

<b>Title of the measure:</b>	<b>LV 9 Investments in Renewable Technologies for Heat and Electricity Production to Reduce GHG emissions: Tertiary sector</b>
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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 of sectors<sup>1</sup>, by indicating the specific financing and impact data for each of the sectors separately.

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 had been allocated as the national Climate Change Financial Instrument (CCFI) programme for CO<sub>2</sub> emissions reduction by implementing renewables based heat and electricity production technologies thus decreasing fossil fuels utilization. Responsible ministry for the measure - 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”*) [1].

The beneficiaries of the measure were :

- (1) municipalities, education institutions and public administration institutions,
- (1) business sector entities<sup>2</sup>.

The measure was implemented by two open tenders announced in year 2010 (“Technology Switch from Fossil to Renewable Energy Resources”, [2]) and in year 2011 (“Utilisation of Renewable Resources for Greenhouse Gases Emissions Reduction” [3]). The activities provided for in the projects approved within the framework of the tenders should be implemented **until December 2012 at the latest**. The buildings as well land in which project was implemented must be the property of the project applicant or must be in the possession on the long-term agreement basis (at least 5 years after project completion).

The municipalities or administration institutions shall use electricity or heat, produced by the technologies installed in the framework of the tenders, only for own purposes, namely, the eligible costs had been calculated proportionally to the amount of energy used for own purposes compared to total energy produced by new installations.

**Financing.** Within the tenders the total available financial support was earmarked separately for these two target audiences. The total financing for both target audiences constitute ~7.2 MEUR<sup>3</sup>:

**Public sector.** The total financial support, provided by CCFI for public sector institutions<sup>4</sup>, had constituted ~4.7 MEUR. The project’s financial support rate for municipalities, educational and administration institutions was 75%. It was implemented 39 projects total in both tenders.

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<sup>1</sup> Within the given CCFI programme the financial support had been provided also for electricity (wind, hydro) production, combined heat-power production connected to district heating and biomass based district heating. As these projects do not relate to end-use sector, they are included in the general description of the programme, but excluded from financial evaluation as well as CO<sub>2</sub> emissions evaluation. Also in the evaluation there are not included two projects related to biodegradable waste processing by applying hydrothermal gasification method.

<sup>2</sup> The business sector installations which participate in the EU Emission Trading Scheme (both tenders) or have licence for district heating (2<sup>nd</sup> tender) had been stated as non-eligible. Business entities which are under the insolvency procedure or have financial squeezes were non-eligible.

<sup>3</sup> In addition, the administrative costs, evaluated for the whole CCFI, constitutes around 2.4% of the finances paid to beneficiaries [9]

**Tertiary sector businesses.** The total CCFI co-financing for these beneficiaries (8 projects) had constituted ~2.5 MEUR. The financial support rates<sup>5</sup> for business entities were: 65% - for micro and small business entities and science institutions, 55% - for medium size business entities, 45% - for large business entities<sup>6</sup>, and 35% - for those electricity producing business entities which are receiving feed-in tariffs or capacity reservation payments<sup>3</sup>. Maximum financing provided by CCFI for 1 project was stated 498 thsd EUR (the 1<sup>st</sup> tender) and 2134 thsd EUR (the 2<sup>nd</sup> tender). The project's financing by CCFI was based on the principle of additionality, namely, the support received within the framework of CCFI might not be combined with the *de minimis* support or the support received from other public programmes. The implemented projects relate to hotel businesses, entertainment business, trading and freight houses, service buildings.

**Eligible Technologies.** Technologies eligible for financial support are characterized in the Table 1. New renewables utilizing heat technologies should replace existing fossil fuel ones (the replacement of existing renewable technologies by more efficient ones was not eligible). Important, the threshold level for buildings' energy efficiency – 150 kWh/m<sup>2</sup> annual heat energy consumption for heating – was defined to avoid heat energy loss.

Within the 2<sup>nd</sup> tender the criterion was introduced - the total support for the one category technologies should not exceed 40% of the total available finances of the tender – thus the development of all types of renewable technologies had been promoted. For each of technologies particular eligibility criteria were defined, like efficiency factor, minimal requirements for energy transformation coefficient for heat pumps, etc. The maximal thresholds for eligible costs of renewable technologies per 1 installed kW were stated, in case the costs exceed these thresholds, additional costs should be covered by the beneficiary.

For the 2<sup>nd</sup> tender the threshold criterion related to emissions reduction cost efficiency – at least 421.7 g CO<sub>2</sub> annually/ 1 EUR annually – was stated.

