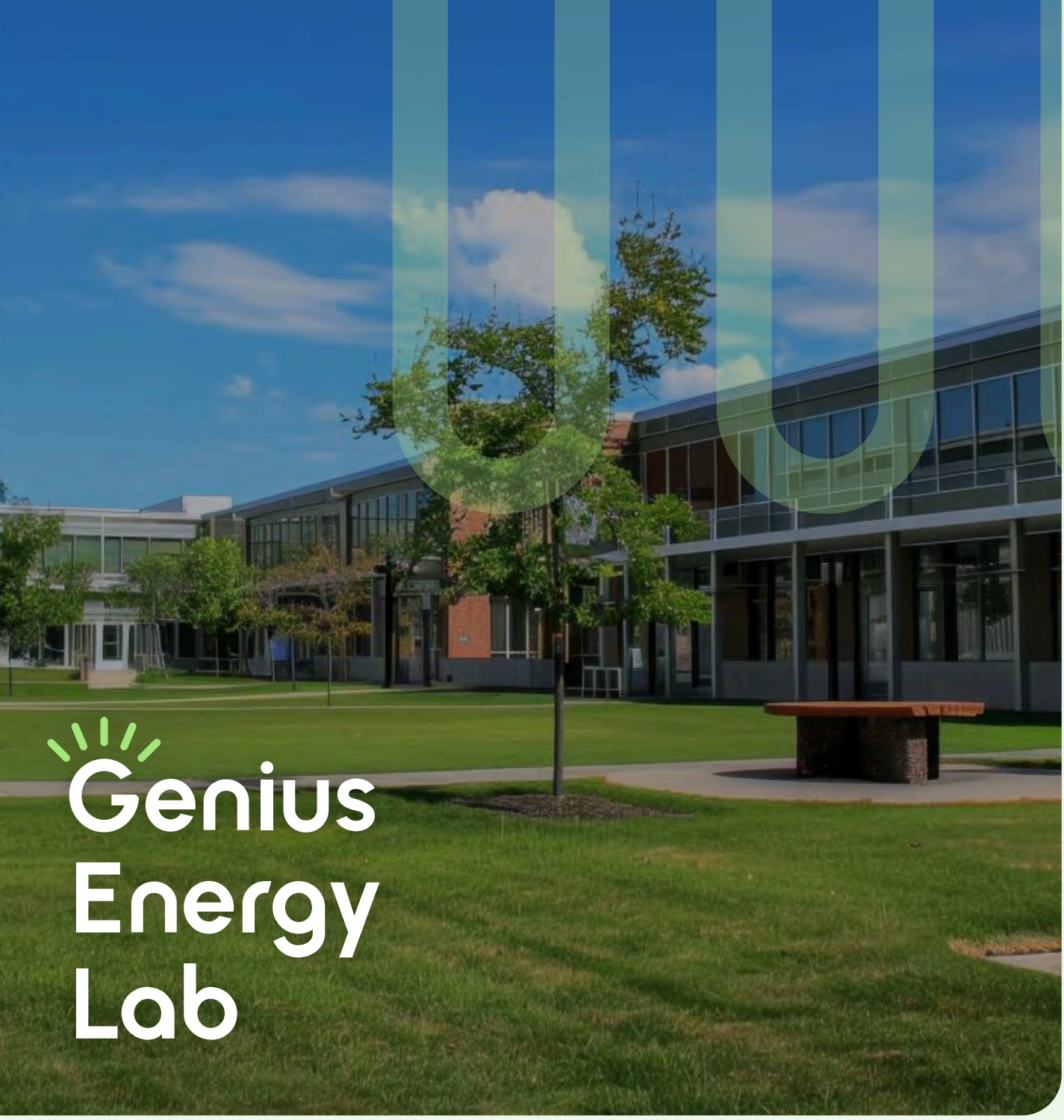


A Practical Guide for Bid & Design Teams

Ground Source Heating for DfE Schools

What it is. Why it fits schools. And where we can leverage 2 decades of experience to ensure successful outcomes by reducing and eliminating risk.

What is a GSHP System?

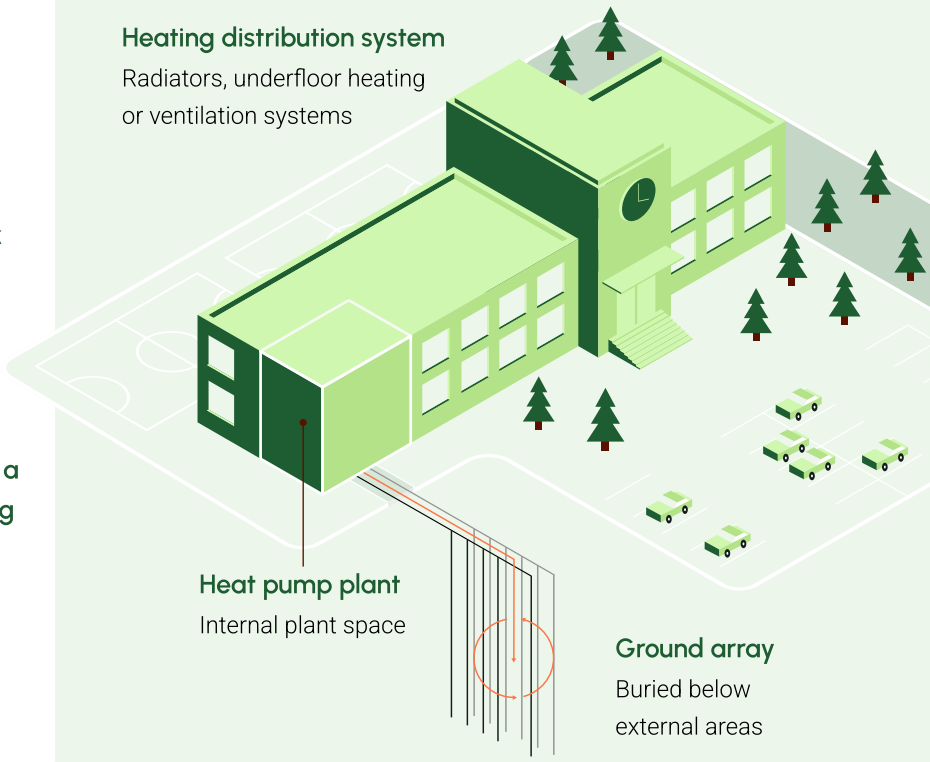
A Ground Source Heat Pump (GSHP) system uses the stable temperature of the ground to provide heating - and, where designed, cooling - to a building.

