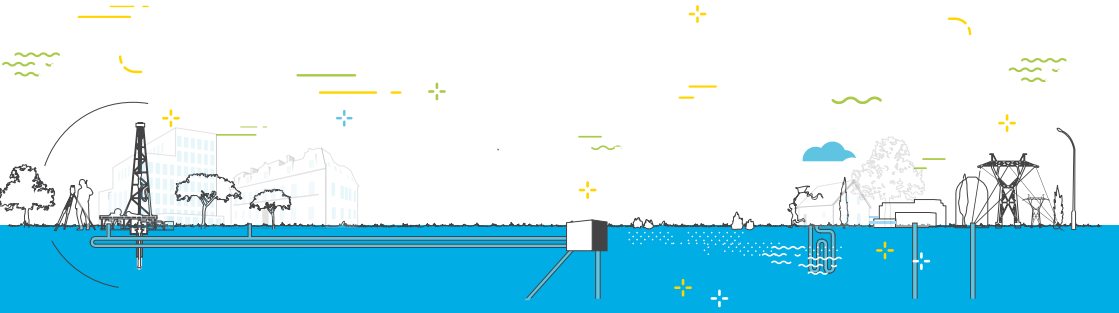



Geothermal energy, **the energy of tomorrow, starting today!**



GEOTHERMAL ENERGY IN FRANCE

Sector study 2023

OVERVIEW

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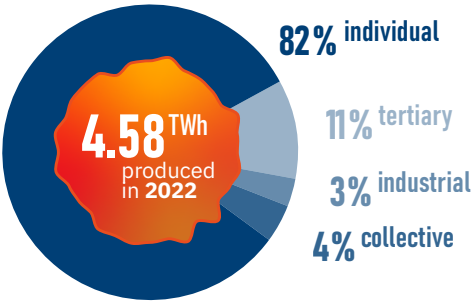
ASSOCIATION FRANÇAISE
DES PROFESSIONNELS DE LA GÉOTHERMIE

Shallow geothermal

Shallow geothermal energy exploits low ground temperatures of up to 30°C, amplified by a heat pump (PAC). It can be used for heating, domestic hot water, cooling (standby heat pumps) and cooling (amplified heat pumps). Shallow geothermal energy can be used in all sectors (collective residential, agricultural, industrial and tertiary), although the individual sector will account for 98% of installations by 2022.

205,300 installations by surface geothermal energy

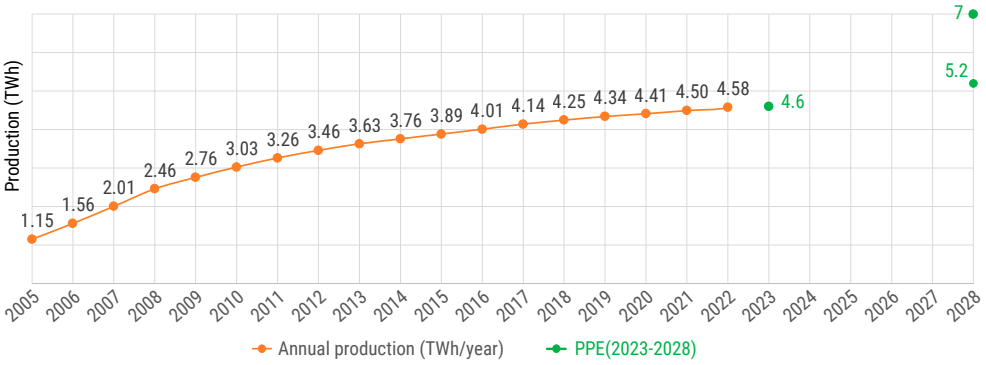
of wich **98 %** of installations in **individual sector**



The individual sector accounts for 98% of geothermal heat pump installed and contributes to 82% of the total energy produced by shallow geothermal energy.

The significant potential of geothermal energy development in all sectors could make it possible to meet or even exceed the objectives of the PPE*.

** strategic document for steering France's energy transition*

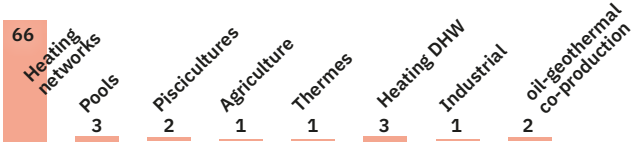


Annual production (TWh/year) of **shallow geothermal** energy in mainland France since 2005 and PPE 2023-2028 forecasts and objectives

Deep geothermal
Heat production

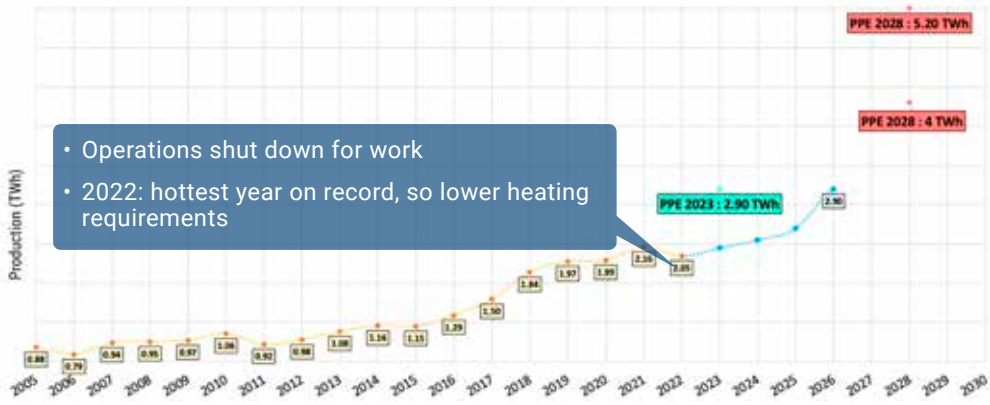
Deep geothermal energy uses groundwater at temperatures above 30°C to supply, in most cases, heating networks (which account for 87% of the energy produced). On a national level, this represents 6% of the energy delivered by heating networks. But geothermal energy can also be used to heat swimming pools, industries and greenhouses, or to extract heat from oil wells at the same time.

