



The UK Ground Source Specialist

EARTHENERGY™

Geothermal Heating & Cooling

Reliable **Affordable** **Renewable**
Renewable **Affordable** **Available**



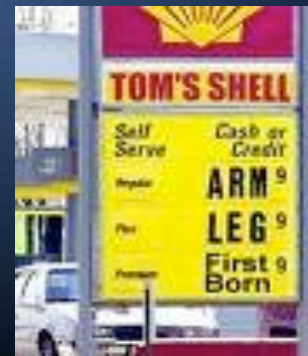
GeoScience Group



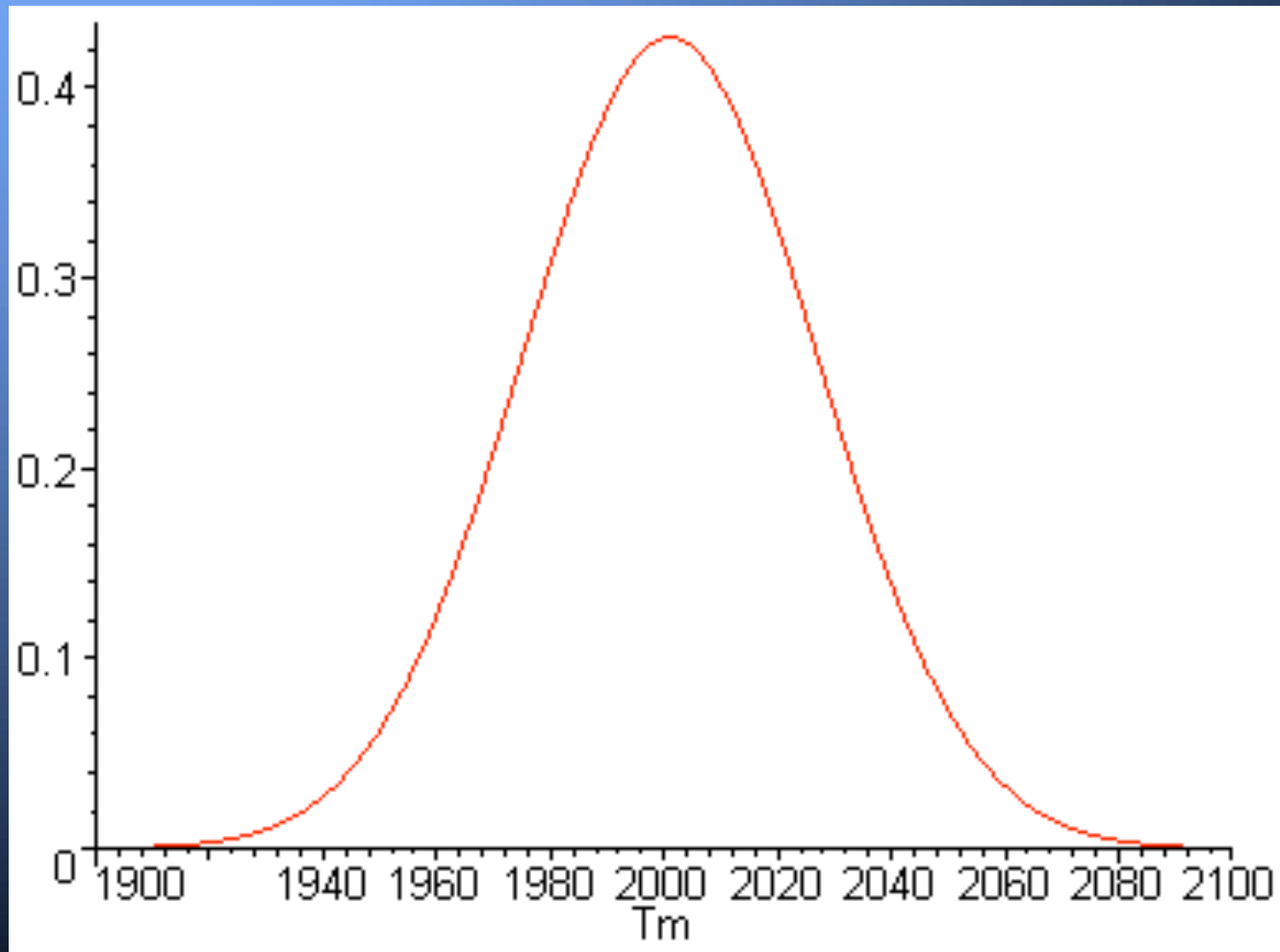
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The Issues

- Depleting fossil fuel stocks
- Increasing greenhouse gases
- Security of Supply
- Fuel affordability



Projected Oil Reserves



Source : *Energy, Physics and the Environment*, McFarland, Hunt, Campbell (Wuerz Pub. 1993)

The Future?

