

Title of the measure:	<p>LV 8</p> <p>Investments in Complex Solutions for GHG Emissions Reduction in Vocational Education Institutions Buildings'</p> <p><i>Kompleksi risinājumi siltumnīcefekta gāzu emisijas samazināšanai valsts un pašvaldību profesionālās izglītības iestāžu ēkās)</i></p> <p>Investments in Higher Education Institutions Buildings' Energy Efficiency</p> <p><i>(Energoefektivitātes paaugstināšana augstākās izglītības iestāžu ēkās)</i></p>
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General description

The described two measures are included in the Latvia's 2nd EEAP [1] for years 2011-2013. The measures continued in years 2014-2015 as well, thus contributed in meeting national indicative energy efficiency targets in 2014-2016 and in achieving a cumulative end-use energy savings target of 1.5%, determined in accordance to the Article 7 of the Directive 2012/27/EU [2]. The energy end-use sector – buildings.

Latvia, due to active participation in the GHG emissions trading mechanism, has the revenues from the sale of GHG emissions under procedures pursuant to Article 17 of the UNFCCC Kyoto Protocol. Part of these revenues has been allocated as the national Climate Change Financial Instrument (CCFI) programmes for CO₂ emissions reduction by decreasing energy consumption in public buildings. Financial support had been available for 5 groups of public buildings¹:

1. municipal public buildings necessary for ensuring autonomous functions of municipalities,
2. vocational education institutions,
3. higher education institutions,
4. medical/health care institutions,
5. culture sector institutions.

Below there are characterised:

1. two CCFI programmes – “Complex Measures to Reduce GHG Emissions in State and Municipal Vocational Education Institutions' Buildings” [3] and “Increase of Energy Efficiency in Higher Education Institutions' Buildings” [4] – announced in year 2010; the activity area of them had included the measures to reduce heat energy consumption, to switch heat supply from fossil fuel to renewables and to reduce electric energy consumption for lighting.
2. in addition, vocational and higher educational institutions might apply for financial support within the framework of the CCFI programme “Complex Measures for GHG Emissions Reduction”, 2nd (October 2012), 3rd (August 2013), 4th (February 2014) and 5th (July 2014) tenders [5], the details related to this programme are provided in the final part of the chapter “General Description” as well as in the detailed description of the MURE Tertiary sector database measure TER-LV7.

Responsible ministry for the implementation of the measure was the Ministry of Environmental Protection and Regional Development, the responsible institution supervising implementation – state ltd. company “Latvian Environmental Investment Fund” (*valsts sabiedrība ar ierobežotu atbildību “Latvijas Vides investīciju fonds”*) [6].

¹ More detailed information see also in the description of the MURE Tertiary sector database measure TER-LV7 “Investments in Municipal Public Buildings' Energy Efficiency and GHG Emissions Reduction”



Open Tenders
“Increase of Energy Efficiency in Higher Education Institutions’ Buildings”
and
“Complex Measures to Reduce GHG Emissions in State and Municipal Vocational Education Institutions’ Buildings”

The beneficiaries were municipal or state owned vocational education institutions and higher education institutions accredited in Latvia (both state or private). The building in which the approved project was implemented must continue to ensure educational functions at least 5 years after project completion.

The measure had raised great interest from the potential beneficiaries. Initially it had been submitted 62 projects for the vocational education institutions’ tender and 34 projects for higher education institutions’ tender, covering in total 168 buildings, the financial support of ~ 50 mill EUR had been requested. Range of expected *ex-ante* specific heat energy consumption, after implementation of the projects, had varied in implemented projects 19.8 -81.32 kWh / 1 m² annually (vocational education institutions’ buildings) and 43.87 – 80.33 kWh / 1 m² annually (higher education institutions’ buildings) [8,9].

As a result, it was implemented 13 energy efficiency improvement projects in Higher Education institutions’ buildings and 23 energy efficiency improvement projects in State and Municipal Vocational Education Institutions’ Buildings.

Financing. The total *ex-post* co-financing, provided by the CCFI within the both tenders for the projects, has been **19.94 MEUR**² [17, Table 1], namely, for the higher education institutions 6.76 MEUR and for the vocational education institutions 13.18 MEUR. Beneficiary must cover not less than 15% of the total eligible costs of the project (for state vocational education institutions and state established colleges these 15% had been covered by the state budget).

The project’s financing by CCFI was based on the principle of additionality, namely, to implement the project the beneficiary had not received a co-financing within the framework of other financing programmes, from other financial instruments, European Union or foreign financial assistance resources for the eligible costs financed by the CCFI. The threshold for minimal financial support, provided by CCFI for one project, was defined 42.686 thsd EUR. The maximum financial support, provided by CCFI for one project, was defined ~ 1423 thsd EUR. The activities provided for in the projects approved within the framework of the tenders should be implemented until 1 December 2012 at the latest.