It works by:

- **Circulating fluid through buried pipework (the ground array)**
- **Absorbing low-grade heat from the ground**
- **Using a heat pump to move that heat to a higher temperature for use in the building**

The system moves heat rather than generating it through combustion, which supports fossil-fuel-free heating strategies required under current DfE output specifications.

How it fits into a school building



Why it makes sense in schools

New-build schools delivered under the DfE framework typically share characteristics that align well with GSHP systems:

- ✓ **Consistent daytime heat demand during term time**
- ✓ **Long asset lifecycles**
- ✓ **Clear operational energy targets and performance-in-use expectations**
- ✓ **External areas available for borehole or ground array placement**
  (subject to site review)

When considered early in design, GSHP systems can integrate cleanly into school layouts without compromising programme or space planning.

Key Performance Characteristics:

High seasonal efficiency
Heat pumps deliver four units of heat for every unit of electricity consumed - making them around 400% efficient.

100+ year ground array lifespan
The buried pipework infrastructure is long-life capital investment.

Low visual and acoustic impact
All major infrastructure is below ground or within internal plant space.

Supports fossil-fuel-free heating strategies
Aligned with DfE requirements for new school projects.

Planning a school project under the DfE framework?

Book 20 minutes with our technical team to sanity-check whether GSHP is viable for your site here.

Where Delivery Risk Sits for DfE School Projects

On new-build schools, most GSHP delivery risk sits not with technology itself, but in **timing, assumptions and coordination.** Below is what typically creates friction and how to mitigate that.

Common Risk Areas:

Risk Area	What It Looks Like in a Bid or Live Project	How to Reduce It Early
Late inclusion	GSHP introduced after layout and cost plan are largely fixed	Confirm GSHP viability during early-stage feasibility & design
Ground assumptions	Early feasibility based on incomplete or misinterpreted ground data	Use structured desktop assessment first, then use Thermal Response Testing (TRT) where appropriate to generate live thermal conductivity data and refine design
Land take / space	External areas insufficient or poorly located	Map array zones alongside landscape and drainage early
Budget alignment	Early cost plans underestimate drilling scope, array depth or electrical upgrades	Size systems against realistic load modelling and validated ground data; align performance targets with cost expectations before submission
Programme coordination	Drilling and groundworks sequencing clashes with wider project	Integrate borehole installation into overall phasing strategy and work with experts to identify highly qualified drilling contractors
Buildability & compliance	Array design not achievable in local geological conditions or by available drilling teams	Align performance modelling with realistic drilling depths, spacing and site access constraints
Interface ownership	Unclear responsibility between M&E, civils and groundworks	Allocate technical interfaces and responsibilities early
Operational handover & OPEX performance	System handed over without clear monitoring, optimisation and maintenance strategy	Define monitoring, controls logic, and performance verification approach pre-handover; ensure OPEX teams understand seasonal optimisation requirements and performance benchmarks
Performance expectations	Modelled performance assumptions not aligned with operational targets	Align design assumptions with DfE operational energy requirement

Early Checks That Strengthen a GSHP Position in a Bid

Before submission, a robust GSHP position in a DfE bid should demonstrate both technical credibility and commercial viability.

A well-developed proposal should be able to answer:

- [ ] Has likely array space been identified and protected within the site layout?
- [ ] Has desktop ground data been reviewed and, where appropriate, validated to reduce sizing assumptions?
- [ ] Are plant space, electrical capacity and controls assumptions clearly defined?
- [ ] Are key technical interfaces mapped and allocated?
- [ ] Have domestic hot water, heating and cooling loads been accurately modelled against real occupancy patterns?
- [ ] Are operational energy targets reflected in system sizing and control strategy?
- [ ] Has capital cost been aligned with realistic drilling scope, electrical upgrades and distribution requirements?
- [ ] Are operating cost assumptions (COP, seasonal performance, maintenance) aligned with how the system will actually be used?
- [ ] Does the financial model demonstrate that the scheme remains viable within funding and investment boundaries?

If these questions are answered clearly, GSHP shifts from an “alternative heating option” to a credible, deliverable strategy.

Genius Energy Lab

Experience with Education Projects & DfE

Genius Energy Lab supported the Department for Education on an £18.6m decarbonisation pilot across seven schools in Northern England, developing ground source heat pump strategies across a range of existing sites - including complex retrofit environments.

Our role spanned concept development, feasibility, detailed design and implementation oversight, with a focus on compliance, coordination and long-term performance.

You can read more about the DfE pilot and our wider education work **here.**

We also support contractors and consultants on both retrofit and new-build education schemes, providing early-stage GSHP input that strengthens bids and reduces uncertainty as projects progress.

What's Next?

Planning a DfE school project?

Book a short call with our technical team to discuss GSHP viability, ground assumptions and early design coordination for your scheme.

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