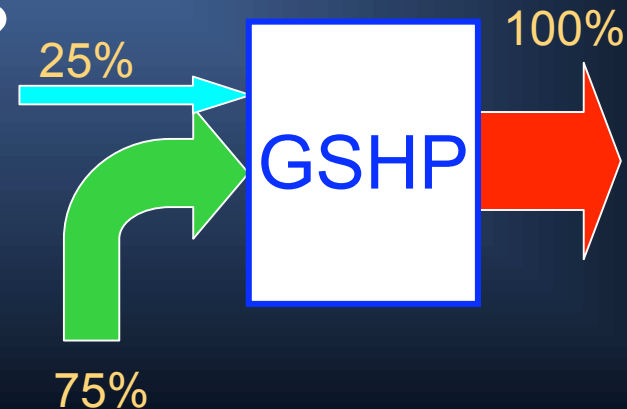
- Liquid & Gaseous Fuels for Transport



- Land for food crops



- Heating & Cooling Buildings?



Energy Hierarchy

Reduce the need for energy
in the buildings design

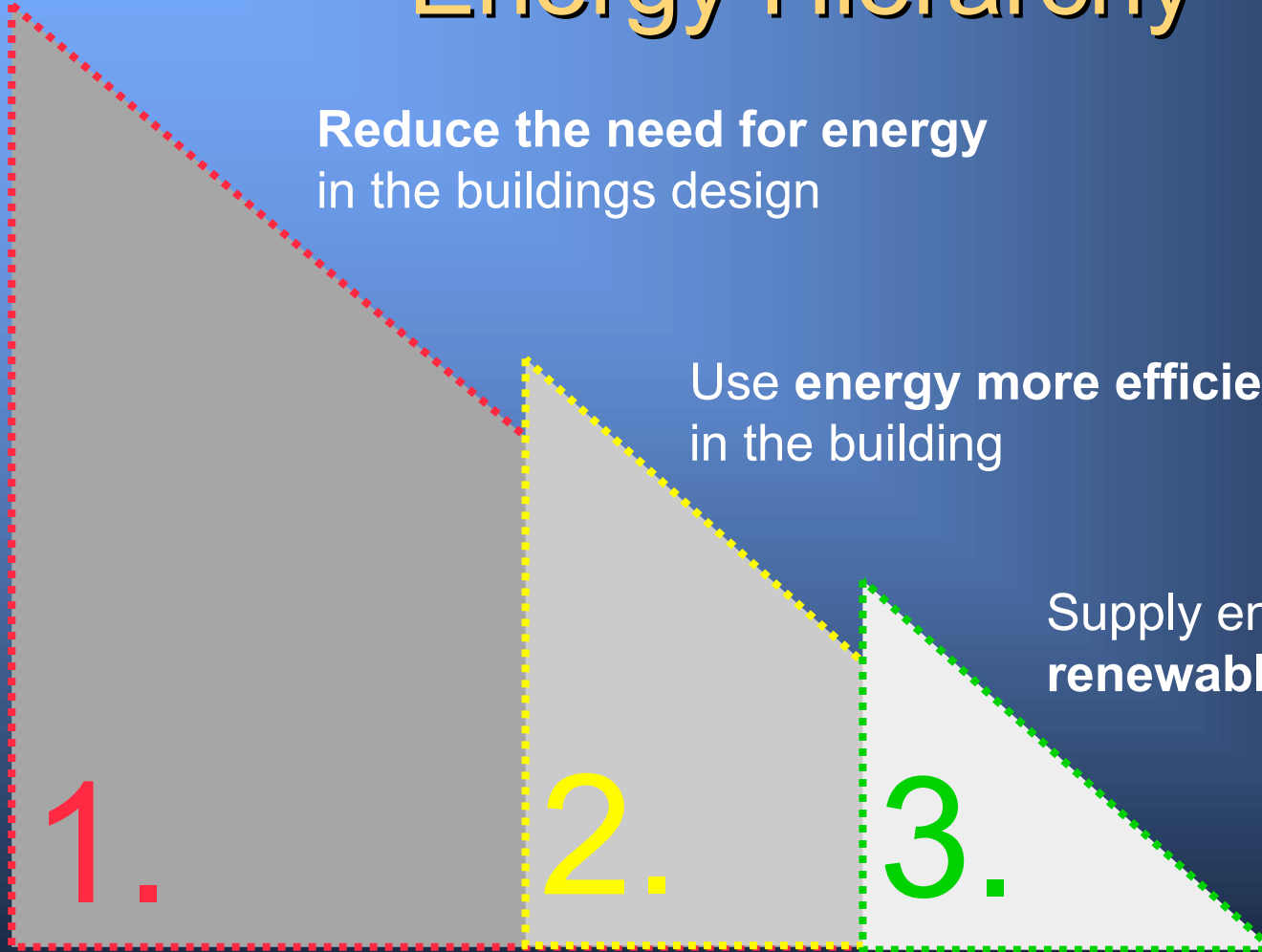
Use energy more efficiently
in the building

Supply energy from
renewable sources

1.

