Potential for hot groundwater in Portugal

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REPÚBLICA PORTUGUESA
AMBIENTE E AÇÃO CLIMÁTICA

Direção-Geral de Energia e Geologia

1. GEOTHERMAL OCCURRENCES

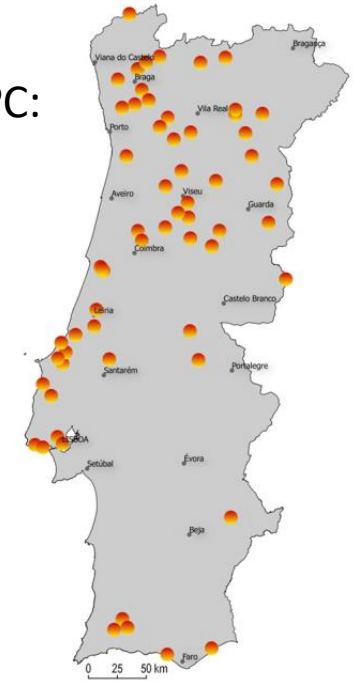
Due to its complex and diverse geology, mainland Portugal has an appreciable geothermal potential, evidenced by the high number of occurrences with T> 20ºC, used for thermal purposes since ancient times.

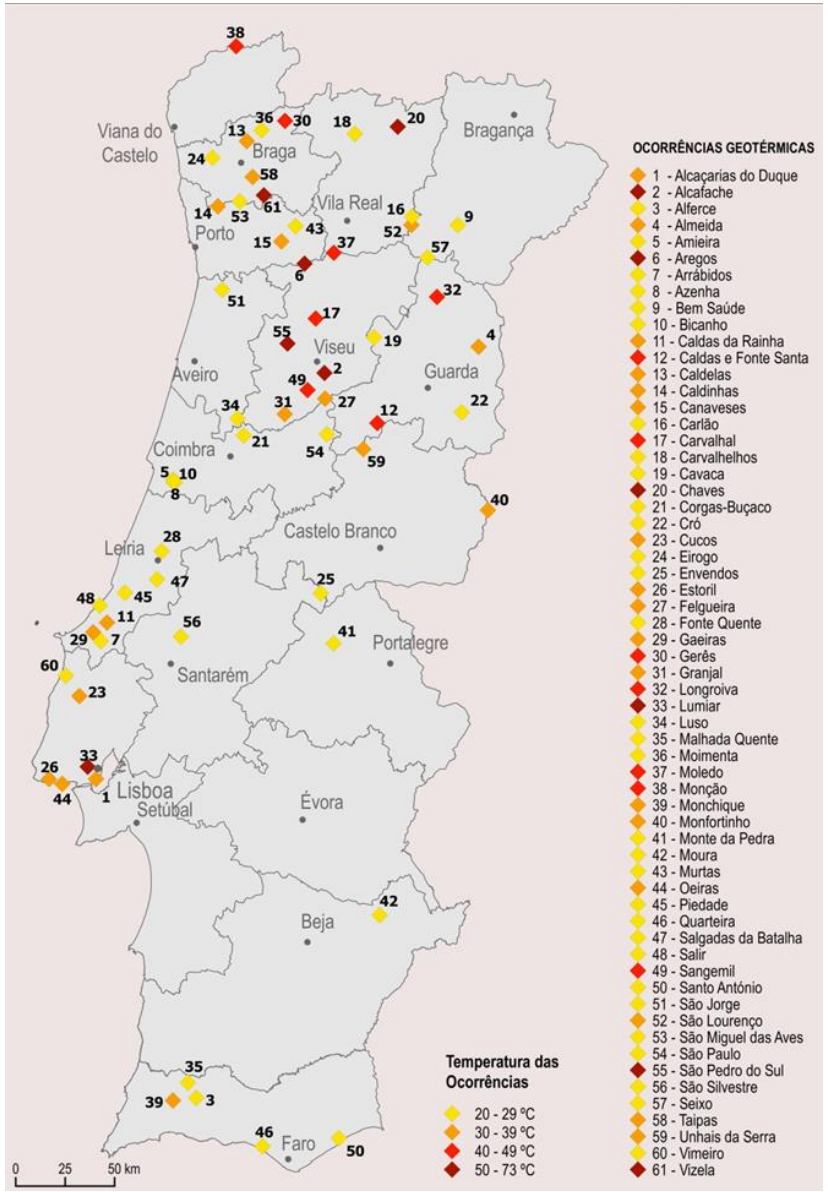
Numerous geothermal occurrences are inventoried, with greater incidence in the north and center-west of the country:

Low enthalpy – Temperature between 30ºC and 73ºC:

- 50 to 73ºC
- 40 to 49ºC
- 30 to 39ºC

Very Low enthalpy – Temperature between
- 20ºC to 29ºC





To date, **mainland Portugal Geothermal Potential** is in the domain of low and very low enthalpies.

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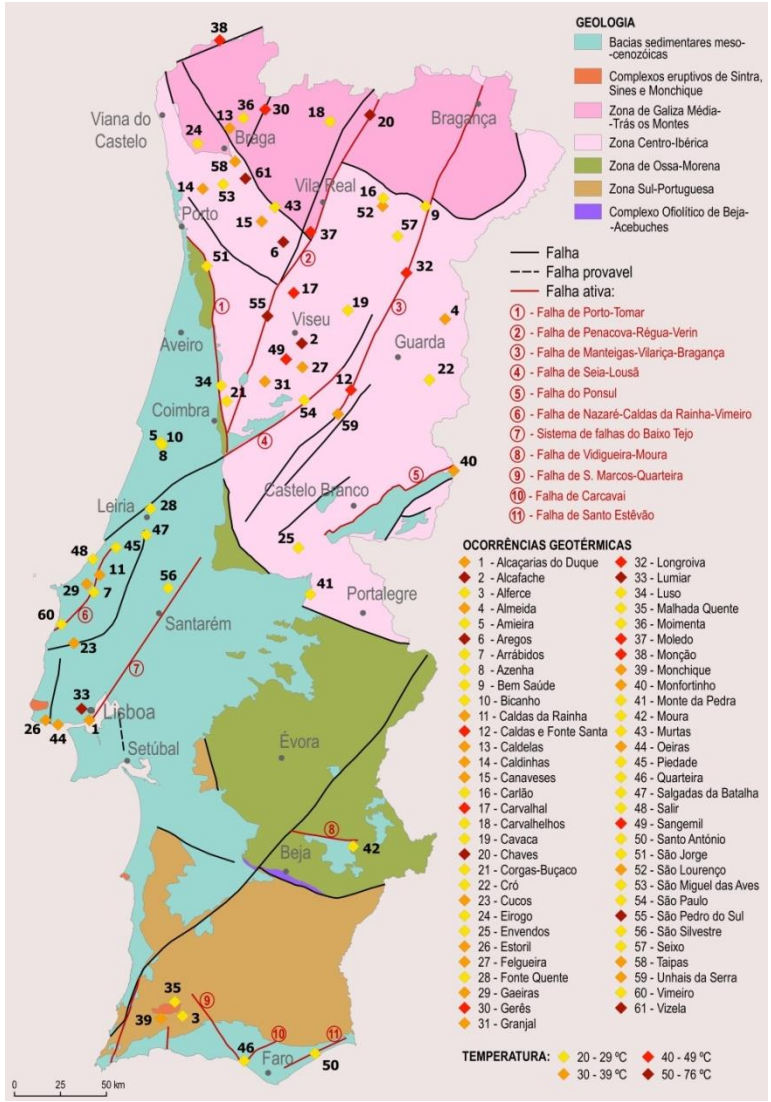
1. GEOTHERMAL OCCURRENCES - GEOLOGICAL FRAMEWORK

There is a clear predominance of geothermal occurrences in the **Central Iberian Zone** (63%) and the **Western Meso-Cenozoic Sedimentary Basin** (25%).

Higher temperature occurrences are directly related to major tectonic accidents such as Penacova-Régua-Verin Fault or Manteigas-Vilariça-Bragança Fault.

It is generally at the intersection between the major regional faults and their conjugates that the most suitable conditions for the rise of geothermal fluids from deep crustal zones are created.



