

### 4.13 Annex 13 - Baseline Report

Municipality: Plovdiv  
 Building code:  
 Building: UHAT „Sv.Georgi“ EAD  
 Corpus for food preparation, base 2  
 Address: Bld. "Peshtersko shose" 66, Plovdiv  
 Total floor area, m<sup>2</sup>: 3 358



Expected results	Value
Energy saved, MWh/year	651.02
Energy saved, €/year	24 284
CO <sub>2</sub> emissions saved, tco <sub>2</sub> /year	118.75
CAPEX, €	295 659
Simple payback period <sup>1</sup> , year	12.18

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

#### 4.13.1. Current status of the building

Infrastructure	Description
Commissioned	1986 year
Building structure	Solid reinforced concrete structure with two joined corpuses, one overground floor each. In the first corpus are located storage rooms, cooling and installation premises, stuff rooms. In the second are situated main (hot) kitchen, confectionary kitchen and service premises.
Facade walls	Reinforced concrete panel with insulation layer, inside sides plastered, outside covered with limestone cladding. The visible condition of all facade walls is good, but with insufficient heat insulation.
Roof structures	Reinforced concrete panel, inside plastered, top covered with heat and water proofing. Large area of roof windows. The visible condition of the roof is good, but with insufficient heat insulation.
Floor structures	Floor on the ground.
Joinery	Wooden joined joinery (~ 60%) Metal joinery (~ 40%)
Heating	Individual substation of water for heating, connected to power station of water vapour. Automation of heat regulation by thermo regulator and three-way valve. Two-pipe system line and forced circulation.
Domestic hot water	DHW feeding by plate heat exchanger. Automation of DHW regulation.
Electric appliances and lighting	Appliances, affecting and non-affecting the heating; Lighting with luminescent lamps and incandescent lamps.
Air conditioning and ventilation	An existing general exchange exhaust and forced ventilation of part of the premises.
Operational hours	Residents: 24 hours a day, 7 days a week, including holidays Heating: the same as residents

#### 4.13.2. Current energy consumption

Energy	Heating			Electricity		DHW		Total	
	Year	Gcal/year	MWh/year	€/year	MWh/year	€/year	MWh/year	€/year	MWh/year
2012	421.10	489.74	23 845	161.49	14 771	19.00	925	670.23	39 541
2013	350.35	407.46	19 091	139.32	13 440	19.00	890	565.78	33 421
2014 <sup>1</sup>	588.42	684.33	31 436	118.43	7 664	19.00	874	821.76	39 974
Average	453.29	527.18	24 791	139.75	11 958	19.00	896	685.92	37 645

<sup>1</sup> Reference year

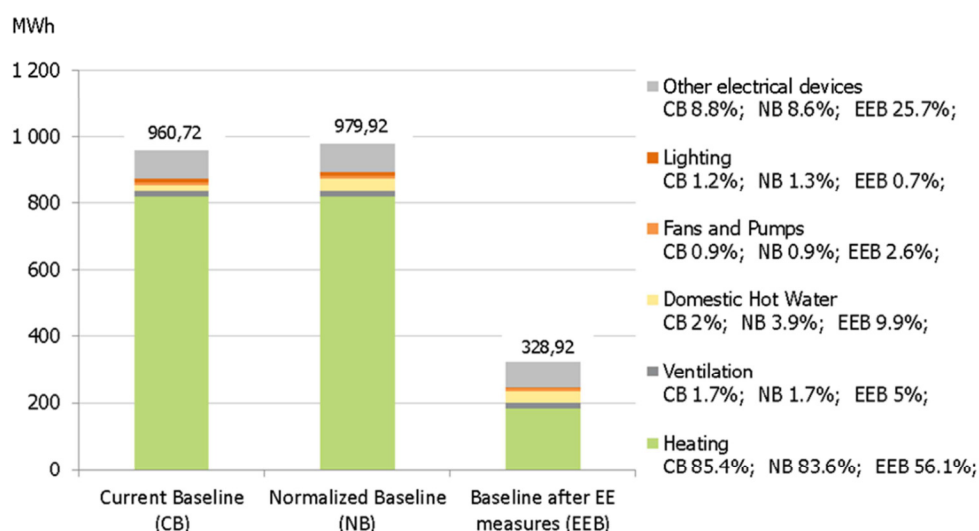
Actual prices of energy sources				
Nº	Energy source	Measure	Value	Consider since
1	Electricity	€/MWh	77.22	1/11/2015
2	Natural gas	€/MWh	36.29	1/1/2016
3	Central Heating Energy	€/MWh	35.20	1/10/2015

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

Energy saving measures		Energy saved <sup>2</sup>			Capex	Pay-back
Nº	Description	MWh/year	€/year	t co <sub>2</sub> /year	€	year
1	Insulation of external walls	31.59	1 146	6.38	28 034	24.45
2	Roof insulation	96.69	3 509	19.53	114 919	32.75
3	Joinery replacement	148.36	5 384	29.97	63 269	11.75
4	Switching the heating from local to DHS supply					
	- heating system renovation	358.72	13 018	56.23	86 227	6.52
	- change of energy source	-	201			
5	Switching the DHW from local to DHS supply					
	- connecting subsystem for DHW supply	5.36	195	-1.78	869	3.78
	- change of energy source	-	35			
6	Lighting measure	10.30	795	8.43	2 342	2.94
Total		651.02	24 284	118.75	295 659	12.18

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

#### 4.13.4. Energy consumption share



Parameter			Baseline	
No	Description	Measure	Current	Normalized <sup>4</sup>
1	Internal temperature	°C	22.4	22.4
2	DHW consumption	l/m <sup>2</sup>	127.0	254.0
3	Lighting functioning	%	92.2	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.

