

## Energy concept summary

### Title of the energy concept: Modernization of an old heating system in an industrial scale greenhouse

Topic area choice and topic marking in blue:

- ( ) **Building** e.g. Insulation, change of windows, Low-energy-buildings
- ( ) **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



Company: Vardar A.D. – Gradsko  
 Branch and NACE-Code(s): mixed farming, A 1.5.0  
 Products/Services: greenhouse food production  
 No of employees: 200  
 Name of energy concept producer: Trajko Ajtov  
 Participant in EUREM No.:

### Energy concept description:

One of the weakest points in the company's greenhouse food production cycle is the high consumption of heating oil to fuel the boilers that heat the areas under greenhouse. The reason for this is the aged heating boilers/burners system which are over 35 years old and thus are conservatively taken efficient in the 75-80% range from the fuel energy. The age of the heaters are the main reason for this deficiency from an energy consumption standpoint. The fuel consumption of this aged setup is significant – when planting is conducted in extremely low temperatures ( $< -5^{\circ}$  C if persistent for 5+ days) the consumption of heating oil is  $>500.000$  Kg/boiler or  $> 5.478$  MWh/year). This situation can be fundamentally improved by simply modernizing the heating boilers and burners which will have a  $>94\%$  efficiency. With additional energy optimization processes, significant savings in heating costs can be achieved that are expected to reach  $>14\%$  on an annual level.



### Results:

Energy saving potential [kWh/a]: **1 076 223**  
 Energy source: Heating Oil  
 Cost reduction potential [Euro/year]: **45 857**  
 CO<sub>2</sub>- saving potential [t/a]: **312,105**  
 (please fill in conversion factor: xy kg CO<sub>2</sub> per kWh)

Investment costs [Euro]: **53 848**  
 Pay-back time [Years]: **1,17**  
 Chance of implementation: **H**  
 (H) high (M) middle (L) low