



ANNUAL ACTION PLAN

MUNICIPALITY OF VALANDOVO

Action Plan for 2020

Municipality of Valandovo

September 2019

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ABBREVIATIONS

EE	Energy Efficiency
EEAP	Energy Efficiency Action Plan
EEP	Energy Efficiency Program
ESCO	Energy Service Company
LSGU	Local Self-government Units
RE	Renewable Energy
Toe	Tons of oil equivalent

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1 RESUMEE OF THE ENERGY EFFICIENCY PROGRAM FOR THE PERIOD 2020 – 2022

The Article 242 of the Law on Energy (Official Gazette of the Republic of Macedonia No. 96/18) reads: “Provisions of the Law on Energy (Official Gazette of the Republic of Macedonia No. 16/11, 136/11, 79/13, 164/13, 41/14, 151/14, 33/15, 192/15, 215/15, 6/16, 53/16 and 189/16) that regulates the energy efficiency matters shall apply accordingly until the entry into force of the Law that regulates the energy efficiency matters.” Therefore, in the area of energy efficiency and the preparation of Energy Efficiency Programs, remains into force the old Law on Energy (Official Gazette of the Republic of Macedonia No. 16/2011) which requires that each of the local self-government units must develop a three-year EEP and an annual Action Plan through which it implements its three-year EEP.

The Municipality of Valandovo aims to improve the living conditions of its population, using the comparative advantages of the environment and the existing infrastructure. Energy Efficiency (EE) is an integral part of the process that enables promotion of the environment and comfort for the population. The municipality aims to improve energy efficiency by achieving several goals:

- › Creation conditions for implementation of the energy efficiency measures for street lighting;
- › Implementation of measures for energy efficiency in the municipal buildings that are under the authority of Municipality of Valandovo;
- › Creation of favorable conditions for inclusion of the private sector in the process of implementation of the energy efficiency measures.

During the preparation of the EEP, three existing energy sectors were monitored: water sector, public lighting sector and the sector municipal buildings. The review of the energy consumption of the municipality shows that the sector municipal buildings is the largest consumer of energy with a total consumption of 1,066,981 kWh/a. The second largest sector is the water sector with 833,292 kWh/a (for the reference year 2018) and the sector public lighting with lowest rate of energy consumption of 680,217 kWh/a. The sectors water and public lighting use only electricity and the sector municipal buildings uses also extra light oil, firewood and pellets.

The analysis of the energy costs shows that the sector street lighting is responsible for most of the municipality's total energy costs with nearly 40%, while the sectors municipal buildings and water account for about 38.6% and 21.9%, respectively. The total energy consumption is 8.9% of the municipal budget for 2018. Currently, the city authorities do not have a detailed status of their energy costs.

The energy consumption and the costs are presented in Table 1.

Table 1: Annual consumption of energy and costs per sector

Type of sector	Electricity consumption [kWh/a]	Heating energy consumption					Total energy consumption [kWh/a]	Electricity costs [MKD/a]	Costs for sources of heating energy [MKD/a]	Total energy costs [MKD/a]
		Heavy oil [kWh/a]	Extra light oil [kWh/a]	Firewood [kWh/a]	Wood pellets [kWh/a]	Total for other sources of energy [kWh/a]				
Water sector										
Drinking water	530,117	/	/	/	/	/	530,117	2,919,120	/	2,919,120
Public lighting sector										
	680,217	/	/	/	/	/	680,217	4,462,222	/	4,462,222
Sector municipal buildings										
Educational facilities	124,729	/	619,077	238,560	28,002	885,639	1,010,368	1,037,963	2,734,400	3,772,363
Social care facilities										
Municipal administrative facilities	56,613	/	/	/	/	/	56,613	595,819	/	595,819
Total for the sector municipal building	181,342		619,077	238,560	28,002	885,639	1,066,981	1,633,782	2,734,400	4,368,182
TOTAL	1,391,676	885,639					2,277,315	9,015,124	2,734,400	11,749,524

The sectors were analyzed in detail using TRACE, a specialized tool for quick assessment of total the energy consumption in the municipality. Based on the relevant inputs described in the EEP, the street lighting sector is ranked first as a priority sector by TRACE, followed by the sector municipal buildings and the water sector.

The Table 2 below presents the recommendation for the sector street lighting that shall be developed into a project to be implemented within a period of one year.

