

THESES

- 1 I have concluded that the energy we get from energy corps, requires approximately two orders of magnitude larger area than we can use by concentrating solar radiation.
- 2 I have established by calculation it is possible to store approximately one order of magnitude larger amount of thermal energy in solid material than in water at atmospheric pressure. That is why higher temperature level can be achieved in solid material than in water.
- 3 I have established the relative heat losses of the same shape thermal energy storages can be reduced by enlargement of their size.
 - 3.1 I have mathematically demonstrated the dependence of the rate of cooling (heating) on the specific (relative) surface of body using the Newton's law of cooling.
- 4 I have determined and classified what technical characters and parameters have to be considered at the proper planning and realization of thermal energy storage and I have determined the relationships of these characters and parameters.
- 5 I have developed a new planning method for reducing of relative heat losses of thermal energy storages wherein not only the thickness of thermal insulation material but also the size of storage is a variable.
 - 5.1 I have characterised the heat storages and I have defined their basic, operating and using characters. The basic characters play the roles of the individual's characters in the genetic algorithm.
 - 5.2 I have created a method and computer software, which can calculate the using characters of heat storages from the basic and operating characters.
 - 5.3 I have created the formula of objective function, which is suitable for the selection of the size of heat storages and their insulation thickness from economical aspect in the exploitation of solar energy.
 - 5.4 I have created a method and computer software which uses the genetic algorithm for the optimization of the scaling of heat storage and the heat insulation thickness. The method considers the size-dependent specific surface in the calculation.
- 6 I have proposed a new storage technology in the exploitation of solar energy. The natural or artificially formed solid material storage should be prepared in large size because of its relative heat loss should be low and this storage can be operated on the high temperature level ($>100^{\circ}\text{C}$) because of the temperature range (ΔT) can be wide as well.