

4.9 Annex 9 - Baseline Report

Municipality: Plovdiv
 Building code:
 Building: UHAT „Sv.Georgi“ EAD
 Clinic of Infectious Diseases, block 2
 Address: Bld. "Peshtersko shose" 66, Plovdiv
 Total floor area, m²: 1 277



Expected results	Value
Energy saved, MWh/year	334.98
Energy saved, €/year	13 623
CO ₂ emissions saved, tco ₂ /year	80.64
CAPEX, €	118 228
Simple payback period ¹ , year	8.68

¹ Simple payback including cost price of materials, labor, mechanization, profit and not including cost of finance.

4.9.1. Current status of the building

Infrastructure	Description
Commissioned	1958 year
Building structure	Solid reinforced concrete structure with one semi-underground and two overground floors. In the basement are located technical premises and storage rooms. On the first and the second floors is situated Ward for viral hepatitis – doctor's offices, hospital and service premises, bathrooms.
Facade walls	Basement - Concrete, inside plastered, outside with mosaic. Overground floors - masonry with solid brick, both sides plastered The visible condition of all facade walls is good, but without heat insulation.
Roof structures	Wooden structure with a roof of a wooden edging, covered with roof tiles. Unusable under-roof space. The visible condition of the roof is good, but without heat insulation.
Floor structures	Floor over non-heated semi-underground floor, without heat insulation.
Joinery	Wooden joined joinery (~ 90%) Double glazed PVC joinery (~ 10%)
Heating	Individual substation for heating, connected to power station of water vapour. Bad condition of the pipe-line system - insulation partially torn, leakage. Two-pipe system line and forced circulation. Radiators of cast iron, not fully functioning. There is no heat armature for regulation.
Domestic hot water	DHW feeding by boiler of water vapour through tank of 5 m ³ . The tank is situated in the basement. Insulation with torn places.
Electric appliances and lighting	Appliances, affecting and non-affecting the heating; Lighting with luminescent lamps and incandescent lamps.
Air conditioning and ventilation	There is no ventilating system. Few rooms conditioned by individual air-conditioners, split system.
Operational hours	Residents: 24 hours a day, 7 days a week, including holidays Heating: the same as residents

4.9.2. Current energy consumption

Energy	Heating			Electricity		DHW		Total		
	Year	Gcal/year	MWh/year	€/year	MWh/year	€/year	MWh/year	€/year	MWh/year	€/year
2012										
2013 ¹	229.41	266.81	15 243	95.92	9 264	38.10	2 177	400.83	26 684	
2014	162.66	189.18	10 604	70.82	6 382	38.10	2 136	298.10	19 122	
Average	196.04	227.99	12 924	83.37	7 823	38.10	2 156	349.46	22 903	

¹ Reference year

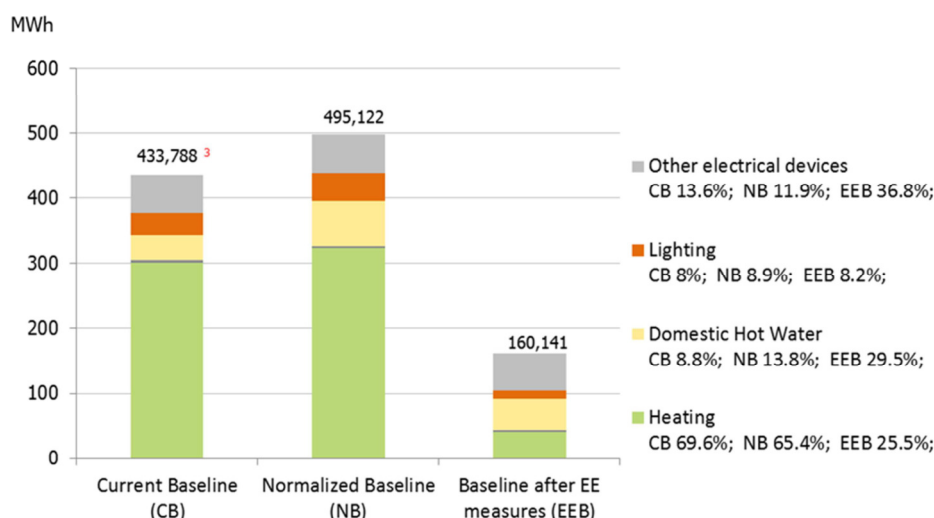
Actual prices of energy sources				
Nº	Energy source	Measure	Value	Consider since
1	Electricity	€/MWh	77.22	1/11/2015
2	Natural gas	€/MWh	36.29	1/1/2016
3	Central Heating Energy	€/MWh	35.20	1/10/2015

