

Challenges & Opportunities



Exploiting mine water energy to decarbonise the housing stock

Bolsover Castle



The Beast of Bolsover





Social Inequalities

- **75% of residents report being satisfied with their neighbourhood which is lower than the average across England of 79.3%.**
- **25% of people have a limiting long-term illness in Bolsover District, compared with 18% across England.**
- **19% of children are living in poverty in Bolsover District compared with 17% across England.**
- **Overall, the health deprivation in Bolsover District is 34.7% compared to 19.8% across England.**



WOODHEAD
CONSTRUCTION

20% faster than traditional builds 

 **80%** less carbon emissions

Built to **2025** building standards 

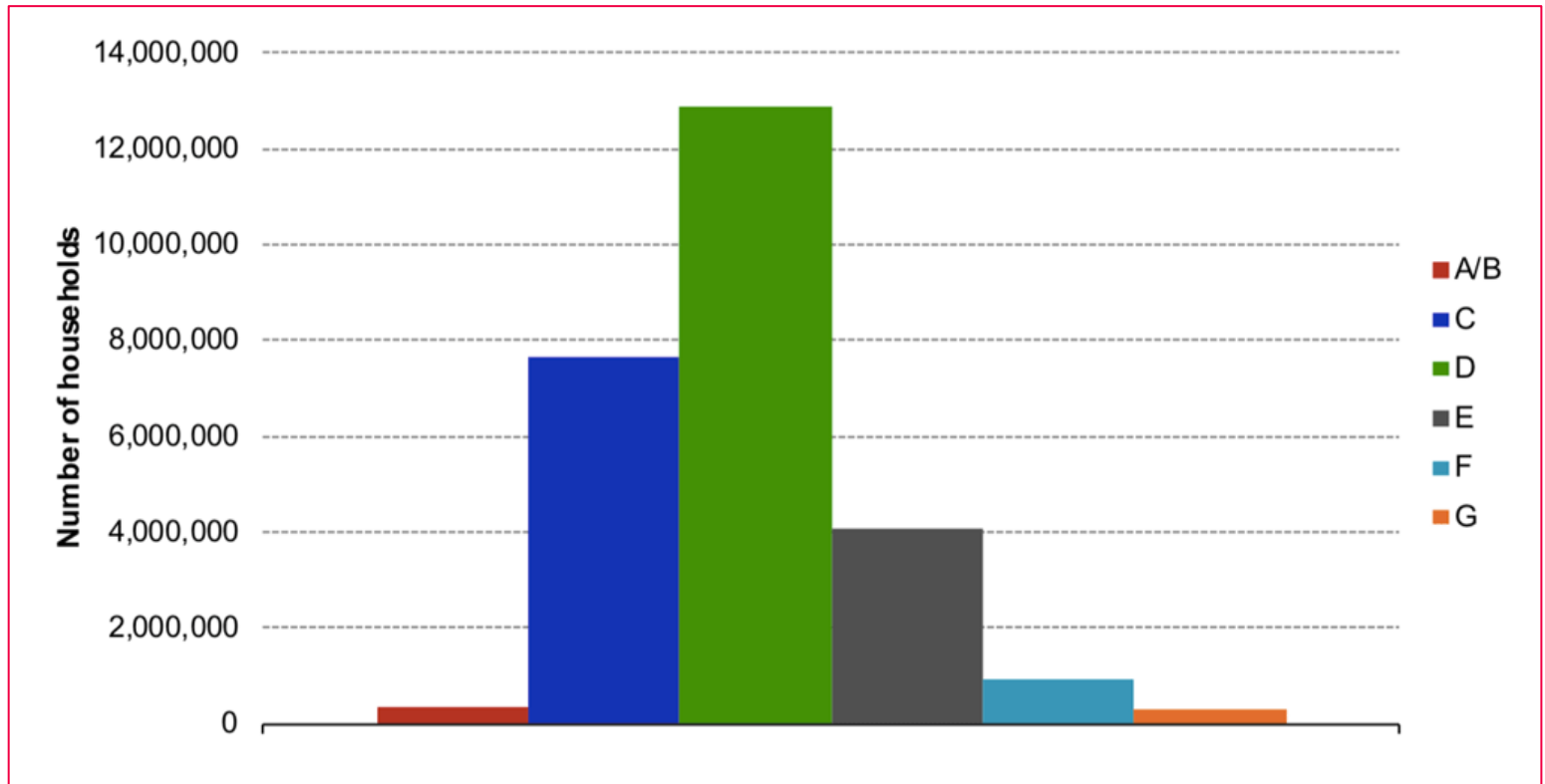
Bolsover
District Council



Future Homes

- **The national Future Homes Standard requires reductions in building emissions starting in 2025.**
- **Our future homes achieve early compliance with a 19-home development in Whaley Thorns.**
- **Each home includes low-emission features like wood frames, structured insulated panels, and air-source heat pumps.**
- **Off-site assembly increases construction speed by 20%, while eco-friendly design reduces emissions by 80% compared to other council homes**

Homes account for around 15% of the UK's emissions...

