	90,534.00	67,900.50	25.11.2010	03.02.2012	01.05.2014	Completed

[48] Data of the Central Statistical Bureau's database, epm2.2 Number of households using wood fuel consuming equipment and average age of the equipment (% of number of wood consuming households; years) (25/11/2013).
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Transition of technologies from fossil to renewable energy sources	Reconstructio n and replacement of heating boilers of the boiler room of Svente Parish	Biomass	945.22	185,913.02	139,434.52	29.11.2010	18.02.2013	01.05.2015	Completed
Transition of technologies from fossil to renewable energy sources	Partial transition of heat supply system of SIA Konstanta TVIS trade and services building from fossil to renewable energy sources	Biomass, solar energy	84.69	57,592.31	37,435.00	14.01.2011	24.05.2012	01.05.2014	Completed
Transition of technologies from fossil to renewable energy sources	Replacement, purchase and installation of thermal energy generation equipment at kindergarten “Varavīksne” for energy generation from renewable energy sources	Biomass	93.51	17,896.09	11,632.46	18.01.2011	21.11.2011	2012.gads - 57.38 t	Completed
Transition of technologies from fossil to renewable energy sources	Replacement, purchase and installation of thermal energy generation equipment for energy generation from renewable energy sources	Biomass, solar energy	53.75	42,269.00	27,474.85	18.01.2011	08.05.2012	01.05.2014	Completed
Transition of technologies from fossil to renewable energy sources	Solar energy power plant	Solar energy	4.2479	24,324.61	15,811.00	25.03.2011	25.10.2012	01.05.2014	Completed
Transition of technologies from fossil to renewable energy sources	Transition of thermal energy generation technologies from fossil to renewable energy sources at the Subate boiler room of Ilūkste County	Biomass	681.26	207,311.00	155,483.00	25.11.2010	23.03.2012	01.05.2014	Completed
Transition of technologies from fossil to renewable energy sources	Ērberģe hydro-electric power plant 2	Water	91.31	138,035.03	89,722.77	17.01.2011	08.04.2013	01.05.2015	Completed

Transition of technologies from fossil to renewable energy sources	Replacement of fossil fuel with renewable energy sources at the Ādaži boiler room	Biomass	1,055	172,901.54	112,386.00	18.01.2011	08.03.2012	01.05.2014	Completed

