

**Kapan 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:	Kapan
Region / Oblast:	Syunik
Country:	Armenia
Number of citizens:	38927
City budget (most recent year):	3567374 EURO 1929949400 AMD ²
Website of municipality:	www.kapan.am
Member of CoM since:	15.07.2016
Date of SEAP/SECAP approval:	Under development
Name of contact:	Never Grigoryan
Position:	Energy Manager
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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, 5a A.Manukyan, Kapan, Syunik Region, RA
Exact GPS coordinates of the site (if available)	39°20'80.084 N, 46°40'20.321 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 one-tariff
Heating system (Yes: centralized, local boiler-house, individual gas-fired boiler, other / No)	Individual electrical heaters
Primary energy for heating system: Natural gas, electricity, diesel, coal, wood, dung, etc.	Electricity
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>	
- <i>other (specify)</i>	

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.

Days and hours of operation of building/facility (days/a and hours per day)	254 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.	
Other information	

* 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 ³ /a) ³	Annual gas costs	
		EUR	AMD		EUR	AMD
2016	102.090	9,600	5,193,700	-	-	102.090
2017	98.940	9,419	5,095,500	-	-	98.940
2018	93.420	7,709	4,170,500	-	-	93.420

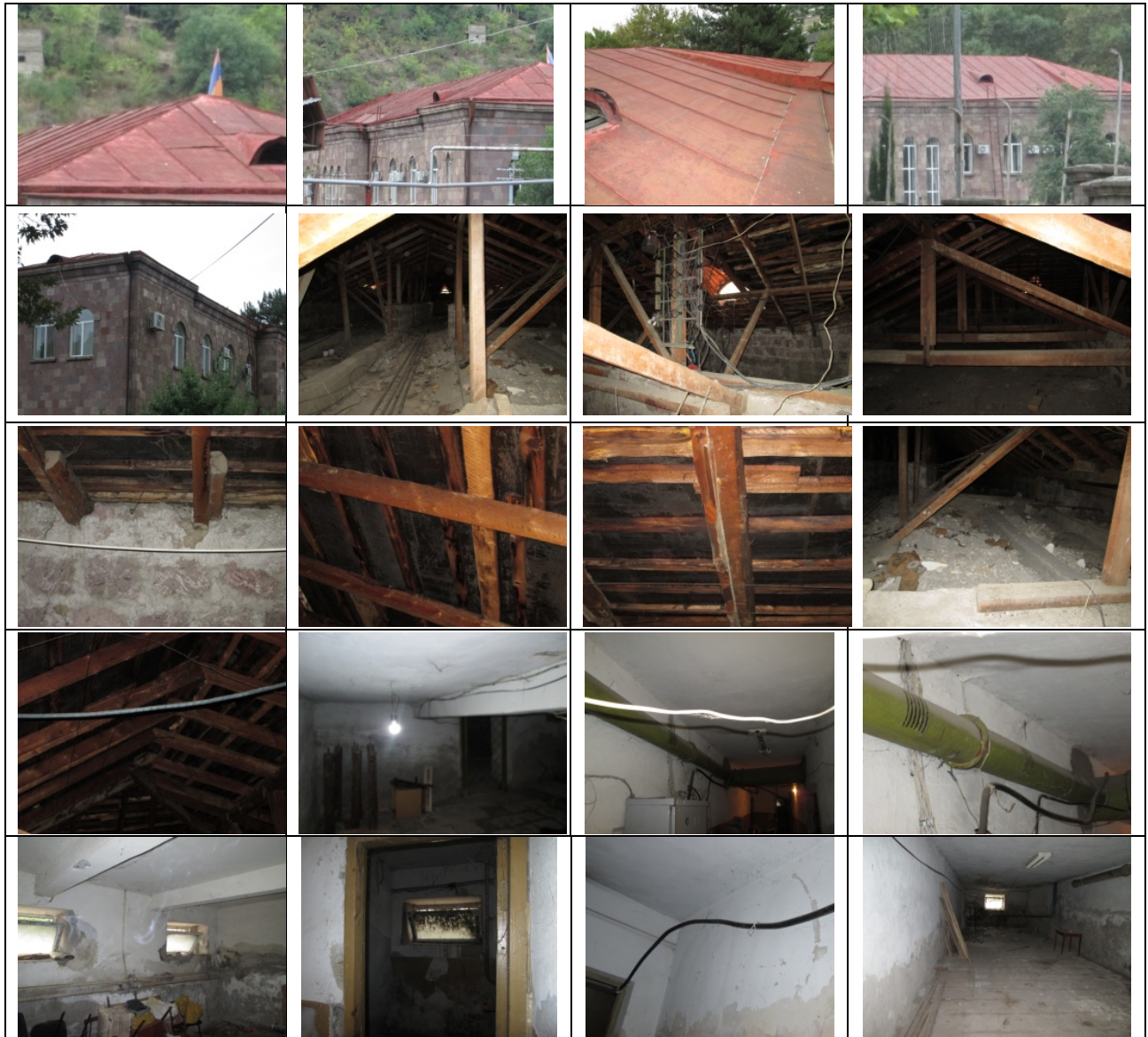
Total energy consumption in the recent year

