THE HARNESSING OF GEOTHERMAL FIELDS WITH GAS-CONTAINING WATERS IN UKRAINE

SHURCHKOV A.V.

Institute of Engineering Thermophysics of the Ukrainian National Academy of Sciences, Kyiv, Ukraine
03057, Kyiv, Zhelyabova str., 2a, e-mail: geoterm@ittf.recl.com

Presently there are 114 explored geothermal fields in Ukraine whose waters contain free and dissolved gaseous fuel. The gas content in the thermal waters of these fields at normal conditions averages between 1-5 cub. m/ 1 cub. m water (temperature 50°C - 90°C). According to preliminary estimates the power generating facilities of total of around 1200 MW thermal and 500 MW electric capacity could be constructed on the basis of there fields.

The technology for utilization of geothermal field with gas-containing waters is proposed. The technology implies gas separation from the extracted waters. The separated gas is fired in power-generating units and the degassed water is fed into the geothermal heat-supply systems. The cooled thermal water is re-injected into the thermal collector.

The technology has been so far realized in Ukraine on two geothermal fields, namely: Czongar (Kherson region) and Medvedevka (Republic of Crimea) in the form of experimental demonstration units.

The main technical characteristics and economic factors of the units are presented in the table below.

Table 1. Main technical characteristics and economic factors of the experimental co-generating units

Index name	Name of unit	
	Settlement of Medvedevka	Settlement of Czongar
1. Time of commissioning	2001 year	2000 year
2. Installed thermal capacity, MW	1.2	1.4
3. Installed electric capacity, kW	100	120
4. Number of production wells	1	1
5. Number of re-injection wells	1	1
6. Gas content, cub. m gas/cub. m water	1	1.2
7. Thermal water temperature, °C	70	75
8. Average depth of a well, m	1800	1800
9. Capital construction costs, USD	62880	66010
10. Production cost of 1 kWh of electricity, USD	0.005	0.005
11. Production cost of 1 MWh of heat	3.7	3.6
12. Payback period at consumer price rates of 0.03 USD/KWh electric and 10.0 USD/MWh thermal, years	5.1	4.9
13. Annual economy of conditional fuel, ton	430	500

Conclusions

The economic viability of the proposed technology for the exploitation of geothermal fields with gas-containing thermal waters has been proved.