



Chapter 1.4

HEALTH AND TOURISM WITH GEOTHERMAL RESOURCES IN ITALY: THE SPA SITUATION

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The increasing attention to well-being is giving new impetus to the spa industry in Italy, after a long period of stagnation when spa stations were considered only places to cure diseases mostly of elderly people, rather than resorts for young and mature persons to become or stay fit.

Italy has some 2,300 mineral water sources located in 930 locations, about a thousand of which are utilized. Two thirds are cold, while the rest exceeds 20°C, reaching up to 100°C and can thus be considered geothermal (7).

Ownership of ground water is of the Regional Governments and its use is subject to concessions. Well-equipped spa resorts number about 180; some of them are public and others are privately owned. Water output is estimated around 40 million cu.m per year of which about three quarters are hot, evidencing the importance of the geothermal

resource for the Italian spa business. A total of 3 million people spend over 16 million days in Italian spa towns, while not all of them use the health facilities, other persons not included in the statistics (local residents, commuters) attend the spas (1, 6, 9). Italy is second only to Germany (8 million visitors) in Europe.

The two largest spa centers, Terme Euganee in NE Italy and Ischia island near Naples, with over 3 million presences per year, have high temperature springs spread in several nearby villages. Three of the five spa towns with 1 to 2 million presences per year have warm to hot water (Montecatini and Chianciano in Tuscany and Sirmione in Lombardy), while Fiuggi and Salso-Magiore in Central Italy are cold.

Most of the larger spas are dedicated exclusively to balneological applications, but two (Montecatini and Chianciano) com-

bine drinking therapy and balneology and Fiuggi is predominantly for drinking cures.

Energy available from the hot spa water is considerable; it is primarily utilized for curative and well-being purposes (water and mud treatments swimming pools) but also in large quantities for heating spa hotels and facilities. In few but significant cases the use of the resource has been extended to non-spa applications, like town district heating (at Bagno di Romagna and Acqui Terme, in Northern Italy) and for greenhouse heating (Gaizignano-Terme Euganee), without any interference with the main spa uses.

Even if it is not easy to calculate the amount of heat extracted and utilized from hot spa water, it can be stated that it represents the main direct use of geothermal energy in Italy, covering more than half of the total. For memory, non-electric uses of geothermal energy in Italy are estimated by different authors between 83,000 and 251,000 TOE/year (2,4,7).

The main spas with warm and hot springs are described hereunder.

Terme Euganee (Veneto - NE Italy)

This is the largest example of integrated use of geothermal resources for health purposes and for residential heating in Europe. In an area of about 23 sq.km, at the Eastern edge of the Euganei volcanic hills of Tertiary age, several small towns (the main one being Abano and the others Montegrotto, Battaglia Terme and Galzignano) are dedicated to the spa business.

Most hotels (120 of them) have their own thermal facilities, each with an average of 2 wells which draw by pumping 65° to 87°C water from Mesozoic fractured limestones at depths between 300 and 700 m. In addition, one spa establishment is open to the public. Some 230 wells produce an average of 22 million cu.m/year of thermal water, which is used both for the various health treatments (including mud applications), for recreational purposes (some 200

swimming pools) and for hotel and spa buildings heating and domestic hot water. Spent geothermal fluids, at about 40°C, are disposed of in sewers.

The utilization scheme is quite simple. Typically part of the thermal water at an average temperature of 75°C passes through heat exchangers (either plate or tube and shell) providing for space heating. The 50°C spent fluid is then conveyed to a hot water reservoir which, coupled with a cold water tank, regulates the flow and temperature of fluids to the health treatment units and to the swimming pools. Another part of the geothermal water is used to condition the cure muds. Back-up conventional boilers are rarely included in the system and emergency needs are generally solved by using nearby wells. All the spa hotels are privately owned.

Some hotels operate the year around, but most are open from March to November. The whole Terme Euganee geothermal field is utilized and the production rate is regulated in order to avoid excess off take which caused sub-sidence problems some years ago and would deplete the reservoir.

An interesting use of geothermal energy is made in Galzignano by a non-spa independent operator: 3 hectare greenhouses are heated with 120 cu.m/h of 65°C water from three 200 m deep wells. The heating season is November to April. The system includes a peak-load boiler, plate heat exchangers, space heaters and air fans. The flower greenhouses are located not far from various spa hotels and there is no evidence of interference between the different uses.

Ischia island (Campania - South Italy)

Another very important group of spa resorts dots the coast of Ischia island which has a surface of 46 sq.km and is located off Naples; they include the small towns of Ischia, Barano, Casamicciola, Forio, Lacco Ameno and Serrara Fontana (S.Angelo). Over 100 springs and many shallow wells

produce water mostly at temperatures from 58°C to 75°C (with a peak of 100°C near S.An-gelo) and partly in the 25°C to 40°C range.

