



PETRATHERM LIMITED
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Spain Update - Madrid District Heating

8 MW district heating project nearing completion of feasibility stage

Petratherm España is advancing its 8 MW Madrid Geothermal District Heating project (GDH) under the Cooperative Agreement with the Spanish and Madrid regional governments.

Through that Agreement a sum of €98,000 (AUD \$140,000) is being provided by the Spanish government to assist the feasibility stage of the project, which is now nearing completion.

The Madrid GDH project has been highlighted as one of six renewable energy projects of interest within the Madrid Regional Government's Renewable Energy Cluster, which is seeking to advance renewable energy projects in the Madrid region.

The Madrid GDH project is planned to be the first application of geothermal district heating in the Madrid region and will seek to provide a foundation to expand such applications across Petratherm España's large tenement north of the city (refer figure overleaf).

Discussions are underway with a potential JV partner

Petratherm España is concurrently engaged in discussions with a major European Utility to assess joint venture arrangements and to optimize the final project design for the GDH project.

The preferred engineering design incorporates the innovative use of heat pumps to maximize the use of the geothermal source and a grid design to allow cascading supply of heat to users (from highest heat requirements first). This novel cascading structure requires a smaller target demand to allow for optimization of grid investment and requires dealing with only one major customer, the Autonomous University of Madrid, for the heat off-take agreement.

The optimal commercial project structure is also being reviewed to ensure that participation within the project best reflects the risk position of the parties, as well as the skills and capabilities each party brings to the project.

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It is planned that the final project design be jointly (with the JV partner) presented to the Spanish Government to secure federal government grant support required to make the project commercially attractive. The Spanish Federal and Madrid Regional governments have acknowledged that the project offers the best opportunity to demonstrate Spain's first deep geothermal energy development. Discussions with all parties are continuing with a resolution expected prior to the end of this calendar year.

Discussions are also progressing with the Madrid Regional Government in respect of obtaining all necessary permits and approvals to allow the project to proceed.



GeoMadrid GDH project showing investigation permit boundary, existing and useable well (GeoMadrid 1) and close proximity of the primary customer – the Autonomous University.

About Petratherm España and the Madrid GDH project

Petratherm Limited owns a 93% share of Petratherm España and the balance of 7% is held by Prehenita, a Spanish specialist geological consulting firm.

The Madrid GDH project aims to produce heat and not electricity and is therefore not covered by Petratherm's España's MoU with Enel Green Power (subsidiary of a large European Utility that is world leader in geothermal electricity production).

A brief summary of the key project parameters are as follows;

- Thermal capacity of geothermal heat exchanger of 8 MW (inclusive of heat pump).
- Total heat demand of the target load of 23,400 MWh.
- Carbon dioxide emissions avoided expected to be in excess of 500,000 tonnes over the life of the project.
- Total project investment of approximately €10.5m which includes:
 - Drilling of only one production well (existing Geo-Madrid well #1 can be used as the injection well);
 - Development of heat exchanger and heat pump system with back-up gas boiler to meet peak load requirements;
 - Construction of the heat grid plus geothermal loop systems.



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