ევროკავშირი
საქართველოსთვის
Project funded by the European Union

Covenant of Mayors
for Climate & Energy
Demonstration Projects
Eastern Partnership

Implementation of the Biomass Supply Chain in Caucasus

"Biomass Energy & Energy Efficient Technologies as a Sustainable Energy Solutions for Georgian CoM Signatories"

Within EU & Telavi Municipality co-financed Project

The Clinic Workshop on waste-to-energy solutions for municipalities

Online, 8 April 2022

George Abulashvili, Elene Gvilava
Tbilisi, Georgia

EEC·336

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Project Title: "Biomass Energy and Energy Efficient Technologies as a sustainable solutions for Georgian CoM signatories"- **BioEn4CoM Sign** Project

Donor: EU Commission

Main Applicant: Energy Efficiency Center Georgia

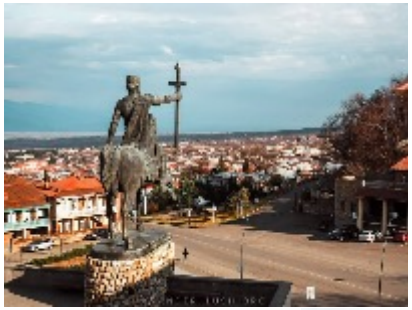
Co-Applicant: Telavi Municipality City Hall

Implementation Period: 2018-2022 წ.წ

Total Budget: 748,641.60 €

Grant: 598,913.28 €

Co-financing: 149,728.32€



Project Purpose:

To enhance Georgian CoM signatory municipalities capacities in climate change mitigation and fulfillment of sustainable local energy policy through implementation of investment projects in line with their Sustainable Energy &Climate Action Plans (SECAPs). The Action will be implemented in Telavi Municipality (Kakheti Region).

Direct Beneficiaries: decision makers, municipal service providers of Telavi municipality as well as the employers and users of the selected renovated public buildings, which energy efficiency parameters were improved.

Indirect Beneficiaries: private companies; more specifically agro vine (vine-growing) farms and/or companies providing their agricultural wastes (vineyard pruning resides) to the municipalities as an energy source as well as local population of the municipalities.

The Project Objectives

- *To promote introduction of EE measures;*
- *To promote locally available biomass production and innovative use;*
- *To assess the possibility and initiate establishment of RE supply chain;*
- *To support local authorities in improving their energy security & reducing GHG emissions;*
- *To raise awareness on CoM policy and sustainable energy investment projects*

Project Main Activities

***Activity 1**: General Coordination and Management;*

- *The Project Steering/Management Committee (S/MC) has been established;*
- *The Project Working Group (PWG) has been set up consisting with members of EEC & Telavi Municipality*

***Activity 2:** Selection of 2 pilot municipal buildings & carrying out of energy audits;*

- *Two municipal buildings were selected: Telavi # 1 and Ikalto Kindergartens;*
- *Energy audits of selected buildings were developed and appropriate renewable energy and energy efficiency measures were identified/determined;*

#	Actrual Consumption (kWh/a)	Baseline Consumption (kWh/a)	After EE Measures (kWh/a)	Anuual Savings, kWh/a	Anuual Savings, GEL	Annual Savings, CO2 t
IKALTO KG	78315	230607	50479	180128	19814	81.6
TELAVI #1 KG	169016	467865	151150	316715	34839	90.0
TOTAL	247331	698472	201629	496843.0	54653	171.6

***Activity 3**: Complete thermo-modernization of 2 selected pilot municipal buildings by applying sustainable clean energy and energy efficiency technologies & using of local renewable energy resources;*

- *Technical Designs (TDs) and Bills of Quantities (BoQ)were developed*

Project Main Activities

Activity 4: Establishment of renewable energy (biomass) supply chain in pilot Telavi municipality;

❖ In order to establish the biomass supply chain, a feasibility study was developed, based on which the potential of the locally available biomass (vineyards pruning) was identified in Telavi Municipality asl well we the detailed biomass supply scheme, the means and equipment needed for its management, the required amount of biomass for the target kindergartens during the season were determined.