Transition of technologies from fossil to renewable energy sources	Reduction of carbon dioxide emissions by using solar energy at the building at 8 Atlasa Street, Riga	Solar energy	5.0878	32,420.00	21,073.00	17.01.2011	25.10.2012	01.05.2014	Completed
Transition of technologies from fossil to renewable energy sources	Installing environment friendly heat supply and electricity generation at the renovated neo-baroque architectural monument in Auguliena Manor	Biomass, solar energy	84.4	162,600.00	105,690.00	18.01.2011	30.11.2012	01.05.2014	Completed
Transition of technologies from fossil to renewable energy sources	Replacement of coal boiler rooms with renewable energy sources technologies at the buildings utilised by Riga city preschool educational institutions	Biomass. solar energy	114.93	239,149.00	179,361.25	29.11.2010	27.04.2012	01.05.2014	Completed
Transition of technologies from fossil to renewable energy sources	Transition to utilisation of renewable energy sources at warehouses of SIA “Abava”	Air	564.959	462,370.50	254,303.77	18.01.2011	06.01.2012	01.05.2014	Completed
Transition of technologies from fossil to renewable energy sources	Modernisation of Ērgļi hydro-electric power plant by increasing generated electricity capacities and ensuring sanitary flow in compliance with the environmental requirements	Water	158.28	180,000.00	117,000.00	14.01.2011	06.02.2012	01.05.2014	Completed
Transition of technologies from fossil to renewable energy sources	Modernisation of Bērzes dzirnavas hydro-electric power plant by increasing volume of generated electricity and ensuring environment friendly operation of the mill	Water	112.75	103,000.00	66,950.00	14.01.2011	12.09.2012	01.05.2014	Completed
Transition of technologies from fossil to renewable energy sources	Modernisation of Trikāta hydro-electric power plant by increasing volume of generated electricity and ensuring environment friendly operation of the plant	Water	77.3	173,000.00	112,450.00	14.01.2011	20.06.2012	01.05.2014	Completed
Transition of technologies from fossil to renewable energy sources	Modernisation of Gauja hydro-electric power plant by increasing volume of generated electricity and ensuring environment friendly operation of the plant	Water	76.4	276,500.00	179,725.00	23.03.2011	14.08.2013	01.05.2015	Completed
Transition of technologies from fossil to renewable energy sources	Solar energy for hot water	Solar energy	37.69	156,855.00	117,484.00	22.11.2010	11.10.2013	01.05.2015	Completed
Transition of technologies from fossil to renewable energy sources	Transition from fossil to renewable energy sources at Allaži Elementary School and Allaži Sports Centre	Biomass	150.75	38,893.34	29,170.00	29.11.2010	06.12.2011	2012 –183.91 t	Completed
Transition of technologies from fossil to renewable energy sources	Modernisation of Staškevici hydro-electric power plant by increasing volume of generated electricity and ensuring environment friendly operation of the plant	Water	34.475	111,041.00	72,176.65	24.03.2011	16.04.2013	01.05.2015	Completed
Transition of technologies from fossil to renewable energy sources	Transition from fossil to renewable energy sources at local government buildings of Jelgava County	Biomass	821.84	452,229.85	339,172.39	22.11.2010	30.10.2012	01.05.2014	Completed

Transition of technologies from fossil to renewable energy sources	Transition of technologies from fossil to renewable energy sources at the buildings of Tiskādi Sanatorium-Boarding-Elementary School	Earth heat	156.5	284,595.00	199,216.50	26.11.2010	27.01.2012	01.05.2014	Completed
Transition of technologies from fossil to renewable energy sources	Transition of technologies from fossil to renewable energy sources at the building of Tiskādi Secondary School	Earth heat	96.6	143,590.02	100,513.01	23.11.2010	28.02.2012	01.05.2014	Completed
Transition of technologies from fossil to renewable energy sources	Heat supply to Pabaži Elementary School from renewable energy sources	Earth heat Solar energy	14.29	59,960.00	44,970.00	29.11.2010	17.05.2013	01.05.2015	Completed
Transition of technologies from fossil to renewable energy sources	Establishment of a modern and environment friendly Karva hydro-electric power plant by ensuring reduction of carbon dioxide emissions	Water	635.2	538,461.54	350,000.00	18.01.2011		01.05.2014	Being implemented