Techno-stratigraphic framework of geothermal occurrences and main active structures (according to Cabral et al. 2011) in mainland Portugal. (geological background adapted from the 1: 1000 000 Geological Map of Portugal, LNEG, 2010)

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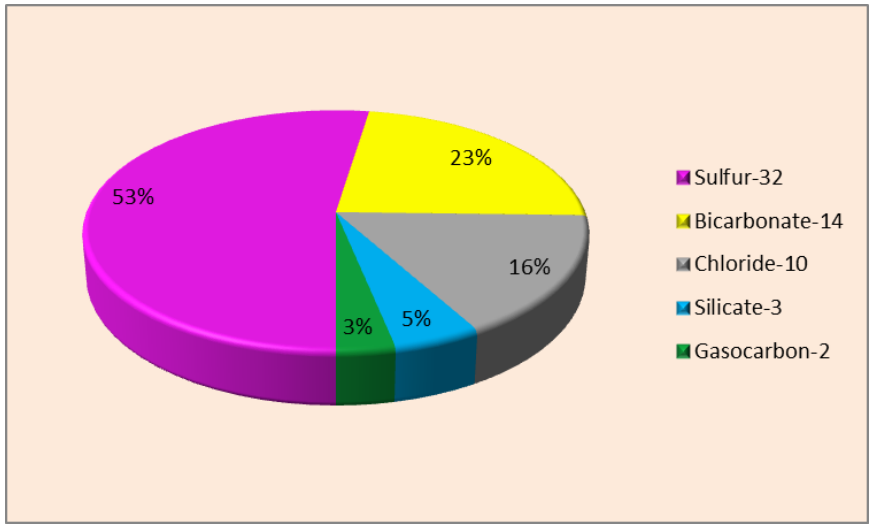
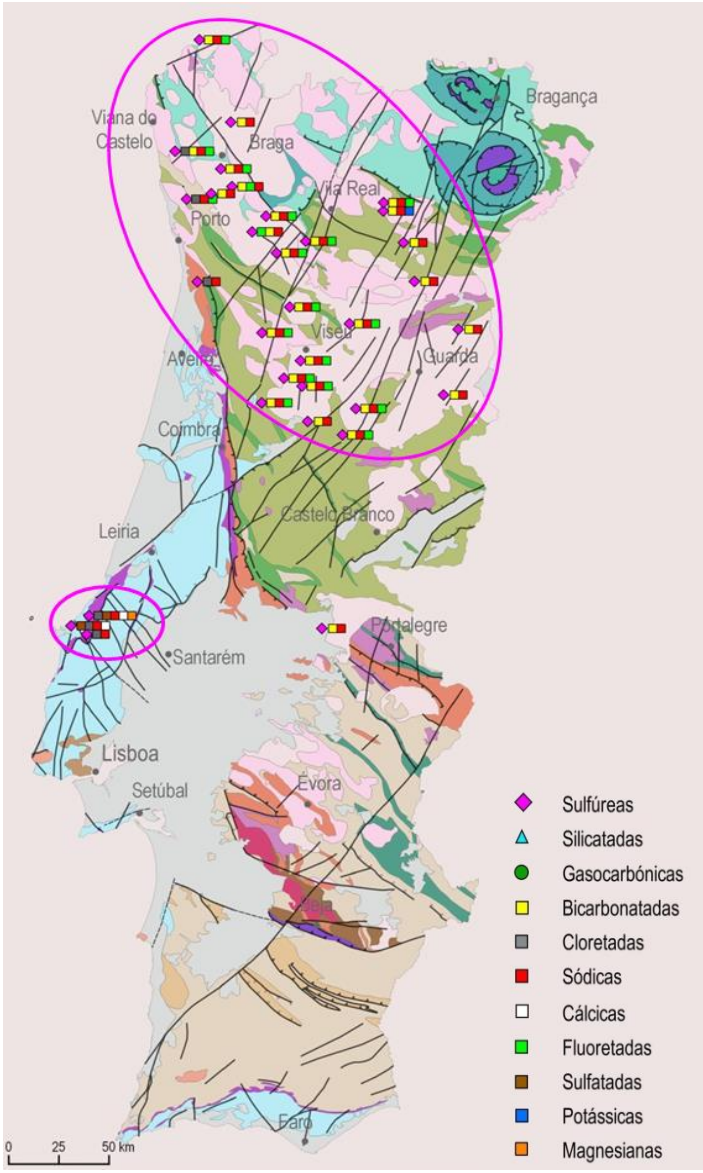
1. GEOTHERMAL OCCURRENCES - CHEMISM



53% of geothermal occurrences correspond to **sulfur waters** characterized by the presence of reduced sulfur forms and high pH values (> 8) and generally weakly mineralized.

Most are associated with the variscal granites of the Central Iberian Zone.
In the **western Meso-Cenozoic Sedimentary Basin** there are also some sulfur waters, but in this case they are hypersaline waters and occur depending on diapiric structures.



Chemism of Geothermal Occurrences in Mainland Portugal (geological chart adapted from the Geological Map of Portugal to scale 1/1 000 000, LNEG, 2010)

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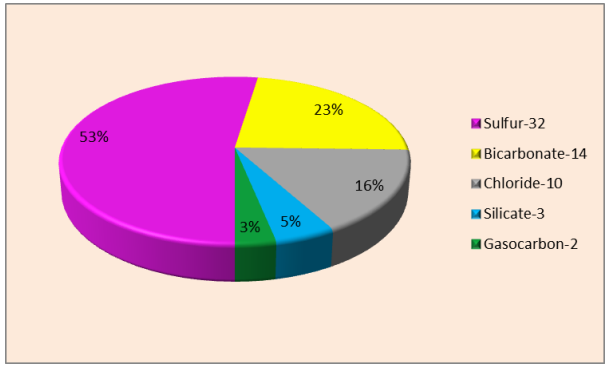
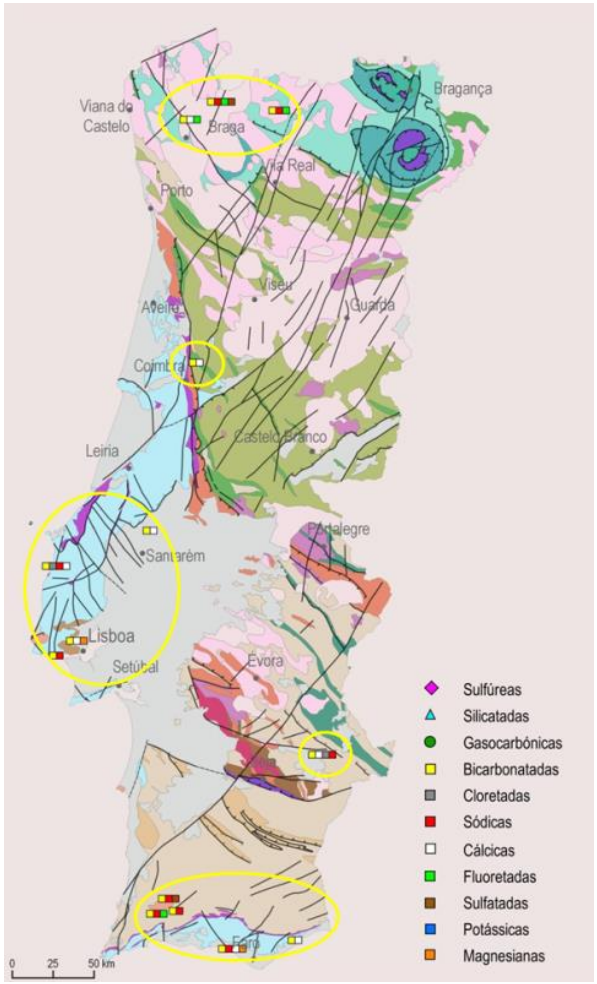
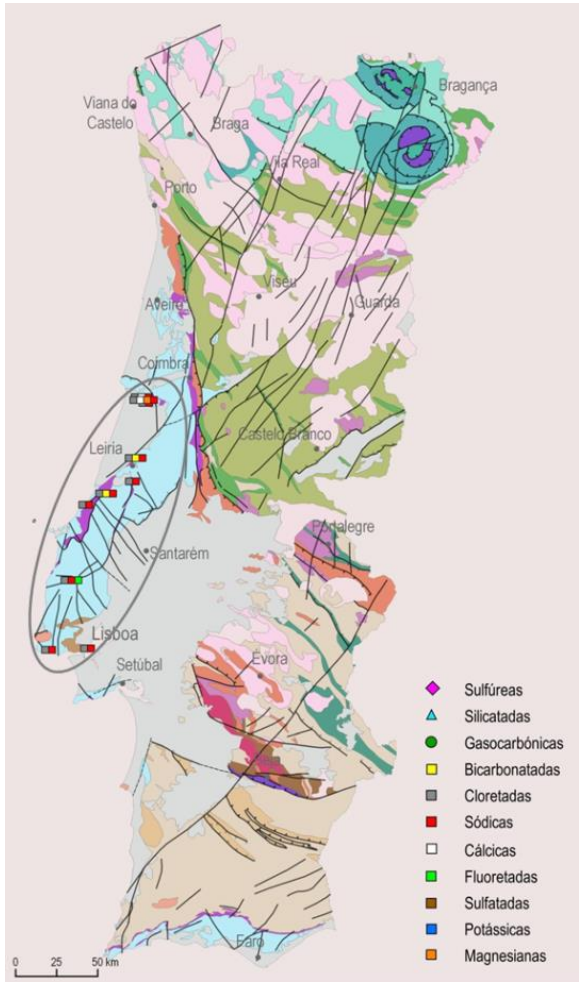
1. GEOTHERMAL OCCURRENCES - CHEMISM



Bicarbonated waters are the second most common chemical type of geothermal occurrences (**23%**).
They are generally weakly mineralized and the pH is close to neutrality.
They occur most often in the **Western and Algarvian Meso-Cenozoic Rim**.