#### 4.13.5. Energy saving measures - description

Energy saving measures	Activities	Measure	Price <sup>1</sup> (€)	Quantity	Sum (€)
1. Insulation of external walls	Preliminary preparation of internal walls	m <sup>2</sup>	2.12	1 221	2 589
	Thermal insulation mineral wool 7.5 cm, covered with plasterboard	m <sup>2</sup>	10.97	1 221	13 394
	Flipping, plastering and painting the adjacent areas	m <sup>2</sup>	8.55	1 221	10 440
	Collection, transport and disposal of construction waste to landfill up to 20 kilometers.	m <sup>2</sup>	1.32	1 221	1 612
	<b>Total ESM 1:</b>				<b>28 034</b>
2. Roof insulation	Preliminary preparation of roof	m <sup>2</sup>	0.72	3 358	2 418
	Thermal insulation EPS 8 cm on roof, covered with plaster	m <sup>2</sup>	19.28	3 358	64 742
	Stucco 4 cm., reinforced with welded mesh	m <sup>2</sup>	4.25	3 358	14 272
	Two layered waterproof, second layer with powder	m <sup>2</sup>	8.67	3 359	29 123
	Collection, transport and disposal of construction waste to landfill up to 20 kilometers.	m <sup>2</sup>	1.30	3 358	4 365
	<b>Total ESM 2:</b>				<b>114 919</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	604	53 520
	Sealing, patching and flipping edges ; plastering and painting from inside	m <sup>2</sup>	10.6	604	6 402
	Dismantling of old joinery, collection, transport and disposal of construction waste to landfill up to 20 kilometers.	m <sup>2</sup>	5.54	604	3 346
	<b>Total ESM 4:</b>				<b>63 269</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	3 358	2 519
	Dismantling of pipelines and radiators, iollection, transport and disposal of waste to landfill up to 20 kilometers	m <sup>2</sup>	0.90	3 358	3 022
	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	3 358	12 760
	Supply and mounting of a new pipeline system thermo-isolated for the heating system	m <sup>2</sup>	16.70	3 358	56 079
	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	3 358	3 358
	Supply and installation of water tank and distributor with fittings and thermo insulation for the condensate	m <sup>2</sup>	1.00	3 358	3 358
	Supply and mounting of plasterboard decorations, mineral wadding isolated	m <sup>2</sup>	0.40	3 358	1 343
	Supply and installation of a an automated system for the HVAC monitoring	m <sup>2</sup>	1.10	3 358	3 694
	Charge new accession to the central heating	psc	93.82	1	94
	<b>Total ESM 5:</b>				<b>86 227</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	10	550
	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
	<b>Total ESM 6:</b>				<b>869</b>
7. Lighting measure	Dismantling of luminaires (whole units)	psc	2.81	60	169
	Supply and installation of new luminaires	psc	23.26	60	1 396
	Supply and mounting of LED cigars	psc	10.74	60	644
	Dismantling of incandescent lamps, supply and installation of energy saving lamps	psc	3.58	20	72
	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>2 342</b>
<b>Total:</b>					<b>295 659</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.

#### 4.13.6. Information about investment and savings according measures applied

##### Energy efficient measures

Type of Measures	Investments (BGN)	Savings (kWh)		Savings (BGN)	
		Electrical Energy	Heat energy	Electrical Energy	Heat energy
Insulation of external walls	54 830		31 590		2 242
Roof insulation	224 763		96 690		6 863
Joinery replacement	123 743		148 360		10 530
Switching the heating from local to DHS supply	168 644		358 720		25 461
Switching the DHW from local to DHS supply	1 699		5 360		380
Lighting measure	4 580	10 300		1 556	
<b>Total:</b>	<b>578 260</b>	<b>10 300</b>	<b>640 720</b>	<b>1 556</b>	<b>45 476</b>
<b>CO2 Savings</b>		<b>8.43</b>	<b>110.32</b>		

##### Additional activities

Type of Measures	Investments (BGN)
Related to external walls ESM	5 483
Related to roof ESM	22 476
Related to basement ESM	12 374
Related to switching the heating from local to DHS supply	16 864
Related to switching the DHW from local to DHS supply	170
Related to Lighting ESM	458
<b>Total:</b>	<b>57 825</b>

Energy consumption

Items	Object
Type of object	hospital service
Gross floor area (sq.m.)	3 358
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
Electrical energy	0.13	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>960 719</b>	<b>91 323</b>	<b>979 924</b>	<b>93 087</b>	<b>328 920</b>	<b>32 305</b>
Electrical energy	121 465	15 790	122 348	15 905	111 920	16 903
Heat Energy	839 254	75 533	857 576	77 182	217 000	15 402