Project Main Actions

Activity 4: Establishment of renewable energy (biomass) supply chain in pilot Telavi municipality;

❖Creating a long-term supply chain for renewable energy (biomass) with the participation of the private and public sectors.
❖Identification of the supplier (s) of renewable energy (biomass) for buildings selected for long-term supply of energy resources (signing of a memorandum of cooperation);

Biomass Supply Scheme Agricultural Machineries	GEL	EURO
Tractor #1		
Tractor #2 with trailer		52 340
Appliances		
the Round baler needed for collecting of the vineyards pruning		
The shredder for chopping of the vineyards pruning		31 970
Biomass Storing		
Warehouse (350m2 – height 5m)	98 000	

Total investment cost 113,130.00 Euros 28820

Collecting of the biomass		
During the two seasons about (2020-21), 53,5 tones of biomass were collected, stored and shredded	15 780	4640

Total operation cost 4540 Euros for 2 years of the project period

Project Main Findings

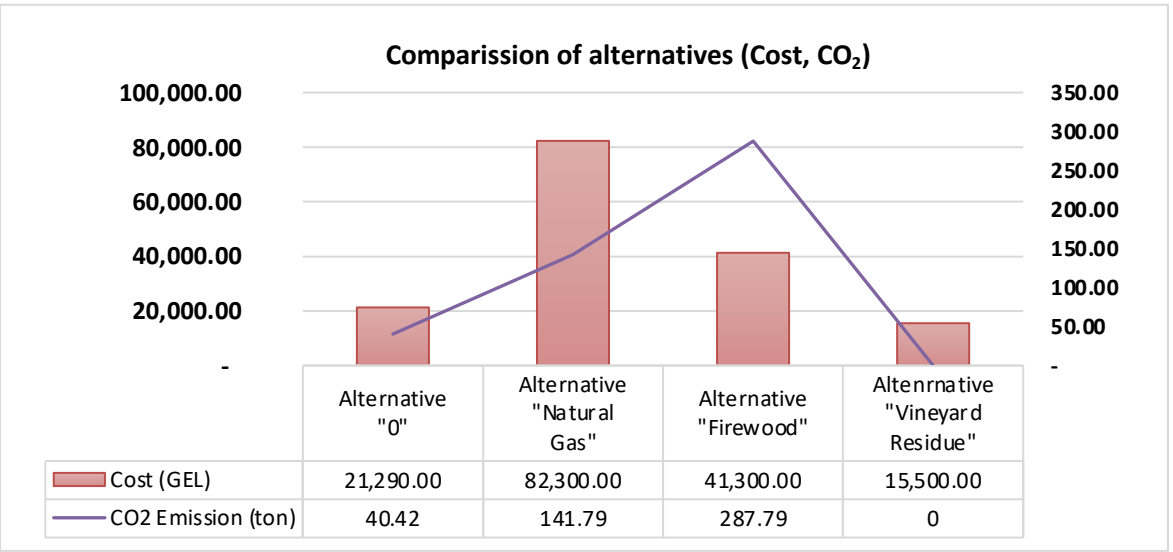
The main findings revealed during the testing process based on the Georgian reality

- *According to 2018 statistics, the total amount of vineyards (ha) in Telavi Municipality is around 6000 hectares.*
- *In the Telavi municipality, the volume of biomass (vineyards pruning) is expected to be up to 12000 tons.*
- *The amount of pruning from one hectare is around 1.5-2 tons;*
- *Bales of vineyards pruning weigh 18-28 kg, with an average weight of 20 kg and a humidity of 35%.*
- *Bales' dry weight ranges from 11 to 15 kg, with an average weight of 12 kg at 8% humidity.*

Approximately 35 ha of vineyards were farmed and 53.5 tons (humid) of pruning were gathered within 2 seasons (2020-21).
Vineyards Pruning:
Energy Content : 18.7 MJ/kg; 5.19 kWh/kg (International Survey)
Energy Content : 17.3 MJ / kg (gross mass); 4.82 kWh / kg (Lab Test in GTU)

Total biomass (vineyards pruning) required for Telavi # 1 and Ikalto KGs for one (1) season: according to theoretical calculations up to 50 tons (dry mass): ***(Less then 1% of the local potential).***