The following two criteria regarding tangible results – energy savings and CO₂ emissions reduction – were defined for the projects implemented within the framework of the tenders:

- 1) minimum threshold requirement of heat energy consumption for heating - 100 kWh/m² annually,
- 2) the reduction of CO₂ emissions in relation to the requested financing provided by CCFI shall not be less than 250 g CO₂/1 EUR per year .

The costs of the following project activities might be supported within the framework of the tenders:

- (i) the costs of the energy audit, the costs of preparation of technical design, building supervision costs (shall not exceed in total 10% of eligible costs of the project),
- (ii) the costs of construction works for renovation of a building envelope, if such works had been included in the energy audit report as measures to be performed and if they ensured reduction in consumption of heat energy,
- (iii) the costs of renovation of a heat supply, hot water supply, ventilation systems allowing to reduce the energy consumption,
- (iv) the costs of heat supply switch from fossil to renewable resources, installation of renewable energy based heat supply system (wood pellets or chips, solar heat, heat pumps),

² In addition, the administrative costs, evaluated for the whole CCFI, constitutes around 2.3% of the finances paid to beneficiaries [15].

- (v) the costs of reconstruction or renovation of a lighting system and installation of efficient lightning, if included in energy audit and if they ensured reduction in consumption of electric energy,
- (vi) additional costs included in the project budget, which had not been indicated in the energy audit report but which had been provided for in the technical design (shall not exceed 5% of total eligible costs of the project),

The following project activities were not supported within the framework of the tender: the costs which had not been related to the energy efficiency measures specified in the energy audit report (except the mentioned above additional costs provided for in the technical design); construction of outer heat supply networks; the costs of change or repair of electrical equipment (for example, purchase or repair of washing machines, television sets or refrigerators).

To submit the application, an energy audit should be performed in the building, the building should had a technical design in respect of the activities included in the project application (if it was applicable in accordance with regulatory enactments). It had to be submitted energy consumption calculation (performed in accordance with Latvian standard LVS EN ISO 13790:2009) for those buildings in which it was planned that heat energy consumption after reconstruction will not exceed 60 kWh/m² annually, and detailed specification of technological equipment and devices to be installed.

The criteria applied for projects' quality evaluation are presented in the following Table 1.

Table 1. Layout of projects' quality evaluation criteria [Annex 6 of [3], Annex 10 of [4]).

maximally available score, in points	30
1. quality of application of the requirements for green procurement to implementation of project activities, maximally available points	6
2. reduction of CO ₂ emissions in relation to the requested financing provided by CCFI, maximally available points	10
<i>threshold level, kgCO₂/EUR annually</i>	<i>0,250</i>
<i>the level to be reached to receive the maximal score, kgCO₂/EUR annually</i>	<i>0,570</i>
3. Expected heat energy consumption after implementation, maximally available points	9
<i>threshold level, kWh/m² annually</i>	<i>100</i>
<i>the level to be reached to receive the maximal score, kWh/m² annually</i>	<i>20</i>
4. Proportion of the co-financing of the project applicant (% of the total eligible costs of the project),	5
<i>the level to be reached to receive the maximal score, in %</i>	<i>21</i>

Open Tenders of the CCFI-programme "Complex Measures to Reduce GHG Emissions"

The eligible activities of the given CCFI programme [5] in general corresponded to the eligible activities of the described above tenders [3,4]. In addition to heat supply switch from fossil to renewable resources and installation of renewable energy based heat supply system it had been included in this tender [5] as eligible also electricity production applying solar PV, wind and biomass cogeneration (up to 3 MW of heat capacity) technologies. The beneficiaries responsibility for projects results and method for calculation of CO₂ savings is the same. As above, beneficiary must cover not less than 15% of total eligible costs of the project. The maximum financial support, provided by CCFI for one project, was defined ~ 854 thsd EUR.

Within the framework of the 2nd - 5th tenders of the noted CCFI programme "Complex Measures to Reduce GHG Emissions" it was implemented 26 projects (of which 20 projects in vocational education institutions and 6 projects in higher education institutions). The activities within the 5th tender were implemented until 30 April 2015.



Financing. The total co-financing, provided by the CCFI within these noted tenders for higher and vocational education institutions, was **7.95 MEUR** [10-13], namely, for the higher education institutions 1.43 MEUR and for the vocational education institutions 6.52 MEUR

Within the given CCFI programme “Complex Measures to Reduce GHG Emissions” the 2 criteria regarding tangible results were stated in the following way:

- 1) the general requirement to reach minimum threshold of heat energy consumption for heating, namely, 90 kWh/m² annually, after implementation of the project³,
- 2) the minimum threshold for the CO₂ emissions reduction cost efficiency (reduction of CO₂ emissions in relation to the requested financing provided by CCFI) was raised up to 420 g CO₂/EUR annually.