Underground temperature, as evidenced from an old geothermal well, reaches 250°C at 1051 m depth. All the island is volcanic, of Quaternary age.

Tourists and curists spend almost 4 million days in Ischia island hotels. About 100 or the 276 hotels have their own geothermal water and spa facilities and swimming pools are widespread. Nine spa establishments are additionally open to the public. The tourist season lasts 8 months (March to October) but several hotels operate all year around.

Many of the spa hotels use geothermal water for space heating, similarly to Terme Euganee. Spent water is discharged in the sewers.

Apart from the dominant use, in the past a small 0.3 MW experimental binary plant was installed and operated for a short time.

Chianciano Terme and Montecatini Terme (Tuscany - Central Italy)

These two important and fashionable spa towns are characterized by warm water (respectively 32°C-36°C in Chianciano, originating from Lower Mesozoic carbonates, and 23°C-32°C in Montecatini, derived from fractured marlstones and jaspers of Mesozoic age).

The therapeutic uses are drinking cure and balneological applications. Both resort towns have a large attendance: 1.4 and 1.8 million presences were registered in 1998 respectively in Chianciano and Montecatini.

Contrary to Terme Euganee and Ischia spas, all the medical treatments are provided for outside of the hotels, in four establishments in Chianciano and in nine in Montecatini.

Sirmione (Lombardy - Northern Italy)

In 1998 a little over 1 million days were spent by tourists in this spa resort on the Lake Garda coast.

65°C water from faulted Upper Mesozoic marlstones and limestones is utilized in two thermal establishments and in three spa-hotels for balneological applications.

Bagno di Romagna and other hot spas

Presences in the remaining spas (with the exclusion of the cold water Salso-Maggiore and Fiuggi resorts which fall outside the scope of this note) are under the 300,000 mark. Limiting ourselves to the category between 100,000 and 300,000 presences, hot springs are utilized in Sciacca (Sicily) (26°C-57°C), Acqui Terme (Piemont) (35°C - 70°C), Porretta Terme and Bagno di Romagna (Emilia-Romagna) (respectively 23-35°C and 26-43°C).

Bagno di Romagna is quite interesting because of the multiple successful uses of the resource. This thermal spa in the Northern Appennines which handles yearly 230,000 presences is located on the site of a 43°C spring emerging from fractured Miocene sandstones. In 1983 the Municipality of S.Pietro in Bagno, owner of the spa, decided to develop a district heating network for the 6,000 inhabitants of the town. As it was necessary to increase the output of thermal water 3 shallow wells were drilled, one of which, with a flow rate on pump of 90 cu.m/h of 37°C water, was put in production for the district heating system. The plant includes two heat pumps coupled with two cogeneration engines which produce electricity for internal use and for town lighting, the excess being sold to the national utility. For peaking purposes 3 conventional boilers are available. The pipe distribution network extends for 12 km and heating is provided for 240,000 cu.m of space related to 250 end-users (mostly houses and 25 hotels and public buildings), together with sanitary

water supply. Operating schedule is flexible, to take into account the four-fold increase in population during the thermal season (March to November).

The system works satisfactorily since 1987 without interference between the spa uses and the new development, even if the source dedicated to balneology and the district heating well are just a few hundred meters apart.

THE GEOTHERMICIAN POINT OF VIEW

The spa industry in Italy as well as elsewhere has undergone and is still undergoing drastic changes, from providing exclusively medical treatments to also taking care of people's well-being and relax.

In this light opportunities arise for the geothermal business to develop activities within the spa domain, which in Italy is the most important sector of earth energy direct uses. What are the pro and con?

On the negative side, there are practically no significant contacts between spa and geothermal representatives and thus no reciprocal information on the possibilities and merits of cooperation and integration. There is also, in absence of a careful assessment of the geothermal resources feeding the spa resorts, the risk of interference between the different uses which generates hostility towards non-balneological applications (as happened some years ago in Spain).

The positive points include the following:

- Spa water resources are proven and in many cases their production can be increased without hampering the present use thus the main problem in geothermal development, geologic risk, is generally overcome.

- Through careful planning in several Italian and foreign spas side uses of geothermal heat have been developed with good economic results and without negative influence on the main therapeutical use.

- This approach allows also to optimize the year-round utilization of the resource and thus the economics of thermal water business.

In conclusion, even if integration is not easy, there are good opportunities for a better and profitable use of the spa hot water resources in complementary or additional applications which have to be investigated and developed by an indepth approach to the problem both by the geothermicians and the spa people.

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