**Market Need Report**

**Kaunas District Municipality**

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1. Introduction

This document provides an overview of the current measures for improving energy efficiency in public and private buildings. The measures include state and municipal incentive schemes under which financing is allocated to reducing energy consumption in buildings (e.g. renovation of buildings, installation of energy saving devices) or using renewable energy resources.

In addition to the current funding instruments, the document also provides examples of three investment projects (or groups of projects) that are being implemented in Kaunas region with the support of these funding instruments and the deliverables of these projects and other experience in connection with these projects.

The document assesses accessibility of the current funding instruments for the owners of private residential homes and public or private entities, requirements for obtaining financing which are burdensome or risks arising in connection with obtaining financing.

To summarise the collected information, the need for new funding instruments, the characteristics of such instruments and conditions which give rise to the need for new funding instruments are examined. Subsequently, proposals are made on how to increase efficiency and availability of the current funding instruments, what new instruments should be proposed and what would be their advantages compared with the existing instruments.

1. Current Funding Opportunities

This chapter presents current financial opportunities for building owners in Kaunas District Municipality. The instruments include measures financed both under municipal programmes and state programmes funded from the budget of Lithuania or other foreign sources (e.g. EU funds). Below is a brief description of each funding instrument.

|  |  |
| --- | --- |
| **Name of the instrument** | Using renewable energy resources (solar, wind, geothermal energy, biofuels, etc.) in one- or two-family private homes by replacing fossil fuel-based energy production. |
| **Brief description of the instrument** | Administrator – Lithuanian Environmental Investment Fund. Funding is provided under the Climate Change Special Program. |
| **Funded activities** | * Installation costs of small capacity solar power units for electricity generation for own needs (not for sale) or installation of solar panels for water heating or heat storage
* Installation costs of wind energy sources for own needs (not for sale)
* Installation Costs of heat pumps for hot water and thermal energy production for own needs (not for sale)
 |
| **Type of funding** | Subsidy of up to 25% of the costs incurred |
| **Beneficiaries** | Owners of private homes |
| **Obtaining funding and other important information** | Calls for submission of project registration forms are published in the first half of each year when all the relevant legislation is adopted. Calls must specify the procedure for collecting, registration and evaluation of the registration forms.Level of support – up to 25% of the actual eligible costs incurred, based on documents which support actual costs and payment, but not exceeding EUR 14,500. |
| **Further information available at** | http://www.laaif.lt/lt/tinkamos-islaidos/ |

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| **Name of the instrument** | Modernisation of private homes |
| **Brief description of the instrument** | Administrator – Lithuanian Environmental Investment Fund. Funding is provided under the Climate Change Special Program. |
| **Funded activities** | * Renovation of hot water supply and heating systems;
* Replacement of windows, glazing of balconies and loggias, door replacement;
* Installation of barriers/walls and blocking of gaps;
* Insulation of walls, ceilings, and floors;
* Roof insulation or replacement;
* Installation of recuperation devices and systems;
* Energy performance certification of buildings;
* Costs of the building materials required for implementing the project, transport costs.
 |
| **Type of funding** | Subsidy of up to 25% of the costs incurred |
| **Beneficiaries** | Private home owners |
| **Obtaining funding and other important information** | Level of support – up to 25% of the actual eligible costs incurred, based on documents which support actual costs and payment, but not exceeding EUR 14,500.Applicants who renovate (modernise) their homes must also submit the energy performance certificate of the building and a certificate indicating that after the modernisation the building reached energy efficiency Class C and energy consumption costs decreased by at least 20%%. |
| **Further information available** | http://www.laaif.lt/lt/tinkamos-islaidos-2/ |