Table 2: List of projects for EE selected with the Energy Efficiency Program

Sector	Energy efficiency project	Initial (preliminary) expenses (MKD)	Energy savings potential (kWh/a)	Energy savings potential (MKD/a)	CO ₂ emissions reduction (Tons of CO ₂)	Payback period (years)	Duration of the implementation (years)
Street lighting	Complete Program for revitalization of the street lighting ^{1 2}	20.34 million	463,969	3.04 million	426.9	6.7	1

At the same time with the development of this Action Plan, Municipality of Valandovo in cooperation with a team of experts is preparing a Feasibility study for reconstruction of the street lighting, which would analyze the feasibility of financing through an ESCO model. Development of such comprehensive study of the sector by including all necessary data is strongly recommended.

The implementation period foreseen for each of the measures from the selected Energy efficiency project for the street lighting sector is presented in the Table 3.

¹ These are specific assessments for the Project determined by the municipal EE Team in the Energy Efficiency Program.

² Includes components from all four TRACE recommendations – assessment, audit, renovation and procurement

Table 3: Implementation of EE projects included in the three-year EEP

No.	Energy Efficiency Projects	Description	Source of funding	Period of implementation	Responsible person	Implementation approach (public procurements, deadlines, activities, cooperation, etc.)
1	Complete Program for revitalization of the street lighting	›Integrated program for assessment of the public lighting	Municipal budget	2020	EE Manager	Municipal team
		›Guidelines for procurement of new lamps	Municipal budget	2020	EE Manager	Municipal team
		›Modernization of the street lighting: the existing 1,520 high-pressure sodium (HPS) lamps, 70 W each, with 1,520 new LED lamps of 25 W each;	“ESCO“ model of PPP	2020	EE Manager	Public procurement
		› Modernization of the street lighting: the existing 50 high-pressure sodium (HPS) lamps, 150 W each, with 50 new LED lamps, 70 W each.	“ESCO“ model of PPP	2020	EE Manager	Public procurement

If the municipality manages to achieve the main goal of its EEP related to the sector street lighting, then it can set a greater emphasis on the implementation of the energy efficiency in the remaining sectors such as the sector municipal buildings and water. Within buildings sector, the ranking of buildings is based on the specific energy consumption in kWh/m² for each building as presented in the table below:

Table 4: Prioritization in public sector – public buildings

	Final user	No. of users	Total area of the building m²	Total heated area m²	Total energy consumption kWh/a	Specific energy consumption kWh/(m2.a)	Energy costs MKD/a
1	- RS "29 November Kalkovo	49	191	191	33,013	172.8	83,706
2	- RS "Jane Sandanski" Grchishte	7	216	191	27,507	144.0	58,532
3	- RS "Cvetan Dimov" Kazandol	19	124	124	17,059	137.6	35,436
4	- RPS "Ham'k Kemal" Chalakli	73	494	494	60,293	122.1	140,282
5	- RPS "Strasho Pindzur" Udovo	67	573	573	54,209	94.6	132,493
6	- RS "Mito Simeonov" Marvinci	30	333	333	31,115	93.4	67,317
7	- RS "Dame Gruev" Brajkovci	40	323	323	29,302	90.7	102,960
8	Municipal building	34	607	607	54,047	89.0	568,809
9	- RS "Goce Delchev" Pirava	136	1,095	1,095	83,228	76.0	310,932
10	- RS "Jeni Gjun" Bashibos	9	153	153	10,471	68.4	23,291
11	- PMS "Strasho Pindzur" Josifovo	350	2,300	2,300	156,395	68.0	571,559
12	SMS "Goce Delchev" Valandovo	258	3,400	3,400	225,832	66.4	1,160,748
13	- RS "Moshia Pijade" Dedeli	21	311	311	18,759	60.3	49,419
14	PMS "Josip Broz Tito" Valandovo	470	7,535	7,535	263,187	34.9	1,035,688
15	Regional center for certification		230	230	2,566	11.2	27,010

The following tasks will be developed with the preparation of the annual AP:

- › Energy efficiency projects, previously presented in the existing EEP that are prepared for implementation in the following 2020;
- › Goals that shall be achieved with the implementation of this EE projects;
- › Sources of funding and budget for realization of the energy efficiency projects;
- › Timeframe for implementation of the selected projects for EE;
- › Responsible parties during the implementation period.

