

**208,000** installations in shallow geothermal energy

**4.70 TWh** of heating and cooling from shallow geothermal energy

including **4 150** new installations in 2023

of which **3 900** installations in the individual residential sector

**250** installations in the collective, agricultural and industrial sectors

which represent around **500** new geothermal heat pumps installed

**Shallow geothermal energy**



**Deep geothermal energy**

Heat production **73** operations

**1 million** of people heated in France

Power generation **2** power plants

**15.5 MW** in Bouillante (Guadeloupe)

**1.7 MW** in Soultz-sous-Forêts (Alsace)

Geothermal lithium an Alsatian project

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

**2.26 TWh** generated by deep geothermal energy

Upcoming projects in mainland France **19** Geothermal research permits

**7** Lithium research permits

**8** Geothermal research permits in French overseas territories

**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<sub>2</sub>-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<sup>th</sup>, 2010 in Paris, AFPG has over 150 members representing the various geothermal energy professions in France mainland and the French overseas departments and territories: drillers, heat pump manufacturers and installers, heating 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 jobs,
- Structure and promote the French geothermal industry for export.

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**LinkedIn** Follow our AFPG profile to keep up to date on French geothermal news.

**Our clusters :**

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



Geothermal energy, the energy of tomorrow, today!



GEOTHERMAL ENERGY IN FRANCE

Sector study **2024** OVERVIEW



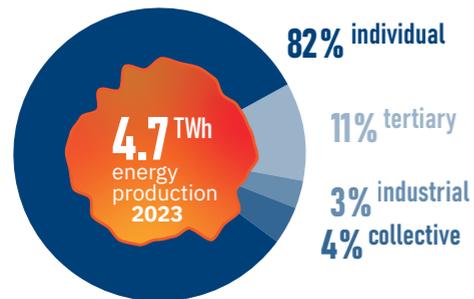


## Shallow Geothermal Energy

Shallow geothermal energy exploits low ground temperatures of up to 30°C, which are further increased by the use of a heat pump (PAC). It can be used for heating, domestic hot water, cooling (heat pump on standby) and cooling (heat pump in operation). Shallow geothermal energy can be used in all sectors (individual and collective residential, agricultural, industrial and tertiary), although the individual sector accounts for 94% of installations by 2023.

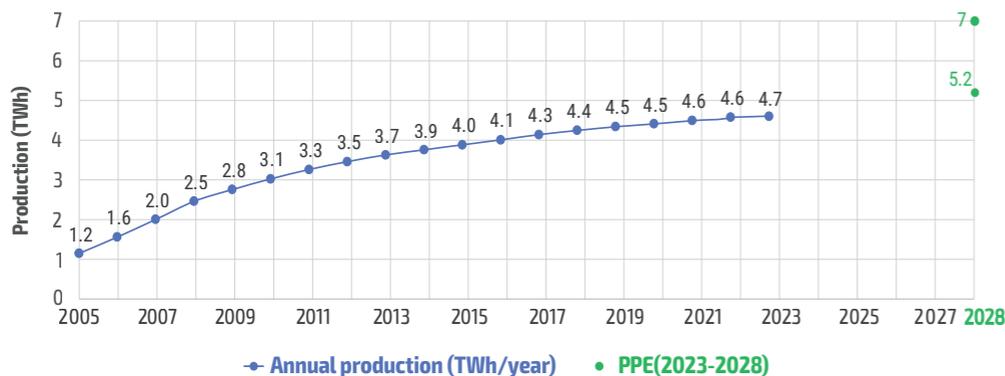
**208,000** installations by surface geothermal energy of which **94%** of installations in individual sector

The individual sector accounts for 94% 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\*.

