

**Sisian Municipality (Armenia)****One-pager on PV/Solar Projects****(Identification form for municipal project proposals on local generation of renewable energy¹)**

1. Information about municipality	
Name of municipality:	Sisian
Region / Oblast:	Syunik
Country:	Armenia
Number of citizens:	16023
City budget (most recent year):	2017299.2 EURO 1079013000 AMD ²
Website of municipality:	www.sisian.am
Member of CoM since:	13.03.2018
Date of SEAP/SECAP approval:	In finalization stage
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2. SEAP/SECAP Sector	Local electricity production from renewable sources: solar photovoltaic (PV)
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3. Description of an existing electrical/thermal energy supply system of a building/facility N1	
Parameter	Description
Type of building (e.g. municipal, kindergarten, school, hospital, sport hall, house of culture, residential, tertiary, other, N/A*)	City Hall
Name and address of building/facility, construction date	City Hall of Sisian, 31 Sisakan Street, Sisian, Syunik Region, RA, 1956
Exact GPS coordinates of the site (if available)	39°31'26.4 N 46°01'26.5 E
Electricity supply (national grid, local power producer, other?)	National grid
Feed-in tariff to grid (revenues per kWh), AMD/kWh	22.49
Capacity of transformer/available capacity of grid (in/out)	
Electricity metering system (Yes: individual meter, combined / other / No)	Individual two-tariff
Heating system (Yes: centralized, local boiler-house, individual gas-fired boiler, other / No)	Gas boiler
Primary energy for heating system: Natural gas, electricity, diesel, coal, wood, dung, etc.	Natural gas
Thermal energy metering system for heating (Yes/No)	No
Hot water supply (Yes: centralized, local gas-fired boiler, local electrical boiler, other / No)	Gas boiler (hot water is available only when the boiler is in operation under heating mode, i.e. November-April period.

¹ The information provided with this form is for information purposes only. No rights can be exerted because of information provided with this form, nor can the municipality be held accountable for any mistakes or incorrect information provided within.

² Use the exchange rate of your national bank on the moment of filling in the form.

Annual hot water consumption (liter/a or kWh/a)	
- bathing	
- cleaning (laundry)	
- cooking	
- other (specify)	
Days and hours of operation of building/facility (days/a and hours per day)	252 day/a
Any peaks for hot water consumption? (specify period, e.g. a month)	November - April
Thermal energy metering system for hot water supply (Yes/No)	No
Primary energy for hot water supply system: natural gas, electricity, diesel, coal, wood, dung, etc.	Natural gas
Other information	

* In case of construction of a new grid-tied PV power plant, that supplies electricity to a national grid.

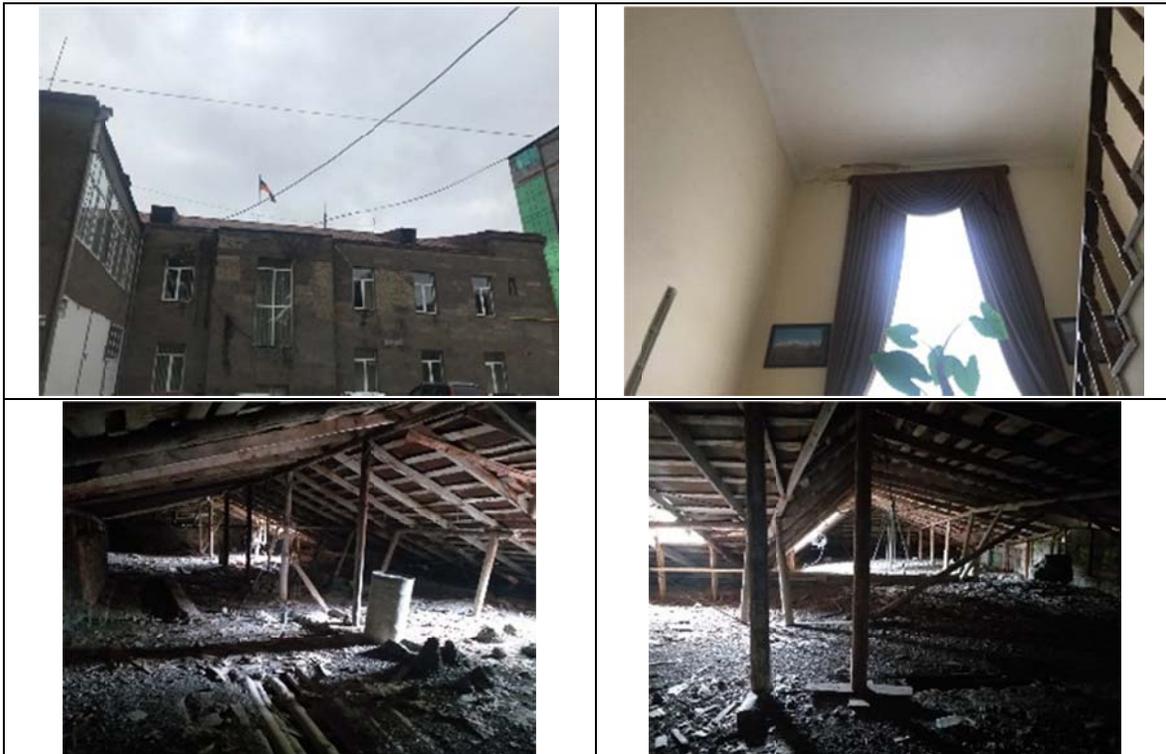
4.1 Annual heating energy consumption and costs over the past 3 years						
Year	Electricity consumption (MWh/a)	Annual electricity costs		Natural gas consumption (m ³ /a) ³	Annual gas costs	
		EUR	AMD		EUR	AMD
2018				9598	2494.2	1334122
2017				10865	2823.5	1510235
2016				12085	3435.3	1837477