Utilisation of renewable energy sources for greenhouse gas emission reduction	Installation of solar energy collector system at the building of "Ķekava County Local Government Sports Agency" for reduction of greenhouse gas emissions	Solar energy	31.92	64,750.00	48,562.50	23.09.2011	03.10.2012	01.05.2014	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Solar energy collector system for hot water supply and heat system support at old people's home of VSAC Vidzeme Branch "Ropaži" and VSAC Vidzeme Branch "Rūja"	Solar energy	43.26624	58,850.51	44,137.88	06.12.2011	18.10.2012	01.05.2014	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Heat supply from renewable energy sources for operation of the resort "Albatross"	Biomass	3,605.08	479,115.00	311,424.75	23.09.2011	24.08.2012	01.05.2014	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Replacement of fossil fuel thermal energy generation equipment of the National Armed Forces buildings with thermal energy generation from renewable energy sources	Biomass	885.07	103,538.21	77,653.64	21.10.2011	17.12.2012	01.05.2014	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Full utilisation of thermal pumps thermal and cold energy for microclimate adjustments at the printing house	Earth heat	197	498,700.00	273,725.56	14.11.2011	20.12.2012	01.05.2014	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Replacement of coal boiler room with renewable energy sources heating boiler at the building of Riga 14th Evening (shift) High School in Riga, at Margrietas Street	Biomass, solar energy	96.63	63,296.07	47,472.05	23.09.2011	08.04.2013	01.05.2015	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Installation of solar energy collector system and construction of un earth thermal pumps in Saulkrasti	Earth heat Solar energy	236.103	351,372.63	189,741.21	23.09.2011	29.01.2013	01.05.2015	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Replacement of thermal energy generation technologies at the buildings of branches of Pilsrundāle High School, i.e. building of Bērstele Elementary School and Viesturi Parish administrative building	Biomass	140.685	52,753.47	39,565.10	07.09.2011	22.10.2012	01.05.2014	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Installation of solar energy collector system at buildings owned by the local government of Krāslava County	Solar energy	9.647	21,400.00	16,050.00	23.09.2011	15.08.2012	01.05.2014	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Reconstruction of boiler room and heating system of Malta Special Elementary Boarding-School	Earth heat	96.25	139,250.80	104,438.10	19.09.2011	31.10.2012	01.05.2014	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Reduction of carbon dioxide emissions at Ulbroka Sports Complex	Solar energy	32.21	58,248.58	43,686.43	19.09.2011	02.11.2012	01.05.2014	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Replacement of fossil thermal energy generation equipment at buildings of educational institutions of Rūjiena County local government for thermal energy generation from renewable energy sources	Solar energy, biomass	324.62	118,374.70	88,721.83	23.09.2011	24.09.2012	01.05.2014	Completed

Utilisation of renewable energy sources for greenhouse gas emission reduction	Reduction of carbon dioxide emissions at Ķekava preschool educational institution "Ieviņa"	Solar energy	25.76	51,971.61	38,978.71	07.09.2011	12.09.2012	01.05.2014	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Modernisation of boiler room of administration, culture centre and elementary school of Siļukalna Parish of Riebiņu County	Biomass	89.06	44,800.00	33,600.00	23.09.2011	20.06.2012	01.05.2014	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Solar energy for hot water in Skrīveri County	Solar energy	33.67	51,851.71	38,888.78	19.09.2011	14.08.2012	01.05.2014	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Installation of renewable energy sources technologies for greenhouse gas emission reduction at local government buildings in Jelgava County	Solar energy, biomass	232.53	178,146.09	133,609.57	22.09.2011	25.03.2013	01.05.2015	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Establishment of cogeneration power plant of SIA "Seces koks"	Biomass	9,022	2,312,995.00	1,272,147.25	19.09.2011	07.05.2013	01.05.2015	Completed

