APPROVED
by Resolution No of
2014

of the Seimas of the Republic of Lithuania

LONG-TERM STRATEGY FOR THE RENOVATION OF THE NATIONAL POOL OF BUILDINGS

EXECUTIVE SUMMARY

1. The purpose of the long-term strategy for the renovation of the national pool of buildings (‘the Strategy’) is to outline the key national provisions and areas for mobilising investments in the field of the renovation of the national pool of publicly and privately owned residential and commercial buildings.

2. The Strategy sets out the key national provisions and implementation guidelines up to 2020 and offers further guidance up to 2030.

3. The Strategy contains an overview of the national pool of buildings, investment planning and the underlying set of the country’s energy policy and building renovation measures.

4. It also offers quantitative and qualitative indicators of the national pool of buildings of the Republic of Lithuania, types and purpose of buildings, territorial distribution indicators, heat consumption in buildings, energy performance of buildings, energy consumption for heating purposes by various categories of buildings and an overview of the impact of the climatic zone of the Republic of Lithuania on the energy performance of buildings.

5. The Strategy gives an evaluation of the renovation of buildings and an overview of the key measures of building renovation (including those covering the use of renewable energy sources) and their combinations and discusses the possibilities of applying these measures to buildings of various groups. To evaluate combinations of building renovation measures, certain criteria of optimal expenditure have been selected including the benefits offered by the combinations of measures, investment performance, the return period of the combinations of measures and all required investment for implementing the combinations of measures. The basic underlying combination of measures is analysed in terms of its economic, social,

environmental and energy benefits.

6. The Strategy also presents the possibility of the renovation of priority groups of buildings that would significantly contribute to heat energy savings and be relevant to the majority of the public, an overview of the current renovation status of buildings, an evaluation of the main obstacles to the renovation of buildings and the key risks relating to the renovation of buildings as well as the future policy overview for the period between 2020 and 2030.

7. The Strategy discusses investment planning and sources and structure of financing for the renovation of buildings and presents a broader evaluation of energy savings envisaged and direct and indirect benefits of the renovation of buildings. It outlines the main areas for the renovation of the building stock between 2020 and 2030.

8. The Strategy is updated once every three years and notified to the European Commission as part of the National Energy Efficiency Action Plan.

CHAPTER I. INTRODUCTION

Principal measures for the renovation of buildings

9. The renovation of buildings is one of the key priorities of Lithuania's energy independence policy. This strategic initiative was set out in the National Energy Strategy approved by Resolution No XI-2133 of the Seimas of the Republic of Lithuania of 26 June 2012.

10. **The purpose of the Strategy** is to outline the key national provisions and areas for mobilising investments in the field of the renovation of the national pool of publicly and privately owned residential and commercial buildings.

11. **The objective of the Strategy** is to renovate 2.5 million m^2 of public and residential buildings using the budget of LTL 1 836 billion (of the EU support and the national budget).

12. The following energy efficiency improvement measures are completed and ongoing in households and the service sector:

1) **Household sector.** Programme for the renovation (upgrading) of multi-apartment buildings; European Union (EU) Structural Funds for 2007-2013 (Measure "Promoting the upgrading of multi-apartment buildings"); programmes for the development of problem areas in municipalities for 2011-2013; the Special Climate Change Programme; Ignalina Programme for 2007-2013;

2) **Services sector.** Renovation of heated and/or cooled buildings owned by the state and used by public authorities and bodies that are public administration entities; Programme for the upgrading of educational institutions; Programme for the renovation and upgrading of libraries for 2003-2013; Programme for the upgrading of cultural centres for 2007-2020; Programme for the upgrading of museums for 2007-2015; EEA and Norwegian Financial Mechanisms; Ignalina Programme for 2007-2013; Special Climate Change Programme.

13. The building renovation process is delayed by various obstacles and/or groups of obstacles that need to be divided into obstacles and risks. Obstacles are factors having delayed previous or delaying current building renovation initiatives while risks are unprecedented factors that may however arise due to a new procedure in place or the increased scale of building renovation and are impossible or difficult to control before and after the building renovation activities.