4.2 Annual electricity consumption and costs over the past 3 years						
Year	Electricity consumption (MWh/a)	Annual electricity costs		Natural gas consumption (m ³ /a)	Annual gas costs	
		EUR	AMD		EUR	AMD
2018	19.98	1603.4	857605			
2017	23.86	1983.4	1060869			
2016	33.24	2954.5	1580296			

Total energy consumption in the recent year		
Total annual energy consumption	MWh/a	88.437
Total annual costs associated with energy consumption	Euro	2494.2
	AMD	1334122



³ For converting consumption of natural gas (and other energies/fuels) into MWh/year, use conversion data provided in SECAP Guide or national data.



6. Available supporting documents (If necessary, provide links or attach copies of documents)

Reference to any available supporting documents like energy audits, feasibility studies, preliminary assessments, software simulations, etc.

Document / Source N1: _____

7. Description of renewable energy generation system to be implemented by the project

Parameter	Description
PHOTOVOLTAIC SYSTEM (PV)	
Annual global horizontal irradiation (kWh/m ²)	1,633
Type of system (grid tied, battery based)	Grid tied
Total installed capacity of the system (DC peak power) (kW)	14.2
Expected annual production (kWh/a)	19,975
PV Modules	
Individual capacity of a PV module (wattage)	355
Type of PV module (mono-crystalline / poly-crystalline)	M-Si
Number of PV modules, pcs.	40
Inverters	
Type of inverters (grid tied, hybrid, stand-alone)	Grid tied
Rated input power of inverters (kW)	7
Number of inverters, pcs.	2
Mounting structure	
Orientation of the system (south, southeast, southwest, etc.)	South-West
Tilt angle (degree)	20 ^o
Material of bearing structure (aluminum, metal, galvanized)	Aluminum
System installation type (ground mounted, roof mounted, BIPV)	Roof mounted
System tracking option (none - fixed, single axis, dual axis)	Fixed

Battery /Transformer	
Battery capacity (Ah)	
Transformer capacity (kVA)	
Number of transformers, pcs.	



Location of PV modules on the roof of the building

8. Energy efficiency measures and modernizations to be implemented within the project						
PV system components	Unit	Number of units	Indicative costs per unit (with VAT) ⁴		Subtotal costs	
			EUR	AMD	EUR	AMD
PV module	Pieces	40	160	84,000	6,400	3,360,000
Inverters	kW and pieces	7 kW, 2	952	500,000	1,905	1,000,000
Mounting structure	Sets	2	1,333	700,000	2,667	1,400,000
Cabling	Meter	250	1.1	600	286	150,000
Transmission line	-	-				
Battery	Pieces	0				
Transformer	Pieces	0				
Substation	-	0				
Auxiliary equipment	-					
TOTAL					11,388	5,910,000

9. Other costs		
Description	Indicative costs for PV	
	EUR	AMD
Human resources	200	105,000
Structural survey (in case of roof mounted)	304.8	160,000
Geological survey (in case of ground mounted)		-
Technical design	609.5	320,000
State expertise	99.0	52,000
Site supervision (technical and author supervision)	228.6	120,000
Installation works (labor)	295.2	155,000
Land and license acquisition		-

⁴ These are indicative costs based on the data from real implemented projects under the Covenant of Mayors – Demonstration Projects (CoM-DeP programme). However, municipalities are advised to contact suppliers/service providers to obtain more accurate information for their specific case.

Other (please specify)	9428.6	4,950,000
TOTAL	11,165.7	5,862,000
Annual operation and maintenance costs	95	50,000

10. Grand total costs	PV system	
Euro	22,554	
AMD	11,772,000	

11. Expected results	PV system	
Annual renewable energy generation, MWh ⁵	19.975	
Annual monetary savings, EUR/AMD	1,711	898,475
Annual CO ₂ emission reduction ⁶ , tCO ₂	4.43	

12. Timetable of the project	
Description of step	Indicative time needed (months)
Recruitment/Mobilization of IPU	0.5
Structural survey of building (drafting ToR, procurement of services, implementation, report)	1
Energy audit (drafting ToR, procurement of services, implementation, report)	1
Technical design (drafting ToR, procurement, implementation, report)	1
State expertise	0.3
Procurement	1
Works/site supervision (technical and author)	1
Final acceptance (including correction of defects)	0.3
Calculation of real savings (post intervention measurement & verification audit)	6
Total	12.1

13. Other information
Within the framework of this proposal it is suggested to install a grid-ties PV system with an installed (peak) capacity of 14.2 kW on the roof of the city hall of Sisian. The system consists of 40 PV modules with individual peak capacity of 355 W and will generate annually 20.0 MWh of electricity. The total cost of the project is about 22.500 Euro.

⁵ It is important that you fill in reasonable estimates of RE generation with consideration of energy consumption for own needs of the systems. Too optimistic forecasts for RE generation will raise questions about your trustworthiness as partner.

⁶ For calculation of CO₂ emission reduction, please refer to national GHG emission factors (SECAP Guide).