Utilisation of renewable energy sources for greenhouse gas emission reduction	Establishment of a cogeneration plant in Brocēni	Biomass	7,563	1,919,000.00	1,055,450.00	19.09.2011	26.04.2013	01.05.2015	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Establishment of woodchip consuming cogeneration plant in Smiltene	Biomass	7,492	1,919,000.00	1,055,450.00	19.09.2011	08.04.2013	01.05.2015	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Installation of mobile heat boiler rooms with module type pellet boilers	Biomass	12,662.8	1,213,871.70	789,016.60	23.09.2011	26.02.2013	01.05.2015	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Construction of biomass boiler room and installation of solar energy collector system at Smiltene Technical School	Biomass, solar energy	4,974.18	278,012.09	208,509.06	30.08.2011	17.09.2012	01.05.2014	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Construction of biogas cogeneration power plant - utilisation of renewable energy sources for greenhouse gas emission reduction	Biogas	4,496	1,020,000.00	459,000.00	23.09.2011		01.05.2014	Being implemented
Utilisation of renewable energy sources for greenhouse gas emission reduction	Transition of technologies from fossil to renewable energy sources at the buildings of Daugavgrīva Prison's Grīva Section	Biomass	2,006	241,587.61	181,190.70	18.10.2011	23.01.2013	01.05.2015	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Reconstruction of boiler room of the Dagda Vocational Secondary School for transition to biomass fuel	Biomass	251.35	184,047.43	138,035.50	07.10.2011	10.09.2012	01.05.2014	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Installation of biomass cogeneration power plant in Tukums thus ensuring generation of electricity and thermal energy from renewable energy sources and by reducing carbon dioxide emissions	Biomass	8962.55	1,464,500.00	805,475.00	21.09.2011	28.03.2013	01.05.2015	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Replacement of heating systems at VSAC "Zemgale" branches "Iecava" and "Jelgava"	Biomass	372.27	94,260.75	70,695.56	19.10.2011	21.02.2012	01.05.2014	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Reduction of carbon dioxide emissions by transition from fossil fuel to utilisation of renewable energy sources in heating	Biomass	121.59	24,399.38	18,299.54	05.10.2011	04.07.2012	01.05.2014	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Replacement of equipment for thermal energy generation from fossil fuels with thermal energy generation from renewable energy sources at the local government buildings of Burtnieku County	Earth heat	93.4	114,057.84	85,543.38	08.09.2011	11.03.2013	01.05.2015	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Reconstruction of heating system of Kārķi Folk Centre of Valka County Kārķu	Biomass	34.79	9,372.47	7,029.35	19.09.2011	28.12.2011	2012.gads -34.79 t	Completed

Utilisation of renewable energy sources for greenhouse gas emission reduction	Utilisation of renewable energy sources for greenhouse gas emission reduction at 40 Karlīnes Street, Ventspils	Biomass	152.5	37,765.80	28,324.35	19.09.2011	28.09.2012	01.05.2014	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Prevention of greenhouse gas emissions caused by biodegradable waste by using hydrothermal gasification technology	Biogas	2,704	573,435.60	369,636.59	19.09.2011	18.03.2013	01.05.2015	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Utilisation of renewable energy sources at the State Agency for Social Integration	Solar energy Earth heat	59.9141	132,715.39	99,536.54	19.10.2011	21.03.2012	01.05.2014	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Modernisation of boiler room of local government objects at Dviete Parish	Biomass	158.71	49,322.56	36,991.92	19.09.2011	09.08.2012	01.05.2014	Completed

Utilisation of renewable energy sources for greenhouse gas emission reduction	Installation of solar energy collectors in preschool education institutions of Cēsis city	Solar energy	76.526	168,347.73	126,260.80	07.09.2011	09.10.2012	01.05.2014	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Utilisation of renewable energy sources for greenhouse gas emission reduction and for thermal energy generation for the needs of AS "Rīgas Dzirnavnieks"	Biomass	2,533.18	320,400.00	144,180.00	19.09.2011	11.01.2013	01.05.2015	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Utilisation of renewable energy sources at the Social Care Centre "Tērvete", by reducing greenhouse gas emissions and ensuring transition from technologies using fossil energy sources	Biomass, solar energy	445.1	180,281.00	135,210.75	19.09.2011	25.07.2012	01.05.2014	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Utilisation of solar energy at Dunte Manor	Solar energy	23.03	81,587.09	33,858.64	14.11.2011	12.11.2012	01.05.2014	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Purchase and installation of wind power plant technologies for electricity generation at "Lipstiņi", Popes Parish	Wind	8,188.13	3,375,000.00	1,181,250.00	16.11.2011	10.05.2013	01.05.2018	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Installation of solar energy collector system at AS "ROGA-AGRO"	Biomass	7.62	18,913.19	10,381.15	04.11.2011	13.03.2012	01.05.2014	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Purchase, installation and adjustment of technologies for biogas with low methane content processing at a cogeneration power plant	Biogas	10,467	158,512.79	47,553.84	21.09.2011	23.04.2013	01.05.2015	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Utilisation of renewable energy sources for greenhouse gas emission reduction at Beach Aqua Park, Ventspils	Solar energy	35.72	67,628.81	50,721.60	19.09.2011	21.08.2012	01.05.2014	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Solar energy for hot water in Salacgrīva County	Solar energy	23.237	45,733.33	34,300.00	19.09.2011	30.08.2012	01.05.2014	Completed
Utilisation of renewable energy sources for greenhouse gas emission reduction	Prevention of greenhouse gas emissions at sludge disposal locations of Ventspils treatment plants by using hydrothermal gasification technology of biodegradable waste	Biogas	3,976	795,568.67	497,090.14	20.09.2011	07.03.2013	01.05.2015	Completed