14. The main obstacles in renovating buildings include insufficiently developed condominiums, low income of the population, regional gaps in the subsistence level and the

dominant negative attitude towards the renovation of buildings. The dissemination of information on the renovation of buildings is inadequate. Inactive condominiums are slow to take decisions to renovate buildings and unwilling to get involved in the organisation of this process. New condominiums lack experience. In 2012, only about 20% of multi-apartment buildings were owned by condominiums in Lithuania. Contributions to the renovation of buildings are too high in economically weaker regions of Lithuania. The public is often sceptical about the renovation of buildings and waits until more projects are completed and results are evident.

15. The main risks in renovating buildings include the vagueness or uncertainty relating to future benefits and the absence of a clear system defining responsibility for warranty service and warranty security. The population feel underinformed of the effect of the renovation of buildings and the scale of savings. The decreasing total energy consumption undermines the effect of the economies of scale as permanent infrastructure costs remain irrespective of energy consumption. Currently the main responsibility lies with the administrator. Building renovation initiatives may be characterised by limited viability and long-term return rates in regions where the depopulation and ageing rates are the highest.

Policy overview

16. Key legislation of the EU and of Lithuania in the area of building renovation:

1) 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 (‘Directive 2012/27/EU’);

2) Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (‘Directive 2010/31/EU’);

3) National Energy Strategy;

4) Lithuanian Housing Strategy;

5) Programme for the renovation (upgrading) of multi-apartment buildings.

17. **Directive 2012/27/EU** promotes the mobilisation of investments in the renovation of residential and commercial buildings with a view to improving the energy performance of the building stock. The Strategy focuses on cost-effective overhaul leading to renovation that ensures a significant decrease in final energy consumption in the building as compared with the consumption rate before the renovation, thus creating conditions for very high energy performance.

18. **Directive 2010/31/EU** promotes an increase in the energy performance of

buildings taking into account climatic and local conditions as well as indoor climate environment and cost-effectiveness.

19. **National Energy Strategy.** One of the greatest problems in the heating sector is inefficient heat energy consumption, and the highest efficiency in energy savings can be achieved in old non-renovated buildings and the transport sector. In 2020-2030 the district heating sector will have three priorities: improving heat efficiency, promoting heat production from environmentally friendly energy sources (renewable energy sources) and improving the heat production and supply system. The implementation of these initiatives will render the Lithuanian heat sector stable, competitive and environmentally friendly.

20. **The Lithuanian Housing Strategy** seeks to ensure the efficient use, maintenance, renovation and upgrading of available housing. The objective is to encourage the renovation and upgrading of residential buildings increasing their energy efficiency and to improve the financing mechanism.

21. **The programme for the renovation (upgrading) of multi-apartment buildings** seeks to urge and enable owners of multi-apartment buildings built in accordance with technical construction regulations effective before 1993 to renovate (upgrade) multi-apartment buildings to increase their energy performance.

CHAPTER II. OVERVIEW OF THE NATIONAL POOL OF BUILDINGS

Purpose and year of construction of buildings

22. Lithuania has 557 700 buildings of the total surface area of 162.4 million m^2. Residential buildings account for 86.5% of the number of buildings and 67.4% of the total surface area of the entire national pool of buildings. The number of residential buildings registered is 482 200, and the total surface area of these buildings is 109.4 million m^2.

Number and total surface area of residential and non-residential buildings

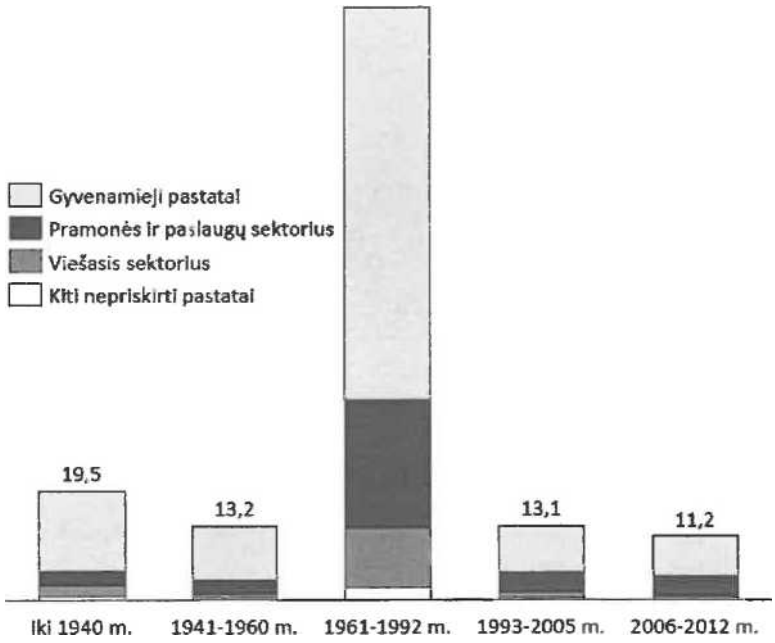
Purpose of buildings	Number of buildings	Share, %	Total surface area, m^2	Share, %
Residential buildings	**482 206**	**86.5**	**109 450 170**	**67.4**
Non-residential buildings	**75 544**	**13.5**	**52 953 098**	**32.6**