2 EE PROJECTS INCLUDED IN THE ACTION PLAN

2.1.1 Public lighting

The proposed project for energy efficiency “Complete program for revitalization of the street lighting” includes several activities for energy efficiency that should be implemented in the period of one year. The first phase of this Action Plan, foresees the following activities:

- › Development of “Integrated program for assessment of the public lighting”. Preparation of an audit for the existing inventory, as well as assessment of the operational activities and the activities for maintenance will assist in the identification of appropriate measures for significant increase of the energy efficiency;
- › Guidelines for procurement of new street lamps while replacing the non-working ones, fulfilling the necessary light-technical characteristics;
- › Replacement of the existing 1,520 high-pressure sodium (HPS) lamps, 70 W each, with new 1,520 LED lamps of 25 W each;
- › Replacement of the existing 50 high-pressure sodium (HPS) lamps, 150 W each, with new 50 LED lamps of 70 W each.

Table 5: List of projects for EE that were selected for the Action Plan

No.	EE projects	Description	Initial (preliminary) cost (MKD)	Energy savings potential (kWh/a)	Energy savings potential (MKD/a)	CO ₂ emissions reduction (Tons of CO ₂)	Payback period (years)	Duration of the Implementation (years)
Street lighting	Complete program for revitalization of the street lighting	Integrated program for assessment of the public lighting	120,000					
		Guidelines for procurement of new street lamps	/					
		Modernization of the street lighting: › Existing 1,520 high-pressure sodium (HPS) lamps, 70 W each, with new 1,520 LED lamps of 25 W each; › Existing 50 high-pressure sodium (HPS) lamps, 150 W each, with 50 new LED lamps, 70 W each.	20.34 million	463,969	3.04 million	426.9	6.7	1

After the compilation of the inventory of entire street lighting and the development of a detailed program in a study, the municipality shall determine which part of the system will be renovated (replacement of existing lamps, expanding the grid, replacement of poles, modernization of the lighting with smart metering, etc.).

2.1.1 Municipal buildings

Municipality of Valandovo continuously implements EE measures in the area of municipal buildings, with special attention to the educational facilities. Most of the buildings have been already reconstructed with replacement of windows, replacement of roofs including insulation, as well as construction of thermal facades.

Currently the existing kindergarten “Kalinka” is in process of renovation designed to satisfy the highest energy efficiency standards. The implementation is enabled through the project “3Em” funded by the Programme for cross-border cooperation with Greece, in a total amount of EUR 400,000.

Due to the completion of the construction activities of the kindergarten “Kalinka”, no additional investments are planned in the sector municipal buildings during 2020.

3 GOALS TO BE ACHIEVED WITH THE IMPLEMENTATION OF THE ENERGY EFFICIENCY MEASURES

Implementation of one-phase “Complete program for revitalization of the street lighting” will contribute to reducing the overall energy demand of the Municipality of Valandovo. Energy consumption by EE measures is calculated using the energy savings estimation calculator proposed by the TRACE tool. Expected savings are calculated as the difference between the reference consumption for 2018 of 680,217 kWh/year and the electricity consumption after the replacement of the lamps of 216,248 kWh/year.