The layout of projects’ quality evaluation criteria [5] is provided in the Table 2.

Table 2. Layout of projects’ quality evaluation criteria

maximally available score, in points	37
1. reduction of CO ₂ emissions per year, kg CO ₂ annually <i>The submitted by the applicant emission reduction value is scored against the average value calculated taking into account all projects which passed administrative evaluation</i>	0 - 10
2. reduction of CO ₂ emissions in relation to the requested financing provided by CCFI, maximally available points <i>threshold level, kgCO₂/EUR annually</i>	1 - 10
<i>the level to be reached to receive the maximal score, kgCO₂/ EUR annually</i>	0.42 4.92
3. proportion of the co-financing of the project applicant (% of the total eligible costs of the project), <i>the level to be reached to receive the maximal score, in %</i>	1 - 5 20
4. evaluation of the financial capacity of the applicant (if applicable)	0 - 2
5. preparadness of the application <i>as the minimum requirement technical project of construction shall be submitted</i>	5 - 10

Responsibility of a beneficiary. A beneficiary is responsible for achievement of CO₂ emissions reduction specified in the project application and project contract. Beneficiary, during 5 years period after completion of the project, shall submit project results’ monitoring reports. The monitoring year corresponds to full calendar year (01 January – 31 December). If the responsible institution supervising the implementation determines that, according the submitted monitoring report (except the final monitoring year), the reduction of CO₂ emissions per year specified in the project contract has not been achieved, the responsible institution shall calculate the scope of non-conformity and inform (within 20 days after receiving the monitoring report) the beneficiary. A beneficiary shall submit (within 40 days after receiving the noted information) the plan for elimination of non-conformity. This plan shall include: (i) necessary technical and organizational measures, (ii) additional measures to provide energy efficiency (important, the measures which are financed by public funding of any kind cannot be included in the list of these additional measures), the additional measures shall be approved by the independent energy auditor competent in the field (iii) reasoned information on *force majeure* extraordinary events or circumstance beyond the control of the beneficiary which had impacted the meeting of the contracted results. The responsible institution approves the plan or provide information on the necessary improvements of the plan (within 20 days). After the approval of the plan, a beneficiary shall implement the plan, using his own resources. Monitoring period is suspended during implementation of the plan. The implementation of the plan shall be done no later than 31 December of the next year (after approval of the plan). Important, the plan for elimination of non-conformity might be implemented in each of years (except last one) of the whole monitoring period and calculation of non-conformity is based on the average result of all submitted monitoring reports. If the responsible institution, after receiving the

³ the projects which envisaged only such activities which were not targeted to reduce heat consumption (ie., fuel switch to renewables) might be implemented in the buildings having annual heat energy consumption for heating 120 kWh/1m² and below .

monitoring report of the last monitoring year, determines that the reduction of CO₂ emissions per year specified in the project contract has not been achieved, the responsible institution calculates non-conformity (average yearly CO₂ emission reduction value within the whole monitoring period is used, *force majeure* conditions are taken into account) and makes the decision regarding recognition of resources of the CCFI disbursed for the project as ineligible and commence recovery of that part of resources corresponding to the calculated non-conformity. In case the monitoring period has ended and the contracted CO₂ savings are not reached, the beneficiary may ask the responsible institution to prolong the monitoring period up to 3 years, and if it is approved, shall submit and implement the plan for elimination of non-conformity. In case of prolongation of monitoring period the best 5 years regarding CO₂ emissions reduction are taken into account, thus the non-conformity in the first years (or end years) of monitoring period does not have the impact on beneficiary responsibility.

Impact evaluation (methods and results)

The evaluation method – “bottom-up”, based on the data provided by the 62 implemented projects.

Contracted savings [8-13]. The total amount of contracted CO₂ savings of the projects of all six tenders constitutes 11.1 thsd CO₂ tons annually (of which 27.8% in higher education institutions’ buildings and 72.2% in vocational education institutions’ buildings). The dominant part of CO₂ savings relate to savings in heat energy consumption. If all noted above CO₂ savings are assumed to be achieved due to heat energy savings, and the specific method for CO₂ savings calculation (see below in the description) is applied, it can be calculated ~42 GWh (0.15 PJ) heat energy savings. In practice, final energy savings are somewhat lower, due to the part of CO₂ savings relate to savings in electricity consumption (having higher specific CO₂ savings per 1 MWh) as well as implementation of RES technologies.

