

## 4.5 Annex 5 - Baseline Report

Municipality: Plovdiv  
 Building code:  
 Building: UHAT „Sv.Georgi“ EAD  
 Clinic of Infectious Diseases, block 3  
 Address: Bld. "Peshtersko shose" 66, Plovdiv  
 Total floor area, m<sup>2</sup>: 2 184



Expected results	Value
Energy saved, MWh/year	370.46
Energy saved, €/year	14 842
CO <sub>2</sub> emissions saved, tco <sub>2</sub> /year	82.79
CAPEX, €	123 856
Simple payback period <sup>1</sup> , year	8.34

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

### 4.5.1. 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 of intestinal and common infections – 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 (~ 95%) Double glazed PVC joinery (~ 5%)
Heating	Individual substation for heating, connected to power station of hot water . Bad condition of the pipe-line system - insulaton 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

#### 4.5.2. 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 <sup>1</sup>	225.56	262.33	12 330	95.92	1 386	62.00	2 914	420.25	16 630	
2014	253.34	294.63	13 538	70.82	1 593	62.00	2 849	427.45	17 981	
Average	239.45	278.48	12 934	83.37	1 490	62.00	2 882	423.85	17 305	

<sup>1</sup> Reference year

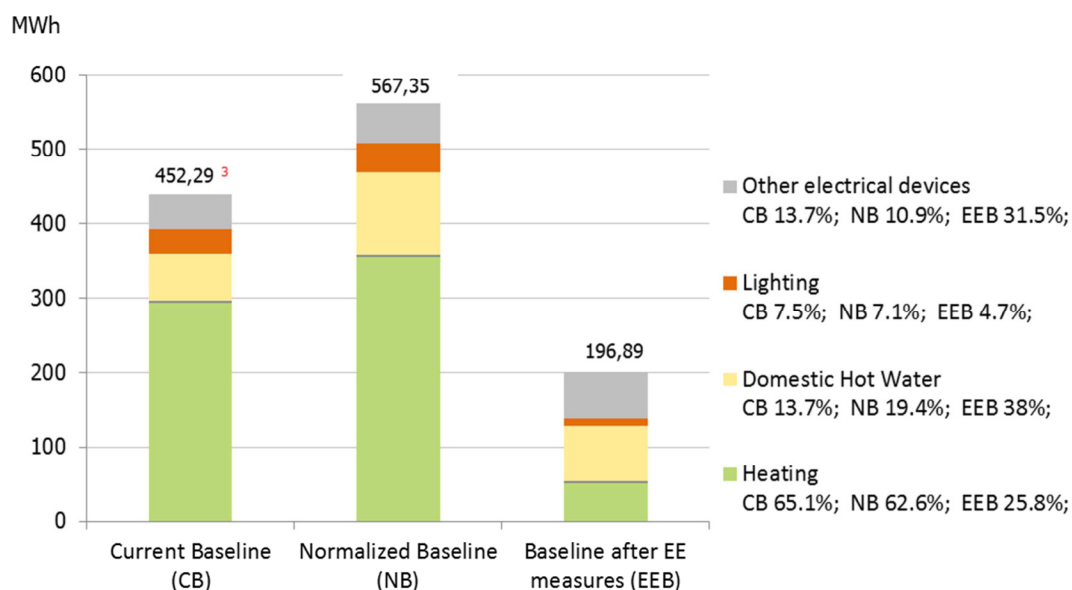
Actual prices of energy sources				
Nº	Energy source	Measure	Value	Consider since
1	Electricity	€/MWh	77.22	1/11/2015
2	Natural gas	€/MWh	36.29	1/1/2016
3	Central Heating Energy	€/MWh	35.20	1/10/2015

#### 4.5.3. Analysis of the estimated energy savings

Energy saving measures		Energy saved <sup>2</sup>			Capex	Pay-back
Nº	Discription	MWh/year	€/year	t co <sub>2</sub> /year	€	year
1	Insulation of external walls	64.25	2 331	12.98	22 421	9.62
2	Roof insulation	50.00	1 815	10.10	9 398	5.18
3	ESM on basement	26.50	962	5.35	19 791	20.57
4	Joinery replacement	41.78	1 516	8.44	29 540	19.49
5	Switching the heating from local to DHS supply					
	- heating system renovation	121.58	4 412	20.09	37 440	8.38
	- change of energy source	-	55			
6	Switching the DHW from local to DHS supply					
	- connecting subsystem for DHW supply	35.55	1 290	0.60	1 919	1.40
	- change of energy source	-	82			
7	Lighting measure	30.80	2 379	25.23	3 347	1.41
	<b>Total</b>	<b>370.46</b>	<b>14 842</b>	<b>82.79</b>	<b>123 856</b>	<b>8.34</b>

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

#### 4.5.4. Energy consumption share



Parameter			Baseline	
No	Description	Measure	Current	Normalized <sup>4</sup>
1	Internal temperature	°C	19.0	21.0
2	DHW consumption	l/m <sup>2</sup>	799.0	1 421.0
3	Lighting functioning	%	82.0	100.0

<sup>3</sup> 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.