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| **Name of the instrument** | Multi-apartment building renovation (modernisation) programme |
| **Brief description of the instrument** | Administrator – Housing Energy Efficiency Agency (BETA). Funding is provided from the budget of the Republic of Lithuania |
| **Funded activities** | * Renovation (modernisation) project and expert examination, administration, technical maintenance (100% subsidy);
* Measures to increase energy efficiency: renovation of heating, hot water supply, and ventilation systems, insulation of the roof and walls, replacement of windows and doors, modernisation of lifts and electrical systems, and repair of stairwells (30% subsidy);
* Additional 10% subsidy for owners of those buildings where the owners have installed a separate/modernised the existing non-automated boiler unit and installed balancing valves or other individual heat meters.
 |
| **Type of funding** | * Preferential credit
* Subsidy (compensation)
 |
| **Beneficiaries** | Owners of multi-apartment buildings. Applications may be submitted by municipalities, managers of common areas of multi-apartment buildings, entities which provide administration services for the implementation of the renovation projects of multi-apartment buildings, and administrators who implement municipal energy efficiency improvement programmes. |
| **Obtaining funding and other important information** | Planned state aid – EUR 50 million, reimbursement of 30% of the costs incurred on measures which increase energy efficiency. It is planned to renovate at least 500 multi-apartment buildings in Lithuania under this programme. It is planned to pay or compensate 100% of project preparation, implementation administration and construction technical maintenance costs under this call, and also 100% of the costs of those apartment owners most in need (i.e. those eligible to receive compensation of the costs of heating of their homes, supply of drinking water, and hot water costs).Requirements for energy savings:* For the multi-apartment buildings, for which compulsory minimum energy performance requirements apply: at least energy performance Class C and reduction of the estimated energy costs by at least 40% compared to those prior to the implementation of the modernisation project.
* For the multi-apartment buildings, for which compulsory minimum energy performance requirements do not apply: reduction of the estimated energy costs by at least 25% compared to those prior to the implementation of the modernisation project.
* The programme is intended only for multi-apartment buildings (a multi-apartment building means a three- or more family residential building, which may also contain such non-residential premises as retail trade, administrative, catering, etc.).
* A multi-apartment building must be built under the construction technical requirements which were in force before 1993.
 |
| **Further information available at** | https://www.e-tar.lt/portal/lt/legalAct/TAR.AE67B6739526/WThqaVWCcL |

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| --- | --- |
| **Name of the instrument** | Modernisation of multi-apartment buildings in Kaunas region under the municipal programme for improving energy efficiency of residential buildings |
| **Brief description of the instrument** | Administrator – UAB Komunalinių Paslaugų Centras [utility service centre]. Funding is provided from the budget of Kaunas District Municipality and other multi-apartment building renovation programmes funded by the state (climate change programme, multi-apartment building renovation programme). By the end of 2017, 40 multi-apartment buildings had been renovated in Kaunas District municipal area under this programme. |
| **Funded activities** | * Up to 50% of the costs of the preparation of an investment plan;
* Subsidy for the renovation of the multi-apartment buildings (insulation of external walls and roof, replacement of windows and doors, modernisation of the hot water supply systems, installation of individual metering devices, and modernisation of ventilation systems. The amount of the subsidy depends on the conditions.
 |
| **Type of funding** | * Preferential credit
* Subsidy (compensation)
 |
| **Beneficiaries** | Owners of multi-apartment buildings. |
| **Obtaining funding and other important information** | * It is mandatory to reduce the costs of thermal energy consumption by a multi-apartment building by at least 40%, and achieve at least energy efficiency Class D.
 |
| **Further information available at** | https://www.krs.lt/savivaldybe/struktura-ir-kontaktai/administracijos-direktorius/aplinkos-skyrius/daugiabuciu-namu-renovacija/ |