23. The overview of the national pool of buildings does not account for auxiliary, agricultural (farms, housekeeping and greenhouses) and gardening buildings.

24. In Lithuania the majority of residential buildings are old (built before 1992). The largest share in the national pool of buildings in Lithuania by surface area of buildings (65%) is buildings built between 1961 and 1992. In the number of buildings built between 1961 and

1992, residential buildings account for 66%.

105.4



Surface area of the building stock by year of construction and by purpose, million m^2

Gyvenamieji pastatai	Residential buildings
Pramonės ir paslaugų sektorius	Industry and services sector
Viešasis sektorius	Public sector
Kiti nepriskirti pastatai	Other buildings not attributed elsewhere

25. Breakdown of the surface area of residential buildings by purpose (in the total surface area of residential buildings):

1) residential buildings of one and two flats account for 49%;

2) residential (multi-apartment) buildings of three and more flats account for 47%;

3) residential buildings for various social groups account for 4%.

26. Groups of the building stock accounted for together:

1) the total of 61% of (371 666) buildings are in rural areas while 39% (238 223) are in urban areas;

2) the total of 67% of the total surface area of buildings (124 924 165 m^2) are in urban areas while 33% (61 626 659 m^2) are in rural areas.

27. 75% of buildings are owned by natural persons but by surface area they only account for 33% of the building stock.

Climatic data for Lithuania

28. The entire territory of Lithuania falls within the cool temperate climate zone but the western part of the country is affected by the Baltic Sea, which is why the annual precipitation rate, wind velocity and the average annual air temperature there are higher than in the rest of the country.

29. Lithuania is dominated by moderately warm summers and moderately cold winters. The average winter temperature is about minus 5°C.

30. Western Lithuania is characterised by the following indicators:

1) higher average annual air temperatures than in other regions of the country where the average annual air temperature is up to 25% higher than in Eastern Lithuania;

2) higher annual precipitation rate than in other regions of the country where the precipitation levels are up to 45% higher than in Central Lithuania;

3) higher average annual wind velocity than in other regions of the country where the average annual wind velocity is double that in Southern Lithuania.

31. As the entire territory of Lithuania falls within the cool temperate climate zone, the impact of the climatic zone on the energy performance of buildings is deemed uniform throughout the country. Although the west of Lithuania is marked by higher annual levels of precipitation, wind velocity and average annual air temperature than the rest of country, the difference in energy consumption as compared with the other areas of the country is only up to 2%. The share of buildings located in Western Lithuania (exclusive of auxiliary buildings) in the entire national building stock is the total of 7.2%.

Energy consumption in Klaipėda and Vilnius multi-apartment residential buildings

2012-2013 heating season	Klaipėda	Vilnius
Average outdoor air temperature, °C	1.0	-1.6
Average heat consumption for heating, kWh/m^2	16.44	16.90

Energy performance properties of buildings

32. The energy performance class of buildings and the annual heat demand are evaluated on the basis of information supplied by the state enterprise Construction Products

Certification Centre *(*http://www.spsc.lt/cms/index.php*)* and standard indicators set out in technical construction regulations. The energy performance class of a specific building is evaluated by experts certified as energy performance certification experts.

33. A total of 45 000 buildings have been evaluated. Building structures and engineering systems are evaluated taking into account the purpose and the year of construction of the building. Buildings are attributed to Classes A, B, C, D, E, F and G by their energy consumption.