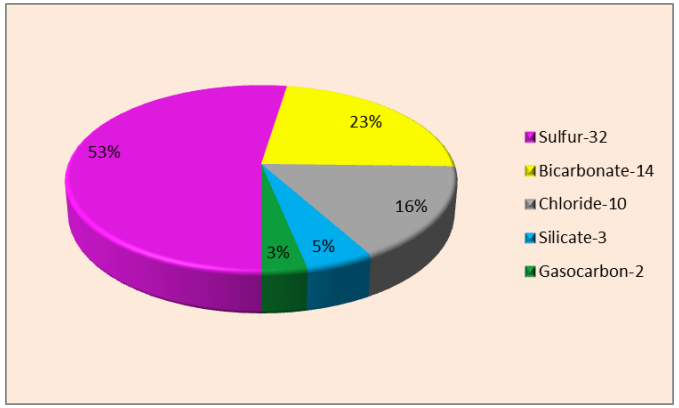




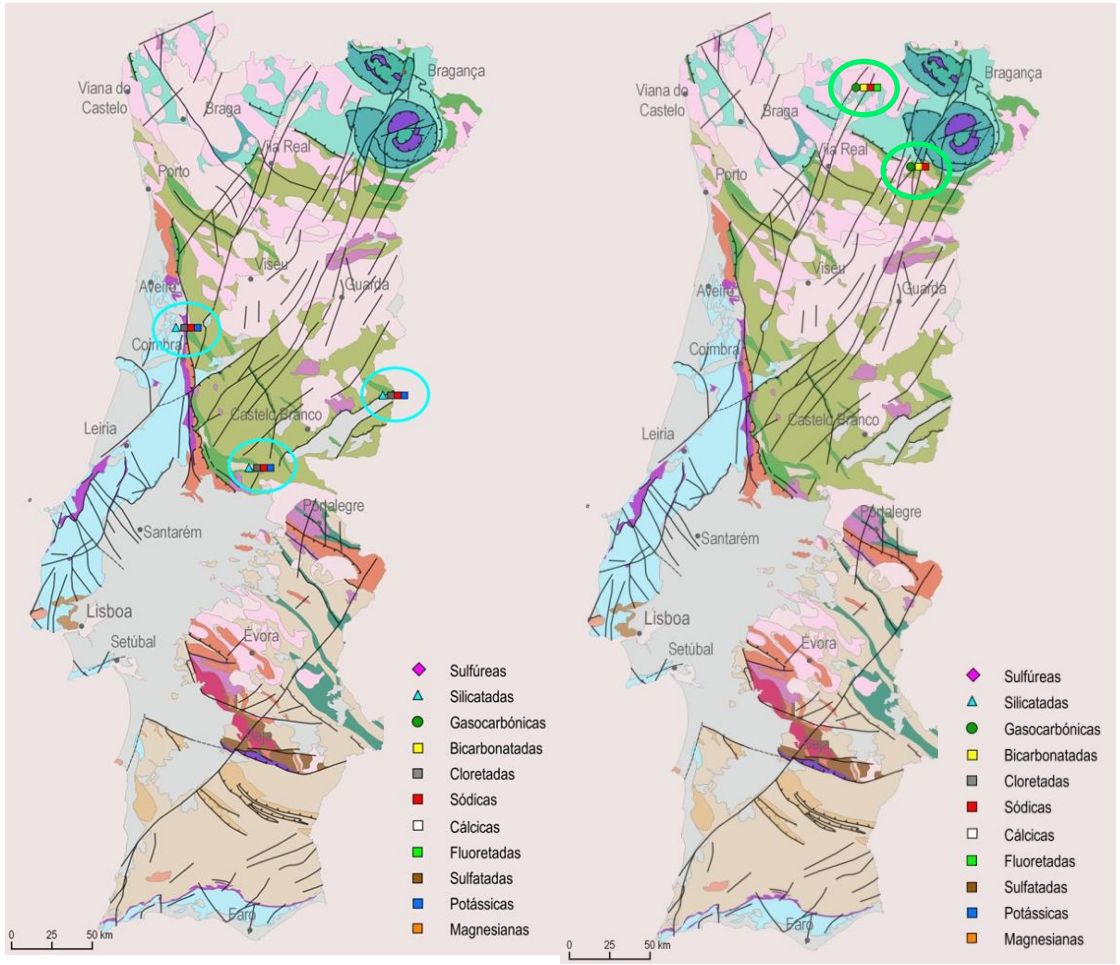
Chemism of Geothermal Occurrences in Mainland Portugal (geological chart adapted from the Geological Map of Portugal to scale 1/1 000 000, LNEG, 2010)

Chlorinated / sulphated waters represent 16% of occurrences and occur on the **western mesocenozoic Rim**.
Its composition is influenced by the presence of evaporites in the diapiric zones.
They have high levels of chlorides, sulfates, sodium and calcium.
TM reaches 35 000 mg/L

1. GEOTHERMAL OCCURRENCES - CHEMISM



Silicate waters (**5%**) occur in association with quartzites in the Central Iberian zone.
They are hyposaline waters, with TM < 200 mg/L.
The 3 known occurrences are chlorinated, sodium and potassic and the maximum recorded temperature is 28 ºC.

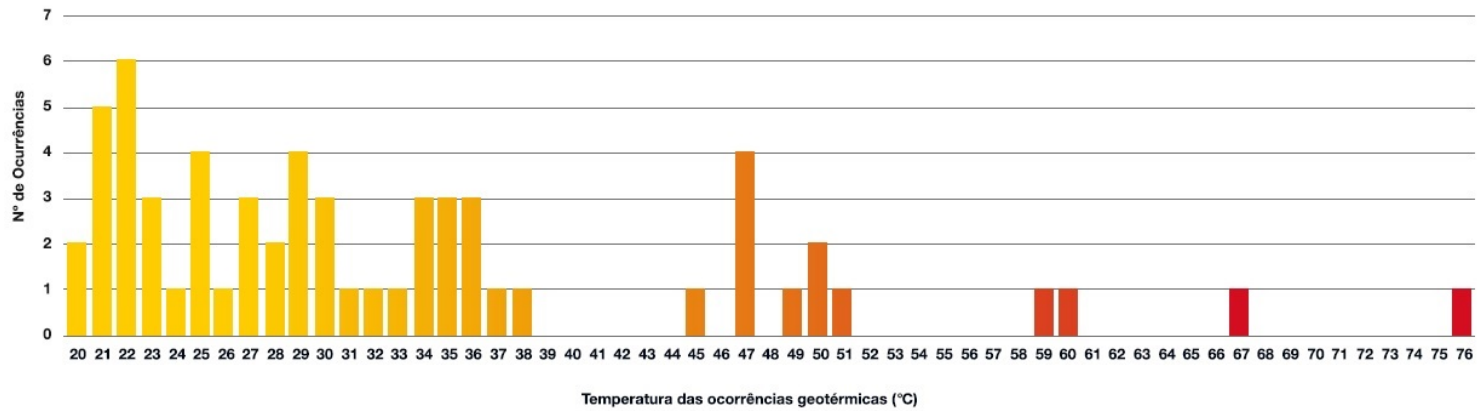


Chemism of Geothermal Occurrences in Mainland Portugal (geological chart adapted from the Geological Map of Portugal to scale 1/1 000 000, LNEG, 2010)

Gasocarbon waters (**3%**) are naturally enriched in CO2 (carbon dioxide content greater than 250 mg/L).
Two occurrences are located in deep active fault zones.
One has a temperature of 21 ºC and another of 76 ºC.
In the chemical composition they are both sodium bicarbonated.

