

Title of the measure:	LV 31 Complex Solutions for GHG Emissions Reduction in Production Buildings and Technologies of Tertiary Sector <i>(Kompleksi risinājumi siltumnīcefekta gāzu emisiju samazināšanai ražošanas ēkās)</i>
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General description

The particular measure concerns both Tertiary Sector and Industry Sector of MURE database, thus the measure is included in both sectors, by indicating the specific financing and impact data for each of the sectors.

The described measure has been included in the Latvia's 2nd NEEAP for years 2011-2013 [1]. The measure 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 – industrial buildings (buildings in which production processes take place), technologies and equipment for production. The objective of the measure was to reduce CO₂ emissions by improving energy efficiency of business entities' buildings and production technologies.

Latvia has actively participated in the GHG emissions trading mechanism under the UNFCCC Kyoto Protocol and thus has revenues from the sale of GHG emissions under procedures pursuant to Article 17 of the Protocol. Part of these revenues had been allocated as the national Climate Change Financial Instrument (CCFI) programmes for CO₂ emissions reduction by improving energy efficiency of both production buildings and technological equipment as well as by promoting utilization of renewable resources in energy supply of commercial sector premises.

Below there are characterised the following CCFI programmes:

1. CCFI programme “Complex Measures to Reduce GHG Emissions in Industrial Buildings”[3], open tender had been announced in year 2010,
2. CCFI programme “Complex Measures to Reduce GHG Emissions” [4], open tenders announced August 2012 (1st tender), October 2012 (2nd tender), August 2013 (3rd tender), February 2014 (4th tender) and July 2014 (5th tender).

Responsible ministry - 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”*) [5].

The applications might be submitted by registered in Latvia micro, small, medium and large business entities, the financial support had been provided according the conditions defined in EC Regulation Nr.800/2008. Business activities corresponding to particular NACE codes were eligible¹. The financial support could not be awarded to the installations participating in EU GHG Emission Trading Scheme as well as to the business entities which are under the insolvency procedure or which are classified as having financial squeezes. The non-eligible business branches were stated corresponding to the Article 1.3 of the EC Regulation 800/2008. The land and buildings, in which project activities were implemented, must be the property or in possession (duration of agreement - at least 5 years after project completion) of the beneficiary. The applicant must state that at least 5 years after project completion the investments will be

¹ NACE codes 10-33, **52.1 or 52.29** were eligible for the tender “Complex Measures to Reduce GHG Emissions in Industrial Buildings”, NACE codes 10-33, 35.3, **45-47.99, 85.1-85.6, 86.1-86.9, 87.2 and 90-91.04** were eligible for the tenders of the sub-programme “Complex Measures to Reduce GHG Emissions”. The buildings and technological equipment in which the energy efficiency measures were implemented must be used before for commercial purposes (industrial production as well as wholesale or retail sale) at least 3 years [3] or 2 years [4].



used for achieving the goals specified in the project, the function of the buildings will not be changed and installed within the project renewable technologies and other devices will not be dismantled.

Financing. The total co-financing, provided by the CCFI for the projects within all noted above tenders, for the tertiary sector beneficiaries, were ~ **7.6 MEUR** (analysis based on information regarding 35 implemented projects in tertiary sector, [6-11])². The maximum rates of financial support, provided by CCFI, and thresholds for financing the project's are presented below, in Table 2. 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.

Implementing the projects the beneficiary should apply the principles of green purchase for the selection of technical designers and contractors of the construction works (see also Table 3 below). After the completion of the project the beneficiary should place publicly available visual information demonstrating the achieved results and energy certificate for the building.

The costs of the **following activities** of the projects' might be supported within the framework of the tenders:

- (i) renovation works of a building if they ensure reduction in consumption of energy (renovation of buildings boundary constructions, of ventilation system, construction/renovation of building's engineering systems if stated by the energy audit report as necessary to reach the objective of the project), installation of the equipment and systems for effective re-use of heat energy,
- (ii) energy efficiency investments in existing technological equipment which is directly used to ensure industrial production or to provide commercial services, e.g., heat/mass exchangers, optimisation of heat supply systems, water re-circulation cooling systems, installation of frequency convertors/transformers for motors, recuperation of exhaust gasses,
- (iii) installation of efficient lightning in inner premises,
- (iv) installation of buildings' management-control systems to provide energy consumption control and reduction,
- (v) installation on renewable resources based energy supply systems
 1. within the tender "*Complex Measures to Reduce GHG Emissions in Industrial Buildings*" - installation of renewable energy based heat supply system (biomass, biogas, solar heat, heat pumps with energy transformation coefficient above 4); cogeneration units were not eligible for support.
 2. within the tender "*Complex Measures to Reduce GHG Emissions*" - installation of renewable energy based electricity and heat supply system (biomass heat boilers, biomass combined heat-power units, heat pumps if they correspond to defined in Annex of [4] requirements of the transformation coefficient, solar heat, solar PV, wind). Costs of construction of local heat supply networks up to 100 metres were eligible as well as power connection lines if they remain property of beneficiary. Energy efficiency improvements in such existing heat or CHP unit, which utilised before implementation of the project renewable energy sources, were not eligible.
- (vi) consultations, preparation of energy audit, of technical design, preparation of cost estimates, costs of provisional energy certification of building (not applicable for large business entities).