Average energy performance in certain groups of buildings

Purpose of buildings	Average energy performance, by year of construction				
	Before 1940	1941-1960	1961-1992	1993-2005	2006-2012
1. Residential buildings					
1.1. One and two flats	**E, F, G**	**E, F, G**	**E, F, G**	**C**	**B**
1.2. Three and more flats (multi-apartment buildings)	**E, F, G**	**E, F, G**	**E, F, G**	**D**	**B**
1.3. Various social groups	**E, F, G**	**E, F, G**	**E, F, G**	**D**	**C**
2. Buildings in the industry and the services sectors					
2.1. Administrative buildings	**E, F, G**	**E, F, G**	**E, F, G**	**C**	**B**
2.2. Production and industrial buildings	**E, F, G**	**E, F, G**	**E, F, G**	**C**	**B**
2.3. Hotels	**E, F, G**	**E, F, G**	**E, F, G**	**C**	**B**
2.4. Commercial buildings	**E, F, G**	**E, F, G**	**E, F, G**	**C**	**B**
2.5. Services buildings	**E, F, G**	**E, F, G**	**E, F, G**	**C**	**B**
2.6. Catering buildings	**E, F, G**	**E, F, G**	**E, F, G**	**C**	**B**
2.7. Recreational buildings	**E, F, G**	**E, F, G**	**E, F, G**	**C**	**B**
3. Public sector buildings					
3.1. Administrative buildings	**E, F, G**	**E, F, G**	**E, F, G**	**C**	**B**
3.2. Cultural buildings	**E, F, G**	**E, F, G**	**E, F, G**	**C**	**B**
3.3. Research buildings	**E, F, G**	**E, F, G**	**E, F, G**	**C**	**B**
3.4. Sports buildings	**E, F, G**	**E, F, G**	**E, F, G**	**C**	**B**
3.5. Healthcare buildings	**E, F, G**	**E, F, G**	**E, F, G**	**C**	**B**
4. Not attributed					
4.1. Special-purpose buildings	**E, F, G**	**E, F, G**	**E, F, G**	**C**	**B**
4.2. Religious buildings					
4.3. Other buildings	**E, F, G**	**E, F, G**	**E, F, G**	**D**	**C**

34. Classes E, F and G are joined as the condition of all buildings falling within these classes is unsatisfactory and their annual heat demand is over 300 kWh/m^2.

Annual heat demand by energy performance class of the building

Energy performance class	Annual heat demand, kWh/m^z
A	**<40**
B	**40-100**
C	**100-200**
D	**150-350**
E, F, G	**>300**

35. An evaluation of energy efficiency properties of residential buildings for each group of buildings by age covered > 10% of all buildings falling within each group. An evaluation of properties of all other buildings covered > 20% of all buildings by group and age.

CHAPTER III. BUILDING RENOVATION METHODS

Measures for the renovation of buildings

36. To ensure the greatest energy savings with the least investment, the best option is to renovate buildings by implementing only energy saving measures. These measures focus on saving energy, and the model for financing them is clear. It is possible to conduct renovation works on individual buildings, so the renovation covers buildings consuming most energy. The implementation is also easier as the renovation works are performed on one building.

Implementation of building renovation measures in various buildings (green – measures implemented, gray – measures not implemented)

Purpose of buildings	Measures to increase energy efficiency								Measures relating to renewable energies			
	Refitting of heating systems	Installing individual heat meters	Winterisation of the roof or attic slab	Winterisation of facade walls and the plinth wall	Glazing of projecting and recessed balconies	Replacement of entrance and other doors	Replacement of windows	Winterisation of the cellar slab and floor	Installation of a geothermal power plant	Installation of solar collectors	Installation of wind power plants	Installation of photovoltaic elements
1. Residential buildings												
1.1. One and two flats												
1.2. Three and more flats (multi-apartment buildings)												
1.3. Various social groups												
2. Buildings in the industry and the services sectors												
2.1. Administrative buildings												
2.2. Production and industrial buildings												
2.3. Hotels												
2.4. Commercial buildings												
2.5. Services buildings												
2.6. Catering buildings												
2.7. Recreational buildings												
3. Public sector buildings												
3.1. Administrative buildings												
3.2. Cultural buildings												
3.3. Research buildings												
3.4. Sports buildings												
3.5. Healthcare buildings												
4. Not attributed												
4.1. Special-purpose buildings												
4.2. Religious buildings												
4.3. Other buildings												

37. Most energy efficiency improvement measures can apply to buildings of all groups. The applicable measures are implemented to renovate individual groups of buildings in Lithuania or are not widely applicable but the technology allows their application in some groups of buildings.

