

4.12 Annex 12 - Baseline Report

Municipality: Plovdiv
 Building code:
 Building: UHAT „Sv.Georgi“ EAD
 Former AG clinic. Oncology and Hematology
 Address: Bld.“Vasil Aprilov” 15A, Plovdiv
 Total floor area, m²: 4 361



| Expected results | Value |
|---|---------|
| Energy saved, MWh/year | 652.23 |
| Energy saved, €/year | 26 556 |
| CO ₂ emissions saved, tco ₂ /year | 141.89 |
| CAPEX, € | 266 297 |
| Simple payback period ¹ , year | 10.03 |

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

4.12.1. Current status of the building

| Infrastructure | Description |
|----------------------------------|--|
| Commissioned | 1936 year |
| Building structure | Solid reinforced concrete structure with two corpuses – one with three overground and one attic floors, other with one semi-underground, four overground and one attic floors. In the basement are located premises for a substation, storage rooms, doctor's offices, bathrooms. On the first and the second floors is situated the clinic of Oncology and Hematology; on the third is the Early rehabilitation; in the lofts are situated administration, classrooms, lecture halls, kitchen and bathrooms |
| Facade walls | Basement - stonework, inside plastered, without heat insulation. Overground floors - masonry with solid brick, both sides plastered, without heat insulation. |
| Roof structures | Wooden structure with a roof of a wooden edging, covered with roof tiles. Attics (57%), unusable space (43%) |
| Floor structures | Floor over heated semi-underground floor (~ 43%) Floor on the ground (~ 57%) |
| Joinery | Wooden joined joinery (~ 20%) Double glazed PVC joinery (~ 63%) Metal joinery with single glazing (~ 17%) |
| 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 |

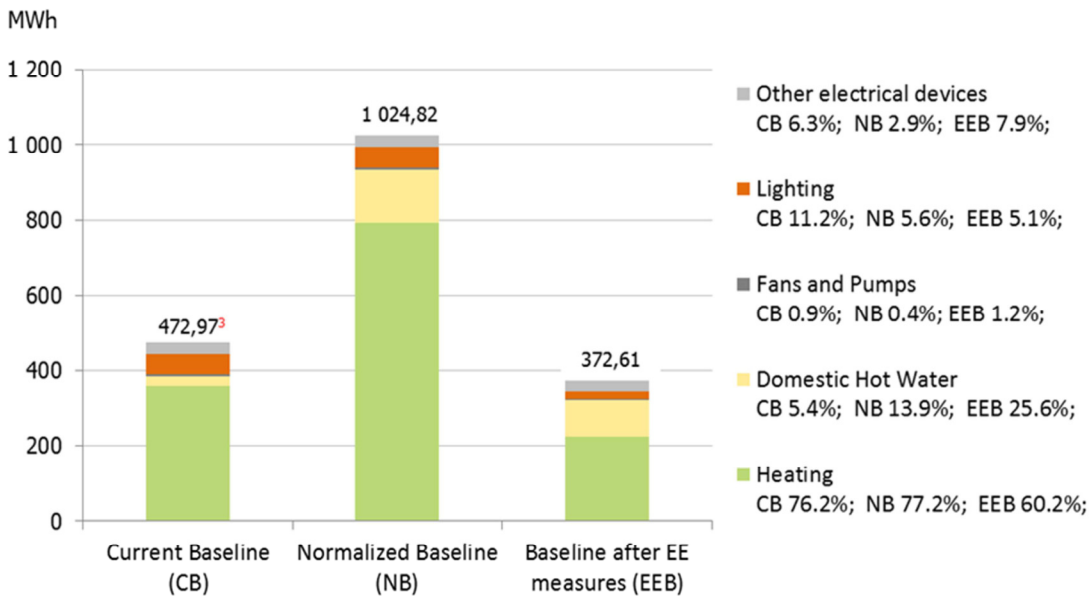
4.12.2. Current energy consumption

| Energy | Heating | | | Electricity | | DHW | | Total | |
|-------------------|-----------|----------|--------|-------------|--------|----------|--------|----------|--------|
| | Gcal/year | MWh/year | €/year | MWh/year | €/year | MWh/year | €/year | MWh/year | €/year |
| 2012 | 238.29 | 277.13 | 13 009 | 70.74 | 6 398 | 25.51 | 1 197 | 373.38 | 20 604 |
| 2013 | 221.44 | 257.54 | 12 082 | 87.53 | 8 407 | 25.51 | 1 197 | 370.58 | 21 686 |
| 2014 ¹ | 251.90 | 292.96 | 13 509 | 96.25 | 6 744 | 25.51 | 1 176 | 414.72 | 21 429 |
| Average | 237.21 | 275.88 | 12 867 | 84.84 | 7 183 | 25.51 | 1 190 | 386.23 | 21 240 |

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 |

4.12.3. Analysis of the estimated energy savings



| Nº | Parameter | Discription | Measure | Baseline | |
|----|----------------------|------------------|---------|----------|-------------------------|
| | | | | Current | Normalized ⁴ |
| 1 | Internal temperature | °C | 13.6 | 21.0 | |
| 2 | DHW consumption | l/m ² | 100.0 | 559.0 | |
| 3 | Lighting functioning | % | 92.2 | 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.