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| **Name of the instrument** | Modernisation of state-owned buildings |
| **Brief description of the instrument** | Modernisation of the heated and/or cooled state-owned public buildings by increasing their energy efficiency. Administrator – the Ministry of Energy of the Republic of Lithuania and UAB Viešųjų Investicijų Plėtros Agentūra (VIPA) [public investment development agency]. Funding is provided from the budget of the Republic of Lithuania and the EU Structural Funds. |
| **Funded activities** | * Renovation of the hot water supply and heating systems;
* Replacement of windows, glazing of balconies and loggias, door replacement;
* Installation of barriers/walls and blocking of gaps;
* Insulation of walls, ceilings, and floors;
* Roof insulation or replacement;
* Renovation of lighting, electrical fire safety, drinking water supply, wastewater removal, and drainage systems;
 |
| **Type of funding** | Refund subsidy of up to 100%. |
| **Beneficiaries** | Entities who own state-owned public buildings in trust or use them under the lending right (with the exception of state enterprises) and/or the manager of the centrally managed state property. |
| **Obtaining funding and other important information** | Funding is carried out by planning state projects. The energy performance class of the buildings – below Class C and the building must be included in the list of buildings eligible for renovation. The aim must be to reduce the energy costs by at least 30%.  |
| **Further information available at** | Http://enmin.lrv.lt/lt/veiklos-sritys-3/europos-sajungos-parama/europos-sajungos-investicijos-ir-strukturine-parama/2014-2020-m-europos-sajungos-investicijos/valstybei-nuosavybes-teise-priklausanciu-pastatu-atnaujinimas |

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| --- | --- |
| **Name of the instrument** | Promotion of the use of biofuels for the production of thermal energy |
| **Brief description of the instrument** | Installation of biofuel boilers in the district heating systems. The aim of the instrument is to increase the use of biofuels for heating. Administrator – the Ministry of Energy of the Republic of Lithuania and the public institution Lithuanian Business Support Agency (LBSA). Funding is provided from the budget of the Republic of Lithuania and the EU Structural Funds. |
| **Funded activities** | * Installation of biofuel boilers for thermal energy production (capacity of up to 10 MW) in reconstructed or newly built boiler facilities by replacing the use of fossil fuel in the district heating systems.
 |
| **Type of funding** | Non-repayable subsidy |
| **Beneficiaries** | Heat suppliers and independent heat producers which operate heating facilities that use fossil fuel. |
| **Obtaining funding and other important information** | Project tender. Projects cannot be implemented in the district heating systems where more than 70% of the fuel used for heating comes from biofuels. |
| **Further information available at** | Http://enmin.lrv.lt/lt/veiklos-sritys-3/europos-sajungos-parama/europos-sajungos-investicijos-ir-strukturine-parama/2014-2020-m-europos-sajungos-investicijos/biokuro-panaudojimo-skatinimas-silumos-energijai-gaminti |

|  |  |
| --- | --- |
| **Name of the instrument** | Replacement of boilers using biofuels with more modern boilers |
| **Brief description of the instrument** | Replacement of the boilers using biofuels with more modern in the district heating systems. Administrator – the Ministry of Energy of the Republic of Lithuania and the public institution Lithuanian Business Support Agency (LBSA). Funding is provided from the budget of the Republic of Lithuania and the EU Structural Funds. |
| **Funded activities** | * Replacement of boilers using biofuels with more modern boilers (capacity of up to 10 MW) in the district heating systems
 |
| **Type of funding** | Non-repayable subsidy |
| **Beneficiaries** | Heat suppliers and independent heat producers which operate old biofuel heat production facilities. |
| **Obtaining funding and other important information** | Project tenders |
| **Further information available at** | Http://enmin.lrv.lt/lt/veiklos-sritys-3/europos-sajungos-parama/europos-sajungos-investicijos-ir-strukturine-parama/2014-2020-m-europos-sajungos-investicijos/biokura-naudojanciu-silumos-gamybos-irenginiu-keitimas |

|  |  |
| --- | --- |
| **Name of the instrument** | Improving the energy efficiency of public infrastructure |
| **Brief description of the instrument** | Administrator – the Ministry of Finance of the Republic. Funding is provided from the budget of the Republic of Lithuania and the EU Structural Funds. |
| **Funded activities** | * Modernisation of the heated and/or cooled state-owned public buildings by increasing their energy efficiency;
* Modernisation of street illumination by increasing energy efficiency.
 |
| **Type of funding** | Implementation of financial instruments |
| **Beneficiaries** | * Suppliers of energy saving services (ESCO);
* Municipalities and/or municipal enterprises;
* Entities who own state-owned public buildings in trust or use them under the lending right (with the exception of state enterprises) and/or the manager of the centrally managed state property.
 |
| **Obtaining funding and other important information** | The implementation of financial instruments. No further details are available. |
| **Further information available at** | Http://enmin.lrv.lt/lt/veiklos-sritys-3/europos-sajungos-parama/europos-sajungos-investicijos-ir-strukturine-parama/2014-2020-m-europos-sajungos-investicijos/energijos-vartojimo-efektyvumo-didinimas-viesojoje-infrastrukturoje |