1. GEOTHERMAL OCCURRENCES - CHEMISM

Nº	Designação	Temp. máxima registada (°C)	Quimismo	Mineralização total
1	Alcaçarias do Duque	30	Cloretada, sódica	Fracamente mineralizada
2	Alcafache	51	Sulfúrea, bicarbonatada, sódica, fluoretada	Fracamente mineralizada
3	Alferce	27	Bicarbonatada, sódica	Fracamente mineralizada
4	Almeida	35	Sulfúrea, bicarbonatada, sódica	Fracamente mineralizada
5	Amieira	27	Cloretada, cálcica, sódica	Fracamente mineralizada
6	Aregos	59	Sulfúrea, bicarbonatada, sódica, fluoretada	Fracamentemineralizada
7	Arrábidos	29	Sulfúrea, cloretada, sódica	
8	Azenha	29	Cloretada, sódica	Fracamente mineralizada
9	Bem Saúde	21	Gasocarbónica, bicarbonatada, sódica	Hipersalina
10	Bicanho	28	Cloretada, cálcica, magnesiana, sódica	Fracamente mineralizada
11	Caldas da Rainha	36	Sulfúrea, cloretada, sulfatada, sódica, cálcica, magnesiana	Hipersalina
12	Caldas e Fonte Santa	47	Sulfúrea, bicarbonatada, sódica, fluoretada	Fracamente mineralizada
13	Caldelas	33	Bicarbonatada, cálcica, fluoretada	Hipossalina
14	Caldinhas	36	Sulfúrea, cloretada, sódica, fluoretada	Fracamente mineralizada
15	Canaveses	34	Sulfúrea, fluoretada, bicarbonatada, sódica	Fracamente mineralizada
16	Carlão	29	Sulfúrea, bicarbonatada, sódica, fluoretada	Fracamente mineralizada
17	Carvalhal	60	Sulfúrea, bicarbonatada, sódica, fluoretada	Fracamente mineralizada
18	Carvalhelhos	22	Bicarbonatada, sódica, fluoretada	Fracamente mineralizada
19	Cavaca	29	Sulfúrea, bicarbonatada, sódica, fluoretada	Fracamente mineralizada
20	Chaves	76	Gasocarbónica, bicarbonatada sódica, fluoretada	Hipersalina
21	CorgasBuçaco	22	Bicarbonatada, cálcica	Fracamente mineralizada
22	Cró	25	Sulfúrea, bicarbonatada, sódica	Fracamente mineralizada
23	Cucos	34	Cloretada, sódica, fluoretada	Hipersalina
24	Eirogo	25	Sulfúrea, cloretada, bicarbonatada, sódica, fluoretada	Fracamente mineralizada
25	Envendos	22	Silicatada, cloretada, sódica, potássica	Hipossalina
26	Estoril	35	Cloretada, sódica	Hipersalina
27	Felgueira	36	Sulfúrea, bicarbonatada, sódica, fluoretada	Fracamente mineralizada
28	Fonte Quente	24	Cloretada, bicarbonatada, sódica	Fracamente mineralizada
29	Gaeiras	35	Sulfúrea, sulfatada, cloretada, sódica, cálcica	Hipersalina
30	Gerês	47	Bicarbonatada, sódica, fluoretada, tiossulfatada	Fracamente mineralizada
31	Granjal	38	Sulfúrea, bicarbonatada, sódica, fluoretada	Fracamente mineralizada
32	Longroiva	47	Sulfúrea, bicarbonatada, sódica	Fracamente mineralizada
33	Lumiar	50	Bicarbonatada, cálcica, magnesiana	Hipersalina
34	Luso	27	Silicatada, cloretada, sódica, potássica	Hipossalina
35	Malhada Quente	28	Bicarbonatada, sódica, sulfatada	Fracamente mineralizada
36	Moimenta	21	Sulfúrea, bicarbonatada, sódica	Fracamente mineralizada
37	Moledo	45	Sulfúrea, bicarbonatada, sódica, fluoretada	Fracamente mineralizada
38	Monção	49	Sulfúrea, bicarbonatada, sódica, fluoretada	Fracamente mineralizada
39	Monchique	32	Bicarbonatada, sódica, fluoretada	Fracamente mineralizada
40	Monfortinho	31	Silicatada, cloretada, sódica, potássica	Hipossalina
41	Monte da Pedra	21	Sulfúrea, bicarbonatada, sódica	Fracamente mineralizada
42	Moura	22	Bicarbonatada, cálcica, cloretada, sódica	Fracamente mineralizada
43	Murtas	23	Sulfúrea, bicarbonatada, sódica, fluoretada	Fracamente mineralizada
44	Oeiras	30	Bicarbonatada, sódica	Fracamente mineralizada
45	Piedade	25	Cloretada, bicarbonatada, sódica	Hipersalina
46	Quarteira	21	Bicarbonatada, sódica, cálcica, magnesiana	
47	Salgadas da Batalha	20	Cloretada, sódica	Hipersalina
48	Salir	20	Cloretada, sódica	Hipersalina
49	Sangemil	47	Sulfúrea, bicarbonatada, sódica, fluoretada	Fracamente mineralizada
50	Santo António	25	Bicarbonatada, cálcica	Fracamente mineralizada
51	São Jorge	23	Sulfúrea, cloretada, sódica	Fracamente mineralizada
52	São Lourenço	34	Sulfúrea, bicarbonatada, sódica, potássica	Fracamente mineralizada
53	São Miguel das Aves	22	Sulfúrea, bicarbonatada, sódica	Fracamente mineralizada
54	São Paulo	23	Sulfúrea, bicarbonatada, sódica	Fracamente mineralizada
55	São Pedro doSul	67	Sulfúrea, bicarbonatada, sódica, fluoretada	Fracamente mineralizada
56	São Silvestre	22	Bicarbonatada, cálcica	Fracamente mineralizada
57	Seixo	21	Sulfúrea, bicarbonatada, sódica	
58	Taipas	30	Sulfúrea, bicarbonatada, sódica, fluoretada	Fracamente mineralizada
59	Unhais da Serra	37	Sulfúrea, bicarbonatada, sódica, fluoretada	Fracamente mineralizada
60	Vimeiro	26	Bicarbonatada, cloretada, sódica, cálcica	Hipersalina
61	Vizela	50	Sulfúrea, bicarbonatada, fluoretada, sódica	Fracamentemineralizada



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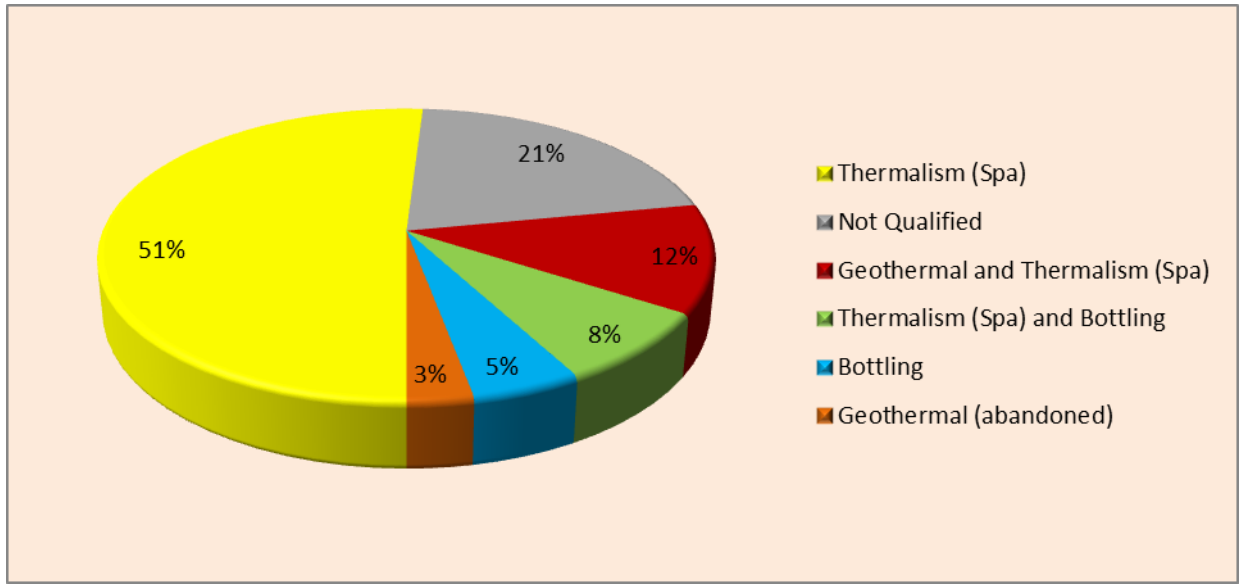
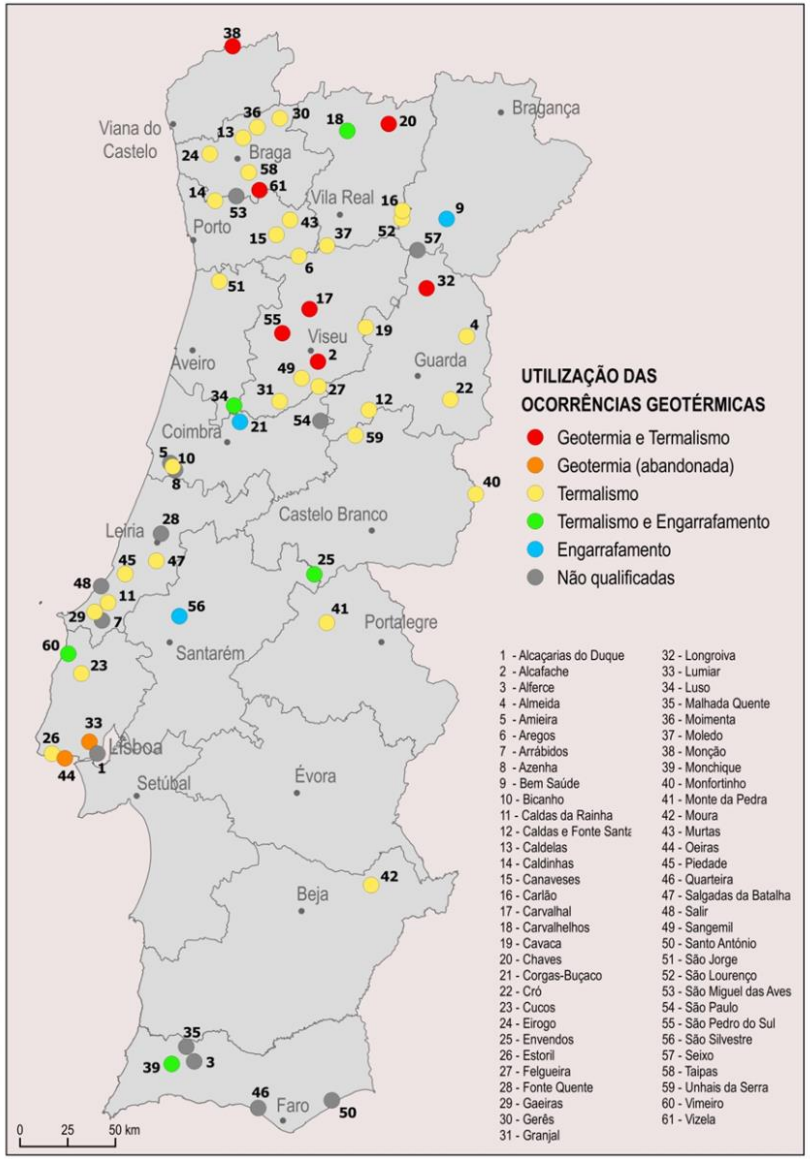
1. GEOTHERMAL OCCURRENCES - USE



