

4.10 Annex 10 - Baseline Report

Municipality: Plovdiv
 Building code:
 Building: UHAT „Sv.Georgi“ EAD
 Clinics for Neurology and Psychiatry
 Address: Bld.“Vasil Aprilov” 15A, Plovdiv
 Total floor area, m²: 3 793



Expected results	Value
Energy saved, MWh/year	273.37
Energy saved, €/year	11 584
CO ₂ emissions saved, tco ₂ /year	31.73
CAPEX, €	102 207
Simple payback period ¹ , year	8.82

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

4.10.1. Current status of the building

Infrastructure	Description
Commissioned	1962 year
Building structure	Structure with two corpuses, both of reinforced concrete, with united volumes. Main corpus has one semi-underground and three overground floors. The adjoined corpus has three overground floors. On the first floor is situated Department of Psychiatry and Medical Psychology; on the second is Department of Common Neurology; on the third is Department of vascular brain diseases. In the lofts are situated offices, storage rooms, archive, dressingrooms and bathrooms.
Facade walls	Facade walls - masonry of solid bricks, insides plastered. Outside insulated with EPS 8 cm. The visible condition of all facade walls is excellent.
Roof structures	Both corpuses have a roof of a wooden edging (insulated between beams), covered with roof tiles. The visible condition of the roof is good. The lofts are used and heated.
Basement structures	The main corpus is over a heated semi-underground floor. The adjoined corpus is on the ground.
Joinery	Double glazed PVC joinery
Heating	Individual station for heating, connected to power station of water vapour. Bad condition of the pipe-line system - insulator 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 2.5 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

4.10.2. Current energy consumption

Energy	Heating			Electricity		DHW		Total	
	Gcal/year	MWh/year	€/year	MWh/year	€/year	MWh/year	€/year	MWh/year	€/year
2012	263.93	306.95	14 410	173.78	15 968	208.80	9 802	689.53	40 180
2013	215.43	250.55	11 756	97.59	9 379	208.80	9 797	556.94	30 933
2014 ¹	259.91	302.27	13 938	104.20	7 391	208.80	9 628	615.27	30 958
Average	246.42	286.59	13 368	125.19	10 913	208.80	9 743	620.58	34 023

¹ Reference year

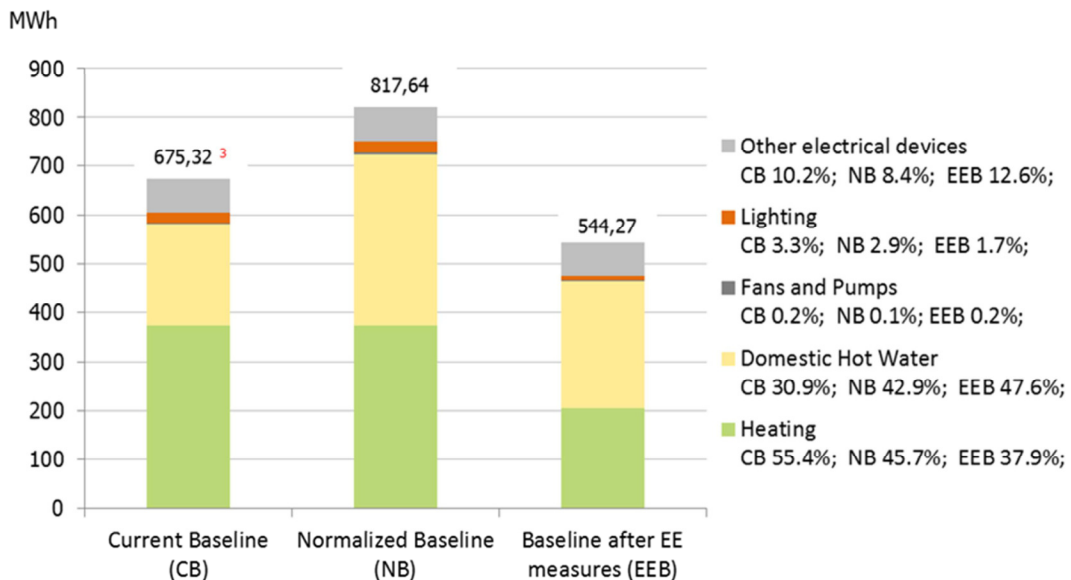
Actual prices of energy sources				
Nº	Energy source	Measure	Value	Consider since
1	Electricity	€/MWh	77.22	1/11/2015
2	Natural gas	€/MWh	36.29	1/1/2016
3	Central Heating Energy	€/MWh	35.20	1/10/2015