1. Policy Background

The programme for Increasing Energy Efficiency in Multi-Apartment Residential Buildings in Kaunas District Municipality is the main local (Kaunas District Municipality) strategic document on which funding for the reduction of energy consumption and increasing the use of renewable energy resources in residential buildings is based.

Main objectives of the programme:

1. To reduce energy consumption in multi-apartment buildings in Kaunas district with the highest energy consumption indicators by at least 20% and to reach at least energy efficiency Class D;
2. To ensure that multi-apartment buildings comply with the essential requirements for the buildings stipulated in legal acts and that the amounts of thermal energy consumed, depending on the climatic conditions of the area and the needs of the population, do not exceed the required limit;
3. To ensure rational use of energy resources and reduction of greenhouse gas emissions.

The programme falls within the medium-term strategy for 2013–2020 and was prepared by taking into account the current state-funded measures on energy, therefore various energy solutions integrated in the Programme are funded from a variety of sources.

The main indicators for the implementation of the programme:

1. To reduce energy consumption costs in the multi-apartment buildings with the highest energy consumption indicators in Kaunas District by at least 20%;
2. To reach at least energy efficiency Class D in the multi-apartment buildings in Kaunas District with the highest energy consumption indicators.

At national level, one of the main strategic documents for the renovation of multi-apartment buildings is the Programme for Renovation (Modernisation) of Multi-Apartment Buildings approved by the Government of the Republic of Lithuania in 2004. The objective of the programme is to reduce consumption of thermal energy (fuel) in multi-apartment buildings built under the technical construction regulations which were in force prior to 1993 by at least 20% by the end of 2020, i.e. to reduce the estimated annual thermal energy (fuel) costs in these buildings by at least 1,000 GWh and to reduce annual carbon dioxide emissions into the atmosphere by at least 230,000 tonnes compared to those in 2005. The list of deliverables of the programme by 2020:

| Evaluation criteria | Unit of measurement | Values |
| --- | --- | --- |
| 2011 | 2015 | 2020 |
| Relative reduction of the estimated thermal energy costs in multi-apartment buildings built under the technical construction regulations which were in force prior to 1993 compared to 2005 | % | 3 | 8.4 | at least 20 |
| Relative reduction of the estimated thermal energy costs in multi-apartment buildings built under the technical construction regulations which were in force prior to 1993 ( since 2005) | GWh per year | 150 | 420 | 1,000 |
| Reduction of carbon dioxide emissions into the atmosphere (since 2005) | tonnes per year | 34,000 | 96,000 | 230,000 |
| Implemented multi-apartment building renovation (modernisation) projects funded under the Programme and other state-supported or municipal programmes (since 2005) | units | 430 | 1,500 | 4,000 |
| Implemented energy-saving measures on the initiative of the managers of common areas in the multi-apartment buildings/on the initiative of the residents of multi-apartment buildings | units | 3,000 | 6,000 | 10,000 |
| Improvement of public awareness | % | 45 | 70 | 90 |
| Increase in the number of participants of the Programme/ those implementing energy-saving measures independently | % | 30 | 50 | 60 |

1. Current Local and Regional Investment Projects

This section contains three examples of ongoing or recently completed projects for building renovation or promotion of renewable energy resources in Kaunas District Municipality.

1. **Renovation of the building of Kaunas District Municipality and installation of solar panels**

The building of Kaunas District Municipal Administration is an administrative purpose building located in a densely populated area of Kaunas, next to a busy street. It was constructed in 1979. It is a four-storey U-shaped building with a basement. There is a transformer station in the courtyard of and an underground car park on the left side of the building.

The building – reinforced concrete frame, external wall panels are finished with a decorative terasit plaster surface, sections of the walls are concrete, also finished with decorative terasit plaster, the walls on the side of the courtyard are smooth, painted. The basement of the building is heated.