Most direct uses of geothermal heat are made from qualified resources such as natural mineral waters and geothermal resources.

In situations where the temperature is higher, it is necessary to cool the water to a temperature that allows the thermal practices.

Of the 61 geothermal occurrences identified, 45 are qualified as Natural Mineral Water



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2. THE RESOURCE - USE

The heat energy from the warm waters that occur in mainland Portugal has long been used only for **balneotherapy**, a practice used since the time of the Roman occupation.

Concessionaires must make the best use of resources according to appropriate technical standards and in harmony with the public interest of making the best use of these assets.

There is a growing interest from the concessionaires in the use of water, also as a geothermal resource, for the **air conditioning not only of the changing rooms, but also of swimming pools, hotels to support the thermal activity, in the production of DHW**, etc.

DGEG, through its legal resource management mechanisms, has been making concessionaires aware of the possibility of **using the heat of waters** above **20 ºC**.

↳ preparation of feasibility studies for the use of heat from the waters

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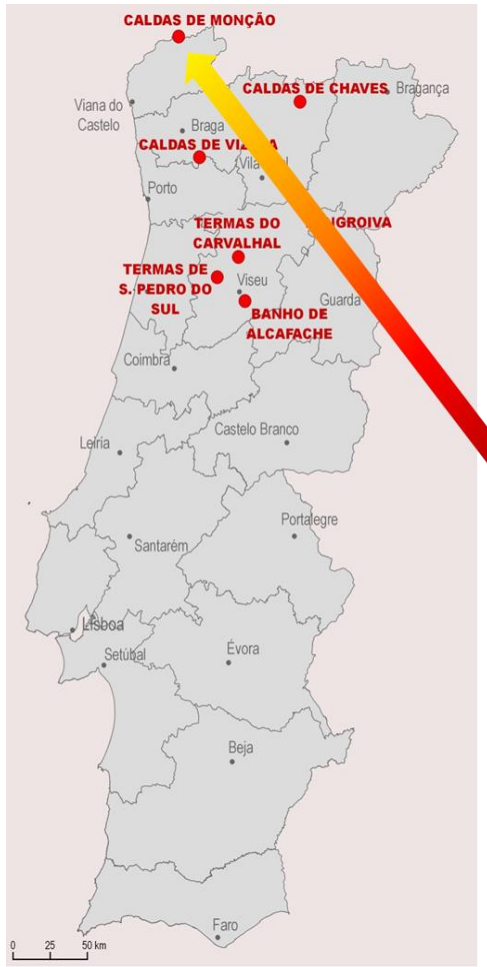
2. THE RESOURCE - USE



Currently, of the 61 existing geothermal occurrences, only **7** have a dual qualification as **Natural Mineral Water** and **Geothermal Resource**.
In **6** of them the energy is already used in direct heating, or using heat exchangers:

CALDAS DE MONÇÃO **51ºC**

Geothermal exploitation began in March 2015.
It is used for heating the Spa, public swimming pools, hotel and public buildings.
It is currently in a trial period.

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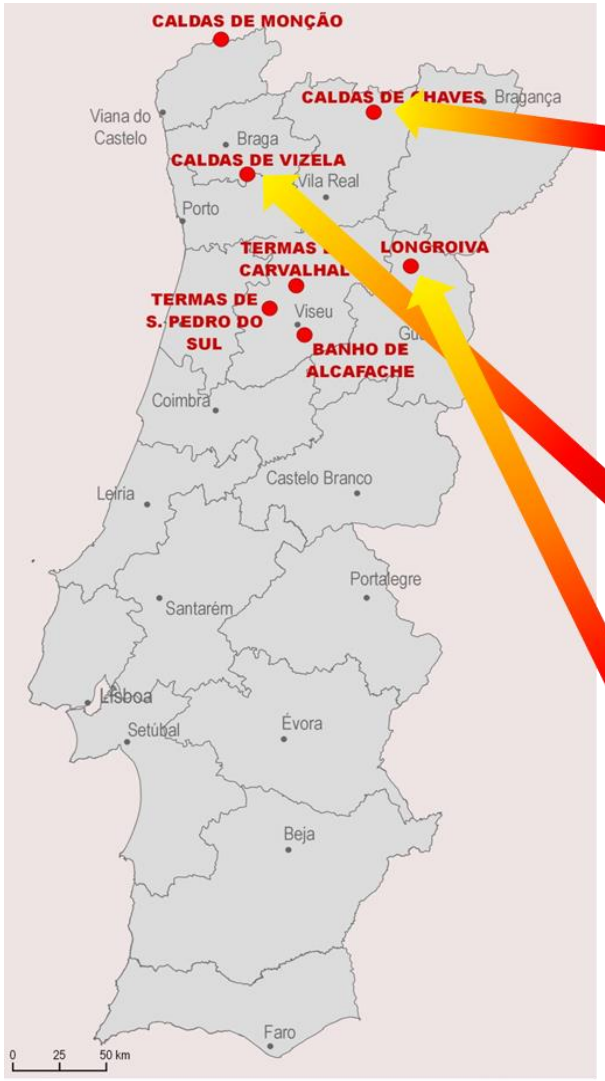
2. THE RESOURCE - USE



CALDAS DE CHAVES 73ºC

Geothermal exploitation began in the 1980s.

It was, in mainland Portugal, the first project to use heat in a district heating network, for air conditioning and DHW production of two hotels, the Spa and also for heating a swimming pool.

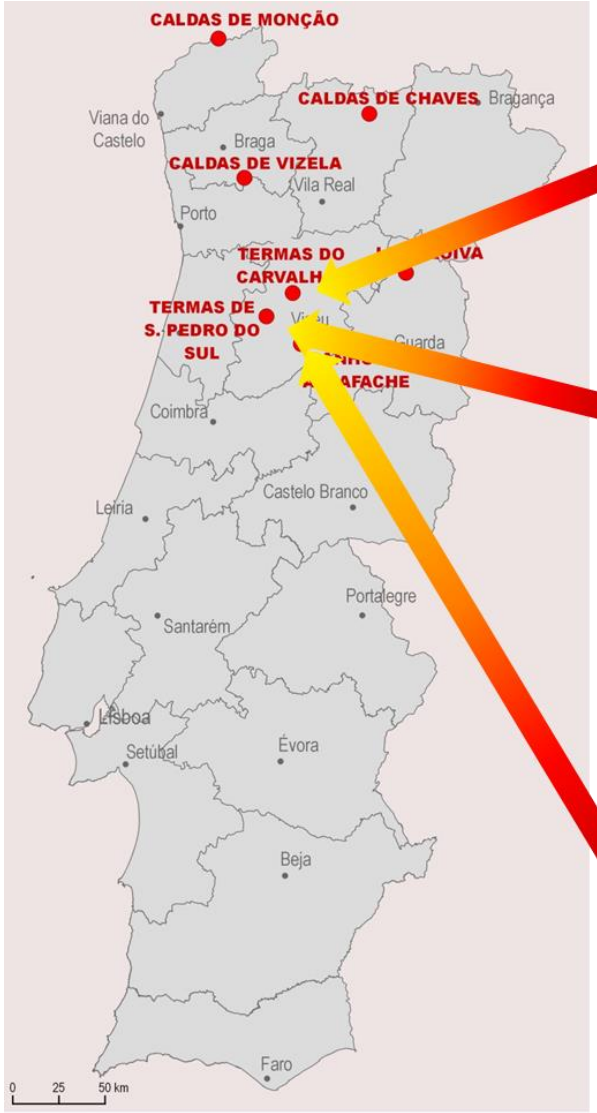
CALDAS DE VIZELA 50ºC

Excess flow is used to heat a swimming pool and for air conditioning and produce DHW for an hotel located near the thermal baths.

