

4.4 Annex 4 - Baseline Report

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



Expected results	Value
Energy saved, MWh/year	406.55
Energy saved, €/year	16 547
CO ₂ emissions saved, tco ₂ /year	96.00
CAPEX, €	109 458
Simple payback period ¹ , year	6.61

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

4.4.1. 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 (~ 70%) Double glazed PVC joinery (~ 30%)
Heating	Individual substation for heating, connected to power station of hot water . 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 hot water supply is implemented by a plate heat exchanger and a water heat accumulator. Bad condition of the system - some areas are with compromised thermal insulation, which doesn't provide the legally required quantity of hot water
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

4.4.2. 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	265.64	308.94	14 508	81.29	1 175	39.80	1 869	430.03	17 552	
2014	180.03	209.37	9 689	60.02	1 350	39.80	1 842	309.19	12 882	
Average	222.83	259.16	12 099	70.66	1 262	39.80	1 855	369.61	15 217	

¹ Reference year

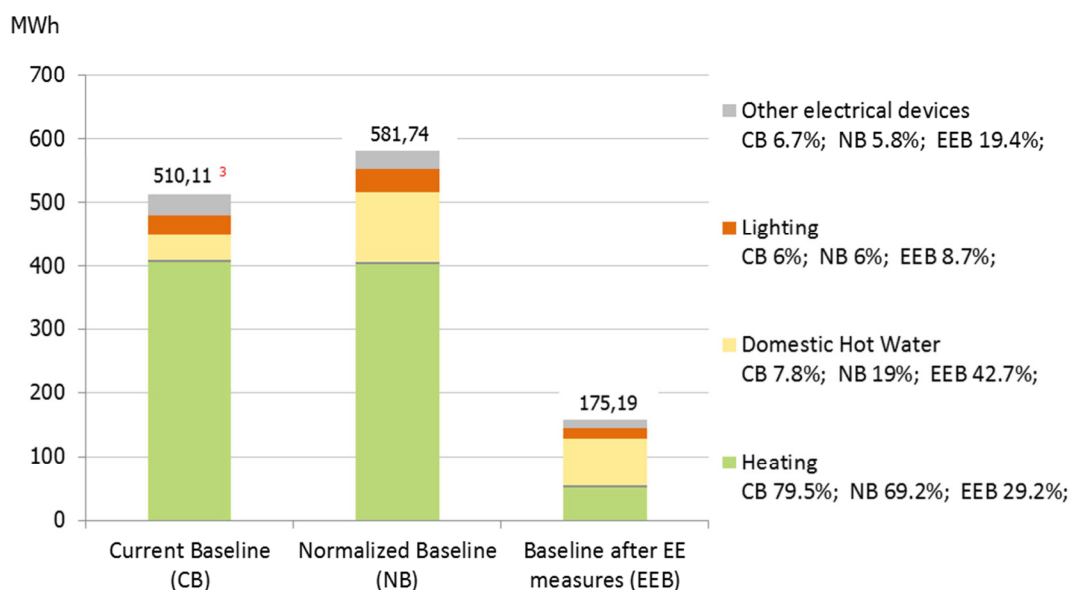
Actual prices of energy sources				
Nº	Energy source	Measure	Value	Consider since
1	Electricity	€/MWh	77.22	1/11/2015
2	Natural gas	€/MWh	36.29	1/1/2016
3	Central Heating Energy	€/MWh	35.20	1/10/2015

4.4.3. Analysis of the estimated energy savings

Nº	Discription	Energy saved ²			Capex	Pay-back
		MWh/year	€/year	t CO ₂ /year	€	year
1	Insulation of external walls	68.90	2 644	16.08	22 003	8.32
2	Roof insulation	48.43	1 859	11.31	10 725	5.77
3	ESM on basement	27.01	1 036	6.31	17 804	17.19
4	Joinery replacement	39.02	1 498	9.11	22 521	15.03
5	Switching the heating from local to DHS supply					
	- heating system renovation	167.65	6 434	36.21	32 849	4.98
	- change of energy source	-	161			
6	Switching the DHW from local to DHS supply					
	- connecting subsystem for DHW supply	35.54	1 290	0.60	1 919	1.40
	- change of energy source	-	82			
7	Lighting measure	20.00	1 544	16.38	1 637	1.06
	Total	406.55	16 547	96.00	109 458	6.61

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

4.4.4. Energy consumption share



Parameter			Baseline	
Nº	Discription	Measure	Current	Normalized ⁴
1	Internal temperature	°C	23.4	23.4
2	DHW consumption	l/m ²	585.0	1 620.0
3	Lighting functioning	%	85.0	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.

4.4.5. 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. / m2	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. / m2	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:				
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. / m2	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:				
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	215	19 051
	Sealing, patching and flipping edges ; plastering and painting from inside	m ²	10.6	215	2 279
	Dismantling of old joinery, collection, transport and disposal of construction waste to landfill up to 20 kilometers.	m ²	5.54	215	1 191
	Total ESM 4:				
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, collection, 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 insulation	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	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 6:				1 919
7. Lighting measure	Dismantling of luminaire, removing transformers and chokes	psc	2.81	29	81
	Supply and installation of new luminaires	psc	23.26	29	675
	Supply and mounting of LED cigars	psc	10.74	58	623
	Dismantling of incandescent lamp, supply and installation of energy saving lamp	psc	3.58	55	197
	Collection, transport and disposal of lighting waste to landfill up to 20 kilometers.	m ³	30.68	2	61
	Total ESM 7:				1 637
Total:					109 458

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 - neither conservative, nor optimistic.

4.4.6. 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	3 514	65 382	531	4 641
Roof insulation	20 977	2 470	45 961	373	3 262
ESM on basement	34 821	1 378	25 632	208	1 819
Joinery replacement	44 048	1 990	37 030	301	2 628
Switching the heating from local to DHS supply	64 247	8 550	159 099	1 307	11 591
Switching the DHW from local to DHS supply	3 753	0	35 542		2 682
Lighting measure	3 202	19 996		3 020	
Total:	214 082	37 898	368 646	5 740	26 623
CO2 Savings		31.04	64.96		

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	4 405
Related to switching the heating from local to DHS supply	6 425
Related to switching the DHW from local to DHS supply	375
Related to Lighting ESM	320
Total:	21 408

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
Electical energy	0.03	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	510 109	41 426	581 735	47 730	226 473	20 204
Electrical energy	85 337	2 412	89 642	2 533	51 283	7 770
Heat Energy	424 772	39 014	492 093	45 197	175 190	12 434