

Madrid Basin District Heating Potential

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The area surrounding Madrid City constitutes one of the most favourable medium-low temperature geothermal environments identified to date in Spain.

Madrid Basin geothermal potential was discovered in 1980 when an oil well drilled by Shell demonstrated temperatures of 88 °C and 150 °C at 1,700 m and 3,400 m depth respectively. Petratherm EspaZa applied in 2006 for a geothermal exploration license of 290 km² over the most prospective areas. The tenement was awarded in November 2007.

Geologically, the Madrid basin occupies the northern part of the Tajo sedimentary basin, and is filled with fluvial and lacustrine tertiary deposits. Next to the northern margin of this basin, the thickness of sediments reaches 4,000 m. Sediments are thrust against crystalline basement rocks, mainly granites and gneisses which delineate the North Madrid Sierras (Central System). These thrust structures are deep parallel faults trending SSW-NNE.

The low temperature geothermal reservoir was defined by four exploratory wells drilled in the 1980s at four locations namely, Pradillo (the original Shell oil well), San Sebastian de los Reyes, Tres Cantos and Geomadrid 1, these wells have identified a dependable geothermal resource, hosted in a tertiary, clastic, consolidated sandstone reservoir consisting of a thick multilayered sequence (200-800m) with temperatures ranging from 70 ° to 90 °C, overlying a Mesozoic sequence. The reservoir is located under the city of Madrid and Petratherm EspaZa intends to feed partially the heat demand of the City with the development of geothermal district heating technology (GDH).

The lower, medium temperature reservoir is located along the contact between the Mesozoic Cretaceous limestone and the fractured granite that constitutes the basement. A reservoir temperature of 156 °C was measured at 3,400 m. This lower reservoir is being investigated for combined power and heat production (CPH).