4.12.5. Energy saving measures - description

| Energy saving measures | Activities | Measure | Price (€) | Quantity | Sum (€) |
|---|--|----------------|-----------|----------|----------------|
| 1. Isolation of external walls | Preliminary preparation of external walls | m ² | 4.62 | 2 066 | 9 545 |
| | Thermal insulation EPS 10 cm, flipping edges with safety profiles; plugging 8 pcs. / m2 | m ² | 21.37 | 2 066 | 44 150 |
| | Plastering two layers of "scratched" mineral plaster | m ² | 6.29 | 2 066 | 12 995 |
| | Collection, transport and disposal of construction waste to landfill up to 20 kilometers. | m ² | 2.59 | 2 066 | 5 351 |
| | Total ESM 1: | | | | 72 041 |
| 2. Roof isolation | Preliminary preparation of ceiling | m ² | 4.14 | 651 | 2 695 |
| | Thermin insulation mineral wool 12 cm., covered with plasterboard | m ² | 21.45 | 1 111 | 23 836 |
| | Plastering and painting | m ² | 16.72 | 1 111 | 18 576 |
| | Collection, transport and disposal of construction waste to landfill up to 20 kilometers. | m ² | 2.35 | 1 111 | 2 611 |
| | Total ESM 2: | | | | 47 718 |
| 3. ESM on basement | Preliminary preparation of external walls | m ² | 4.62 | 21 | 97 |
| | Thermal insulation EPS 10 cm, flipping edges with safety profiles; plugging 8 pcs. / m2 | m ² | 21.37 | 21 | 449 |
| | Plastering two layers of "scratched" mineral plaster | m ² | 6.29 | 21 | 132 |
| | Collection, transport and disposal of construction waste to landfill up to 20 kilometers. | m ² | 2.59 | 21 | 54 |
| | Total ESM 3: | | | | 732 |
| 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: | | | | 22 521 |
| 5. Switching the heating from local to DHS supply | Design of a new HVAC project for reconstruction - stage: technical level | m ² | 0.75 | 4 464 | 3 348 |
| | Dismantling of pipelines and radiators, iollection, transport and disposal of waste to landfill up to 20 kilometers | m ² | 0.90 | 4 464 | 4 018 |
| | 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 | 4 464 | 16 963 |
| | Supply and mounting of a new pipeline system thermo-isolated for the heating system | m ² | 16.70 | 4 464 | 74 549 |
| | Supply and installation of pipelines for the condensate and connect the fan coil units to the internal electro grid | m ² | 1.00 | 4 464 | 4 464 |
| | Supply and installation of water collector and distributor with fittings and thermo isulation | m ² | 1.00 | 4 464 | 4 464 |
| | Supply and mounting of plasterboard decorations, mineral wadding isolated | m ² | 0.40 | 4 464 | 1 786 |
| | Supply and installation of a an automated system for the HVAC monitoring | m ² | 1.10 | 4 464 | 4 910 |
| | Charge new accession to the central heating | psc | 93.82 | 1 | 94 |
| | Total ESM 5: | | | | 114 595 |

| | | | | | |
|---|--|----------------|-------|-----|----------------|
| 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 luminaires (whole units) | psc | 2.81 | 196 | 551 |
| | Supply and installation of new luminaires | psc | 20.20 | 196 | 3 959 |
| | Supply and mounting of LED cigars | psc | 10.74 | 196 | 2 105 |
| | Dismantling of incandescent lamps, supply and installation of energy saving lamps | psc | 3.58 | 26 | 93 |
| | Collection, transport and disposal of lighting waste to landfill up to 20 kilometers | m ³ | 30.68 | 2 | 61 |
| Total ESM 7: | | | | | 6 769 |
| Total: | | | | | 266 297 |

4.12.6 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 | 140 901 | 5 024 | 162 457 | 759 | 11 531 |
| Roof insulation | 93 328 | 1 876 | 60 662 | 283 | 4 306 |
| ESM on basement | 1 432 | 204 | 6 601 | 31 | 469 |
| Joinery replacement | 44 048 | 2 797 | 90 442 | 422 | 6 419 |
| Switching the heating from local to DHS supply | 224 129 | 7 095 | 229 400 | 1 072 | 17 299 |
| Switching the DHW from local to DHS supply | 3 753 | | 47 366 | | 3 565 |
| Lighting measure | 13 240 | 38 290 | | 5 783 | |
| Total: | 520 831 | 55 286 | 596 928 | 8 350 | 43 589 |
| CO2 Savings | | 45.28 | 96.61 | | |

Additional activities

| Type of Measures | Investments (BGN) |
|---|-------------------|
| Related to external walls ESM | 14 090 |
| Related to roof ESM | 9 333 |
| Related to basement ESM | 143 |
| Related to joinery replacement | 4 405 |
| Related to switching the heating from local to DHS supply | 22 413 |
| Related to switching the DHW from local to DHS supply | 375 |
| Related to Lighting ESM | 1 324 |
| Total: | 52 083 |

Energy consumption

| Items | Object |
|--|------------------------|
| Type of object | hospital |
| Gross floor area (sq.m.) | 4 361 |
| 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 | C |
| Class of the building after the project | A |

| Energy Prices (BGN/kWh) | Before the project (historical) | After the project |
|----------------------------|---------------------------------|-------------------|
| Electrical 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 | 472 966 | 47 243 | 1 024 823 | 97 817 | 372 611 | 30 694 |
| Electrical energy | 97 921 | 13 419 | 115 074 | 15 769 | 53 058 | 8 013 |
| Heat Energy | 375 045 | 33 824 | 909 749 | 82 048 | 319 553 | 22 681 |