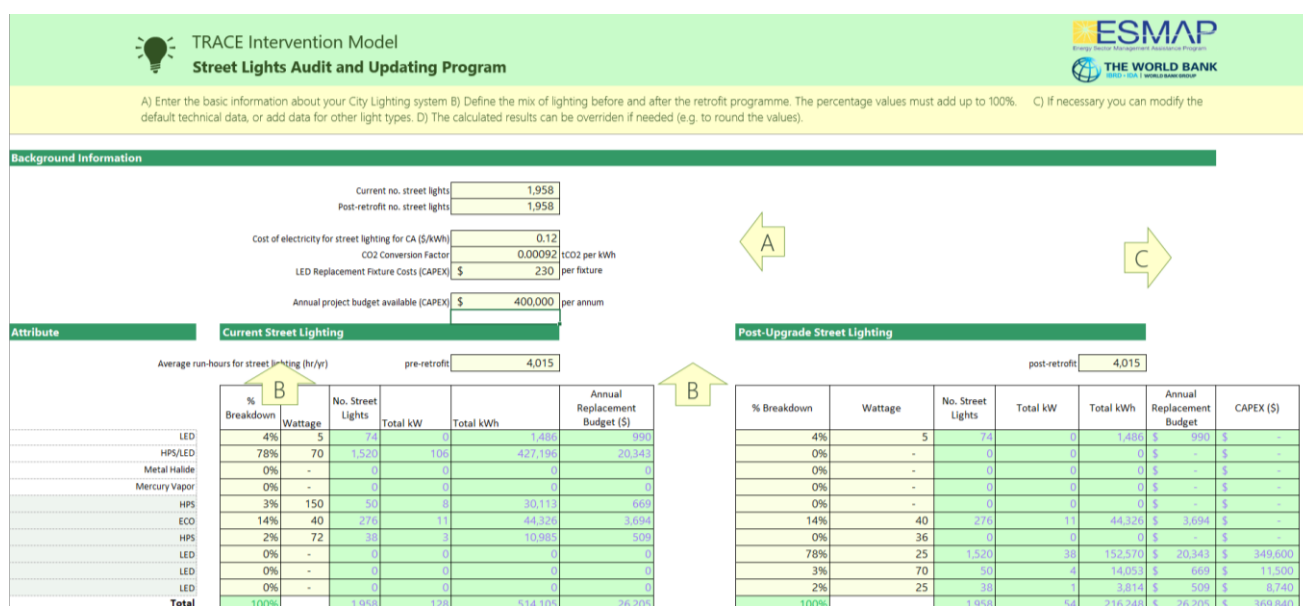


Figure 1: Scenario of detailed calculations – Street lighting

Table 6: Annual energy savings

Project No.	EE project	Total energy consumption before EE measures (kWh/a)	Total energy consumption after EE measures (kWh/a)	Expected total energy savings		Total energy savings (%)
				(kWh/a)	(ktoe/a)	
Street lighting sector						
1	Complete program for revitalization of the street lighting	680,217	216,248	463,969	0.04	68.2

* 1 toe = 41.868 GJ = 11630 kWh

With these energy savings, Municipality of Valandovo contributes to the achievement of the national goals for energy efficiency. In one year, in accordance with the savings foreseen with the “Complete program for revitalization of the street lighting” they are equal to 0.04 ktoe. If the project

is completed until 2020, for the following 10 year period this would lead to savings of 0.4 ktoe which represents 0.04% of the national goal for energy savings until 2030³. If taken into consideration that Valandovo is small urban municipality with 0,6% of the country's total population, this percentage of savings for one year is quite significant and important for the achievement of the national energy goals.

³ In accordance with the "Study for the overall 2030 goals", published on 12 June 2019 for the Energy Community Secretariat

4 FINANCIAL SOURCES FOR IMPLEMENTATION OF THE ACTION PLAN

In this part, the municipality assesses the financial sources available and the amount for funding that can be obtained for investments in energy efficiency for the next year. As stated in the EEP for the implementation of the priority project, a Contract for energy services will be concluded following prior publication of a public tender under a public-private partnership procedure. This Contract will regulate the relations between the Public Partner in this case the municipality, and the Private Partner – the ESCO company.

Table 7: Sources of funding and budgets

List of priority projects			Sources of funding				Other funding possibilities		
Project title	Payback period	Investment amount MKD million	Available basic funding MKD million	Grant program MKD million	Loans MKD million	PPP/ESCO MKD million	Basic funding	Grant programs	Loans
TOTAL AVAILABLE FUNDS:			-	-	16.4	-	-	-	-
1. Complete program for revitalization of the street lighting	6.7	20.34		-	-	20.34	-	-	
Total project investment:		20.34				20.34			

5 TIMEFRAME FOR IMPLEMENTATION OF THE ENERGY EFFICIENCY PROJECTS AND RESPONSIBLE PARTIES

This chapter presents the period of implementation of the selected project for energy efficiency. At the same time it provides a description of all activities that need to be undertaken for carrying out a solid project in a timely manner. It is very important to assign responsible person or a team for each activity that should be completed in order to enable efficient monitoring of the process.

A simple Excel Gantt chart⁴ is proposed for better monitoring of the project activities.

⁴ Gantt project planner.xls

Table 8: Implementation of EE projects included in the Action Plan

No.	EE projects	Description	Implementation activities	Period of implementation	Responsible person
1	Complete program for revitalization of the street lighting	Integrated program for assessment of the street lighting	<ul style="list-style-type: none"> • Assignment of responsible person for the condition of the inventory • Compiling a list of necessary information related to the inventory (street name, No. of poles, type of poles, type of lighting, type of lamps and wattage and illumination level) • Data collection • Data analysis and interpretation • Public announcement of the implemented inventory • Preparing an audit for street lighting 	January - February 2020	EE Manager
2		Guidelines for procurement of new street lamps	<ul style="list-style-type: none"> • These guidelines will include parameters for lighting, poles distance, recommendations related to the type of lamps and light dimming as well as recommendations for night lighting for all streets in the municipality and the minimal light-technical characteristics that the lamps shall meet. • Analysis of the components' lifetime during the procurement process 	January - February 2020	EE Manager and Public Relations Department
3		Renovation of the street lighting	<ul style="list-style-type: none"> › Existing 1520 high-pressure sodium (HPS) lamps, 70 W each, with 1520 new LED lamps of 25 W each; › Existing 50 high-pressure sodium (HPS) lamps, 150 W each, with 50 new LED lamps, 70 W each; 	March - December 2020	EE manager