38. The measures not implemented are evaluated on the basis of the following criteria:

1) Groups of buildings where the measures cannot be implemented for technical reasons (e.g. the cellar slab is not winterised if there is no cellar in the building, balconies are not glazed if there are none, etc.);

2) No measures are applicable in unheated buildings;

3) Measures are implemented in individual rare cases;

4) Measures are not applicable to mass renovation of buildings due to high investment demand;

5) Mass renovation measures cannot be implemented due to special renovation requirements applicable to buildings.

39. The basic set of measures was formed by selecting the best measures suitable for mass renovation of buildings. The demand for investment and energy savings are evaluated based on case studies of renovated buildings. The demand for investment is presented as an interval of values as each case is subject to a different number of measures, a variety of materials and different prices of renovation works. Savings are also presented as an interval as the condition of buildings before renovation is different as is the number of measures used during the renovation, characteristics of buildings and technical application of measures.

Basic set of measures

No	Ongoing measures	Total demand for investment, LTL/m^2	Energy savings, %	Energy performance class
1	Winterisation of walls, plinth wall and roof	300-500	40-50	C
2	Replacement of windows and entrance doors			
3	Winterisation of the cellar slab and floor			
4	Glazing of balconies			
5	Renovation of the heat supply system			

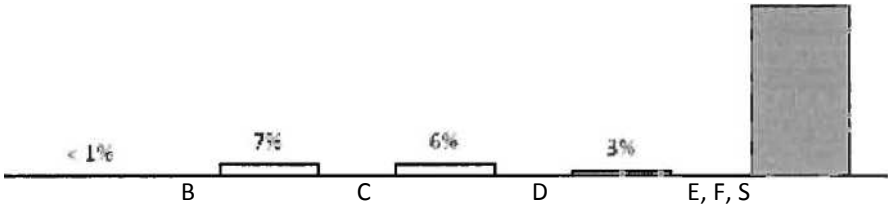
40. The basic set of measures is shaped assuming that the building has not been subject to any renovation measures or that minimum renovation measures have been implemented. Given that an investment project is drawn up for each building before the renovation specifically evaluating the condition of the building, its energy efficiency and the need for renovation measures, the basic set of measures may be used implementing all of the measures or using them selectively on a case-by-case basis (e.g. where only old windows are replaced as some of the windows have already been replaced in the building). In accordance with case studies of renovated buildings, the application of measures included in the basic set usually achieves Class C of energy performance.

Evaluation of the basic set of measures for the renovation of buildings

41. Initial investment in the basic set of measures reaches 300 to 500 LTL/m^2, and the

implementation of the set yields annual savings of 40 to 50% of heating energy. The preliminary return on investment period of the basic set of measures is between 13 and 28 years. The most probable return on investment period is 20 years while the acceptable period is between 25 and 30 years. This set of measures pays back faster than building renovation measures become depreciated, and the measures remain operational and continue to save energy for one year after the point of payback. The basic set of measures is the optimal investment set of saving measures as the implementation only requires the minimum amount of investment, which makes it possible to renovate a larger number of buildings.

42. It is best to renovate the least energy-efficient buildings first as 85% of the pool of buildings by energy performance class fall within Classes E, F and G.



Breakdown of the surface area of the building stock of Lithuania by energy performance class in 2013, %

Results of the implementation of the basic set of measures with the investment of LTL 10 million in the renovation of a standard multi-apartment building (of the total surface area of 4 400 m^2)

Criterion	Basic set of measures
Possibilities	
Total demand for investment, LTL/m^2	**300-500**
Energy savings, %	**40-50**
Results	
Number of renovated multi-apartment buildings	**4-7**
Energy savings, MWh/year	**1 200-2 100**

43. The pool of buildings with the worst energy performance is the priority in renovating buildings. It is best to use the basic set of measures for the renovation works. This set of measures makes it possible to renovate the largest number of buildings and to save most energy.

