

4.7 Annex 7 - Baseline Report

Municipality: Plovdiv
 Building code:
 Building: UHAT „Sv.Georgi“ EAD
 Clinics of Nephrology, Pulmonology, Toxicology, Hemodialysis
 Address: Bld.“Vasil Aprilov” 15A, Plovdiv
 Total floor area, m²: 4 157



Expected results	Value
Energy saved, MWh/year	681.40
Energy saved, €/year	26 774
CO ₂ emissions saved, tco ₂ /year	136.47
CAPEX, €	225 880
Simple payback period ¹ , year	8.44

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

4.7.1. Current status of the building

Infrastructure	Description
Commissioned	1962 year
Building structure	Solid reinforced concrete structure with one semi-underground, three overground and one attic floors. In the basement are located premises for a substation, coffee with kitchen, storage rooms. On the first floor is situated the clinic of Toxicology, offices, lecture halls; on the second are Nephrology and Hemodialysis; on the third are Pulmonology and Occupational diseases.
Facade walls	Basement - reinforced concrete surrounding walls, both sides plastered. Overground floors - masonry of hollow 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. The visible condition of the roof is good, but without heat insulation. The lofts are used and heated.
Floor structures	Floor over heated semi-underground floor (~ 65%) Floor on the ground (~ 35%)
Joinery	Double glazed PVC joinery (~ 65%) Wooden joined, wooden double, wooden solid, metal with single glazing, metal solid (~ 35%)
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	The DHW system works with an 5 m ³ external boiler, heated up by power station of water vapour. Thermal isolation 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

4.7.2. Current energy consumption

Energy	Heating			Electricity		DHW		Total		
	Year	Gcal/year	MWh/year	€/year	MWh/year	€/year	MWh/year	€/year	MWh/year	€/year
	2012	249.29	289.93	13 609	250.02	23 156	143.60	6 740	683.55	43 505
	2013	235.06	273.37	12 824	327.03	31 462	146.60	6 736	747.00	51 022
	2014 ¹	282.32	328.34	15 140	145.97	11 123	143.60	6 622	617.91	32 885
	Average	255.56	297.21	13 858	241.01	21 914	144.60	6 699	682.82	42 471

¹ Reference year

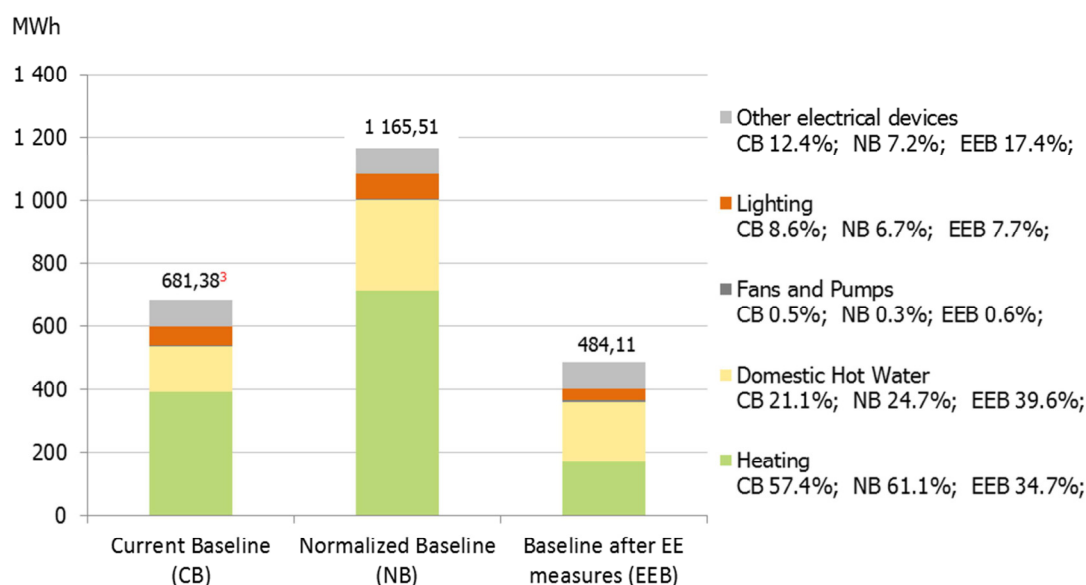
Actual prices of energy sources				
Nº	Energy source	Measure	Value	Consider since
1	Electricity	€/MWh	77.22	1/11/2015
2	Natural gas	€/MWh	36.29	1/1/2016
3	Central Heating Energy	€/MWh	35.20	1/10/2015

4.7.3. 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	158.39	5 748	45.34	54 990	9.57
2	Roof insulation	79.88	2 899	15.22	20 348	7.02
3	ESM on basement	19.10	693	9.58	2 999	4.33
4	Joinery replacement	69.35	2 517	14.66	25 873	10.28
5	Switching the heating from local to DHS supply					
	- heating system renovation	218.78	7 940	41.08	106 721	13.14
	- change of energy source	-	183			
6	Switching the DHW from local to DHS supply					
	- connecting subsystem for DHW supply	95.48	3 465	2.74	1 919	0.52
	- change of energy source	-	209			
7	Lighting measure	40.42	3 121	7.85	13 030	4.17
	Total	681.40	26 774	136.47	225 880	8.44

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

4.7.4. Energy consumption share



Parameter			Baseline	
Nº	Description	Measure	Current	Normalized ⁴
1	Internal temperature	°C	15.0	21.0
2	DHW consumption	l/m ²	605.0	1 210.0
3	Lighting functioning	%	67.7	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 norm according to type and functioning of the building, number of persons inside, etc.