Monitored savings. The CCFI 2017 monitoring report [17] indicates 10.255 thsd tons of CO₂ savings reached in total 48 projects. In addition, for 14 projects the monitoring period has ended in year 2016, for these projects the CCFI 2016 monitoring report [15] data - 2.575 thsd tons of CO₂ savings reached – might be used. Thus, in 2017, the CO₂ savings of 12.829 thsd tons might be accounted. One can see, the monitored CO₂ savings are per ~15.5% higher than contracted savings (per ~16.8% higher in higher education institutions and per ~15% higher in vocational education institutions).

Energy Savings indicated by the 2nd NEEAP⁴.

The 2nd NEEAP had envisaged energy savings within the particular measures against CCFI financing 1.48 MWh/year/1000 LVL (vocational educational institutions) and 1.72 MWh/year/1000 LVL (higher educational institutions). As 1EUR=0.702804 LVL, it corresponds to 1.040 MWh/year/1000 EUR and 1.209 MWh/year/1000 EUR respectively. If taking into account the full volume of CCFI financing (~28 MEUR) and increased, compared to contracted ones, savings, it might be calculated ~ **35 GWh (0.13 PJ)** energy savings.

In case of first two open tenders (“*Increase of Energy Efficiency in Higher Education Institutions’ Buildings*” and “*Complex Measures to Reduce GHG Emissions in State and Municipal Vocational Education Institutions’ Buildings*”) by applying this methodology, it might be calculated respectively 21.9 GWh savings (increased saving factor not included) and 25.3 GWh savings (if increased savings factor is included).

Energy Savings evaluated by bottom-up method

The evaluation of savings by bottom-up method is presented in Latvia 2017 “Information Report on the Progress towards the Indicative National Energy Efficiency Target in 2017-2019 ...” for the noted above two open tenders “*Increase of Energy Efficiency in Higher Education Institutions’ Buildings*” and

⁴ The 2nd NEEAP indicates (total, in pages 60&62 [1]) savings of 145.25 GWh (in 2016) and 261.45 GWh (in 2020). Thus, these figures do not correspond to annual savings, namely, some method of cumulative savings calculation had been applied in the 2nd NEEAP. Instead other described method, based on 2nd NEEAP specific cost of savings, is used to calculate savings

“Complex Measures to Reduce GHG Emissions in State and Municipal Vocational Education Institutions’ Buildings”. The Table 3 (pages 10&11) of [16] indicates 26.6 GWh (0.096 PJ) final energy savings in year 2015 total for both tenders. Thus, this presented figure is in line (105%) with the indicated above 2nd NEEAP savings.

The actual final energy consumption in Latvia tertiary sector (commercial and public, in total) in years 2010-2015 varied in the range 23.45-26.1 PJ (average ~ 25 PJ) [14]. Thus the impact of the measure might be evaluated ~ 0.5% and the semi-quantitative impact might be attributed as high. .

Method of Calculation of Reduction of CO₂ Emissions.

According [3,4] the CO₂ saving, which is achieved due to reduction of heat energy consumption of public buildings, is determined pursuant to the CO₂ emission average factor – 264 g/kWh. This average emission factor is calculated pursuant to the total emissions in Latvia in the energy conversion sector (heat boiler houses and combined heat-power units), which are applied against the final consumption of the district heating energy – the average value during the time period from 2000 until 2007 – by correcting the indicator value by the amount of heating fuel used in CHP units and which has been consumed for the generation of electricity, i.e. not taking into account the CO₂ emissions that have occurred during electricity generation process. The average emission factor shall be applied to buildings which are heated using biomass (for example, wood, chipped wood, granules) or which are connected to the district heating system, in which the biomass is used for the heat production. If autonomous heating of a particular building is ensured by a heating fuel with a higher emission factor than the average value of emission factor specified, a project applicant may use the CO₂ emission factor of the relevant heating fuel. If heating of particular building is ensured by district heating, the CO₂ emission factor provided by district heating operator may be used, in this case heat losses in district heating network are accounted as well.

The CO₂ saving, which is achieved due to reduction of electric energy consumption, is determined pursuant to the specific CO₂ emission factor for electricity production and transmission – 397 g CO₂ /1 kWh. When calculating CO₂ saving, which is achieved due to heat supply switch from fossil fuel to heat pumps, the electricity consumption is taken into account by applying the above specific CO₂ emission factor.

Interaction of measures

see also Latvia tertiary sector measure TER-LV7 “Investments in Municipal Public Buildings’ Energy Efficiency” and TER-LV15 “Energy Certification of Non-residential Buildings”.

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