44. The average price of saving 1 kWh of heat energy using the basic set of measures is about LTL 5.8.

45. There is also a need to evaluate the possibility of renovating buildings by block. The principle of block renovation covers the upgrading of not only buildings but also infrastructure including heat and water supply networks, parking areas near buildings, lighting, playgrounds, greenery and access roads. This method is useful where it is possible to undertake comprehensive renovation of all buildings located in a block including engineering and transport infrastructure. Benefits of the block renovation principle may be both economic due to energy savings and the

increased value of buildings and social due to maintained surroundings. This requires substantial investments depending on the need for infrastructure renovation. The principle may be implemented efficiently if the municipality or the energy supplier/the manager of the engineering infrastructure provide for infrastructure renovation works in their strategic plans.

Renovation of priority groups of buildings

46. Priority groups in the pool of buildings are groups of buildings the renovation of which would significantly contribute to heat energy savings and be important to the majority of the public, i.e. buildings that can be renovated using measures for mass renovation of buildings seeking the greatest heat energy savings with minimum investment.

Number of buildings of priority groups and total surface area of buildings

Number of buildings of priority groups by year of construction				
1941-1960	**1961-1992**	**1993-2005**	**2006-2012**	**Total**
5 585	**34 654**	**2 756**	**1 265**	**44 260**
Surface area of buildings of priority groups by year of construction, m^2				
1941-1960	**1961-1992**	**1993-2005**	**2006-2012**	**Total**
3 661 845	**57 914 889**	**5 288 386**	**4 019 755**	**70 884 875**

Criteria for identifying priority groups of buildings

Criteria for identifying priority groups of buildings	**Impact of the criterion on benefits of building renovation**	**Share of the surface area in the pool of buildings in 2013, %**
Low energy performance of buildings (Classes D, E, F and G)	**Greatest energy savings; Payback of building renovation costs**	**85**
Buildings not subject to special building renovation conditions	**Simpler drafting of renovation projects; Easier to obtain financing**	**90**
Public sector and residential buildings	**Renovation of buildings of critical and strategic importance; Groups consuming most heat**	**75**
Buildings obtaining heat energy by incineration of fossil fuels	**Reducing energy dependence on foreign fossils**	**60**
Share of the surface area of buildings meeting all of the criteria in the entire pool of buildings		**33**

47. The purpose of mass renovation of buildings is to save as much heat energy as possible. This is why there is a need to evaluate and include in priority groups buildings of low energy performance attributable to Classes E, F and G. 100% of buildings attributed to Classes E, F and G are built before 1993. 85% of the surface area of the pool of buildings by energy performance class fall within Classes E, F and G. Buildings subject to special building renovation conditions (buildings of cultural heritage, buildings in old towns and their protective areas; religious buildings) account for 10% of the surface area of the building stock. Mass renovation measures can apply to 90% of the surface area of the building stock.

48. The renovation of residential and public sector buildings should be one of the key areas for building renovation as these buildings account for 75% of the total surface area of the

pool of buildings. The renovation of these buildings will lead to the attainment of threshold values of air temperature, temperature variation, relative air humidity and air movement velocity set in hygiene regulations, which will contribute to better health of the population. Multi-apartment residential buildings in Lithuania consume most heat energy generated from fossil fuels, which means that their renovation would substantially contribute to the reduction of energy dependence. These buildings account for 60% of the surface area of the building stock.

49. Given the life cycle of buildings and the period of full depreciation of renovation measures, priority groups of buildings are valid for a period until 2020.

50. The priority group of buildings (for the renovation of the building stock by 2020) includes multi-apartment buildings, residential buildings for various social groups, public buildings and special-purpose buildings built before 1993. Most of such buildings are buildings of Class E, F and G of energy efficiency that may be subject to mass renovation measures. Other buildings are not included in the group of priority buildings up to 2020 as they are attributed to Classes A, B, C or D of energy efficiency, subject to special renovation conditions, consuming a small share of fossil fuels for heat energy or industrial and service buildings that should be renovated not through mass renovation measures.

CHAPTER IV. SOURCES OF FINANCING

51. The key sources of financing for the ongoing renovation of multi-apartment buildings are the funds of low-interest loans and state subsidies. The majority of public buildings are renovated using the EU assistance. In the future the value of various investment funds is expected to increase, which will enable both the population and public state bodies to perform renovation works and gradually repay loans.

52. Between 2015 and 2020, LTL 1 836 billion (EU support and the state budget funds) are to be used to renovate buildings falling within priority groups.