The total heat capacity of installed biomass heat boilers and biomass CHP units should not exceed 3 MW. If replacing fossil fuels based heat supply system with renewables based one, the total heat capacity of new renewables based heat supply system should not exceed the capacity of previously existing fossil fuel based system or produce the heat amount which exceed the amount of heat utilized before.

The costs were eligible if they help to reach higher energy saving comparing with the one defined by EU standards and promote utilisation of renewable sources. Only additional costs in accordance with the Articles 21.3, 22.3 and 23.3 of the EC Regulation Nr.800/2008 were eligible. Furthermore, the specific eligible maximal amount of financial support per 1 kW_{installed} for installation of different

² In addition, the administrative costs, evaluated for the whole CCFI, constitutes around 2.4% of the finances paid to beneficiaries [13]

renewables based technologies were stated (Annex 5 of [3] and Annex 2 of [4]). The eligible costs which exceed the given specified maximum level had to be covered by the project beneficiary. The beneficiaries should submit the costs estimates comparing the costs of installation of new renewables based energy supply system and the costs of new fossil fuel based system.

To submit the application, an energy audit should be performed by certified energy auditor; a technical design in respect of the activities included in the project application, detailed specification of technological equipment and devices to be installed, technical project for construction works should be added.

Defined within the tender “Complex Measures to Reduce GHG Emissions in Industrial Buildings” requirements for building renovation were as follows [Annex 4 of [3]]:

- costs of change of windows were eligible if heat penetrability coefficient U was decreased from above 1.7 W/m²*K to below 1.3 W/m²*K,
- costs of change of doors were eligible if heat penetrability coefficient U was below 1.3 W/m²*K.
- the coefficient for ventilation system with recuperation had to be at least 85%.

The following threshold criteria regarding CO₂ emissions reduction were defined, see Table 1. The maximum rate of financial support slightly varied in different tenders, see the following Table 2.

Table 1. Threshold criteria regarding CO₂ emissions reduction

Tender	<i>Complex Measures to Reduce GHG Emissions in Industrial Buildings [3]</i>	<i>Complex Measures to Reduce GHG Emissions [4]</i>
the threshold for reduction of CO ₂ emissions in relation to the requested financing provided by CCFI	No less than 490 g CO ₂ / 1 EUR CCFI	No less than 420 gCO ₂ / 1 EUR CCFI
the threshold of heat energy consumption for heating after implementation of the project		80 kWh/m ² per year ³

Table 2. The maximum rate of financial support, provided by CCFI

Tender	<i>Complex Measures to Reduce GHG Emissions in Industrial Buildings</i>	<i>Complex Measures to Reduce GHG Emissions, the 1st tender</i>	<i>Complex Measures to Reduce GHG Emissions, the 2nd tender</i>	<i>Complex Measures to Reduce GHG Emissions, the 3rd, 4th and 5th tenders</i>
<i>Maximum rate of financial support</i>				
Micro entities	55%	65%		
Small entities		55 %		
Medium entities				
Large entities	45%			
Entities which have received the rights to sell produced electricity under conditions of feed-in	not applicable	35%		not eligible

³ the projects envisaging 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 (stated within the frame of the 3rd - 5th tenders, [4]).

tariff or guaranteed payment for installed electrical capacity				
<i>Grant limits</i>				
The minimum grant for 1 project, thsd EUR	28.46			
The maximum grant for 1 project, thsd EUR	711	498		854
The activities should be implemented until	1 December 2012	30 April 2013	31 October 2013	30 June 2014 (3 rd), 30 April 2015 (4 th), 29 May 2015 (5 th)

The criteria applied for projects' quality evaluation are presented in the following Tables 3 and 4.

Table 3. Layout of projects' quality evaluation criteria within the tender "Complex Measures to Reduce GHG Emissions in Industrial Buildings" [Annex 3 of [3])

	Points, maximum available score	Percentage in relation to maximum score
maximum available score	160	100%
1. Quality of application of the requirements for green procurement in the stage of preparation of technical documentation	15	9.4 %
2. Quality of application of the requirements for green procurement in the project implementation stage (construction works, installation technological equipment)	20	12.5 %
3. Complex evaluation of environmental policy realized by project applicant and sustainability of proposed energy efficiency measures, <i>threshold – 5 points.</i>	15	9.4 %
4. Project applicant turnover compared with the costs of the project	10	6.25 %
5. Reduction of CO ₂ emissions in relation to the requested financing provided by CCFI, <i>threshold – 490 g CO₂ / EUR annually maximum score available if at least 820 g CO₂ / EUR annually</i>	50	31.25 %
6. Rate of the CCFI financing, requested by applicant, against the maximally available <i>to get the maximal score – at least 21% below the "standard" level</i>	20	12.5 %
7.A. Benchmarking: specific electric energy consumption per unit of production,	13	8.1 %
7. B. Benchmarking: specific heat energy consumption per unit of production,	7	4.4 %
8. Necessary technical project and technical documentation is submitted together with the project application, additional points	10	6.25 %