4.9.3. Analysis of the estimated energy savings

Energy saving measures		Energy saved ²			Capex	Pay-back
Nº	Discription	MWh/year	€/year	t co ₂ /year	€	year
1	Insulation of external walls	61.42	2 254	12.79	22 003	9.76
2	Roof insulation	43.24	1 587	9.00	10 725	6.76
3	ESM on basement	24.15	886	5.03	17 804	20.09
4	Joinery replacement	41.86	1 536	8.71	29 540	19.23
5	Switching the heating from local to DHS supply					
	- heating system renovation	112.78	4 139	19.93	32 849	7.85
	- change of energy source	-	44			
6	Switching the DHW from local to DHS supply					
	- connecting subsystem for DHW supply	20.87	757	0.06	2 544	3.15
	- change of energy source	-	52			
7	Lighting measure	30.67	2 368	25.12	2 764	1.17
Total		334.98	13 623	80.64	118 228	8.68

² The amount of the energy savings is calculated according to the normalized value of the base consumption.

4.9.4. Energy consumption share



Parameter			Baseline	
Nº	Discription	Measure	Current	Normalized ⁴
1	Internal temperature	°C	20.0	21.0
2	DHW consumption	l/m ²	578.0	1 034.0
3	Lighting functioning	%	80.0	100.0

³ The difference between the numbers arising from the invoices and the software comes by technological deviation in the degree-days, used in modelling. According the methodology approved by the norm.

⁴ Values come from the norm according to type and functioning of the building, number of persons inside, etc.

4.9.5. Energy saving measures - description

Energy saving measures	Activities	Measure	Price ¹ (€)	Quantity	Sum (€)
1. Insulation of external walls	Preliminary preparation of external walls	m ²	4.62	631	2 915
	Thermal insulation EPS 10 cm, flipping edges with safety profiles; plugging 8 pcs. / m ²	m ²	21.37	631	13 484
	Plastering two layers of "scratched" mineral plaster	m ²	6.29	631	3 969
	Collection, transport and disposal of construction waste to landfill up to 20 kilometers.	m ²	2.59	631	1 634
	Total ESM 1:				
2. Roof insulation	Mineral wool insulation 12 cm., covered with waterproof	m ²	11.44	639	7 310
	Collection, transport and disposal of construction waste to landfill up to 20 kilometers.	m ³	1.47	639	939
	Preliminary preparation of external walls	m ²	4.62	71	328
	Thermal insulation EPS 10 cm, flipping edges with safety profiles; plugging 8 pcs. / m ²	m ²	21.37	71	1 517
	Plastering two layers of "scratched" mineral plaster	m ²	6.29	71	447
	Collection, transport and disposal of construction waste to landfill up to 20 kilometers.	m ²	2.59	71	184
Total ESM 2:					10 725
3. ESM on basement	Preliminary preparation of external walls	m ²	4.62	123	568
	Thermal insulation EPS 10 cm, flipping edges with safety profiles; plugging 8 pcs. / m ²	m ²	21.37	123	2 629
	Plastering two layers of "scratched" mineral plaster	m ²	6.29	123	774
	Collection, transport and disposal of construction waste to landfill up to 20 kilometers.	m ²	2.59	123	319
	Preliminary preparation of ceiling of the basement	m ²	2.08	639	1 329
	Thermal insulation EPS 5 cm, covered with mineral plaster	m ²	17.82	639	11 387
	Collection, transport and disposal of construction waste to landfill up to 20 kilometers.	m ²	1.25	639	799
Total ESM 3:					17 804
4. Joinery replacement	Mounting PVC windows with double panes (one multigrade and one float glass), exterior and interior window panels and anti-mosquito nets to the opening parts	m ²	88.61	282	24 988
	Sealing, patching and flipping edges ; plastering and painting from inside	m ²	10.6	282	2 989
	Dismantling of old joinery, collection, transport and disposal of construction waste to landfill up to 20 kilometers.	m ²	5.54	282	1 562
Total ESM 4:					29 540