6 MONITORING OF THE IMPLEMENTATION OF THE ENERGY EFFICIENCY PROGRAM

6.1 REGULAR MONITORING OF THE ENERGY EFFICIENCY PROGRAM, IMPROVEMENT IN THE WORK AND EVALUATION OF THE IMPACT

Regular monitoring is a key element in the process of the Energy Efficiency Program. The monitoring and evaluation (M&E) might include different phases and aspects of the process of the Energy Efficiency Program. It usually starts at the very beginning and continues during the implementation of the Program. It is strongly recommended that the monitoring and evaluation (M&E) continues even after the completion of the planned framework of the Energy Efficiency Program towards creation of long-term impacts of the EEP on the local economy, energy sector, environment and the human behavior.

The implementation of the municipal EEP will be carefully monitored and evaluated on annual level by the Municipal team for energy efficiency in Valandovo. Evaluation will be conducted in November and December and will cover the current year.

Monitoring and assessment will be performed based on the previously defined indicators approved by the municipal administration. As soon as the installation is completed, each project separately will be commissioned and the overall period of the realization of the Energy Efficiency Program will start to expire, therefore the changes can be quantified. The easiest way to do this is by comparison using the data for:

- › Situation of the systems affected, as well as impacts on the municipality as a whole, before and after the program implementation;
- › The total amount of energy savings achieved during the overall period of implementation of the Program and the energy savings foreseen for a particular period, by using the data from actual measurements and projections based on the real results from the implemented measures.

The following indicators of successfulness may be identified and used for proper assignment of responsibilities:

- › Achieving the listed preliminary qualitative program goals;
- › Achieving the listed preliminary quantitative program goals;
- › Creating conditions for replication of successful practices in the same or other municipalities;
- › Influence of the implementation of the program on the planning and development of the municipality in other areas;
- › Effectiveness of the program on the management.

6.2 INTERIM REPORTS FOR THE RESULTS TO THE POLITICAL AUTHORITIES

Reporting on the results may be performed towards internal or external authorities. Internal reporting will be performed by summarizing the results from the monitoring of the Energy Efficiency Program in written by the Energy Efficiency Team and will be reported to the Mayor and the Municipal Council of Valandovo. The reporting periods depend on the City Government's decision-making policy. Good example of inclusion of the Municipal Council and other stakeholders in the implementation of the Program is scheduling regular meetings for information exchange in December. In addition to reporting, it will be extremely useful if the EE Team Leader publishes information on the achievements of the Energy Efficiency Program on the municipal website as well as in the local media and discusses this information at special EE events.

In accordance with Article 132, paragraph 5 of the Law on Energy (Official Gazette of the Republic of Macedonia No. 16/2011) which is still in force regarding the issues in the area of the energy efficiency until the entering into force of the Law that will regulate the issues in the area of energy efficiency, municipalities shall prepare External Report on the implementation of the Energy Efficiency Program by providing information to the Energy Agency in relation to the implementation of the Energy Efficiency Program from the previous year about the evaluation, monitoring and verification. The information shall be delivered by the end of February each year.

Table 9: Information on the implementation of the Program

Project for EE	Detailed description of the project	Evaluation of the implemented project	Status of the Project within the EEP
Street lighting	Integrated program for assessment of the public lighting	<i><The project is being implemented in accordance with the EEP / The project is being implemented with a delay / The project is being implemented partially / The project is not being implemented.></i>	<i><Achieved/ Implementation continues / Postponed></i>
	Guidelines for procurement of new street lights	<i><The project is being implemented in accordance with the EEP / The project is being implemented with a delay / The project is being implemented partially / The project is not being implemented.></i>	<i><Achieved/ Implementation continues / Postponed></i>
	Modernization of the street lighting	<i><The project is being implemented in accordance with the EEP / The project is being implemented with a delay / The project is being implemented partially / The project is not being implemented.></i>	<i><Achieved/ Implementation continues / Postponed></i>

6.3 INTERIM UPGRADES OF THE EEP BASED ON RECEIVED OBSERVATIONS AND RESULTS

As part of the process for continuous monitoring, implemented projects may be evaluated through their influence on the energy consumption and the reduction of the CO₂ emissions. Based on the results, additional corrective and prevention measures can be undertaken if necessary.

The M&E results may lead to change and update of the EEP. The updated EEP will serve as a base for the development of the Action Plan for the next year.

ATTACHMENT

