

## Enel Green Power

In the central part of Italy, in the region of Tuscany, there is the biggest district of ENEL Green Power (the State National Energy company) for the exploitation of the Geothermal energy from the underground giant deposit.

This is a sole example of exploitation of geothermal Energy in the world, since the quantity of electricity



produced and quality of extracted steam are unique worldwide.

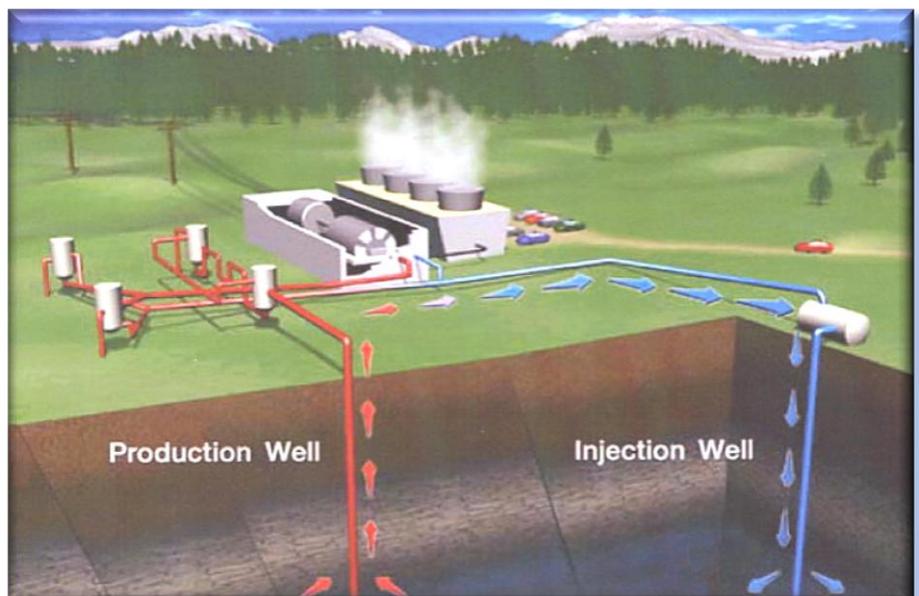
In fact, in this region there are more than 70 geothermal power stations, fed with that underground steam. Those power stations produce about 1.50 Megawatt of power electricity; which corresponds on about 30% of the energy demand of the Tuscany region.

Marly, is acting in this industry sector since more that 20 years and the cooperation with Enel started about 15 years ago. Thanks to this long lasting cooperation Marly developed some specific product in order to overcome to some very challenging application like chemically aggressive water and high temperature water to be pumped in the production cycle of the geothermal power station.

Now Marly can offer to its industrial clients a unique experience and application knowledge which come from this long experience made in the Enel Power Station sector.

The exploitation of the Larderello steam underground deposits, consist of drilling wells up to 6.000m depth to extract the geothermal water steam.

The extracted steam has an average temperature of 160-200°C and a pressure of 5-10 bars.



# Marly Case History

The steam is conveyed with Stainless steel pipes to the local power stations which transform the steam into electrical Energy by steam turbines systems.

Marly pumps are used in the following key phases of the Energy production.

- 1) In case the steam pressure is too low to feed the turbine, the Marly End-Suction pumps are used to re-launch the steams into the turbine at higher pressure
- 2) Once the process of energy production is completed, about 60% of the geothermal steam is re-condensate into water and collected to be re-inject underground, to feed the wells for news team production. Multistage Marly pumps are used to feed the wells with that re-condensed water.
- 3) Marly pumps are also used in some special cleaning phase of the steam called AMIS phases. In that application the pump is handling condensed water with a very high concentration of caustic soda.

In the following picture is shown the Marly pump model HP 100-4 made of casted stainless steel AISI 316, producing a flow of 250m<sup>3</sup>/h, with a pressure of 200m; the power of the installed electric motor is 160 kw. This pump is part of the pumping system made of 3 units which re-inject the condensate water, at about 85°C into the feeding wells.



Below picture shown a Marly pumping station made of 3 End-Suction pumps model CAX150-400 with 75Kw motor and 2 multistage pumps model HPR 125/5 with 90Kw motors.

All the 5 pumps are made of casted stainless steel AISI 316.

The total capacity of the station is 1200m<sup>3</sup>/h, at the pressure of 150 m.

All the pumps are controlled with Variable Speed Controllers



# Marly Case History

The following picture shows another pumping station for well re-injection, located in Lago Boracifero into the Larderello area. In this site there are about 180 suction wells which are used to feed 26 local power stations.

This set of 4 Marly pumps are all made of casted stainless steel AISI316, the pumps are of the model HP125-2, coupled with an electric motor of 315 kw each.

Each pump produces 350 m<sup>3</sup>/h flow at 220m head, all the pumps are driven by variable speed controllers, in order to keep the wells feeding pressure precisely stable and constant.

All those pumps installed are working safely since more that 10 years, facing a regular yearly maintenance program, but never suffering of critical failures.