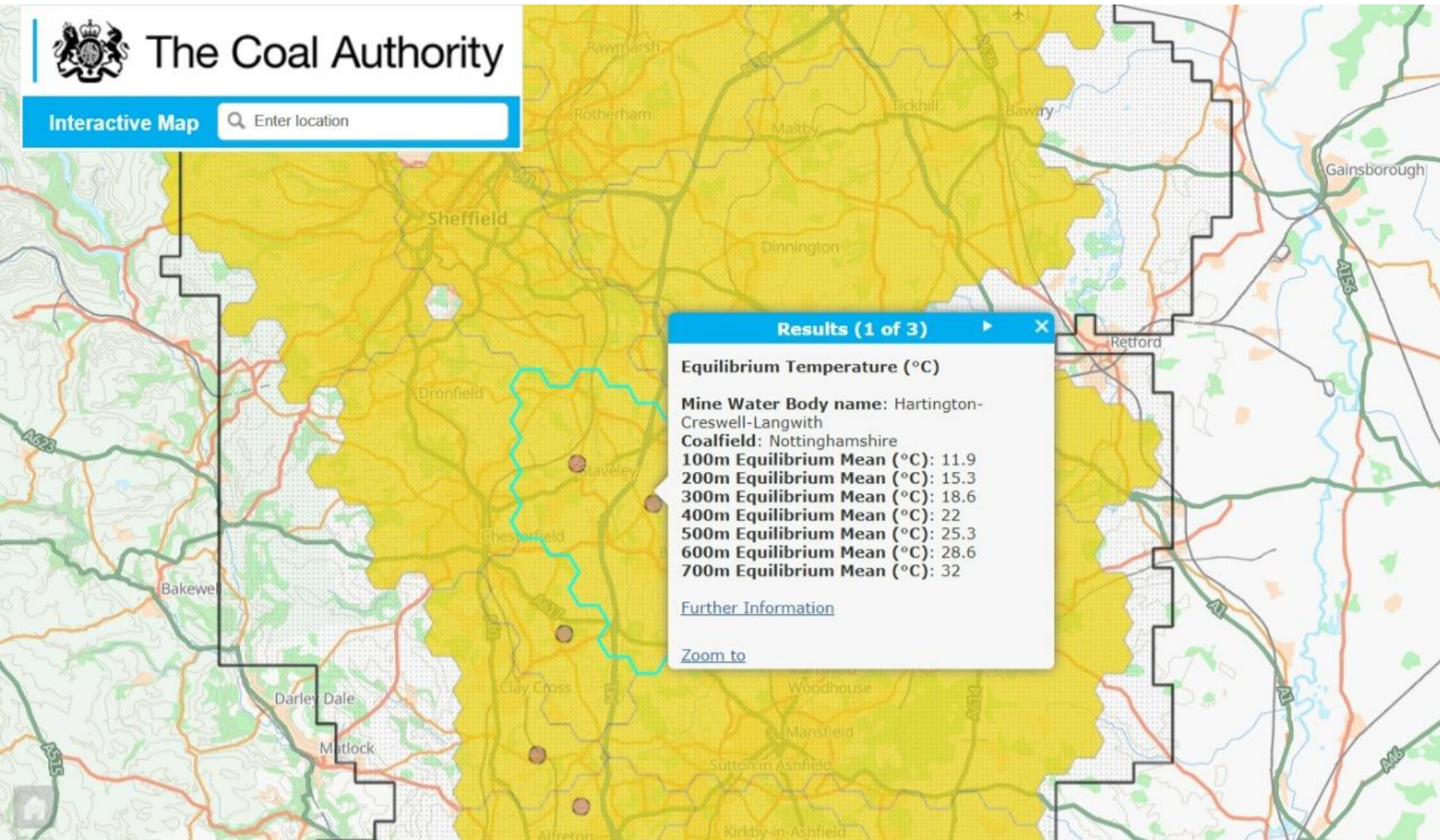


Distribution of EPC certificates in 2016.
Source: CCC 2019



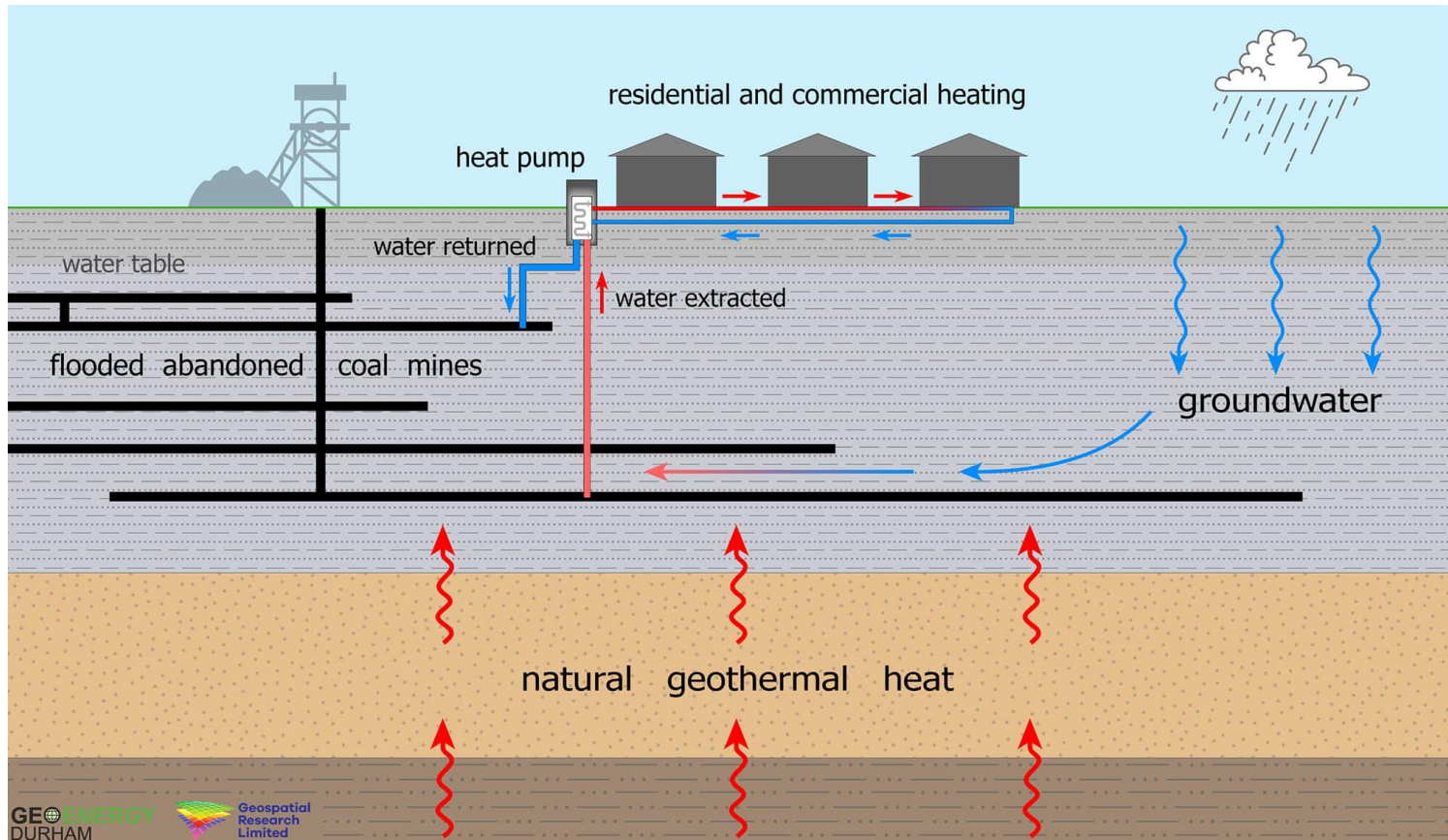
Energy in transition

- **While the crises share the same root causes and solutions, we're seeing a rise in potent and persuasive narratives that pit tackling climate against tackling the cost-of-living crisis.**
- **Evidence and logic point to moving away from unaffordable oil and gas. But to make this happen facts need to be woven into a clear and compelling story that effectively connects the climate and the cost-of-living crises.**
- **This is essential if we're to build and maintain strong support for an affordable, clean energy future - as well as immediate financial relief.**

