



DETERMINATION OF COST-EFFECTIVE PIPELINES INSULATION OF SOLAR THERMAL SYSTEM

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ABSTRACT

Solar radiation intensity in the Baltic region is lower in comparison with the average European values. The average solar radiation intensity reaches 1100 kWh/m² per year in Baltic region. And outdoor air temperature range is below average values in Europe. Range of outdoor air temperature in the Baltic region is -3 °C in winter and +16 °C in summer. Therefore, there is a particular need to optimize the solar thermal system in the Baltic region.

A certain proportion of the solar thermal system generated energy is consumed as the heat loss in pipes between the solar energy absorbing devices to the heat-accumulation tank.

Pipeline isolation of solar thermal system is necessary for both outdoor and indoor pipes. Outdoor heat pipe isolation reduces systems heat losses in the environment. While, indoor heat pipe isolation reduces value of unnecessary energy distribution indoors in the summer period.

The amount of pipeline heat energy losses dependence on the pipeline isolation type of solar thermal system was determined with the PolySun simulation program models.

The most popular heat pipe insulation materials in Baltic region were inspected and compared. They were compared and shown in table form by the thermal conductivity coefficient and the price.

The amount of absorbing energy value and heat losses are calculated and displayed in the graphic form.

As a result the method was created. The method can determine most cost-effective solar thermal systems pipe insulation type.

Keywords: Renewable Energy; Solar thermal systems; efficiency increasing.