Total floor area – 3,544.10 m2.

Heated floor area – 3,843.82 m2 (including stairwells).

Heating for the building is supplied by AB Kauno Energija from the district heating system of Kaunas.



Building of Kaunas District Municipal Administration

In 2016, an audit of the consumption of energy resources and cold water in the building was carried out. The audit established that due to the thermal characteristics of the external walls and the outdated heating system the building consumed large amounts of thermal energy for heating. The conclusion of the audit was that the building should be renovated by insulating its external walls, roof and floor and replacing windows and doors.

After the energy audit of the building in 2016, renovation of the building, funded from the budget of Kaunas District Municipality and the Climate Change Special Programme, commenced. Total value of the renovation project – EUR 1,643,225.42. During the project, the following work was carried out:

1. Renovation of external walls, roof, and the basement floor;
2. Replacement of external doors and windows;
3. Renovation of the heating system;
4. Renovation of the ventilation system;
5. Installation of a solar panel.

The building renovation work was completed in 2017. The improvement in energy efficiency of the building and levels of reduction of CO2 emissions will be assessed in July 2018. Therefore, the effect of the renovation on energy consumption and CO2 emissions will be assessed only after the 2018 assessment. Planned CO2 emission reduction:

Table 2.1. Planned changes in CO2 emissions following the renovation of the building of Kaunas District Municipal Administration.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Emissions | Unit of measurement  | Prior to the implementation of the project | Planned after the implementation of the project | Change |
| CO2 | In tonnes CO2 equivalent per year | 300.14 | 228.13 | 72.01 (- 24 %) |

After renovation, the planned reduction in CO2 emissions is 24%, i.e. Co2 emissions of the building will be reduced by almost a quarter. In view of the fact that the renovation of the building was necessary to ensure proper conditions for people working in the building, to resolve the biggest problems concerning the suitability of the building for use, and to create proper conditions for employees of the building, in further stages of the renovation greater emphasis will be placed on further reduction of CO2 emissions.

1. **Modernisation of multi-apartment buildings in Kaunas District Municipality**

Currently, modernisation of multi-apartment buildings is carried out under the Programme for Increasing Energy Efficiency in Multi-Apartment Buildings of Kaunas District Municipality. By 31 December 2017, 40 multi-apartment buildings were renovated. The total value of the 40 renovation projects – EUR 10,920,000, funding allocated for the projects – EUR 5,560,000. The following renovation measures were implemented: insulation of external walls and the socle, roof insulation and the installation of new roofing material, replacement of windows in the apartments and the stairwell of the building (provided they have not previously been replaced), glazing of exterior door and balconies under a common design, insulation of the basement ceiling, replacement/renovation of piping and equipment of the hot water supply system, modernisation of the heating systems, installation of individual heat metering devices, and replacement/renovation of the ventilation system. After renovation, energy efficiency Class C (37 buildings) or Class B (3 buildings) was achieved and thermal energy consumption decreased by more than 40%. Preparation of the documentation was fully compensated (100%), while 40% of the construction works were compensated by the state of Lithuania and the EU. In 2017, the municipality prepared 9 investment plans for the modernisation of multi-apartment buildings (under call 3 of the Ministry of the Environment, 9 quotas were fixed for Kaunas District Municipality). The owners of the buildings and the Housing Energy Efficiency Agency approved all 9 projects for implementation. Design works were carried out for 7 multi-apartment buildings and funding for a further 2 buildings is still waiting confirmation. Renovation of these multi-apartment buildings is planned to be completed by 31 December 2018. Total value of the 9 renovation projects – EUR 5,002,000, funding allocated for the projects – EUR 1,749,000.

In the next stage, Kaunas District Municipality plans to request the Housing Energy Efficiency Agency to renovate another 20 multi-apartment buildings.

