



## Tashir Municipality (Armenia) One-pager on PV/Solar Projects

(Identification form for municipal project proposals on local generation of renewable energy<sup>1</sup>)

<b>1. Information about municipality</b>	
Name of municipality:	Tashir
Region / Oblast:	Lori
Country:	Armenia
Number of citizens:	15985
City budget (most recent year):	438042.4 EURO      231724429.6 AMD <sup>2</sup>
Website of municipality:	www.tashirciti.am
Member of CoM since:	15.11.2016
Date of SEAP/SECAP approval:	In finalization stage
Name of contact:	Hayarpi Kirakosyan
Position:	Senior Specialist of Procurement, Programs and Economic Development Division of the Municipality
Email:	hayarpi.kirakosyan@bk.ru
Phone:	+374 77 818568

<b>2. SEAP/SECAP Sector</b>	Local electricity production from renewable sources: solar photovoltaic (PV)
-----------------------------	--

<b>3. Description of an existing electrical/thermal energy supply system of a building/facility N1</b>	
Parameter	Description
Type of building (e.g. municipal, kindergarten, school, hospital, sport hall, house of culture, residential, tertiary, other, N/A*)	Municipal building
Name and address of building/facility, construction date	City Hall of Tashir, 94 V.Sargsyan Street, Tashir, Lori Region, RA, 1954
Exact GPS coordinates of the site (if available)	41°07'14.7"N 44°16'54.3"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)	No
Annual hot water consumption (liter/a or kWh/a)	
- <i>bathing</i>	
- <i>cleaning (laundry)</i>	
- <i>cooking</i>	

<sup>1</sup> 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.

<sup>2</sup> Use the exchange rate of your national bank on the moment of filling in the form.

- other (specify)		
Days and hours of operation of building/facility (days/a and hours per day)		313 day/a, 8 hour/day
Any peaks for hot water consumption? (specify period, e.g. a month)		
Thermal energy metering system for hot water supply (Yes/No)		
Primary energy for hot water supply system: natural gas, electricity, diesel, coal, wood, dung, etc.		Natural gas
Other information	The building is heated from October till April.	

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

4. Annual energy consumption and costs over the past 3 years						
Year	Electricity consumption (MWh/a)	Annual electricity costs		Natural gas consumption (m <sup>3</sup> /a) <sup>3</sup>	Annual gas costs	
		EUR	AMD		EUR	AMD
2016	10.001	800.1	420,042	14,100	3,733	1,959,900
2017	10.022	801.8	420,924	14,250	3,773	1,980,750
2018	10.101	865.4	454,342	14,310	3,789	1,989,090

Total energy consumption in the recent year		
Total annual energy consumption	MWh/a	148.84
Total annual costs associated with energy consumption	Euro	4,597
	AMD	2,413,332
Total specific annual energy consumption in heated area	kWh/m <sup>2</sup>	157



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



Location of the target building on the city map

**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
<b>PHOTOVOLTAIC SYSTEM (PV)</b>	
Annual global horizontal irradiation (kWh/m <sup>2</sup> )	1,354
Type of system (grid tied, battery based)	Grid tied
Total installed capacity of the system (DC peak power) (kW)	8.875
Expected annual production (kWh/a)	10,881
<b>PV Modules</b>	
Individual capacity of a PV module (wattage)	355
Type of PV module (mono-crystalline / poly-crystalline)	M-Si
Number of PV modules, pcs.	25
<b>Inverters</b>	
Type of inverters (grid tied, hybrid, stand-alone)	Grid tied
Rated input power of inverters (kW)	8
Number of inverters, pcs.	1
<b>Mounting structure</b>	
Orientation of the system (south, southeast, southwest, etc.)	South-East
Tilt angle (degree)	25 <sup>o</sup>
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



Location of PV modules on the roof of the building

<b>8. Energy efficiency measures and modernizations to be implemented within the project</b>						
PV system components	Unit	Number of units	Indicative costs per unit (with VAT) <sup>4</sup>		Subtotal costs	
			EUR	AMD	EUR	AMD
PV module	Pieces	25	160	84,000	4,000	2,100,000
Inverters	kW and pieces	8 kW, 1	1,000	520,000	1,000	520,000
Mounting structure	Sets	5	300	155,000	1,500	775,000
Cabling	Meter	350	1.1	600	385	210,000
Transmission line	-	-				
Battery	Pieces	0				
Transformer	Pieces	0				
Substation	-	0				
Auxiliary equipment	-					
<b>TOTAL</b>					<b>6,885</b>	<b>3,605,000</b>

<b>9. Other costs</b>		
Description	Indicative costs for PV	
	EUR	AMD
Human resources	200	105,000
Structural survey (in case of roof mounted)	300	155,000
Geological survey (in case of ground mounted)	0	0
Technical design	600	315,000
State expertise	100	52,000
Site supervision (technical and author supervision)	200	110,000
Installation works (labor)	300	155,000
Land and license acquisition	0	0
Other (please specify)	500	260,000
<b>TOTAL</b>	<b>2,200</b>	<b>1,152,000</b>
Annual operation and maintenance costs	100	50,000

<b>10. Grand total costs</b>	
	PV system
Euro	<b>9,085</b>
AMD	<b>4,757,000</b>

<sup>4</sup> 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.

<b>11. Expected results</b>	<b>PV system</b>	
Annual renewable energy generation, MWh <sup>5</sup>	<b>10.881</b>	
Annual monetary savings, EUR/AMD	<b>907</b>	<b>471,884</b>
Annual CO <sub>2</sub> emission reduction <sup>6</sup> , tCO <sub>2</sub>	<b>2,415</b>	

<b>12. Timetable of the project</b>	
<b>Description of step</b>	<b>Indicative time needed (months)</b>
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)	0.2
Calculation of real savings (post intervention measurement & verification audit)	6
<b>Total</b>	<b>12</b>

<b>13. Other information</b>
Within the framework of this proposal it is suggested to install a grid-ties PV system with an installed (peak) capacity of 8.87 kW on the roof of the City Hall of Tashir. The system consists of 25 PV modules with individual peak capacity of 355 W and will generate annually 10.8 MWh of electricity. The total cost of the project is about 9.000 Euro.

<sup>5</sup> 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.

<sup>6</sup> For calculation of CO<sub>2</sub> emission reduction, please refer to national GHG emission factors (SECAP Guide).