53. The demand for investment between 2015 and 2020 for non-priority groups of buildings is LTL 10 million to be used for informing owners of buildings about possibilities and benefits of renovating buildings. During the first period a higher investment demand is foreseen for the performance of the measure as more intense application of information measures is expected at the beginning of the mass renovation process.

54. Between 2007 and 2013 the bank financing of renovation works has become the most common source of funding for the renovation, which is why the funds invested by banks are likely to remain the key source of financing of the renovation up to 2020 as well.

55. The expected value of the model of energy companies in Lithuania between 2015 and 2020 as a source of financing will be established taking into account good practices in European countries. The model of energy companies makes it possible to renovate about 20 buildings per year, which, according to preliminary estimates, would require about LTL 20 million. The period between 2015 and 2020 is six years, which is why the total value of the source of financing is likely to be about LTL 120 million, i.e. 3% of all demand for investment in 2015-2020.

56. In 2015-2020 some of the building renovation projects are expected to be funded using private capital, i.e. personal savings of building owners. This method of financing will be used with a view to avoiding interest payable on borrowed capital through various forms of funding.

57. Pension and investment funds are used to invest the funds available and receive some return. In the near future, some growth in the interest in these funds and investment opportunities in the renovation of buildings is expected. True, it is unlikely that in 2015-2020 the financing from these funds will be substantial. They will become increasingly important in 5 to 7 years.

58. In 2020-2030 greater popularity is foreseen for the performance of renovation works using borrowed funds with the increasing number of sources of financing for the renovation works. A substantial share of renovation works is also expected to be completed using savings of the population. Public buildings should be renovated increasingly with the help of public-private partnership. The renovation of multi-apartment buildings should still be partly subsidised by the state. The model of energy companies should gain particular importance for the renovation of buildings.

59. The period of the EU structural assistance of 2014-2020 starting in 2014 will continue to favour the implementation of renovation projects in public buildings. In accordance with the information supplied by the Ministry of Finance of the Republic of Lithuania, the EU structural assistance funds envisaged under Thematic Objective 4 “Supporting the shift to low-carbon economies in all sectors” for specific objectives within the Operational Programme are distributed as follows: Objective 4.1.1 “To increase the use of renewable energy sources” – LTL 1 104 billion; Objective 4.3.1 “To increase the efficiency of energy production, supply and consumption and the use of renewable energy resources in public infrastructure including public buildings and in housing” – LTL 1 564 billion. The activities of this objective also include the renovation of multi-apartment buildings and public buildings as well as street lighting.

60. Up to LTL 375 million out of the said LTL 1 564 billion are expected to be allocated

to the renovation of buildings owned by central authorities and to the upgrading of urban street lighting (the Ministry of Energy of the Republic of Lithuania is responsible for both these measures).

61. The renovation of public buildings (especially those owned by central authorities) using the model of energy companies would potentially ensure the attainment of the highest savings targets at minimal cost. This would be a better alternative than the use of the model of repayable subsidies where the project promoter is not very motivated to achieve the highest energy savings targets possible.

CHAPTER V. BENEFITS OF BUILDING RENOVATION

62. Benefits of building renovation may be both direct and indirect (external). In most cases investors (building owners, businesses and the state) evaluate prospective direct benefits gained through the performance of building renovation works while indirect benefits remain underestimated.

63. Investments of LTL 1 836 billion in the renovation of public-sector and residential buildings (EU support and the state budget funds) will renovate the surface area of 2.5 million m^2.

Direct benefits of the renovation of buildings

64. Following the renovation of buildings, building (flat) owners will have to bear lower heating costs and the value of flats (premises) will increase. Following the renovation through the application of the basic set of measures, the demand for energy drops by up to 40-50%. This leads to a decrease in energy expenditure.

65. The value of one flat (of the average surface area of 66.6 m^2) increases by about 10% due to the implementation of the basic set of measures where the building is in a large city and by about 30% where the building is in a smaller town or region.

66. The renovation reduces energy poverty and improves living conditions.

67. Average monthly heat energy costs per household member are LTL 107 while the renovation of residential properties using the basic set of measures makes it possible to save up to 55% of these costs. Therefore, the overall structure of the expenditure changes so that the share of expenditure on heat energy decreases from 13 to 6%. So the population acquires higher consumption powers while heating expenditure limit the power to consume other goods and services to a lesser extent.

