Main operators and developers in Italy

<table>
<thead>
<tr>
<th>Main operators and developers in Italy</th>
<th>Geothermal for Heating &amp; Cooling (in MWe)</th>
<th>Geothermal for Electricity (in MWe)</th>
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Italy is the birthplace of the modern geothermal industry and remains a global leader despite moderate recent developments. The Italian geothermal industry is at the forefront of innovation, developing technologies that allow for new developments worldwide. Geothermal in Italy is mostly destined to electricity production and located in the Tuscany region. Most of the geothermal heating and cooling capacity in Italy comes from the production of combined heat and power.

The market for shallow geothermal systems is underdeveloped in Italy, with an installed state estimated at only 15,000 units, and sales remain moderate considering the size of the overall heating and cooling market in Italy.

Owing to historical developments, the installed deep geothermal capacity is structured around Enel, the historical national utility. The field is now much more competitive and new developments are undertaken by an array of actors.

Policies and Regulations

Legislative framework

Italy strategy and goals for the energy transition were clearly set out in the National Energy Strategy (SEN), approved in 2017, and recently revised in the proposed National Energy and Climate Plan (PNEC), currently under review by the European Commission.

The Plan set an ambitious target of a 29.7% share of RES in total energy consumption by 2030, aiming specifically to reach 55.4% of RES in electricity and 33.1% in Heating and Cooling by implementing new technology-neutral incentives, progressively moving towards market parity for renewables after 2020, and doubling the R&I investments in the sector.

Heat pumps and district heating are also mentioned as having a key role in achieving the targets.

Concerning geothermal, however, the PNEC foresees a limited growth for both geothermal electric (+0.8% of RES share / +130 MW) and heating (+28 ktep) production up to 2030. Low estimates that are complemented by the announced exclusion of geothermal from the new decree establishing subsidies dedicated to mature technologies for the electric production from renewable sources (FER1).
Support schemes

Electricity

In Italy, electricity generated from renewable energy sources, including geothermal, is incentivized through a system of feed-in and premium tariffs based on the plants installed capacity. For geothermal plants the tariff amount between 99 and 135€/MWh for a period of 20/25 years. In addition, producers can also choose to sell the electricity they input into the grid to Gestore dei Servizi Energetici GSE (the authority in charge of electric services) at a guaranteed price, in alternative to the free market. Under certain conditions, electricity producers can make use of “scambio sul posto” (net-metering).

Heating and cooling

Renewable energy for heating and cooling benefits from 2 main supporting schemes: Conto Termico, a price-based scheme granted to small RES-H sources for a period varying between 2 and 5 years to support a number of technologies to improve energy efficiency, including heat pumps; Certificati bianchi, also known as “Energy Efficiency Certificates” (TEE), which are negotiable securities that certify the achievement of energy savings in the final uses of energy through interventions and projects to increase energy efficiency.

In addition, low enthalpy geothermal plants can benefit from a tax scheme that allows for a 65 % tax deduction (“detrazione”) for expenses related to refurbishment of existing buildings and/or energetic requalification of buildings and/or installation of RES-H technologies.

Innovation

Italy’s funding for energy R&D is covered within the scope of the National Research Strategy 2015-2020 which sets the priorities for the country’s applied research. Energy is one of the 12 selected specialised areas of intervention, in accordance with the National Smart Specialisation Strategy (S3). Funding is provided by the Ministry of University and Research though its main operating funds:

- Fund for Basic Research
- Find for Industrial Research

Additional supporting schemes for renewable R&D, including geothermal, are:

- The Fund for interventions and measures for technological and industrial development, managed by CSEA, which is aimed at supporting interventions and measures for technological and industrial development in the field of renewable sources and energy efficiency.

- The Fund for the development of intangible capital, managed by the MEF, in agreement with the MiSE and the MiUR, that can also be used to finance technological research by companies, in collaboration with research institutions:

- The Tax credit measure of the National Industry 4.0 Plan aimed at stimulating private R&D expenditure to innovate processes and products. It consists of a tax credit of 50% on incremental expenses in Research and Development, recognized up to an annual maximum of €20 million/year.

Key public institutions

- MISE – Ministry for Economic Development – sets the legislative framework and policy objective;
- MIUR – Ministry of University and Research – coordinates R&I funding and sets research priorities
- ENEA – Italian National Agency for New Technologies, Energy and Sustainable Economic Development – public body that aims at research, technological innovation and the provision of services in the sectors of energy and environment
- CNR – National Research Council – Italy’s biggest public research body
- GSE – Energy services Manager – supervises and manages supporting schemes for the electricity generated from renewable sources and for heating and cooling
Italy’s resources have been exploited for a century to produce geothermal electricity. Currently, Italy’s geothermal industry is concentrated in the high temperature resource of the Tuscany region. These resources are well developed, although not exploited up to their full potential. Italy also has additional potential for electricity production in other areas of the country. The largely undeveloped potential for Italy however is that of geothermal for heating and cooling, which is way underutilised, especially outside Tuscany where there are many good resources.

Maps based on available geological data (GeoELEC, GeoDH)
Installed capacity of geothermal for heating and cooling grew at a rate of nearly 5% per year in Italy over the past decade. Meanwhile, installed electricity capacity grew at a moderate 1.6% per year pace.

Planning for geothermal energy deployment over the next decade should consider these trends and the context in which they occurred: a CAPEX intensive energy sources, geothermal project developments were undermined by the economic crisis in Italy and the regulatory instability that ensued.

The Italian Energy and Climate plan must consider the large potential of geothermal energy to contribute to the decarbonisation of the Italian economy in the 2030 perspective.

In particular, Italy has the potential to build on the expertise of geothermal industry in developing combined heat and power plants that enable the decarbonisation of the electricity and heating and cooling sectors simultaneously, while providing services to the electricity system coping with greater shares of variable supply.

In addition, Italy can develop new resources for geothermal heating and cooling, beyond the traditional area of Tuscany.

### Key Recommendations

- **Italy must set objectives for geothermal energy that are commensurate with the resources it possesses, and remain a world leader in geothermal energy. In particular, Italy has the potential to rely on geothermal to enable a cost efficient decarbonisation of its electricity sector.**

- **To allow the development of geothermal energy, Italy should set a stable investment framework that allows the deployment of innovative technologies. Italy should also plan for developments in new areas, notably to allow the decarbonisation of heating and cooling to meet the Clean Energy Package requirements in the 2030 perspective.**

- **The potential for shallow geothermal is far underexploited in Italy. An ambitious objective to put deployment rates on par with similarly sized countries (i.e. France, Germany), should be accompanied with relevant policies that recognize the specific characteristics of shallow geothermal systems (higher investment costs, lower operating costs, can provide heating and cooling).**