4.10.3. 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	Switching the heating from local to DHS supply					
	- heating system renovation	167.39	6 328	24.21	97 384	14.19
	- change of energy source	-	536			
2	Switching the DHW from local to DHS supply					
	- connecting subsystem for DHW supply	91.53	3 321	-4.31	1 144	0.32
	- change of energy source	-	282			
3	Lighting measure	14.45	1 116	11.84	3 679	3.30
Total		273.37	11 584	31.73	102 207	8.82

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

4.10.4. Energy consumption share



Parameter			Baseline	
Nº	Description	Measure	Current	Normalized ⁴
1	Internal temperature	°C	23.5	23.5
2	DHW consumption	l/m ²	1114.0	1 871.0
3	Lighting functioning	%	93.5	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.

4.10.5. Energy saving measures - description

Energy saving measures	Activities	Measure	Price ¹ (€)	Quantity	Sum (€)
1. Switching the heating from local to DHS supply	Design of a new HVAC project for reconstruction - stage: technical level	m ²	0.75	3 793	2 845
	Dismantling of pipelines and radiators, iollection, transport and disposal of waste to landfill up to 20 kilometers	m ²	0.90	3 793	3 414
	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	3 793	14 413
	Supply and mounting of a new pipeline system thermo-isolated for the heating system	m ²	16.70	3 793	63 343
	Supply and installation of pipelines for the condensate and connect the fan coil units to the internal electro grid	m ²	1.00	3 793	3 793
	Supply and installation of water collector and distributor with fittings and thermo isolation	m ²	1.00	3 793	3 793
	Supply and mounting of plasterboard decorations, mineral wadding isolated	m ²	0.40	3 793	1 517
	Supply and installation of a an automated system for the HVAC monitoring	m ²	1.10	3 793	4 172
	Charge new accession to the central heating	psc	93.82	1	94
	Total ESM 1:				
2. Switching the DHW from local to DHS supply	Connecting the subsystem to the existing DHW pipelines, thermo isolation of pipelines	m	55.00	15	825
	Dismantling of the existing boiler and pipeline connections, transport and disposal of waste to landfill up to 20 kilometers	m	15.00	15	225
	Charge new accession to the DHS	psc	93.82	1	94
	Total ESM2:				
3. Lighting measure	Dismantling of luminaires (whole units)	psc	2.81	104	292
	Removing fluorescent cigars, supply and mounting of LED cigars	psc	10.74	280	3 007
	Installation of luminaire back	psc	2.30	104	239
	Dismantling of incandescent lamps, supply and installation of energy saving lamps	psc	3.58	22	79
	Collection, transport and disposal of lighting waste to landfill up to 20 kilometers	m ³	30.68	2	61
	Total ESM 3:				
Total:					102 207

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.

4.10.6 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
Switching the heating from local to DHS supply	190 467	6 193	161 196	977	12 448
Switching the DHW from local to DHS supply	2 237		91 528		7 048
Lighting measure	7 195	14 454		2 183	
Total:	199 899	20 647	252 724	3 160	19 497
CO2 Savings		16.91	14.82		

Additional activities

Type of Measures	Investments (BGN)
Related to switching the heating from local to DHS supply	19 047
Related to switching the DHW from local to DHS supply	224
Related to Lighting ESM	720
Total:	19 990

Energy consumption

Items	Object
Type of object	hospital
Gross floor area (sq.m.)	3793
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	B
Class of the building after the project	B

Energy Prices (BGN/kWh)	Before the project (historical)	After the project
Electical energy	0.14	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	661 464	64 128	803 824	77 040	544 267	44 969
Electrical energy	92 136	12 782	93 631	12 989	79 177	11 958
Heat Energy	569 328	51 346	710 193	64 050	465 090	33 011