

# What is a Ground Source Heat Pump (GSHP)?

**A Ground Source Heat Pump (GSHP) is a renewable energy system that extracts heat from the ground to provide heating, cooling, and hot water for residential and commercial buildings. It operates by circulating a fluid through a loop of underground pipes (ground loop) to absorb heat from the earth, which is then compressed and transferred into the building via a heat exchanger.**

GSHPs are widely used in the UK house building, residential retrofit, home renovation, and extension sectors as a sustainable alternative to traditional heating systems. They are particularly effective in well-insulated buildings and are aligned with the UK's net-zero carbon targets.

**Synonyms:** Geothermal Heat Pump, Earth-Coupled Heat Pump

GSHPs leverage the relatively stable temperature of the ground (typically 10-12°C in the UK) to provide efficient heating and cooling. The system consists of three main components:

1. **Ground Loop:** A series of pipes buried underground, either horizontally or vertically, which absorb heat from the ground.
2. **Heat Pump Unit:** Compresses the absorbed heat to a higher temperature and transfers it to the building's heating system.
3. **Distribution System:** Delivers the heat via radiators, underfloor heating, or air ducts.

## **Practical Examples:**

- A detached house in Surrey retrofitted with a GSHP reduced its annual heating costs by 40% while lowering carbon emissions.
- A new-build housing development in Scotland incorporated GSHPs to meet Part L of the Building Regulations, achieving an Energy Performance Certificate (EPC) rating of A.

## **Related Terms:**

1. **Air Source Heat Pump (ASHP):** Extracts heat from the outside air rather than the ground.
2. **Heat Exchanger:** A device that transfers heat between two or more fluids.
3. **Underfloor Heating:** A heating system installed beneath the floor, often used with GSHPs for efficient heat distribution.
4. **Building Regulations Part L:** UK regulations governing the conservation of fuel and power in buildings.
5. **Energy Performance Certificate (EPC):** A certificate that rates a building's energy efficiency.
6. **Renewable Heat Incentive (RHI):** A UK government scheme that provides financial incentives for renewable heating systems, including GSHPs.
7. **Net-Zero Carbon:** A target to balance the amount of greenhouse gases emitted with the amount removed from the atmosphere.