\*Multiannual Energy Program (PPE) : Strategic document for steering France's energy transition



Annual shallow geothermal energy production (TWh/year) in mainland France since 2005 and PPE 2023-2028 projection targets



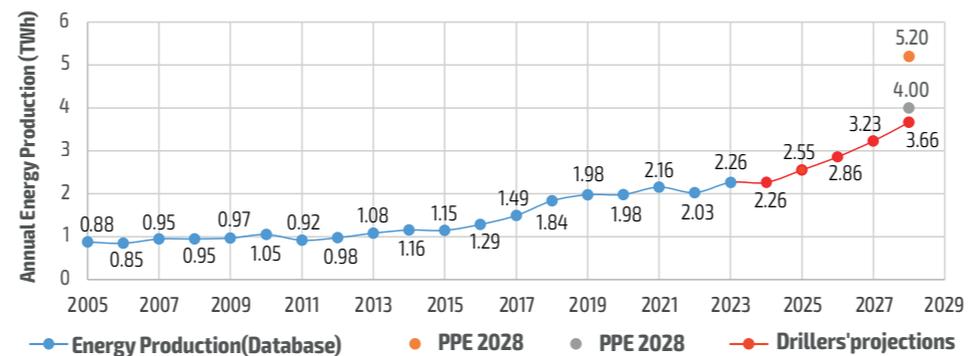
## Deep Geothermal Energy Heat Production

Deep geothermal energy uses groundwater at temperatures above 30°C to supply heating networks (which account for 89% of the energy produced). On a national level, this represents 6% of the energy delivered to heating networks. **However, geothermal energy can also be used to heat swimming pools, greenhouses, industries.**



In 2023, France produced **2.26 TWh**. 86% of this energy was generated by operations located in the Paris basin, 5% by operations in the Aquitaine basin and **8% by one operation (Rittershoffen plant in Alsace, which produces 182 GWh/year). The last 1% correspond to one operation in South-East Basin.**

Basins	Number of operations	Housing Equivalent	Geothermal Energy Production (MWh/year)
Paris basin	55	195 132	1 951 320
Aquitaine basin	16	11 994	119 935
Other regions	2	19 358	193 576
<b>Total</b>	<b>73</b>	<b>226 483</b>	<b>2 264 831</b>

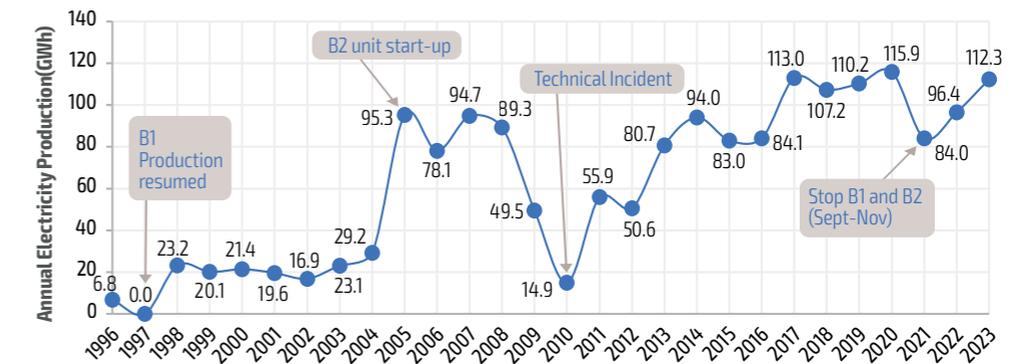


Annual deep geothermal production in France (TWh/year) since 2005 and projections up to 2028 and PPE 2028 targets



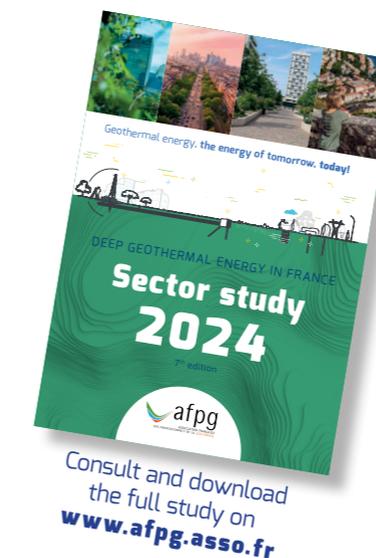
## Deep Geothermal Energy Electricity Production

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 geothermal 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).



Annual net electricity production (GWh/year) at the Bouillante power plant since 1996

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



## Deep Geothermal Energy Geothermal Lithium

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 extracted the first kilograms of lithium via the Soultz-Sous-Forêts power plant. This first in Europe would enable production of 2,000 tons of lithium carbonate per year.