**Table 1.** Eligible Renewable Technologies

	1 <sup>st</sup> tender <i>“Technology Switch from Fossil to Renewable Energy Resources”</i>	2 <sup>nd</sup> tender <i>“Utilisation of Renewable Resources for Greenhouse Gases Emissions Reduction”</i>
solar heat collectors	25 kW and above	25 kW and above
solar electricity	10 kW and above	10 kW and above
wind	50 kW and above	10 kW and above
hydro <sup>7</sup>	50 kW and above	50 kW and above
wood chips, wood pellets and straw : heat production technologies if replace fossil technologies	50 kW – 3 MW	50 kW – 3 MW
biogas technologies for heat production, if replace fossil technologies		50 kW – 3 MW
wood chips, wood pellets and straw : combined heat-power production technologies <sup>8</sup>		up to 3 MW

<sup>4</sup> In this figure of 4.7 MEUR it is included also the financing for 2 projects implemented in private owned educational institutions

<sup>5</sup> The financial support for business entities had been provided in accordance with the requirements of the EC Regulation No.800/2008.

<sup>6</sup> The large business entities and electricity producing business entities were eligible within the 2<sup>nd</sup> tender only.

<sup>7</sup> Hydro technologies should replace existing ones thus receiving higher turbine technology efficiency and should have fish migration ways if required, new turbines might be added in hydro power plants as well. New free water flow (without dams) hydro power technologies might be installed.

<sup>8</sup> In case of installing renewable combined heat-power production (CHP), it should be utilized for heating or production processes purposes at least 50% of heat produced.



biogas technologies <sup>9</sup> for combined heat-power production		up to 3 MW
heat pumps	50 kW and above, transformation coefficient above 4	50 kW and above, transformation coefficient 3.0-5.0, requirements for each type of heat pump defined
combined use of above technologies	eligible	eligible
renewable resources processing technologies (lifecycle calculated CO <sub>2</sub> emissions of particular renewable resource shall be decreased as a result)		eligible

The costs of the following project's activities were supported within the framework of the tenders:

- (i) purchase of renewable technologies,
- (ii) preparation of project documentation, project's supervision costs, patents and licenses fees (these "soft" costs should not exceed 7% of the total eligible costs of the project),
- (iii) installation and regulation of new technologies, related construction works, personal training costs (should not exceed 5% of the total eligible costs of the project),
- (iv) connection with power network (connection line and related equipment should be property of beneficiary),
- (v) demolition costs, if necessary (should not exceed 5% of the total eligible costs of the project).

For business entities the eligible costs were determined as the difference in costs between renewables utilizing technology and fossil fuel technology which might replace the existing one. The default values for natural gas technologies were stated, taking into account that natural gas is the main fossil fuel for heat and electricity production in Latvia.

When replacing the fossil fuel based heat technologies, the renewables based new capacity should not exceed the previously existing capacity (in case the such new capacity was not providing necessary heat production due to technological restrictions or was not fully replacing heat purchased from outer heat supplier, it might be installed larger new capacity).

The criteria applied for projects' quality evaluation are presented in the following Table 2.

**Table 2.** Layout of projects' quality evaluation criteria [Annex 5, [1] & Annex 5, [2]]

	1 <sup>st</sup> tender	2 <sup>nd</sup> tender
maximally available score, in points	55	52
1. reduction of CO <sub>2</sub> emissions, in tons <i>2<sup>nd</sup> tender scoring rule</i> <i>The average CO<sub>2</sub> reduction, taking into account all applications, is calculated. Afterwards the particular project is scored depending on the amount of deviation from the calculated average value. The maximum score – if deviation is "+95%" at least, the medium score (5 points) – if deviation is in range from "-15%" to "+15%", etc.</i>	0-10	0-10
2. emissions reduction cost efficiency <i>2<sup>nd</sup> tender scoring rules</i> <i>The minimum score (1 point) corresponds to the range of values ) 421.7 – 702.8 g CO<sub>2</sub>/1 EUR annually, Maximum score (10 points), if the given value is above 4920 g CO<sub>2</sub>/1 EUR</i>	0-10	1-10
3. rate of the co-financing of the project provided by the applicant (criterion applied for business entities) <i>to receive the maximal score, 20% of co-financing above the minimum</i>	1-5	1-5

<sup>9</sup> CHP production by utilizing biogas produced by agriculture sector entities from waste of agriculture origin was not eligible under the described measure because such activity was financially supported by the Latvian Rural Development Programme (see MURE Tertiary sector database measure TER-LV18 "Investments to Produce Energy from Biomass of Agriculture and Forestry Origin").

<i>requirement has to be provided by the applicant</i>		
4. Applicant's annual turnover (criterion applied for business entities) to receive the maximal score, the turnover shall exceed the total costs of the project at least 3 times	0-2	0-2
4.1. Applicants capacity; experience in realization of renewable technology projects	0-3	not applicable
5. Sustainability (technical life-time) of technology <i>The maximum score, if technology life-time is more than 20 years</i>	1-5	1-5
6. Additional score <u>2<sup>nd</sup> tender scoring rules</u> <i>Projects are ranged in each of technology categories, summing scores of criteria 1-5. Afterwards additional points are scored. The best project in each of technology category receive 20 additional points, the second best – 18 points, etc. Finally, all projects are ranged in common list. The additional score is introduced to equalise conditions for projects of different technologies</i>		0-20