Table 4. Layout of projects' quality evaluation criteria within the tender "Complex Measures to Reduce GHG Emissions" (Annex 5 of [4])

	Points	Percentage in relation to maximum score
maximally available score, in points	37	100 %
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	27 %
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> <i>the level to be reached to receive the maximal score, kgCO₂/ EUR annually</i>	1 - 10 0.42 4.92	27 %
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	13.5 %
4. evaluation of the financial capacity of the applicant (if applicable)	0 -2	5.5 %
5. preparadness of the application <i>as the minimum requirement technical project of construction works shall be submitted</i>	5 - 10	27 %

Beneficiary Responsibility. 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 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 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 contracted projects. It has been implemented 35 projects (total in all tenders) in Tertiary (including Agriculture) sector. As noted above, the total co-financing, provided by the CCFI within all tenders, for the Tertiary sector beneficiaries were ~7.6 MEUR

Contracted CO₂ savings.

Annual contracted CO₂ savings, total for implemented projects in tertiary sector, constitute 12242 tons. If all contracted 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, one can calculate annual heat energy savings of ~46 GWh (0.167 PJ) in Tertiary sector. In practice, final energy savings are lower, due to the part of CO₂ savings relate to savings in electricity consumption (having higher specific CO₂ savings per 1 MWh) and to new renewable energy production.

Monitored CO₂ savings.

The CCFI 2017 monitoring report [16] indicates 6548 tons of CO₂ savings, reached in total 29 projects. The total contracted savings for these 29 projects are 3062 tons, thus one can see the monitored CO₂ savings are more than twice higher than contracted CO₂ savings.

However 1 beneficiary, having contracted CO₂ savings of 7493 tons, did not indicate CO₂ savings in the CCFI 2017 monitoring report, thus highly impacted the overall correspondence to contracted savings. Due to this non-compliance, the monitored 2017 CO₂ savings (6548 tons) constituted only 62% of contracted CO₂ savings (10555 tons) monitored in 2017.

In addition, for 5 projects the monitoring period has ended before 2017. The total contracted CO₂ savings for these 5 projects constitute 1687 tons. In CCFI 2016 report [13] four beneficiaries reported in total 2277 tons of CO₂ savings (one project did not provide this information).

Thus, in 2017 the CO₂ savings of 8825 (6548+2277) tons might be accounted. If all monitored CO₂ savings are assumed to be achieved due to heat energy savings, and the specific method for CO₂ savings calculation is applied, one can calculate annual heat energy savings of ~33.4 GWh (0.12 PJ) in Tertiary sector beneficiaries.

Energy Savings indicated by the 2nd NEEAP.

The 2nd NEEAP indicates in p.62 [1] savings of 187 GWh (in 2016) and of 336.6 GWh (in 2020), total for beneficiaries of Industry and Tertiary sector (it has to be noted, all these savings is attributed by 2nd NEEAP to Industry sector only). Thus, these figures do not correspond to annual savings, namely, some method of cumulative savings calculation had been applied in the 2nd NEEAP.

The 2nd NEEAP had envisaged energy savings within the particular measure against CCFI financing 4.6 MWh/year/1000 LVL [1, page 64]. As 1EUR=0.702804 LVL, it corresponds to 3.233 MWh/year/1000 EUR. If taking into account the full volume of CCFI financing for Tertiary sector beneficiaries (7.6 MEUR) it might be calculated ~ **25 GWh (0.09 PJ)** energy savings in Tertiary sector⁴.

Energy Savings evaluated by bottom-up method

The evaluation of savings by bottom-up method is presented for the noted above open tenders in the Latvia 2017 Report [14]. The Table 3 (page 11) indicates 100.7 GWh (0.363 PJ) final energy savings in year 2015. This figure relates to the whole programme (both Industry and Tertiary sectors). Thus, this presented figure is in line with the indicated above 2nd NEEAP savings.

⁴ In addition, it might be calculated 0.27 PJ savings in Industry sector, see the measure *IND-LV24*.



The 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) [15]. Thus the impact of the measure is medium in Tertiary sector.

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 by 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 above, 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 /kWh, this coefficient is determined as the emission factor of the last marginal power production unit, including transmission and distribution losses, which may be replaced by renewable technologies. 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. The minimal requirements for energy transformation coefficient for different types of heat pumps' are defined by the Regulations [3,4].

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