

POTENTIAL OF SHALLOW GEOTHERMAL ENERGY IN SLOVENIA

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Forum topics	<input checked="" type="checkbox"/> Energy in 21st Century	<input type="checkbox"/> Cultural Heritage in Digital World
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Abstract: (250 to 500 words: for each heading use the bullet points or narrative - the submission including graphics should not exceed one page)

Problems - Issues / Challenges-Needs	<p>Geothermal energy is a renewable source of energy. One of many options is the use of shallow geothermal energy. This energy is stored in the form of warmth under the Earth's surface to 300 or 400 meters of depth. We exploit it with the help of geothermal heat pumps. Those strip the warmth out of the underground water in the case of water-water, or it strips the warmth in the case of earth-water and exploits it to the object where it warms the places. For the deprivation of water open-loop and closed-loop systems are needed. In the case of underground water pumping a well is used that works like an open system, in which the main parts are two holes. One is used to pump water and other for returning of the used water back into the source. In case of dispossession of the heat out of the rocks earth panels are built-in borehole collectors or horizontal collectors. By the deciding for the manner of gathering it is important to consider the situation in the nature (are there any wells, aquifers, lakes or streams), is there enough space to do an excavation, is there access for excavating a hole, is the earth moderate enough for the excavation and so on. The course of the transition of the heat is happening in the heat pump through its component parts. The refrigerant, that took the heat, travels through the evaporator, compressor and condenser, where its state of matter is changed, it ends in an expansion valve, where it cools down so it can begin to start stripping the heat again. The process repeats itself. The produced energy is used for heating, cooling, ventilation and air-conditioning of rooms, also in production processes. In the article we show the potential of using shallow geothermal energy in Slovenia</p>
Solutions - Methods / Results - Findings	<p>Shallow geothermal energy is present everywhere and constantly. There is no possibility that, due to weather or political conditions, there will be a break in its delivery. There is also no need for fuel and waste transportation. There are also no air discharges. We do not need storage and storage for energy products.</p> <p>In general application, that for 1 kW of electric power input we receive additional 3 kW of thermal power from the ground and we heat with total heating power of 4 kW. This efficiency is increasing with the development of technologies. Following the trend of current growth, the pumps installed in 2020 will already achieve the seasonal efficiency factor SPF = 5.</p> <p>Shallow geothermal energy comes from the building and its own grounds, and the payment that we pay for the part of the energy invested, remains at home.</p> <p>Shallow geothermal energy is suitable for new buildings as well as renovation of new and older buildings. The setting in the building requires very small space, the operation is quiet, and the technology of the operation of geothermal heat pumps is comfortable, reliable and enables long operation, for 30 years and even more.</p>
Novelty - Value / Relevance to ...	<p>Shallow geothermal energy in renovations and new constructions always appears as an example of advanced renewable energy sources. In the article we present concrete solutions for the exploitation of shallow geothermal energy, while at the same time we present the good practices and potential that Slovenia has in the exploitation of shallow geothermal energy. Good practices in the use of geothermal energy from individual countries have a wider social significance in the efficient use of renewable energy sources.</p>
Forum statement	...

Keywords: (up to 5 keywords)

Shallow geothermal energy; Geothermal heat pump; Well; borehole collector; Groundwater

