Sorgenia geothermal innovative zero emissions power plants
Founded in 1999 with the liberalization of the energy market, Sorgenia is one of the main Italian energy operators within the energy supply chain.

Sorgenia operates in several energy market segments:

- **Power generation** (modern group of gas combined cycle power plants)
- **Development of renewable energy projects** (geothermal, mini hydro, photovoltaic power generation and other renewables projects)
- **Purchasing of natural gas**
- **Energy management and trading**
- **Power and gas sales** to end customers
- **Development of energy services** (B2B and B2C)

**Electricity sales:** 3,2 TWh

**Gas portfolio:** 1.4 bcm

**Capacity installed:** 4.4 GW

**Customer served:** ~275k

An environmentally friendly fleet, recently built and well distributed across Italy, able to fully exploit opportunities in the Italian energy market.
In 2011 Sorgenia was among the first operators to enter into the newly liberalized geothermal market, taking advantage of the best Geothermal expertise available on the market.

- **6 exploration licences** awarded in Italy (Tuscany and Latium), most of them in the Mount Amiata area (≈ 350 km²).

- Several surveys have been carried out by Sorgenia in order to complete the existing geothermal dataset and reduce the mining risk (CO₂, MT, 2D seismic...)

- **50 MWel** pipeline (estimated) of advanced geothermal power plants:
  - total reinjection of geothermal fluids, including incondensable gases;
  - no air emissions during normal operation.

- **First geothermal target:**
  - Liquid – dominated reservoir;
  - the so-called «first reservoir» (carbonate - evaporitic formations of the Tuscan Nappe Unit);
  - Expected geothermal fluid temperature: 130 °C - 220 °C
  - Expected wells depth: 1000 - 2000 m

Poggio Montone and Le Cacinelle projects, located in the exploration licences in the Mount Amiata Area, are the most advanced projects in terms of development: two power plants have been designed and are under authorization procedure.
**Main data**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average yearly net power</td>
<td>5 MW</td>
</tr>
<tr>
<td>Yearly production</td>
<td>40,000 MWh</td>
</tr>
<tr>
<td>Expected number of wells</td>
<td>8 (3 for production and 5 for reinjection)</td>
</tr>
<tr>
<td>Expected NCG</td>
<td>&gt; 1%</td>
</tr>
<tr>
<td>Estimated CAPEX</td>
<td>≈ 60 millions €</td>
</tr>
</tbody>
</table>

**DEGREE OF INNOVATION**

- Very high environmental sustainability
- First application in Europe of an ORC geothermal power plant with total re-injection of geothermal fluid in reservoir characterized by significant presence of Non Condensable Gases (NCG)
- Sorgenia studied and designed a specific solution to lift the fluid at surface level: a continuous gas lift by compression, injection in the production wells and re-circulation of the dissolved geothermal incondensable gases (mainly CO₂)
- Technical solution easily replicable in similar geothermal context

**PROJECT MATURITY**

- Reduced mining risk: «Poggio Montone» licence includes a previously explored and discovered geothermal field («Poggio Nibbio»)
- Construction permit and exploitation concession procedure successfully concluded in July 2019
- Start of construction expected in January 2020 and Commercial Operation Date of power plant expected in 4Q 2022
- The power plant has been included in the last GSE registry regarding the support scheme for geothermal projects (FIT for 25 y)

**GREENHOUSE GAS EMISSIONS AVOIDANCE**

- No gas emissions in the atmosphere
- Avoidance of 17,000 tons of CO₂ per year, compared to Italian production mix