LONGROIVA 47ºC

The geothermal resource is used for air conditioning of the Spa and also for the production of DHW and heating of the nearby rural hotel outdoor swimming pool.

2. THE RESOURCE - USE



TERMAS DO CARVALHAL 60ºC

Several studies are underway with a view to the development of geothermal projects.

TERMAS DE S. PEDRO DO SUL 69ºC

Geothermal exploitation began three decades ago.
The Polo das Termas, which has been in operation since 2001, has a geothermal station for air conditioning and DHW production for two thermal spas and two hotels.
At the Polo do Vau, located about 2 km south of S. Pedro do Sul, the geoheat has already been used directly to heat tropical fruit greenhouses and is currently under reformulation.

BANHO DE ALCAFACHE 51ºC

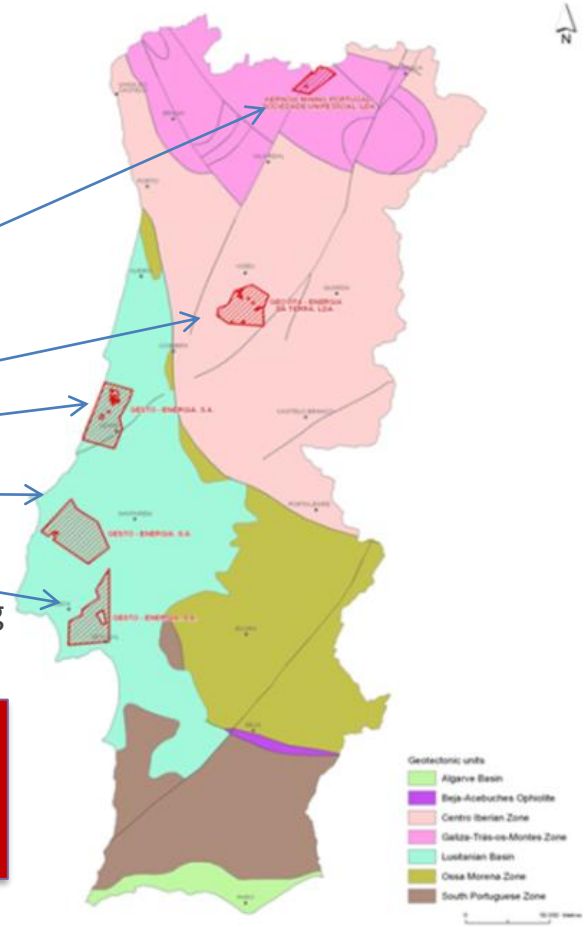
Since 2003, the spa has been air-conditioned from the geothermal resource.

2. THE RESOURCE - POTENTIAL

There is a high potential for the increase use of geothermal resources:

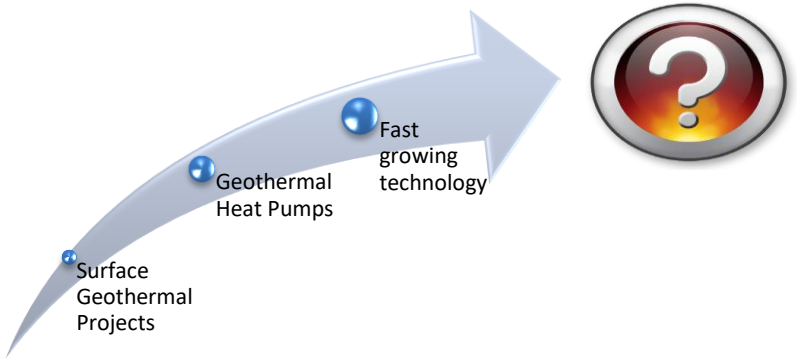
By **direct use** from deep aquifers

From **Enhanced Geothermal Systems – EGS**



Recognition of the existence of this potential in the country led in 2010 to the granting to private investors the rights to prospect and research Geothermal Resources.

Extendable throughout the country there is the potential to develop **geothermal heat pumps** for building air conditioning and DHW production in normal geothermal gradient zones.



The development of geothermal systems for building air conditioning and DHW production as emerging technology (GHP) has interesting potential from the point of view of both availability and resource use.

3. GEOTHERMAL RESOURCES - IMPLEMENTED STRATEGY

As the national authority and organization with information and registration of the geothermal resources of mainland Portugal, DGEG decided to implement a **strategy** to **assess the state of geothermal use, with a view to raising awareness, enhancing and creating conditions for the sustainable development of this form of renewable energy**.

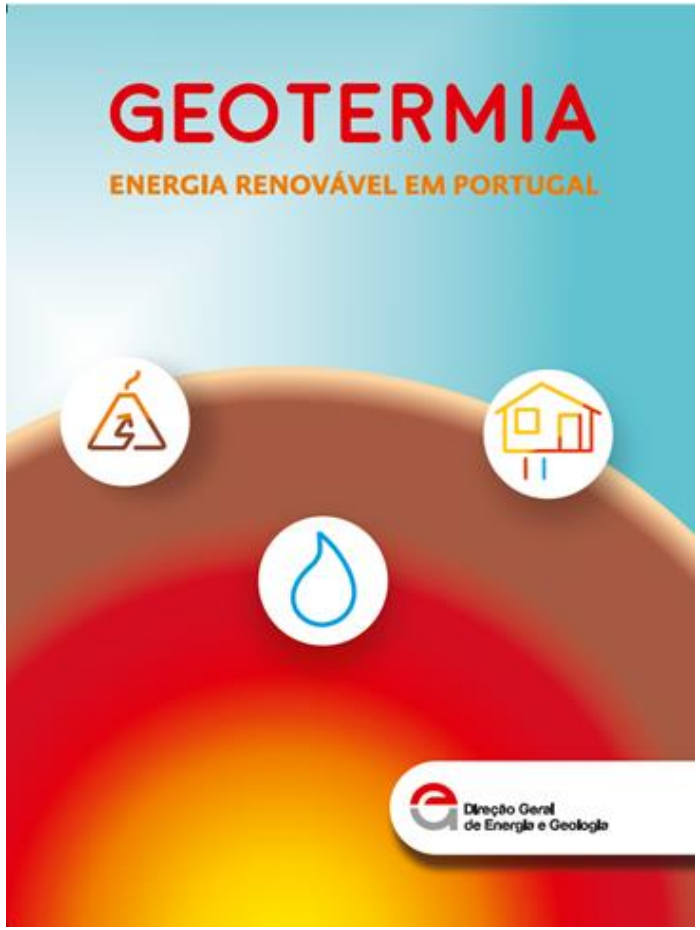
3. GEOTHERMAL RESOURCES - IMPLEMENTED STRATEGY

1

PUBLICATION

Made predominantly a **technical approach** to the **use of geothermal energy**

ÍNDICE



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Direção-Geral de Energia e Geologia