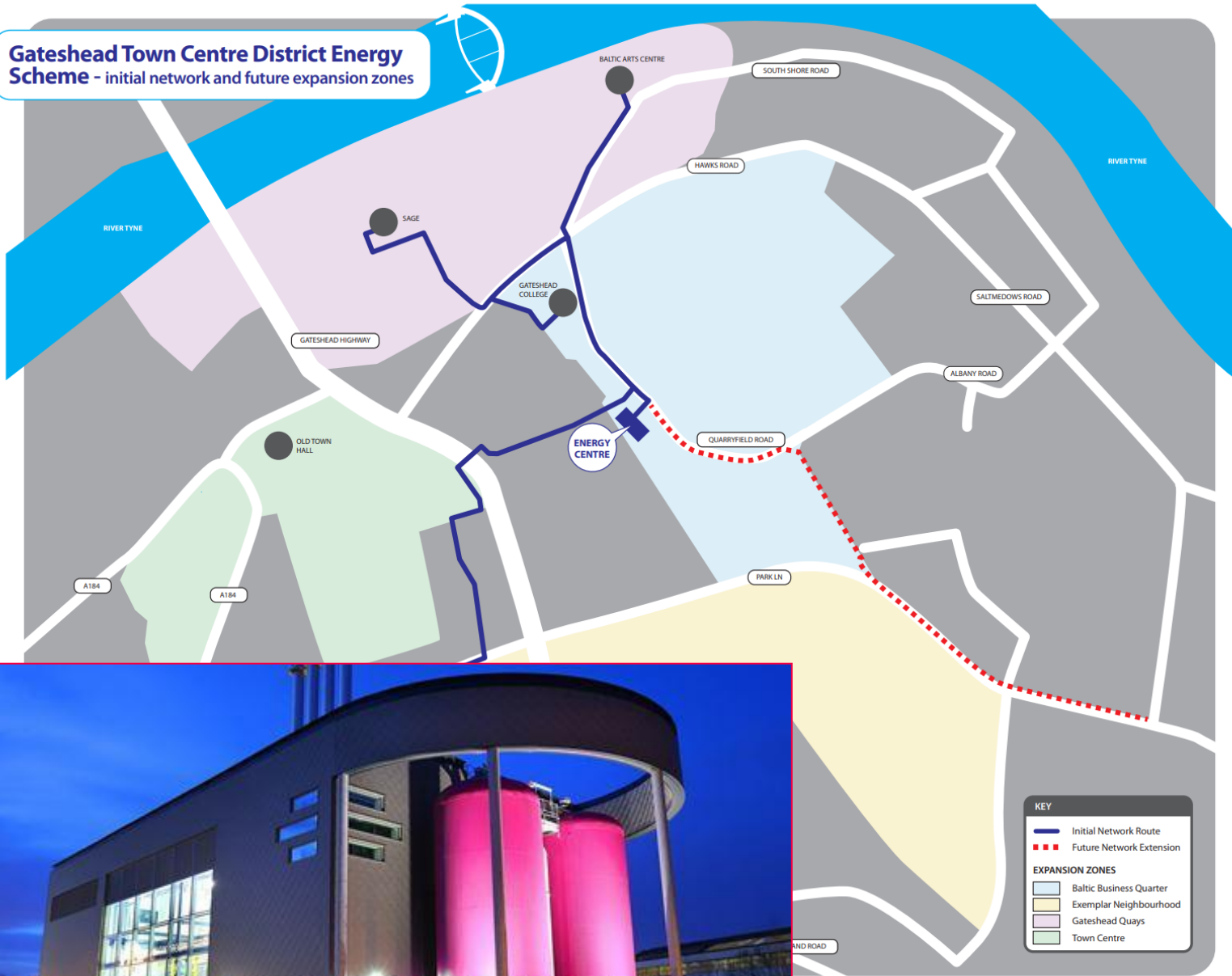


Bolsover is wholly located within a former coalfield – but 25% of all homes and businesses in the UK are located above former coal mines.

The basic principles ...



Gateshead Town Centre District Energy Scheme - initial network and future expansion zones