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

#### 4.5.5. Energy saving measures - description

Energy saving measures	Activities	Measure	Price <sup>1</sup> (€)	Quantity	Sum (€)
1. Insulation of external walls	Preliminary preparation of external walls	m <sup>2</sup>	4.62	643	2 971
	Thermal insulation EPS 10 cm, flipping edges with safety profiles; plugging 8 pcs. / m <sup>2</sup>	m <sup>2</sup>	21.37	643	13 741
	Plastering two layers of "scratched" mineral plaster	m <sup>2</sup>	6.29	643	4 044
	Collection, transport and disposal of construction waste to landfill up to 20 kilometers.	m <sup>2</sup>	2.59	643	1 665
	<b>Total ESM 1:</b>				
2. Roof insulation	Mineral wool insulation 12 cm., covered with waterproof	m <sup>2</sup>	11.44	728	8 328
	Collection, transport and disposal of construction waste to landfill up to 20 kilometers.	m <sup>3</sup>	1.47	728	1 070
	<b>Total ESM 2:</b>				

3. ESM on basement	Preliminary preparation of external walls	m <sup>2</sup>	4.62	126	582
	Thermal insulation EPS 10 cm, flipping edges with safety profiles; plugging 8 pcs. / m <sup>2</sup>	m <sup>2</sup>	21.37	126	2 693
	Plastering two layers of "scratched" mineral plaster	m <sup>2</sup>	6.29	126	793
	Collection, transport and disposal of construction waste to landfill up to 20 kilometers.	m <sup>2</sup>	2.59	126	326
	Preliminary preparation of ceiling of the basement	m <sup>2</sup>	2.08	728	1 514
	Thermal insulation EPS 5 cm, covered with mineral plaster	m <sup>2</sup>	17.82	728	12 973
	Collection, transport and disposal of construction waste to landfill up to 20 kilometers.	m <sup>2</sup>	1.25	728	910
	<b>Total ESM 3:</b>				<b>19 791</b>
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 <sup>2</sup>	88.61	282	24 988
	Sealing, patching and flipping edges ; plastering and painting from inside	m <sup>2</sup>	10.6	282	2 989
	Dismantling of old joinery, collection, transport and disposal of construction waste to landfill up to 20 kilometers.	m <sup>2</sup>	5.54	282	1 562
	<b>Total ESM 4:</b>				<b>29 540</b>
5. Switching the heating from local to DHS supply	Design of a new HVAC project for reconstruction - stage: technical level	m <sup>2</sup>	0.75	1 456	1 092
	Dismantling of pipelines and radiators, iollection, transport and disposal of waste to landfill up to 20 kilometers	m <sup>2</sup>	0.90	1 456	1 310
	Supply and installation of fan coils (Q heat / cool = 4,2 / 1,5kW) equipped with three-way valve for two-pipeline system	m <sup>2</sup>	3.80	1 456	5 533
	Supply and mounting of a new pipeline system thermo-isolated for the heating system	m <sup>2</sup>	16.70	1 456	24 315
	Supply and installation of pipelines for the condensate and connect the fan coil units to the internal electro grid	m <sup>2</sup>	1.00	1 456	1 456
	Supply and installation of water collector and distributor with fittings and thermo insulation	m <sup>2</sup>	1.00	1 456	1 456
	Supply and mounting of plasterboard decorations, mineral wadding isolated	m <sup>2</sup>	0.40	1 456	582
	Supply and installation of a an automated system for the HVAC monitoring	m <sup>2</sup>	1.10	1 456	1 602
	Charge new accession to the central heating	psc	93.82	1	94
<b>Total ESM 5:</b>				<b>37 440</b>	
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
	<b>Total ESM 6:</b>				<b>1 919</b>
7. Lighting measure	Dismantling of luminaire, removing transformers and chokes	psc	2.81	59	166
	Supply and installation of new luminaires	psc	23.26	59	1 372
	Supply and mounting of LED cigars	psc	10.74	138	1 482
	Dismantling of incandescent lamp, supply and installation of energy saving lamp	psc	3.58	74	265
	Collection, transport and disposal of lighting waste to landfill up to 20 kilometers.	m <sup>3</sup>	30.68	2	61
	<b>Total ESM 7:</b>				<b>3 347</b>
<b>Total:</b>				<b>123 856</b>	

<sup>1</sup> 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.

4.5.6. 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	43 852		64 245		4 560
Roof insulation	18 382		49 998		3 549
ESM on basement	38 707		26 504		1 881
Joinery replacement	57 774		41 784		2 966
Switching the heating from local to DHS supply	73 227		121 578		8 737
Switching the DHW from local to DHS supply	3 753		35 546		2 682
Lighting measure	6 545	30 802		4 652	
<b>Total:</b>	<b>242 240</b>	<b>30 802</b>	<b>339 655</b>	<b>4 652</b>	<b>24 376</b>
<b>CO2 Savings</b>		<b>25.23</b>	<b>57.56</b>		

Additional activities

Type of Measures	Investments (BGN)
Related to external walls ESM	4 385
Related to roof ESM	1 838
Related to basement ESM	3 871
Related to joinery replacement	5 777
Related to switching the heating from local to DHS supply	7 323
Related to switching the DHW from local to DHS supply	375
Related to Lighting ESM	655
<b>Total:</b>	<b>24 224</b>

Energy consumption

Items	Object
Type of object	hospital
Gross floor area (sq.m.)	2184
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	E
Class of the building after the project	B

Energy Prices (BGN/kWh)	Before the project (historical)	After the project
Electrical 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
<b>Total consumption</b>	<b>452 294</b>	<b>35 473</b>	<b>567 345</b>	<b>45 655</b>	<b>196 886</b>	<b>19 714</b>
Electrical energy	95 888	2 710	102 074	2 885	71 272	10 798
Heat Energy	356 406	32 763	465 271	42 771	125 614	8 916