

# MINE WATER FOR HEATING AND COOLING USING GEOTHERMAL HEAT PUMP SYSTEMS<sup>1</sup>

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**Abstract:** In many regions of the world, abandoned mines represent a voluminous source of water that could be utilized for heating and cooling using geothermal heat pump systems. For example, a single coal seam in Pennsylvania and West Virginia contains 5.1 trillion liters of water. The volume of water discharging from this seam totals 326,000 liters/min, which is sufficient to heat and cool 17,000 homes. Based on current energy prices, geothermal heat pump systems using mine water could reduce annual costs for heating by 65% and cooling by 50% over conventional methods (natural gas or heating oil and standard air conditioning).

**Additional Key Words:** Abandoned underground mines, flooded deep mines, beneficial use

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