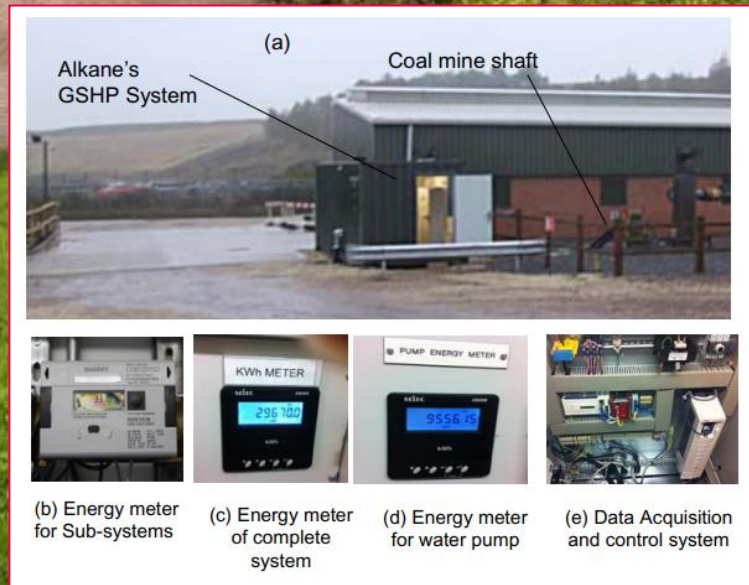


Seaham Garden Village



With mine water temperatures unaffected by seasonal variations, there is a potential 6MW of low cost, low carbon sustainable energy available for local space heating use from the Dawdon treatment scheme all through the year.