1. **Renewable energy technologies in building IX of Kaunas University of Technology**

In 2017, researchers from Kaunas University of Technology, Faculty of Electrical and Electronics Engineering and Faculty of Civil Engineering and Architecture initiated a project for the generation and use of renewable energy sources in building IX of the university. The aim of the project is to create an innovative renewable energy generation and storage system for energy supply to the building. The system consists of the following:

* 380 kW solar power system,
* 150 kW ground source heat pumps,
* aquifier thermal energy storage.

The exclusive characteristics of the project is that the aquifier/ice thermal energy storage technology will be used, this, for example, has been implemented at the ECOLAB in Germany. New energy generation and efficient use systems will produce about 375 MWh electricity and about 835 MWh thermal energy per year. As a result, greenhouse gas emissions (CO2) emissions will be reduced by more than 318 tonnes, and this will contribute significantly to the reduction of the impact of harmful emissions on the environment and climate change.

The renewable energy systems worth nearly a million euro will provide an opportunity for students to familiarise themselves with the efficient application of the engineering systems for energy production. The students in the Renewable Energy Study Programme will not only be able to perform laboratory work at the most modern lab of this type in the Baltics, but will also realise their future business ideas.

The project is financed by the Lithuanian Environmental Investment Fund (LAAIF) which distributes EU aid for the development of modern renewable energy sources.

1. Policy/Funding Compatibility
2. **The main conditions for obtaining funding**

Given the current funding instruments for the use of renewable energy sources in buildings and building renovation, those who wish to obtain funding must fulfil the following main conditions specified in the descriptions of the instruments:

* Owners of private homes who wish to obtain funding for renewable energy equipment or the renovation of the building, must declare the costs for the acquisition of the RES equipment or renovation already incurred, i.e. funding is provided after the completion of the work;
* Funding conditions for owners of private homes under the funding instruments are published in the first half of each year and may differ from the conditions announced in previous years;
* Prior to the allocation of funding, owners of private homes and multi-apartment buildings must carry out an energy efficiency assessment of the building, taking into account that the conditions require the reduction of energy consumption;
* After the implementation of the project, energy efficiency certification of the project is required, taking into account that the conditions require that a certain energy efficiency class of the building (at least D or C) must be achieved;
* Requirements which apply to project funding establish that the minimum energy efficiency class that the building must achieve after the implementation of the project must be established;
* Owners of multi-apartment buildings must obtain consent from (the majority of) the residents that the project can be implemented and funded;
* Biofuel boiler capacity limitations (up to 10 MW) apply to the installation or replacement of biofuel boilers in the district heat supply system.

1. **Challenges and obstacles to obtain funding**

Given the current conditions and requirements of funding instruments for the use of renewable energy sources in the buildings and building renovation, those who wish to obtain funding may face the following challenges and obstacles:

* Since owners of private homes can only obtain funding for projects which have already been completed, they must have the required funds themselves or must borrow them. Borrowing is related to the risk that funding may not be allocated and the owners will not only have to repay the loan, but also interest. Furthermore, prior to the implementation of the project, owners of private homes must carry out energy efficiency calculations of the building in order to assess energy consumption changes after the implementation of the project. The energy efficiency calculations require hiring specialists, which increases the costs of the project, which may not necessarily be compensated, if the homeowner fails to obtain funding for the project.
* Since funding for the renovation of residential buildings can be obtained for works, which have already been completed, and funding conditions may change every year, home owners risk that after the implementation of the project under the conditions of a certain year they may not obtain funding next year when the conditions change.
* Owners of private homes must get documents for obtaining funding ready and prepare cost accounting, therefore additional costs are incurred for hiring specialists. Furthermore, they face the risk of making errors in their calculations and therefore fail to obtain funding.
* Since the minimum energy efficiency class requirement applies to the implementation of the project, there is a risk that in case of the failure to achieve the requirement, no funding will be achieved or funding will have to be repaid. The energy class requirement restricts the choice of engineering solutions, because the projects focus only on energy savings possibly ignoring such factors as increasing comfort, environment friendliness, suitability of engineering solutions to a building, and durability of engineering measures. Also, energy efficiency certification performed by specialists required after the implementation of the project increases the costs of the project, which in the normal course of events would not be mandatory for the implementation of the project.
* Consents must be obtained from the majority of the residents of a multi-apartment building for the renovation of the building. This makes the process more difficult, because negotiations may take a long time, residents may not reach a consensus or may put forward certain conditions. Thus, not only does the administrative burden increase, but also there is a risk that the project will not be implemented at all or that this will stir up bad feelings between the residents of the multi-apartment building.
1. Market Need

In this section, taking into account the information provided in the preceding sections, the need for new funding instruments is assessed in order to ensure the development of near zero CO2-emission buildings and renewable energy sources in Kaunas District Municipality.