4.7.5. Energy saving measures - description

Energy saving measures	Activities	Measure	Price (€)	Quantity	Sum (€)
1. Insulation of external walls	Preliminary preparation of external walls	m ²	4.62	1 577	7 286
	Thermal insulation EPS 10 cm, flipping edges with safety profiles; plugging 8 pcs. / m ²	m ²	21.37	1 577	33 700
	Plastering two layers of "scratched" mineral plaster	m ²	6.29	1 577	9 919
	Collection, transport and disposal of construction waste to landfill up to 20 kilometers.	m ²	2.59	1 577	4 084
	Total ESM 1:				

2. Roof insulation	Mineral wool insulation 14 cm., covered with plaster	m ²	11.44	1 144	13 087
	Collection, transport and disposal of construction waste to landfill up to 20 kilometers.	m ²	1.47	1 144	1 682
	Preliminary preparation of external walls	m ²	4.62	160	739
	Thermal insulation EPS 10 cm, flipping edges with safety profiles; plugging 8 pcs. / m ²	m ²	21.37	160	3 419
	Plastering two layers of "scratched" mineral plaster	m ²	6.29	160	1 006
	Collection, transport and disposal of construction waste to landfill up to 20 kilometers.	m ²	2.59	160	414
	Total ESM 2:				20 348
3. ESM on basement	Preliminary preparation of external walls	m ²	4.62	86	397
	Thermal insulation EPS 10 cm, flipping edges with safety profiles; plugging 8 pcs. / m ²	m ²	21.37	86	1 838
	Plastering two layers of "scratched" mineral plaster	m ²	6.29	86	541
	Collection, transport and disposal of construction waste to landfill up to 20 kilometers.	m ²	2.59	86	223
	Total ESM 3:				2 999
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	247	21 887
	Sealing, patching and flipping edges ; plastering and painting from inside	m ²	10.6	247	2 618
	Dismantling of old joinery, collection, transport and disposal of construction waste to landfill up to 20 kilometers.	m ²	5.54	247	1 368
	Total ESM 3:				25 873
5. Switching the heating from local to DHS supply	Design of a new HVAC project for reconstruction - stage: technical level	m ²	0.75	4 157	3 118
	Dismantling of pipelines and radiators, collection, transport and disposal of waste to landfill up to 20 kilometers	m ²	0.90	4 157	3 741
	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	4 157	15 797
	Supply and mounting of a new pipeline system thermo-isolated for the heating system	m ²	16.70	4 157	69 422
	Supply and installation of pipelines for the condensate and connect the fan coil units to the internal electro grid	m ²	1.00	4 157	4 157
	Supply and installation of water collector and distributor with fittings and thermo insulation	m ²	1.00	4 157	4 157
	Supply and mounting of plasterboard decorations, mineral wadding isolated	m ²	0.40	4 157	1 663
	Supply and installation of a an automated system for the HVAC monitoring	m ²	1.10	4 157	4 573
	Charge new accession to the central heating	psc	93.82	1	94
	Total ESM 4:				106 721
6. Switching the DHW from local to DHS supply	Connecting the subsystem to the existing DHW pipelines, thermo isolation of pipelines	m	55.00	25	1 375
	Dismantling of the existing boiler and pipeline connections, transport and disposal of waste to landfill up to 20 kilometers	m	15.00	30	450
	Charge new accession to the DHS	psc	93.82	1	94
	Total ESM 5:				1 919
76. Lighting measure	dismantling of luminaire, removing transformers and chokes	psc	2.81	315	885
	removing fluorescent cigars, supply and mounting of LED cigars	psc	10.74	1 041	11 180
	installation of luminaire back	psc	2.30	315	725
	dismantling of incandescent lamp, supply and installation of energy saving lamp	psc	3.58	50	179
	Collection, transport and disposal of lighting waste to landfill up to 20 kilometers.	m ³	30.68	2	61
	Total ESM 5:				13 030
Total:				225 880	

4.7.6 Information about investment and savings according measures applied

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	107 551		158 391		11 242
Roof insulation	39 798		79 881		5 670
ESM on basement	5 865		19 100		1 356
Joinery replacement	50 604		69 353		4 922
Switching the heating from local to DHS supply	208 728		218 779		15 885
Switching the DHW from local to DHS supply	3 753		95 475		7 186
Lighting measure	25 485	40 421		6 105	
Total:	441 784	40 421	640 979	6 105	46 261
CO2 Savings, t CO2		7.85	128.62		

Additional activities

Type of Measures	Investments (BGN)
Related to external walls ESM	10 755
Related to roof ESM	3 980
Related to basement ESM	587
Related to joinery replacement	5 060
Related to switching the heating from local to DHS supply	20 873
Related to switching the DHW from local to DHS supply	375
Related to Lighting ESM	2 549
Total:	44 178

Energy consumption

Items	Object
Type of object	hospital
Gross floor area (sq.m.)	4 157
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	D
Class of the building after the project	B

Energy Prices (BGN/kWh)	Before the project (historical)	After the project
Electical energy	0.15	0.15
Heat Energy (type of fuel)	0.09	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	681 379	70 043	1 165 509	114 818	484 108	44 329
Electrical energy	146 004	21 760	164 940	24 582	124 519	18 806
Heat Energy	535 375	48 283	1 000 569	90 236	359 589	25 523