Markham Vale Environment Centre





Bolsover

District Council



The Coal
Authority



WELBECK



UNIVERSITY OF
DERBY

Local
Government
Association

HOUSING ADVISERS
PROGRAMME

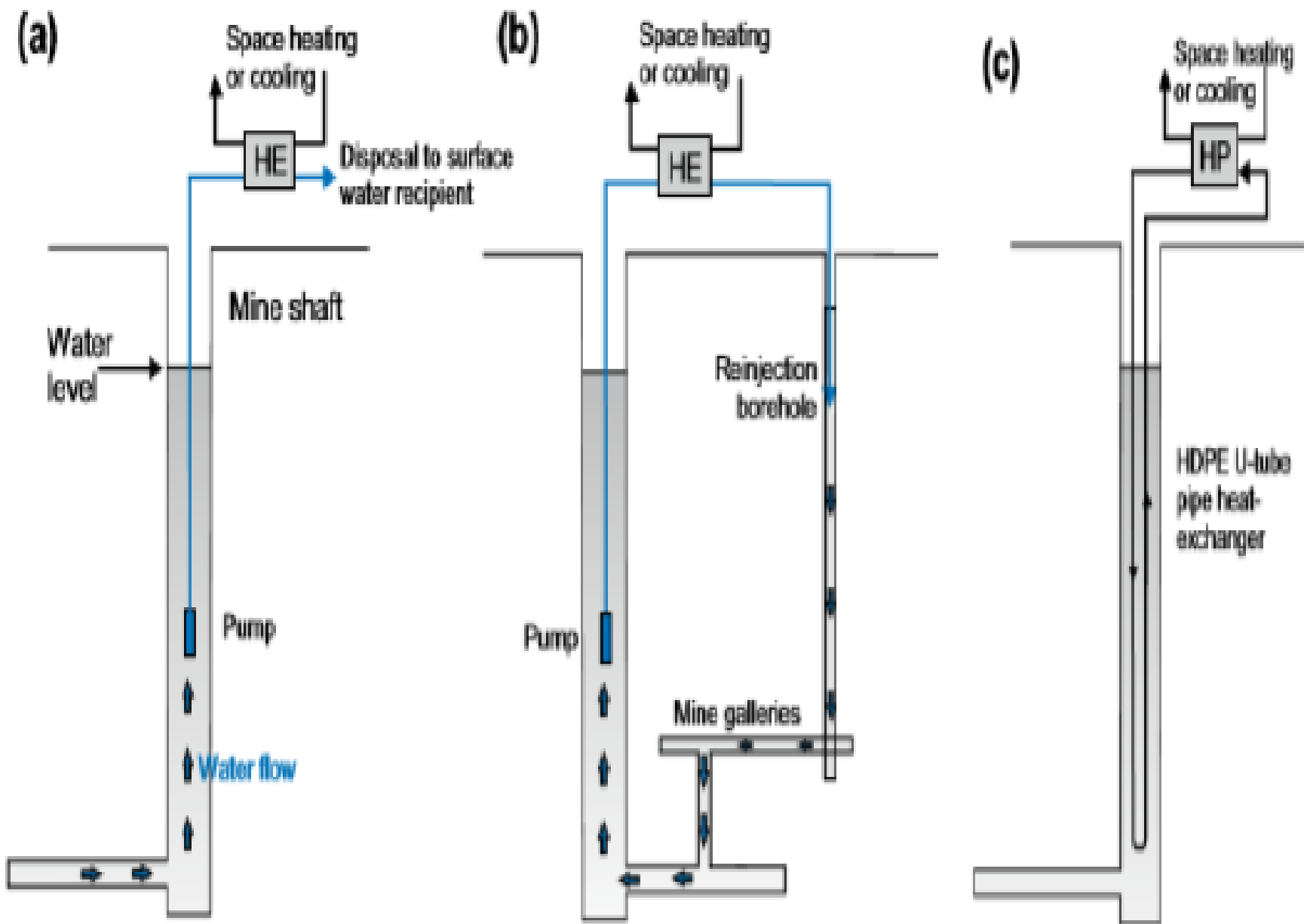


D2N2

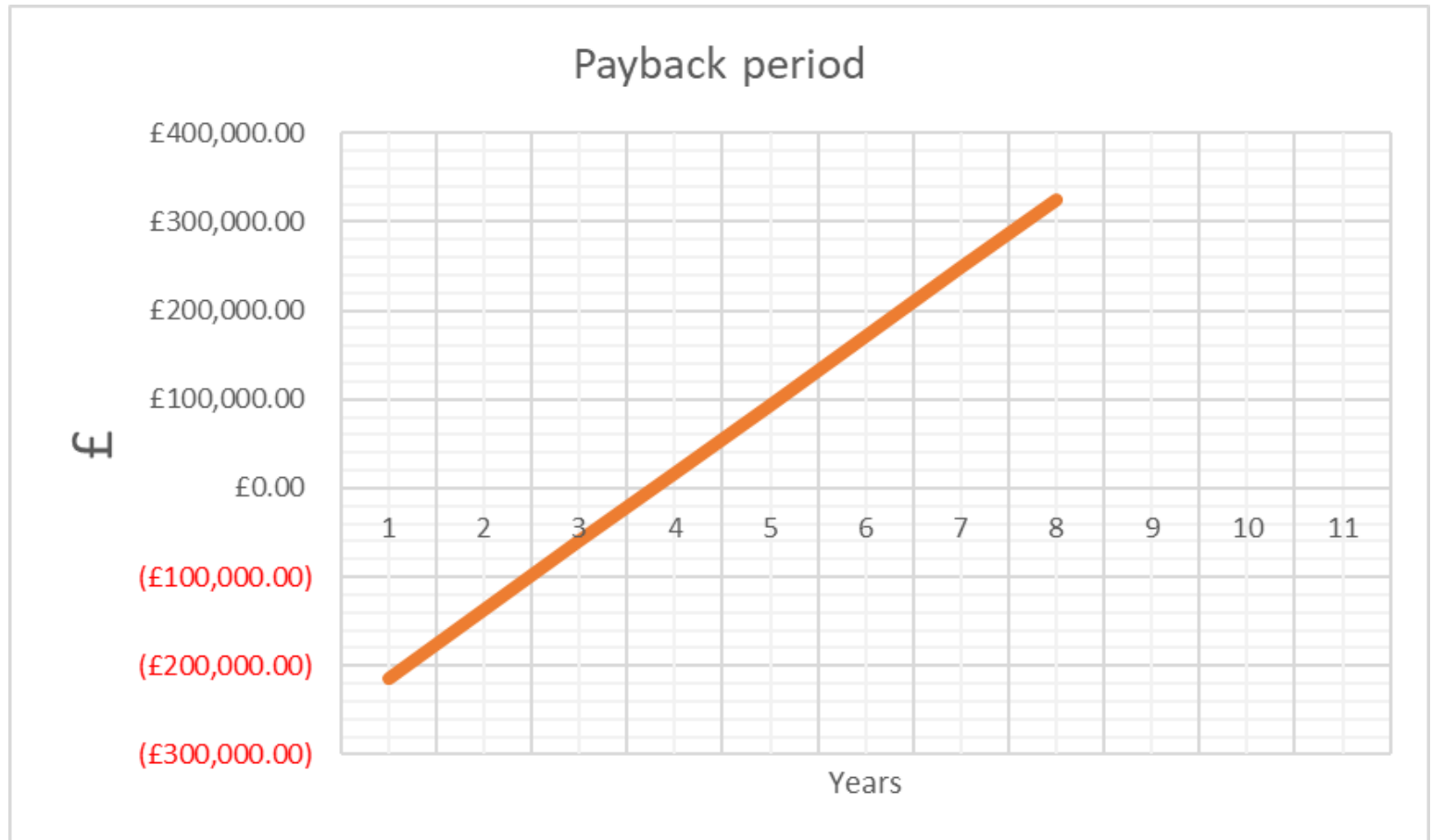
Derby
Derbyshire
Nottingham
Nottingham

Ground Source
Solutions Ltd





4-year payback – 100 homes



COP = 4.3

- **A COP (Coefficient of Performance) value of 4.3 means that you get 4.3kWh of heat output for every 1kWh of electricity used to run the ground source heat pump.**
- **A natural gas boiler could be expected to achieve a COP of c. 0.9.**
- **An air source heat pump may vary between 1.5 to 4 – typically 2.5 in the UK**



Benefits

- ❑ **significant carbon savings
= 283,241kg Co2 per year**
- ❑ **significant cost saving on
energy used =
£900 p/a 5-person home**



Next Steps - Demonstrator

Stage 1: Closed loop design and monitoring

Stage 2 Assembly of demonstrator Heat Pump and testing

Stage 3 Energy Centre (PVt/PCM/Gravity) optimisation and testing

Stage 4 Deployment of the demonstrator to the selected district.



Barriers to Retrofit

- **financing**
- **capacity, capability and skills**
- **consumer engagement and behaviour change**
- **policy and regulation**
- **system governance**
- **common data standards**
- **infrastructure**



Final words...

- **geothermal energy is a non-intermittent and potentially inexhaustible source that can be used for energy saving and environmental energy production, as well as to provide heating and cooling to buildings, by increasing the energy efficiency of conventional systems.**