**Beneficiary responsibility.** A beneficiary is responsible for achievement of CO<sub>2</sub> 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). In case of wind and hydro technologies: the first monitoring report shall be submitted after the 4<sup>th</sup> monitoring year; CO<sub>2</sub> emissions reduction is calculated as average for 3 monitoring years with the highest emissions reduction; for hydro technologies 10% deviation from contracted annual CO<sub>2</sub> savings is acceptable, for wind technologies – 20% deviation is acceptable. If the responsible institution supervising the implementation determines that, according the submitted monitoring report (except the final monitoring year), the reduction of CO<sub>2</sub> 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 CO<sub>2</sub> emissions per year specified in the project contract has not been achieved, the responsible institution calculates non-conformity (average yearly CO<sub>2</sub> 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 CO<sub>2</sub> 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 CO<sub>2</sub> 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.

### **Method of Calculation of Reduction of CO<sub>2</sub> Emissions.**

According [2,3] the **CO<sub>2</sub> saving, which is achieved due to reduction of heat energy consumption**, is determined pursuant to the CO<sub>2</sub> emission average factor – 264 g/kWh. This average emission factor is calculated pursuant to the total emissions in Latvia in the energy conversion sector (boiler houses and combined heat-power units), which are applied against the final consumption of the district heat 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 CO<sub>2</sub> emissions that have occurred during electricity generation process. If autonomous heating is ensured by a fuel with a higher emission factor than the average value of emission factor specified, an applicant may use the CO<sub>2</sub> emission factor of the relevant heating fuel. If heating of particular building is ensured by district heating, the CO<sub>2</sub> emission factor provided by district heating operator may be used, in this case heat losses in district heating network may be accounted as well.

The **CO<sub>2</sub> saving, which is achieved due to reduction of electric energy consumption** is determined pursuant to the specific CO<sub>2</sub> emission factor for electricity production and transmission – 0.397 t CO<sub>2</sub> /MWh. The specific CO<sub>2</sub> emission factor 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. In case of modernization of electricity production technologies, the difference of emissions between new and existing ones is accounted.

When calculating CO<sub>2</sub> 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 CO<sub>2</sub> emission factor. The minimal requirements for energy transformation coefficient for different types of heat pumps are defined.

### **Impact evaluation (methods and results)**

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

#### **1. CO<sub>2</sub> Savings in Public sector**

**Contracted savings** [6]. Total in both tenders it had been implemented 39 projects in public sector (including 2 projects implemented in private education establishments). The presented evaluation of savings in public sector includes also the projects of heat production for small (village) scale district heating. The total annual contracted CO<sub>2</sub> savings constitute **14077 tons**. The dominating part of the CO<sub>2</sub> savings relate to utilizing renewables for heat energy. If assuming 90% of CO<sub>2</sub> savings as arising from new renewable heat energy and 10% of CO<sub>2</sub> savings as arising from new renewable electric energy, it might be anticipated around 48 GWh (0.17 PJ) new renewable heat energy and around 3.5 GWh (0.013 PJ) new renewable electricity.

#### **Monitored savings**

The CCFI 2017 monitoring report [10] indicates 8931 tons of CO<sub>2</sub> savings, reached in total 18 projects. In addition, for the projects, for which the monitoring period has ended before 2017, it is used the CCFI 2016 and 2015 monitoring report data – 2099 tons of CO<sub>2</sub> savings, reached in total 18 projects (3 projects did not provide such information)

**Thus, in 2017 the CO<sub>2</sub> savings of 11030 (8931+2099) tons might be accounted.** If assuming 90% of CO<sub>2</sub> savings as arising from new renewable heat energy and 10% of CO<sub>2</sub> savings as arising from new renewable electric energy, it might be calculated around 38 GWh (0.135 PJ) new renewable heat energy and around 2.8 GWh (0.01 PJ) new renewable electricity.

#### **2. CO<sub>2</sub> Savings in Tertiary sector businesses.**

**Contracted savings** [6]. The total annual contracted CO<sub>2</sub> savings constitute **17265 tons** (total in 8 projects, both tenders). The dominating part of the CO<sub>2</sub> savings relate to utilizing renewables for heat



energy. If assuming 90% of CO<sub>2</sub> savings as arising from new renewable heat energy and 10% of CO<sub>2</sub> savings as arising from new renewable electric energy, it might be anticipated around 59 GWh (0.21 PJ) new renewable heat energy and around 4.3 GWh (0.016 PJ) new renewable electricity.

#### **Monitored savings.**

The CCFI 2017 [10] and 2016 [9] monitoring reports indicates **8215 tons of CO<sub>2</sub> savings**, reached in total in 8 projects. If assuming 90% of CO<sub>2</sub> savings as arising from new renewable heat energy and 10% of CO<sub>2</sub> savings as arising from new renewable electric energy, it might be calculated around 28 GWh (0.1 PJ) new renewable heat energy and around 2 GWh (0.0075 PJ) new renewable electricity.

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) [8]. Thus, the semi-quantitative impact based on monitoring reports might be indicated as medium.

#### **References**

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