3. GEOTHERMAL RESOURCES - IMPLEMENTED STRATEGY

2

INTERNATIONAL SEMINAR

Seminário Internacional
Energia Geotérmica
Uma aposta no futuro

São Pedro do Sul | 13 de dezembro de 2017

8:45	**Acreditação dos Participantes**
9:15	**Sessão de Abertura** Presidente da Câmara de São Pedro do Sul, Vítor Figueiredo Diretor Geral de Energia e Geologia, Mário Guedes
10:00	**Apresentação da Brochura "Geotermia – Energia Renovável em Portugal"** Diretora de Serviços da Direção Geral de Energia e Geologia, Carla Lourenço
10:15	**Potencialidades do Aproveitamento Geotérmico em Portugal Continental** Representantes da Direção de Serviços de Recursos Hidrogeológicos e Geotérmicos da DGEG, Teresa Cunha e José Cruz
10:30	**Recursos Geotérmicos dos Açores** Diretora Regional de Energia, em representação do Governo Regional dos Açores, Andreia Carreiro
10:45	**Geotermia na Madeira – Avaliação preliminar e perspetivas da EEM** Representante da Empresa de Eletricidade da Madeira, Agostinho Figueira
11:00	**Intervalo para Café**
11:15	**Painel I – Casos de Estudo de Aproveitamento dos Recursos Geotérmicos em Portugal** **Moderador** – (a indicar) **Aproveitamentos Geotérmicos em S. Pedro do Sul: situações atuais e perspetivas para o futuro** Diretor Técnico das Termas de São Pedro do Sul e Professor da Universidade da Beira Interior, L. M. Ferreira Gomes **40 Anos de Geotermia em Termas Portuguesas: o caso das Caldas de Chaves** Representante do Município de Chaves, J. Martins Carvalho **Aproveitamento Geotérmico Superficial do Ombria Resort** Consultora Técnica da Quinta da Ombria / SYNEGE, Rita Cerdeira Debate 15 min
12:15	**Percent – Promoção de Eficiência Energética em Energias Renováveis** Investigador auxiliar do Laboratório Nacional de Engenharia Civil, Armando Pinto
12:30	**Almoço Volante**
14:00	**Painel II - Recursos Geotérmicos no Mundo** **Moderador** – Prof. Alcides Pereira, Associação Portuguesa de Geólogos Orador da Agência Internacional de Energias Renováveis (IRENA) Global Geothermal Alliance * Orador do Conselho Europeu de Energia Geotérmica (EGEC) * Orador da Comissão Europeia - DGEnergia - Geothermal Communities * Debate 15 min
15:15	**Painel III – Aproveitamento de Recursos Geotérmicos na Europa** **Moderador** – Prof. Luís Coelho, Instituto Politécnico de Setúbal Orador do Instituto para a Diversificação e Desenvolvimento da Energia de Espanha (IDAE)* **Geothermal Energy - the italian experience** Diretor da Unidade de Minas, Hidrocarbonetos e Georecursos da Direção para a Segurança, Minas e Energia de Itália (DGS-UNMIG), Marcello Saralli **Developing the Geothermal Resource - the icelandic example** Diretor Geral da Autoridade Nacional de Energia da Islândia, Guðni A. Johannesson Debate 15 min
16:30	**Intervalo para Café**
16:45	**Painel IV – Empresas e Investimento em Geotermia na Europa** **Moderador** – Prof. Mário Machado Leite, Laboratório Nacional de Energia e Geologia Orador da Electricidade dos Açores (EDA)* Orador da Entidade Nacional para a Energia Elétrica de Itália (ENEL)* Debate 15 min
17:25	**Apresentação das Linhas Orientadoras das candidaturas a Aviso do FAI** - Estudos de Aproveitamento do Potencial Geotérmico Superficial em Portugal - Promoção da Utilização da Energia Geotérmica em Portugal Comissão Executiva do Fundo de Apoio à Inovação, Sebastião Oliveira Carneiro
17:45	**Visita ao Aproveitamento Geotérmico de São Pedro do Sul** - Opcional
19:00	**Sessão de Encerramento Auditório Principal** Presidente do Laboratório Nacional de Energia e Geologia, Teresa Ponce de Leão Intervenção do Secretário de Estado da Energia, Jorge Seguro Sanches Intervenção da Secretária de Estado do Turismo, Ana Mendes Godinho

** a confirmar*

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3. GEOTHERMAL RESOURCES - IMPLEMENTED STRATEGY

3

AVISOS

fai Fundo de Apoio à Inovação
Energias Renováveis e Eficiência Energética

Calls for the submission of applications for the granting of financial incentives in the form of non-refundable grants to projects in the Lower Enthalpy Geothermal Area.

- Call 04.1/2018 – Geothermal potential of hydromineral and geothermal resources

€ 300.000

- Call 05/2018 – Investments that enhance and value the use of Geothermal Resources

€ 1.700.000

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3. GEOTHERMAL RESOURCES - IMPLEMENTED STRATEGY

AVISOS

fai Fundo de Apoio à Inovação
Energias Renováveis e Eficiência Energética

- **Call 04.1/2018 – Geothermal potential of hydromineral and geothermal resources**

Objective: To assess the exploitation potential of hydromineral and geothermal resources and their use for T> 25ºC.

It is intended to obtain more detailed information about the possibility of geothermal use of the resource, namely for air conditioning, DHW production and heating of swimming pools, Spa buildings, hotels, etc., in order to make a better use of the resource.

3. GEOTHERMAL RESOURCES - IMPLEMENTED STRATEGY

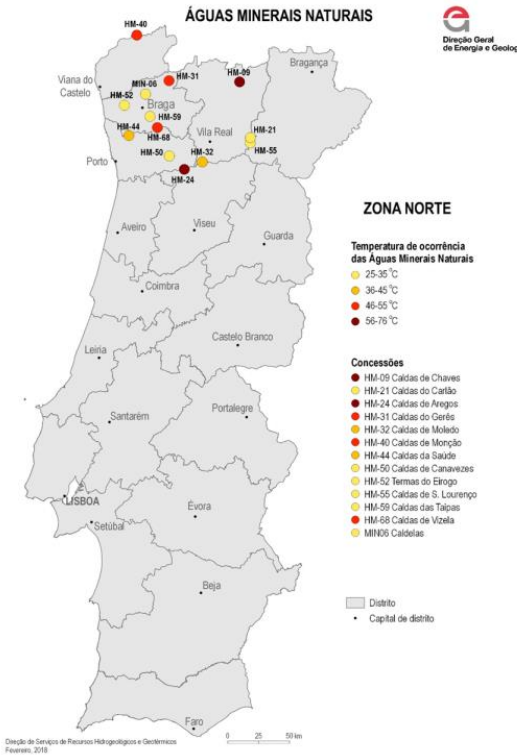
3

AVISOS

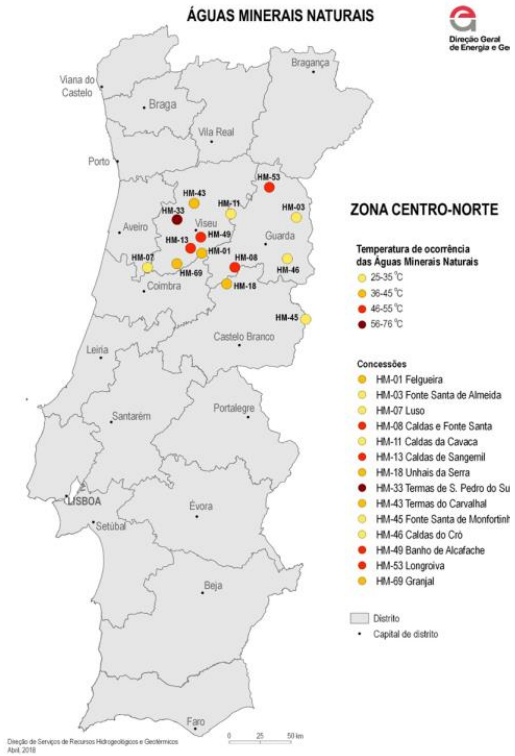
fai Fundo de Apoio à Inovação
Energias Renováveis e Eficiência Energética

- **Call 04.1/2018 – Geothermal potential of hydromineral and geothermal resources**