- *Ikalto Kindergarten - not less than 10 tons (dry mass);*
- *Telavi Kindergarten # 1 - not less than 40 tons (dry mass);*



Alternative	Price per 1 kWh, GEL
"Natural Gas"	0.1172
"Firewood"	0.0471
"Vineyard Residue"	0.0756

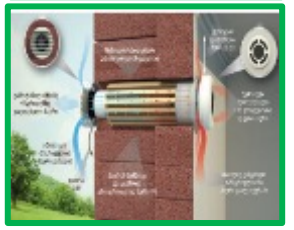
Project Main Activities

Activity 7: Performance, monitoring and commissioning of Demonstration Projects **– IKALTO**

IKALTO Kindergarten – Implemented Renewable Energy & Energy Efficient measures

- Complete renovation of the roof of the building and thermal insulation of the attic floor with 20 cm thick mineral wool and covering with waterproofing membrane.
- Thermal insulation of exterior walls, including foundation walls (Socle) with 10 cm rockwools and 8 cm XPS panels.
- Low emission double glazed PVS windows & doors
- Installation of individual (decentralized) ventilation systems (air flow-exhaust wall recuperators) in groups: playing and sleeping rooms, gym / event hall, and kitchen;
- Replacement of the electrical wiring and Installation of the EE lighting system (LED Lumps)





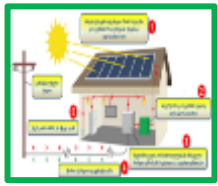

Project Main Activities

IKALTO Kindergarten – Implemented Renewable Energy & Energy Efficient measures

- Installation of autonomous heating system working on biomass (vineyards pruning):
  - *Construction of technical storage (boiler building) for the boiler;*
  - *Installation of a biomass boiler (116 kW), including a control system;*
  - *Installation of biomass (vine reservoir) bunker;*
  - *Installation of fuel supply system (aisle);*
  - *Chimney installation; Installation of 2 heating system, radiators & etc,*

- Installation of solar water heater system connected to autonomous heating system: 3 pieces of helio system, one system includes 20 pipes;

- 5.45 kW solar photovoltaic system connected to the network with a total installed capacity. Expected annual output of solar micro power plant is 7350 kWh.



Testing & Monitoring Process - Findings

Date /		Temperature, 0C			Boiler Temperature, 0C /
		Room # 1 SouthEast (1 floor) /	Room # 2 North West (1 floor) /	Room # 3 South /	
22.03.2022	/Wall	6.2	5.4	10.1	35
	/Window	5.0	3.5	11.2	
	/Radiator	6.5	5.5	25.5	
	/Indoor Air	9.8	9.4	9.8	
25.03.2022	/Wall	19.5	17.5	21.0	57
	/Window	23.2	18.5	28.1	
	/Radiator	56.3	48.1	56.0	
	/Indoor Air	22.0	18.0	24.9	

- **Total cost of the IKALTO KG complete thermo-modernization: 534,307.05 GEL**
- **Total cost of the TELAVI #1 KG complete thermo-modernization: 841,225.91 GEL**

Project Main Actions

Activity 5: Capacity Building and Awareness Raising Campaigns: Sustainable Energy Week/Days 2018-21წწ
Activity 6: Communication and Information Dissemination;










Information and awareness campaigns:
Marathons, cycling, film screenings, literary competitions **"Lile 2020-21",** student scientific conferences-competitions, seminars, exhibitions for young students, etc.

The project *"Biomass Energy and Energy-Efficient Technologies as Sustainable Energy Solutions for Georgian CoM Signatories"* has become **3rd place winner of the EUSEW 2020 Sustainable Energy Award!**

The Project's Challenges

- Administrative – Institutional challenges related to the Management of the Biomass Supply Chain;
- The municipality's willingness to pay for the service (the production and delivery of biomass as energy products to the target customers);
- Technical-engineering challenges requiring the innovative solutions of the heating systems;
- Mental and behavioral challenges related to the service and maintenance of the biomass heating systems;
- Low interest of the UoK's to be in charge of this process as it is not involved in the decision making and budget development process;

Thanks for the Attention ☺