Total annual energy consumption	MWh/a	93.420
Total annual costs associated with energy consumption	Euro	7,944
	AMD	4,170,500
Total specific annual energy consumption in heated area	kWh/m ²	242.02

5. Photos showing pre-project situation and orientation of building/object/facility



³ 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:Main plan (layout) of the building

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)	1,460
Type of system (grid tied, battery based)	Grid tied
Total installed capacity of the system (DC peak power) (kW)	27.6
Expected annual production (kWh/a)	39,380
PV Modules	
Individual capacity of a PV module (wattage)	345
Type of PV module (mono-crystalline / poly-crystalline)	M-Si
Number of PV modules, pcs.	80
Inverters	
Type of inverters (grid tied, hybrid, stand-alone)	Grid tied
Rated input power of inverters (kW)	30
Number of inverters, pcs.	1
Mounting structure	
Orientation of the system (south, southeast, southwest, etc.)	South, South-East
Tilt angle (degree)	30 ^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	80	160	84,000	12,800	6,720,000
Inverters	kW and pieces	30 kW, 1	2,575	1,352,000	2,575	1,352,000
Mounting structure	Sets	4	1,333	700,000	5,333	2,800,000
Cabling	Meter	300	1.1	600	330	180,000
Transmission line	-	-				
Battery	Pieces	0				
Transformer	Pieces	0				
Substation	-	0				
Auxiliary equipment	-					
TOTAL					21,051	11,052,000

9. Other costs

Description	Indicative costs for PV	
	EUR	AMD
Human resources	200	105,000
Structural survey (in case of roof mounted)	305	160,000
Geological survey (in case of ground mounted)		-
Technical design	1486	780,000
State expertise	99	52,000
Site supervision (technical and author supervision)	476	250,000
Installation works (labor)	295	155,000
Land and license acquisition		-
Other (please specify)	7429	3,900,000
TOTAL	10,290	5,402,000
Annual operation and maintenance costs	124	65,000

10. Grand total costs

	PV system
Euro	31,341
AMD	16,454,000

11. Expected results

	PV system	
Annual renewable energy generation, MWh ⁵	39.38	
Annual monetary savings, EUR/AMD	3,374	1,771,312
Annual CO ₂ emission reduction ⁶ , tCO ₂	8,742	

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.

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).

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 27.6 kW on the roof of the city hall of Kapan. The system consists of 80 PV modules with individual peak capacity of 345 W and will generate annually 39.4 MWh of electricity. It is expected that the new system will cover about 40% of annual electricity demand of the building. Installation of a system of a higher capacity is not possible because of limited roof space. Generated electricity is to be used for electrical heating of the house of culture. The total cost of the project is about 31.300 Euro.