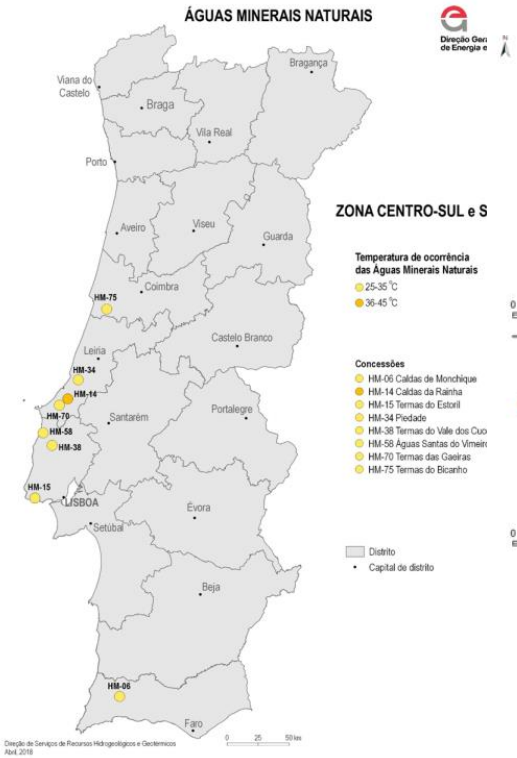
Zona Norte



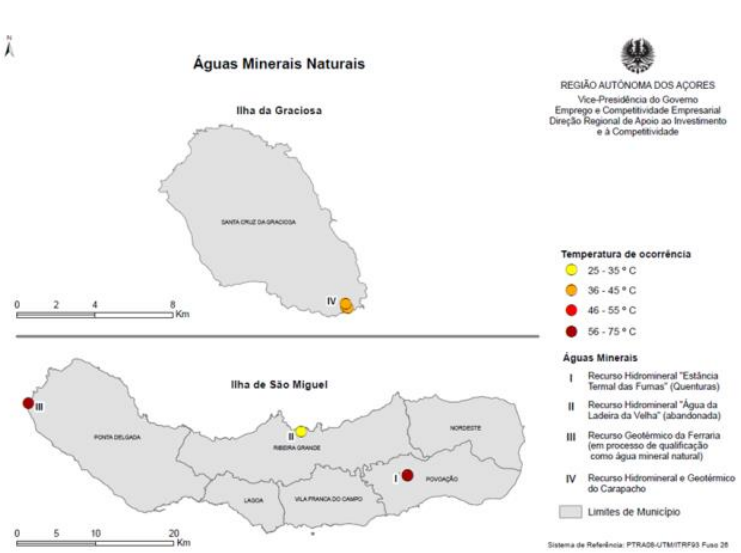
Zona Centro-Norte



Zona Centro-Sul e Sul



Açores



Direção-Geral de Energia e Geologia

3. GEOTHERMAL RESOURCES - IMPLEMENTED STRATEGY

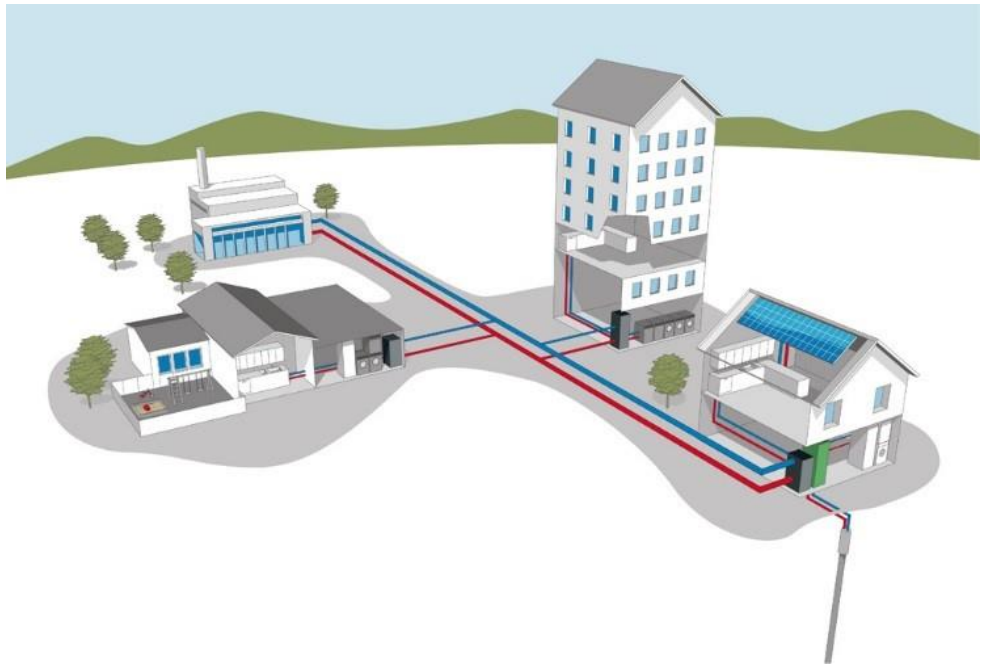
3

AVISOS

fai Fundo de Apoio à Inovação
Energias Renováveis e Eficiência Energética

- Call 05/2018 – Investments that enhance and value the use of Geothermal Resources

Objective: To make investments that enhance the use of geothermal resources, such as the development and expansion of the heat distribution network, connection to the heat distribution network of new users of this renewable source and the installation of equipment for the use of heat for air conditioning and / or DHW production.



Direção-Geral de Energia e Geologia

PROPOSED SHALLOW GEOTHERMAL LEGISLATION

Following the creation of a Working Group, coordinated by DGEG, and with the collaboration of various institutions related to the shallow geothermal theme, a draft law was developed for the legal regime of the exploration of surface geothermal resources with a view to its use for cold or heat production.

Direção Geral de Energia e Geologia
Agência Portuguesa do Ambiente
Laboratório Nacional de Energia e Geologia
Turismo de Portugal
Gov. Reg. Açores – Direção Regional de Apoio ao Investimento e à Competitividade
Governo Regional dos Açores – Direção Regional de Energia
Gov. Reg. da Madeira – Direção Regional de Economia e Transportes
Associação Nacional de Municípios Portugueses
Associação Portuguesa de Geólogos
Associação Portuguesa dos Industriais de Água Mineral Natural e de Nascente
Associação das Termas de Portugal
Ordem dos Engenheiros
Ordem dos Engenheiros Técnicos

4. GEOTHERMAL RESOURCES - LEGAL FRAMEWORK

D. L. n.º 560-C/76, july 16

- The energy crisis experienced at the beginning of the seventies of the last century, associated with the desire existing in the Azores archipelago to proceed with the geothermal use of the resources (for electricity production), led to the establishment of the first legal document concerning geothermia

1990 Legislative Package, March 16

- The development of low-enthalpy projects around the world and the realization that it was possible and desirable to make use of the resources available in mainland Portugal determined the establishment of a new legal framework, integrated into the legislative framework for geological resources. D.L. 90/90 and D.L. 87/90 have given new impetus to the sector, allowing the Administration to properly manage geothermal resources.

"high temperature fluids and geological formations of the subsoil, whose heat is susceptible to use"

Lei n.º 54/2015, june 22

- It slightly changes the definition of geothermal resources to "fan out" the so-called shallow geothermal systems.

"fluids and geological formations of the subsoil, whose temperature is susceptible to economic exploitation"

Shallow Geothermal Systems- Renewable Energy Legal Framework

Diretive 2009/28/CE– Renewable Energies–

• No. 4 do Article 5º: predicts that the energy collected by heat pumps can be accounted for in order to meet the 31% target of renewable energy in national energy consumption by 2020 (in accordance with Annex VII);

• No. 3 do Article 14º: provides that certification or equivalent qualification systems are available for installers of:

- Photovoltaic Systems;
- Thermal Solar Systems
- **Shallow geothermal systems**
- Bioenergy Systems
- Heat Pumps;

The Renewable Energy Directive was transposed into the domestic legal framework by D.L. No. 141/2010 of December 31, amended by D.L. No. 39/2013 of 18 March.

⇩

geothermal energy: "the energy stored as heat beneath the solid surface of the Earth"

Portugal has not regulated surface geothermal systems yet.

Shallow Geothermal Systems- Renewable Energy Legal Framework

Diretive (EU) 2018/2001, of11.12.2018 – Renewable Energy (recast)

• No. 3 do Article 7º: provides that the energy captured by heat pumps may be accounted for for the purpose of meeting the 2030 renewable energy target (in accordance with Annex VII);

• No. 3 do Artiche 18º: provides that certification or equivalent qualification systems are available for installers of:

- Small biomass boilers and ovens;
- Solar thermal systems;
- Heat pumps;
- Photovoltaic solar systems;
- **Shallow geothermal systems**

It must comply with the requirements set out in Annex IV to the Directive, including mutual recognition between EU Member States.

By 31 December 2021, the Commission shall adopt a methodology for calculating the amount of renewable energy used for district heating and cooling, and will revise Annex VII. This methodology shall include minimum seasonal performance factors for inverted cycle heat pumps.

Shallow Geothermal Systems- Renewable Energy Legal Framework

- In 2016 the Profile of Renewable Energy Thermal Systems Installer was created, within the scope of ANQEP's National Qualifications Catalog:
  - Solar Thermal Systems;
  - Bioenergy Systems;
  - Geothermal Heat Pumps Systems.

- The training of these technicians includes a Surface Geothermal module and, at the set of short training units, a 50 hour module for Surface Geothermal Systems.

4. GEOTHERMAL RESOURCES - DRAFT LEGISLATION

The promotion and development aspect of renewable energy is intertwined with other measures, involving the promotion of energy efficiency improvements, namely the focus on heating and cooling efficiency from endogenous renewable sources, such as geothermal energy, **in order to gradually replace fossil sources of heat and contribute to the achievement of the EU and Portugal targets and objectives in these areas.**

Whereas:

The dual role of geothermal energy in promoting renewable energy sources and improving the energy efficiency of buildings;

That high temperature geothermal resources already have a current legal framework,

more favorable conditions should be created for the development of initiatives aimed at harnessing shallow geothermal systems, usually of very low enthalpy, by its potential for exploitation through geothermal heat pumps for the production of heating and cooling.

4. GEOTHERMAL RESOURCES - PROJETO DE LEGISLAÇÃO

The application of D.L. No. 87/90 of March 16 to shallow geothermal systems would make their legalization very heavy.

A new lighter framework for the so-called shallow geothermal systems is intended, with the following concerns:

- Obtain the necessary data so that geothermal energy use can be accounted for in order to meet the targets set by Directive (EU) 2018/2001;
- Safeguard hydromineral resources / drinking water by giving a favorable opinion from DGEG and/or APA, given that certain types of facilities for the use of geothermal energy may interfere with the exploitation of these resources;
- Site identification, including georeferencing by hole coordinates in the PT TM06 / ETRS89 system.

Thank you for your attention

www.dgeg.gov.pt

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