**Current funding instruments and the need for new instruments**

Given the current funding instruments described in this document, it can be stated that at the moment the field of renovation of residential buildings is covered very broadly – various instruments are offered to both the owners of private homes and multi-apartment buildings. Renovation of multi-apartment buildings is planned and carried out both on the national and municipal levels, raising awareness and providing information on the rules and benefits of renovation. Although funding instruments do not compensate all incurred costs, a large number of projects leads to conclude that the renovation process takes place smoothly and successfully.

The assessment of the funding instruments for the installation of renewable energy resources shows that such instruments are in place, but are less frequently used by owners of private homes and the primary beneficiaries of such instruments are businesses, public sector institutions (universities, municipal administration or state-owned buildings) or district heating suppliers. One possible reason is that owners of private homes are not familiar with the area of renewable energy sources and that the benefit of the RES installation is frequently less obvious and the pay back on equipment is long-term. For these reasons, the most widely used type of RES in residential home projects is the renovation/purchase of standard biofuel (wood) boilers. Informing residents about RES benefits, financing of such measures under more favourable conditions or inclusion of RES measures in the renovation funding instruments might lead to faster introduction of RES in residential homes, because currently renovation projects include only standard renovation works (insulation of the walls, floor, and roof, replacement of doors and windows, and renovation of heating systems).

Given the existing taxes in Lithuania, there are no direct tax incentives for building renovation or purchase of energy-saving means or RES. The only indirect tax advantage from renovation or RES projects is decrease in the excise duty. Excise duty applies to the electricity supplied from the general network and fossil fuel (fuel oil, gas oils, natural gas, coal) used for heating. If, as a result of renovation, consumption of electricity and heating is reduced – electricity is generated from RES in the building and fuel, for which no fuel tax is paid, is used for heating (e.g. wood or its waste) – the excise duty paid by residents decreases. Introduction of direct tax incentives is unlikely or necessary due to the complex and lengthy procedure for amending the tax system and due to the current funding instruments directly intended to promote renovation and RES installation in residential homes.

In view of the above, current instruments cover sufficiently widely the reduction of energy consumption in buildings and the use of RES, but in order to achieve better results, it would be beneficial to integrate and promote the installation of RES equipment in residential building in the current instruments.

**Promotion and funding of near zero-CO2 emission buildings**

Given current funding instruments described in this document, it can be stated that currently there are no funding instruments in Lithuania intended to encourage construction of near zero CO2-emission buildings or the conversion of existing buildings. Energy efficiency Class C or Class D requirements are applied in the existing funding instruments for renovation of buildings, so owners of the buildings are not interested in investing to achieve energy efficiency Class B or higher. Usually it is not financially beneficial for owners to achieve a higher energy efficiency class, because in order to achieve higher class, the amount of investment significantly increases. Current funding instruments encourage application of the most effective solutions, which require the least investment to achieve the most notable changes in the levels of energy and comfort. This is attested by the statistics on the renovation of multi-apartment buildings in Kaunas District Municipality: out of 40 multi-apartment buildings renovated between 2013 and 2017, 37 achieved energy efficiency Class C and only 3 buildings – class B.

Since the construction of the near zero CO2 emission residential buildings is neither attractive to the population nor is it funded, the state or municipality could become a developer of such buildings. The conversion of public buildings to near zero CO2 emission buildings is attractive, because managers of public buildings are more familiar with the benefits of zero CO2 emission buildings, have greater financial resources, and do not see only financial payback, but care about the social benefit created by such projects, informing the public, and contributing to the achievement of the strategic objectives of the country. In terms of the suitability of the buildings of the public sector for conversion to near zero CO2 emission buildings, municipal administration buildings are most suitable for such conversion due to the simplicity of the technical conditions for the renovation of such buildings, smaller administrative burden, poor condition of buildings and their need for renovation.

