

## Energy concept summary

**Title of the energy concept:** Replacement of HVAC system in one building, with extended energy savings initiatives (change of lights and implementation of Free Cooling solution in one switching room which is used as small data centre)

Topic area choice and topic marking in blue:

- ( ) **Building** e.g. Insulation, change of windows, Low-energy-buildings
- ( X ) **Electrical energy** e.g. **Light**, Compressed air, Electrical drives, **Cooling machines**, Load management
- ( X ) **Heat** e.g. Heating, Process heat, Heat recovery, **Air conditioning**, Combined heat & power
- ( ) **Renewable energy** e.g. Solar technology, Wood-fired plants, Biogas, Geothermal energy
- ( ) **Management** e.g. Energy buying, Contracting, Emission trade, Energy data management systems



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## Energy concept description:

Main aspect for this investment is to reduce energy costs in the building, as well as to assure future proof technologies which will radically reduced CO<sub>2</sub> emission from the installed equipment.

Target is to reduce operational costs, mainly with reconstruction of HVAC system in the building, as well as with replacing standard lights with LED technology (200 lights as a first phase) and install free cooling solution in switching room (small data center).

Changing of old heating system will have positive effect on environment protection, reducing risks from potential fires or accidents, as well as reducing costs for regular check and certificates for the exhaust from the heating oil.

The building which is considered in this project is comprised of a basement, ground floor and two floors and it serves for business-administrative operations. Hence, the basement has a surface size at the base of cca 660m<sup>2</sup> and is located completely underground, the ground floor has a surface size at the base of cca 449m<sup>2</sup>, and the first and the second floor have a surface size at the base of cca 507m<sup>2</sup> each. The building has a square shape. The façade of the building from the external visible side is also almost completely made of bricks and windows.

At this moment building is occupied with 60% in the office space, with intention to become fully occupied by YE2015.

Equipment proposed for implementation within this Project (reconstruction of HVAC system) is high efficiency reversible air/water heat pumps, producer Blue Box, and type Geysir Max 60.



The evaluation of the energy efficiency of the equipment refers to testing and rating by defining the SEER (Seasonal Energy Efficiency Rating) and SCOP (Seasonal Coefficient of Performance) of each equipment. Calculations are done as per IPLV (integrated Part Load Value) and considering European method for calculation of seasonal coefficients.

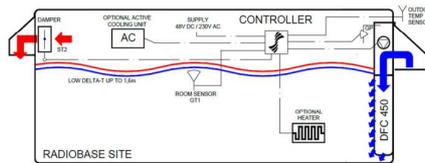
Pilot project is considered for replacing of all office lights on first and second floors of the building. Existing standard office lights (36W) are planned to be replaced with LED lights (5W).

Total number of lights which are subject for replacement is 200. Thus, calculation for lights replacement is done on quantity of 200 lights only.



In one room located on the ground floor, there is one switching room (small data center), with installed equipment which provides IT&Network services for telecommunication provider. With this project modification of installed cooling system is considered, with free cooling solution from Dantherm (type DFC450). The Dantherm DFC 450 (Displacement Free Cooling) is a slim passive cooling unit utilizing the displacement free air cooling technology. The unit is designed to remove excess heat from small rooms with electronic equipment. The DFC450 is the perfect choice when installed in a small room for electronic equipment with stagnant air. Because of the displacement technology, the DFC is even more energy efficient than a traditional free cooling unit. Due to a very low air flow and fan speed, the DFC operates with a very low noise level.

**DISPLACEMENT FREE COOLING**



**Results:**

CO2 reduction = 383 tons/yearly (from all systems considered in this project)

The estimated OPEX savings is 55.211 EUR per year, coming mainly from change of technology and energy efficiency systems.

The estimated CAPEX requirements for whole project are 102.890 EUR, out of which:

- 98.000 EUR for HVAC system (payment distributed in two years, related to fulfillment of milestones - after delivery of equipment and after installation of the equipment and acceptance of the system);
- 2.400 EUR for lights replacement;
- 2.490 EUR for free cooling solution.

	<p>The NPV is 115.399 EUR. IRR is 21,9 %. The discounted payback period is 4,2 Years.</p> <p>Period considered in this financial calculation is 10 years. WACC (Weighted Average Cost Of Capital) rate is 5%, used from real business calculation. Businesses often discount cash flows at WACC to determine the Net Present Value (NPV) of a project.</p> <p>Chance of implementation: <input checked="" type="checkbox"/> high   <input type="checkbox"/> middle   <input type="checkbox"/> low or date of implementation</p>
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