68. The renovation of buildings ensures the appropriate air temperature, does away with drafts and yields the required air humidity and ventilation, thus reducing morbidity rates for such

diseases as asthma, bronchitis, allergies, diseases of upper respiratory tracts, etc. The requirements laid down in the Lithuanian hygiene regulations are implemented.

Indirect benefits of the renovation of buildings

69. **Economic growth:**

1) As the mass renovation of buildings would implement energy saving measures and include various technical works, 21% of the total expenditure would be the value added tax. Additional tax revenue to the national budget would be an important source of additional income for the state.

2) As for business benefits, all building renovation works would be performed, which implies that mass renovation of buildings would ensure long-term employment for the construction sector;

3) The improvement of the economic situation in the country would be beneficial to the public too as it would be easier for the state to implement new large-scale investment projects.

70. **Growth of research and development and related industry competitiveness and export opportunities.** The renovation and upgrading works of buildings would make it possible to practically apply energy-saving technologies developed by local scholars and encourage them to develop new ones. Mass renovation works would encourage more specialists to become involved in technological improvements, and the technologies developed could be exported abroad.

So, there are obvious benefits for the population (new areas of research and jobs), for the state (possible export growth) and for businesses (larger numbers of qualified technical specialists).

71. **Improved health of the population.** The improved health of the population is seen as indirect benefit of the mass renovation of buildings that is important both to the public proper and to the state and businesses given lower morbidity rates and greater productivity.

72. **Lower pollutant emissions.** Lower pollutant emissions are one of the outcomes of the completed process of building renovation as the decreased energy consumption leads to decreased generation and emissions of pollutants. These benefits are important to the public but also have some effect on investors in the renovation of other buildings as reduced pollution contributes to the improved health of the population, lower morbidity rates and higher productivity and efficiency.

73. **Greater energy security.** The mass renovation of the pool of buildings greatly reduces the total heat energy consumption in the country. The drop in total consumption leads to greater importance of local power plants running on renewable energy sources and reduced imports of fossil fuels. The state would become less energy-dependent and the overall economy

would become more stable. There would also be some benefits for the population as the national economy would improve. Benefits for businesses are the growing demand for renewable energy sources.

74. **Reduction of new energy generation capacities.** Given the lower demand for heat energy, it is important to take into account that the amount of energy generated and the use of installations also change. It is safe to assume that with the decreasing energy consumption the significance of biofuel installations in place will be increasing while the demand for new facilities will depend on how much energy is not yielded by biofuel facilities in place. There are some indirect benefits for the public including lower pollution rates and higher energy independence of the country.

CHAPTER VI. MAIN AREAS FOR THE RENOVATION OF THE BUILDING STOCK UP TO 2030

75. Buildings should be renovated using measures within the basic set of measures, gradually expanding the range of commonly used measures and implementing better current and new energy efficiency improvement measures.

Main areas for the renovation of the building stock in 2015-2020

76. The total number of buildings to be renovated is between 1 000 and 1 200, i.e. 2.3 to 2.7% of the total number of priority buildings to be renovated.

77. To renovate the least energy-efficient buildings among buildings attributed to Classes E, F and G of energy efficiency and built before 1993.

78. In 2016, to renovate 10 to 12% more buildings than in 2015 as the year 2014-2015 will be the first year of the mass renovation of buildings when the construction sector becomes adjusted to the mass renovation of buildings. After the renovation of 2016 the growth rate will slow down, and the annual increase in the number of buildings renovated will be 2%. This is attributable to the forecasted improvement in the country's economic situation.

79. To invest LTL 1 836 billion (of the EU support and the national budget) in the renovation of public sector and residential buildings.

80. To save at least 500 GWh of heat energy.

Main areas for the renovation of the building stock in 2021-2030

81. To continue the implementation of the renovation policy launched in 2015-2020;

82. The total number of buildings to be renovated is between 2 500 and 3 000, i.e. 5.9 to 7.1% of the total number of priority buildings to be renovated.

83. To renovate more than 250 buildings per year as the construction sector will have

adjusted to the mass renovation of buildings.

84. To renovate the least energy-efficient buildings among buildings attributed to Classes D, E, F and G of energy efficiency and built before 1993.