

Geothermal plants

Geothermoelectric plants

Geothermal electricity power plants can be of different types; “back pressure system” if the steam, after being exploited, is freed into the atmosphere; “condensing system”, if the utilized steam is condensed and newly injected into the subsoil, through an injection well. “Flash” power plants are installed in areas dominated by water and are equipped with separators that separate the steam sent to the turbine, from the water that is then eliminated.

Geothermal power plants exploit geothermal heat. The flow of steam that comes from the subsoil either freely or channelled in deep geologic wells, produces a force that moves the turbine. The mechanical energy of the turbine is transformed into electricity by alternators. In the geothermal systems dominated by steam, geothermal energy can be utilized to produce electric energy, by forwarding the steam through steam-pipes to a turbine that is connected to a generator that produces electric current. If the fluid does not reach a sufficiently high temperature, the hot water may be used for the production of heat, as for example in teleheating plants.

Besides the “Direct Steam” technology, there is also another called “Binary Cycle” in which the heat of the geothermal fluid is exchanged with another fluid that activates the turbines. The Binary Cycle is a choice that is technically suited when the energy value of the fluid is low (temperatures below 180°C), while the “Direct Stream” is the more efficient choice in the presence of higher temperature geothermal fluid.

With equal fluid characteristics, the “Direct Stream “ plant has significant advantages: the environmental impact is less, thanks to the lesser amount of fluid required to produce the same amount of energy (and therefore less wells to drill and less pipelines to be built), the structure is more compact and therefore occupies less territory, and is less noisy than the Binary Cycle technology due to the reduced number of cooling towers and related fans. Lastly, both technologies do not have significant differences in the emissions in the atmosphere, as, also in the Binary Cycle, the gases that are separated from the liquid phase are treated.

Air conditioning plants

With geothermal power it is possible to supply our houses with air-conditioning. Small geothermal plants are built for small buildings, medium-sized and big buildings. A heat well is made by drilling with an adequate drill and using some coating tubes deep underground in order to prevent the land from sliding down (it can be done in a small space like a garden and small courtyard). The heat well can be built in any area, on any kind of land and regardless of the height of the aquifer. Once the drilling has been concluded, and the final depth has been reached, heat exchangers are introduced in the hole and connected to an external collector that balances the heat flow that comes from the soil and directs it to heat pump inside the building. Later the hole is filled with a mixture of cement and bentonite in order to avoid any form of pollution. In winter the heat exchanger allows to take the free heat from underground and, through the heat pump, use it to warm up the buildings (also sanitary hot water is produced by conveniently extracting heat from underground). In the summer, the excessive heat inside the building is eliminated by transporting it underground through the heat exchanger (summer air-conditioning is particularly convenient if compared to the electric consumption of air-conditioners).