**Promotion of private funding for near zero-CO2 emission buildings**

In order to promote private funding for construction of/conversion to near zero-CO2 emission buildings, the main method for promotion should be the model of the Energy Saving Company (ESCO). The method of ESCO is based on the investment made by a specialist ESCO in energy-saving measures. This investment pays off through energy savings; in the European market this usually takes 7–12 years. ESCO guarantees savings on energy consumption and/or the costs of energy consumption and assumes the full financial, technical and implementation risk of the project, e.g. in the cases where project investment is higher than planned or would require additional investments.

ESCO functions and thus services provided to the ESCO building manager may include:

* Energy supply;
* Planning for energy-saving measures;
* Construction works necessary for the measures that increase energy efficiency;
* Technical maintenance of the building and/or energy-saving measures and/or building utility systems (heating, hot water and electricity systems);
* Administrative and other customer service functions;
* Project funding;
* Energy audit;
* Energy consumption monitoring.

Thus, renovating the building on the basis of the ESCO model, the manager of the building pays for the energy service rather than the construction work and does not need to worry about the project implementation and funding. The Energy Service Company performs everything at its own risk. It implements the project looking for the best technical solution and using its knowledge, experience and the latest technologies. The main advantage of the ESCO model is that the ESCO company ensures project funding and its professional implementation.

The ESCO market analysis carried out in 2017 revealed other possible barriers for further development of the energy efficiency contracts in the future.[[1]](#footnote-1) The decrease in the prices for energy services since 2013, has made investments in energy efficiency less economically attractive. Another relevant problem is caused by differences in the interests of building owners and building users (tenants) with respect to the introduction of the model. This leads to business managers having little interest in renovating the buildings due to uneven distribution of the possible benefits and costs between the three participating parties – building users (tenants), building owner and ESCO. Therefore, in order to apply the ESCO model more broadly, the provisions of the standard energy efficiency contract must also be adapted to other areas, e.g. to the multi-apartment building renovation sector and in the cases where the building (or a part thereof) is leased to another entity.

1. Conclusion

This document provides an overview of the current instruments for increasing energy efficiency in public and private buildings. The instruments include public and municipal promotion programmes for which funding is allocated for reducing energy consumption in buildings (e.g. renovation of buildings, installation of energy-saving measures) or using renewable energy resources.

The overview showed that currently the area of renovation of residential buildings is sufficiently broadly covered – a variety of instruments are offered to both the owners of private homes and multi-apartment buildings. Renovation of multi-apartment buildings is planned and carried out both on the national and municipality levels, thus, raising awareness and providing information on the rules and benefits of renovation.

The assessment of the funding instruments for the installation of renewable energy resources shows that such instruments are in place, but are less frequently used by owners of private homes and the primary beneficiaries of such instruments are businesses, public sector institutions (universities, municipal administration or state-owned buildings) or district heating suppliers.

It can be stated that currently there are no funding instruments in Lithuania intended to encourage construction of near zero CO2 emission buildings or conversion of existing buildings. Energy efficiency Class C or Class D requirements are applied in the existing funding instruments for renovation of buildings, so owners of the buildings are not interested in investing to achieve energy efficiency Class B or higher.

To sum up, current instruments cover sufficiently widely the reduction of energy consumption in buildings and the use of RES, but in order to achieve better results, it would be beneficial to integrate the installation and promotion of RES equipment in residential buildings in the current instruments. When creating new funding instruments, construction of/conversion to near zero CO2 emission buildings should be promoted, primarily in the public or private (corporate) sector buildings.

1. http://www.esinvesticijos.lt/lt/naujienos/atlikta-europos-etpt-rinkos-analize-patvirtino-dideli-energiniu-islaidu-sutaupymu-potenciala-panaudojus-energijos-vartojimo-efektyvumo-paslaugas [↑](#footnote-ref-1)