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Thermal Energy Storage and Generation

Grounding the
energy transition

Energy Pile

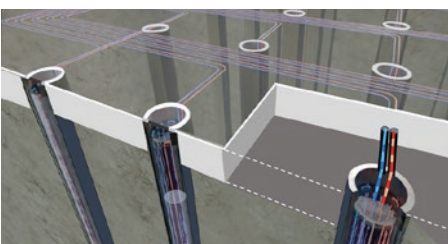
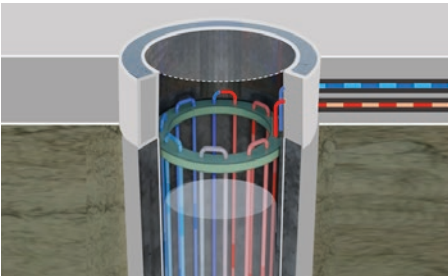
Grounding the energy transition

Harnessing ground-source energy, coupled with the latest heat pump technology, Hiperenergy foundation systems achieve outstanding operational carbon reductions. Ground-source energy solutions, boasting efficiencies twice that of air-source systems, form the bedrock of Hiperenergy’s sustainable approach.



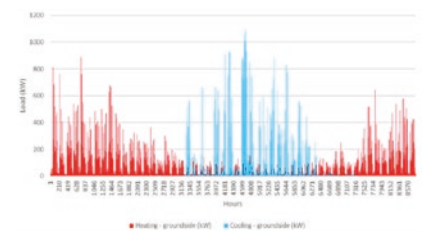
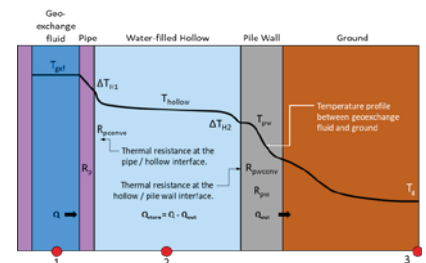
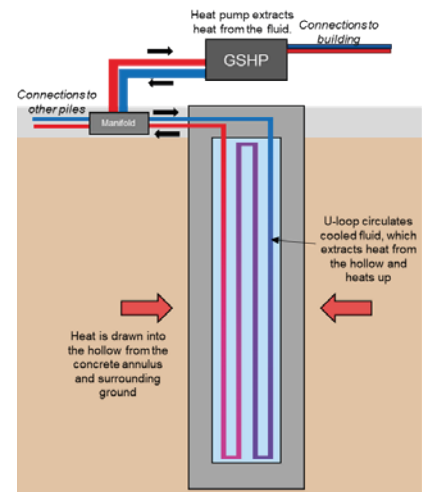
The patented Hiperpile utilises the high thermal capacity of a water-filled void to store thermal energy in the short term. This enables the foundation itself to provide extremely high, short-term peak loads whilst also meeting annual base load demands.

The system mitigates daily, weekly, seasonal and annual on and off-peak demands for a range of building use cases.



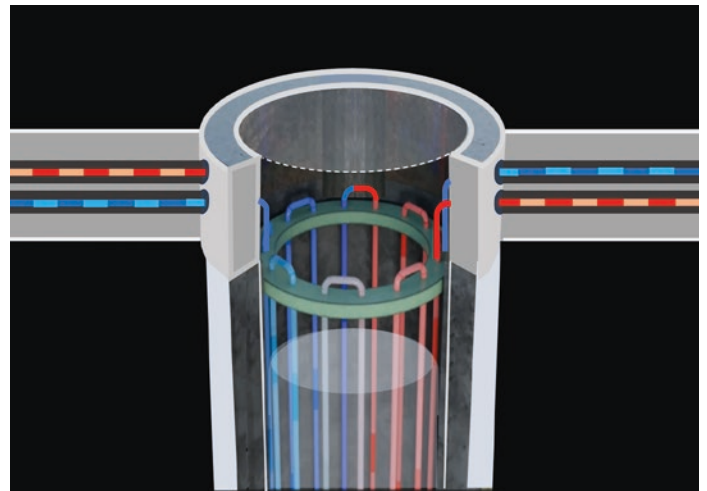
Technical benefits and features

- Once piling is complete, the central void is accessed and filled with a thermal fluid (such as water)
- The pile diameter governs the total number of heat transfer loops installed into the void, connected to a single inlet and outlet port
- A detailed design ensures optimum performance for the entire building system
- A conservative modelling approach ensures the system can meet building requirements in the short, medium and long-term based on accurate and realistic load profiles
- During operation thermal energy is used to heat and cool buildings and provide hot water
- Hiperpile transfers heat energy to and from the ground, utilising the consistent ground temperatures
- High coefficients of performance (COP) are delivered through the GSHP system
- Hiperpile stores thermal energy for short periods within the water-filled void
- For consistent, long-term performance optimal efficiencies are ensured against the thermal design
- An integrated approach is taken to incorporate the ground source energy into the wider M&E building management system



Tangible benefits

- Ground source energy achieves COP upto 6.0; twice that of typical air source systems
- A greater COP results in efficient and sustainable energy solutions, reducing operational costs and carbon emissions
- Hiperpile's are 80% more efficient than traditional, solid thermal piles, providing greater peak loading capacity than energy boreholes
- Geothermal loops enable dual-capability foundation assets, providing heating and cooling which can be traded within an energy network
- High thermal conductivity and large fluid volume act as large thermal stores
- Thermal energy piles provide potential for an increase in net lettable space for developers
- Hiperpile reduces construction programmes when compared to ground source boreholes
- Loops are installed after piling is complete significantly reducing the risk of damage during follow-on works
- Design life of up to 50 years
- Warranties on performance are provided



Achievable Peak Capacity Summary Table – (Indicative)

Pile Diameter (mm)	4hr Peak				8hr Peak				12hr Peak			
	Lower Bound		Upper Bound		Lower Bound		Upper Bound		Lower Bound		Upper Bound	
	kW/pile	kW/m	kW/pile	kW/m	kW/pile	kW/m	kW/pile	kW/m	kW/pile	kW/m	kW/pile	kW/m
900	4	0.14	8	0.31	3	0.12	6	0.22	3	0.11	5	0.19
1200	8	0.30	16	0.65	7	0.26	12	0.47	6	0.23	10	0.41
1500	13	0.50	27	1.08	11	0.43	20	0.78	10	0.39	17	0.68
1800	22	0.89	48	1.92	19	0.77	35	1.39	17	0.69	30	1.21

In summary

The geothermal performance of Hiperpile is linked to variables such as building requirements, pile specifications, ground characteristics, and supplementary energy sources.

Hiperenergy has the expertise to evaluate and provide recommendations for all scenarios.

System design performances are supported by computer modelling, on-site testing, and warranties.

For further information and specific project queries, please get in touch with us.



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