79 operations in 2022



In 2022, France has produced 2.05 TWh. 83% of this energy was generated by operations located in the Paris basin, 8% by operations in the Aquitaine basin and 9% by two operations located outside the Paris basin and Aquitaine basin (including the Rittershoffen plant in Alsace, which produces 182,000 MWh/year).

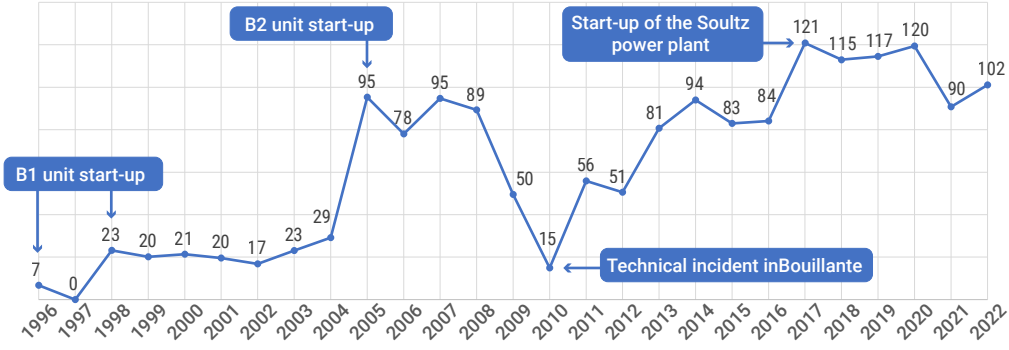
Bassins	Number of operations	Equivalent residential unit	Geothermal production (MWh/an)
Paris bassin	55	315,229	1 697,376
Aquitaine bassin	22	36,146	155,713
Other regions	2	19,940	193,576
Total	**79**	**371,315**	**2,046,665**



Annual production (TWh/year) of **deep geothermal** energy in France since 2005, PPE 2023-2028 forecasts and objectives

Deep geothermal
Power generation

At temperatures above 150°C, it is possible to generate electricity directly or indirectly, possibly coupled with simultaneous heat production. In France, there are two power plants: Bouillante in Guadeloupe, with two production units, Bouillante 1 (B1) and Bouillante 2 (B2) (installed capacity: 15.5 MW), and Soultz-sous-Forêts in Alsace (installed capacity: 1.7 MW).



Net annual electricity production (GWh/year) at the Bouillante power plant since 2005

In the near future, unit B1 bis will be built at Bouillante, adding 10 MW to the two existing units.

Consult and download the full study on
www.afpg.asso.fr
in French only!

Deep geothermal
Lithium géothermal

In France, dissolved lithium is present in many deep geothermal reservoirs. If these reservoirs are already exploited by geothermal installations (whether for heat or electricity production), it makes sense to optimize heat production by extracting geothermal lithium.

The «Eugeli» (European Geothermal Lithium Brine) project, launched in 2019 as the first direct geothermal lithium extraction pilot, has enhanced the first kilograms of lithium via the Soultz-sous-Forêts power plant. This first in Europe would enable production of 2,000 tonnes of lithium carbonate per year.

205,300 installations in shallow geothermal energy

4.58 TWh of heating and cooling from surface geothermal energy

including **3,500** new installations by 2022

of wich

3,300 installations in the **individual sector**

+

45 installations in the **collective sector**

5 installations in the **agricultural sector**

12 installations in the **industrial sector**

162 installations in the **tertiary sector**

Shallow geothermal energy

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Deep geothermal energy

Heat production

79 operations

1 million of people heated in France

2.05 TWh generated by deep geothermal energy

Power generation

2 power plants

15.5 MW in Bouillante (Guadeloupe)

1.7 MW in Soultz-sous-Forêts (Alsace)

Geothermal lithium

Eugeli Project in Soultz-sous-Forêts

production of **2,000 tons** of lithium carbonate per year = **140,000** lithium batteries

Upcoming projects

22 research permits in mainland France

7 research permits in the French overseas territories

L'AFPG

Geothermal energy, **the energy of tomorrow, starting today!**

AFPG is the organization representing French geothermal professionals. It also contributes to the promotion of this renewable, local, low CO_2-emitting energy as a tool of energy independence and as a solution for fighting global disruption and adapting to its consequences.

Founded on June 15, 2010 in Paris, the AFPG has over 130 members representing the various geothermal energy professions in mainland France and the French overseas departments and territories: drillers, heat pump manufacturers and installers, heat network managers, engineering office, universities and research organizations, equipment manufacturers, investors, etc.

It is organized into 2 sectors:

- Shallow geothermal energy
- Deep geothermal energy

These missions are as follows:

- Represent and federate industry professionals in mainland France and the French overseas territories,
- Inform local authorities, professionals and private individuals about the resources and diversity of the geothermal offer,
- Support public authorities in terms of regulations, legislation and qualifications,
- Promote geothermal jobs,
- Structure and promote the French geothermal industry for export.

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Our clusters :

- **Geodeep:** dedicated to exporting French geothermal expertise
- **Alliance Lithium:** to promote and structure the geothermal «green» lithium
- **France Géoénergie :** geoenergy for its users