5. Switching the heating from local to DHS supply	Design of a new HVAC project for reconstruction - stage: technical level	m ²	0.75	1 277	958
	Dismantling of pipelines and radiators, iollection, transport and disposal of waste to landfill up to 20 kilometers	m ²	0.90	1 277	1 149
	Supply and installation of fan coils (Q heat / cool = 4,2 / 1,5kW) equipped with three-way valve for two-pipeline system	m ²	3.80	1 277	4 853
	Supply and mounting of a new pipeline system thermo-isolated for the heating system	m ²	16.70	1 277	21 326
	Supply and installation of pipelines for the condensate and connect the fan coil units to the internal electro grid	m ²	1.00	1 277	1 277
	Supply and installation of water collector and distributor with fittings and thermo isulation	m ²	1.00	1 277	1 277
	Supply and mounting of plasterboard decorations, mineral wadding isolated	m ²	0.40	1 277	511
	Supply and installation of a an automated system for the HVAC monitoring	m ²	1.10	1 277	1 405
	Charge new accession to the central heating	psc	93.82	1	94
	Total ESM 5:				
6. Switching the DHW from local to DHS supply	Connecting the subsystem to the existing DHW pipelines, thermo isolation of pipelines	m	55.00	35	1 925
	Dismantling of the existing boiler and pipeline connections, transport and disposal of waste to landfill up to 20 kilometers	m	15.00	35	525
	Charge new accession to the DHS	psc	93.82	1	94
	Total ESM 6:				
7. Lighting measure	Dismantling of luminaire, removing transformers and chokes	psc	2.81	70	197
	Removing fluorescent cigars, supply and mounting of LED cigars	psc	10.74	179	1 922
	Installation of luminaire back	psc	2.30	70	161
	Dismantling of incandescent lamp, supply and installation of energy saving lamp	psc	3.58	118	422
	Collection, transport and disposal of lighting waste to landfill up to 20 kilometers.	m ³	30.68	2	61
	Total ESM 7:				
Total:					118 228

¹ Cost assumptions are based on analyze of normal practice of local contractors and usage of the guide prices in construction - the last published edition (01.2016). Usage of trade marks is not permitted by the regulator. All the materials has to be chosen by their basic characteristics. All costs are considered at average level - neighter conservative, nor optimistic.

4.9.6 Information about investments and savings according to the measures applying

Energy efficient measures

Type of Measures	Investments (BGN)	Savings (kW/h)		Savings (BGN)	
		Electrical Energy	Heat energy	Electrical Energy	Heat energy
Insulation of external walls	43 034	614	60 804	93	4 316
Roof insulation	20 977	432	42 807	65	3 038
ESM on basement	34 821	241	23 907	36	1 697
Joinery replacement	57 774	419	41 437	63	2 941
Switching the heating from local to DHS supply	64 247	1 128	111 654	170	7 925
Switching the DHW from local to DHS supply	4 975		20 869		1 481
Lighting measure	5 406	30 670		4 632	
Total:	231 234	33 504	301 478	5 060	21 398
CO2 Savings		27.44	60.9		

Additional activities

Type of Measures	Investments (BGN)
Related to external walls ESM	4 303
Related to roof ESM	2 098
Related to basement ESM	3 482
Related to joinery replacement	5 777
Related to switching the heating from local to DHS supply	6 425
Related to switching the DHW from local to DHS supply	498
Related to Lighting ESM	541
Total:	23 123

Energy consumption

Items	Object
Type of object	hospital
Gross floor area (sq.m.)	1 277
Type of heat energy before the project	Natural gas
Type of heat energy after the project	Central Heating Energy
Class of the building before the project	F
Class of the building after the project	B

Energy Prices (BGN/kWh)	Before the project (historical)	After the project
Electrical energy	0.19	0.15
Heat Energy (type of fuel)	0.11	0.07
Example: Diesel		
Example: Gas		

Object 1	Pre-project Consumption		Normalized consumption		Consumption after the project	
	kWh	BGN	kWh	BGN	kWh	BGN
Total consumption	433 788	55 941	495 122	63 509	160 141	17 210
Electrical energy	96 805	18 285	106 070	20 035	72 566	10 994
Heat Energy	336 983	37 655	389 052	43 474	87 575	6 216