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AQUIFER THERMAL ENERGY STORAGE (ATES) – Review of Principles, Significance and Feasibility of ATES Applications in Neogene Strata from the Vienna Basin.

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The City of Vienna is committed to become climate-neutral by the 2040. Its district heating grid (DHC), with a pipe length of over 1,300 Km connects more than 400,000 households. This large DHC grid size provides the scope for large-scale application of geothermal energy, such as the current field development of the Aderklaa Conglomerate by Wien Energie & OMV. Besides the conventional low-enthalpy geothermal applications, Aquifer Thermal Energy Storage is deemed another important building block in the decarbonization process, as vast amount of thermal energy can be stored & harvested in and from the subsurface, using energy that otherwise would have been lost.

The study outlines the status of the search for ATES suitable strata in the Vienna Basin through interpretation of a proprietary modern 3D seismic survey and a large dataset from oil & gas wells.

Although most hydrocarbon prospective areas are situated in different parts of the Vienna Basin, application of sedimentological and sequence-stratigraphic principles enabled extrapolation of the interpretation into the study area with limited well control. Geological concepts are proposed for three distinct Neogene sequences, each representing a specific depositional system that contains a defined number of architectural elements. With this approach the presence, distribution and geometry of the potential ATES aquifers has been assessed. Additionally, core & wireline log data from offset wells have been used to calculate reservoir properties. By integrating all disciplines and data, Gross Depositional Environment (GDE) maps have been created. These maps reflect the subsurface potential for ATES applications and will steer the upcoming lead & prospect generation.

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