]

Project name	Status on 09.12.2013	Actual end date of the project	Total project costs (LVL)	Total amount of eligible expenditure (LVL)	CCFI's funding (LVL)	Planned reduction of CO_2 emissions (t/year)	Planned thermal energy consumption for heating, kWh/m^2/year
New construction of low energy consumption building "Valgunde Sports Hall" in Jelgava County	Completed	26.11.2013	1,144,443.48	592,900.36	74,320.28	n/a	14.00
Renovation of Ventspils City Council building at 36 Jūras Street, Ventspils	Completed	20.05.2013	752,708.85	465,062.48	306,941.23	86.918	12.04
Energy efficient reconstruction of low energy consumption building of Garkalne High School by using environment friendly technologies and construction materials	Being implemented		524,998.00	524,998.00	419,998.40	105.364	14.30
New construction of single-family residential building in compliance with low energy consumption standards, 3A Kadiķu Road, Jelgava	Completed	23.07.2013	62,740.82	30,999.24	20,149.51	n/a	14.79
Reconstruction of production building of LV KU SIA "HM Rīga" in compliance with low energy consumption requirements	Completed	11.112013	472,185.01	372,255.94	176,353.33	305.598	14.81
Construction of single-family residential building "Kalnamuiža" in Siguldas Parish of Siguldas County in compliance with low energy consumption standards	Completed	25.01.2013	157,893.83	47,267.23	30,723.70	n/a	12.26
Reconstruction of office building of A/S "RAR" in compliance with low energy consumption requirements	Completed	23.04.2013	1,130,303.81	1,126,977.81	730,210.58	623.54	14.64
New construction of energy efficient private house ZEMDIMDI in Baltezera village of Ādaži County	Completed	04.02.2013	145,917.00	96,839.23	62,945.50	n/a	14.45
New construction of energy efficient private house ZEMDIMDI in Baltezera village of Ādaži County	Completed	04.02.2013	145,917.00	96,839.23	62,945.50	n/a	14.45
New construction of energy efficient passive two-family residential building	Being implemented		300,342.92	81,287.38	52,551.80	n/a	10.50
New construction of low energy consumption office building in Liepāja at 8/10 Kūrmājas Boulevard 8/10	Being implemented	25.02.2013	189,634.56	112,231.11	72,950.23	n/a	13.91
New construction of energy efficient passive single-family residential building in Riga at 5 Ernsta Bergmaņa Street	Being implemented		278,590.60	78,330.50	50,914.82	n/a	14.50
Reconstruction of Tiskādi Special Elementary Boarding-School in compliance with low energy consumption requirements	Being implemented		639,434.75	573,911.72	459,129.37	123.6837	15.00

New construction of low energy consumption single-family residential building with consumption not exceeding 15 kWh/kvm/year for heating in “Daugaviņas”, Daugavmala, Tīnūžu Parish, Ikšķiles County	Completed	12.01.2012	63,704.38	44,744.43	29,083.88	n/a	13.10
Reconstruction of Tiskādi High School in compliance with low energy consumption requirements	Being implemented		648,380.60	628,540.43	502,832.35	180.7713	15.00

Minister of Economics V.Dombrovskis

Visa:
Secretary of the State M.Lazdovskis

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17158
I.Henilane, 67013038
Inita.Henilane@em.gov.lv
L.Radiņa, 67013040
Liga.Radina@em.gov.lv