2.

3.



Why GSHP?

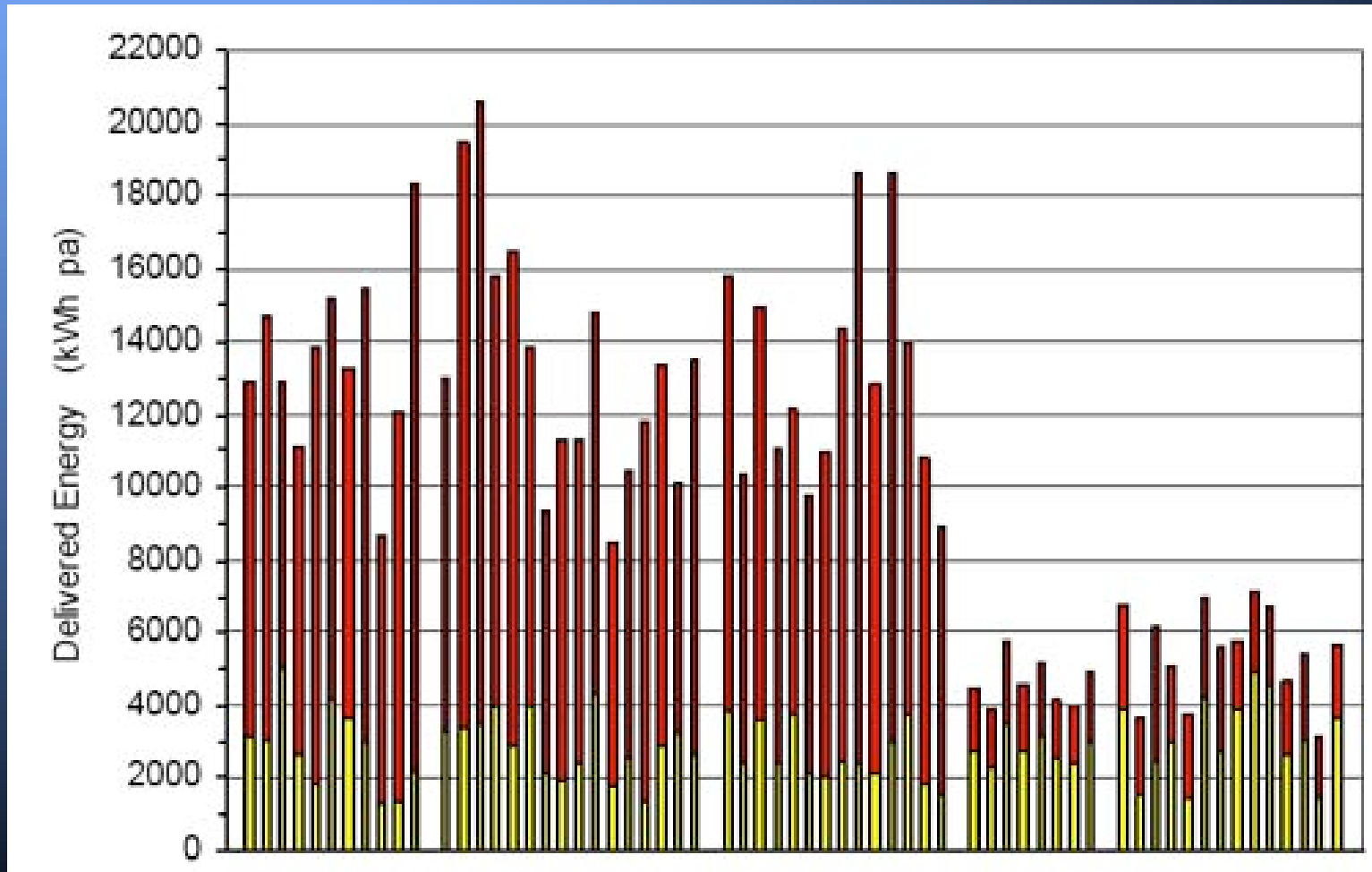
- Low running costs and CO2 footprint
- Unobtrusive – not visible externally
- No flames or combustible gases
- No emissions or noise nuisance
- No fuel handling/storage requirements
- No fire/explosion hazard
- Only requires electrical connection
- Long lifetime
- No reduction in performance over time

Why GSHP?

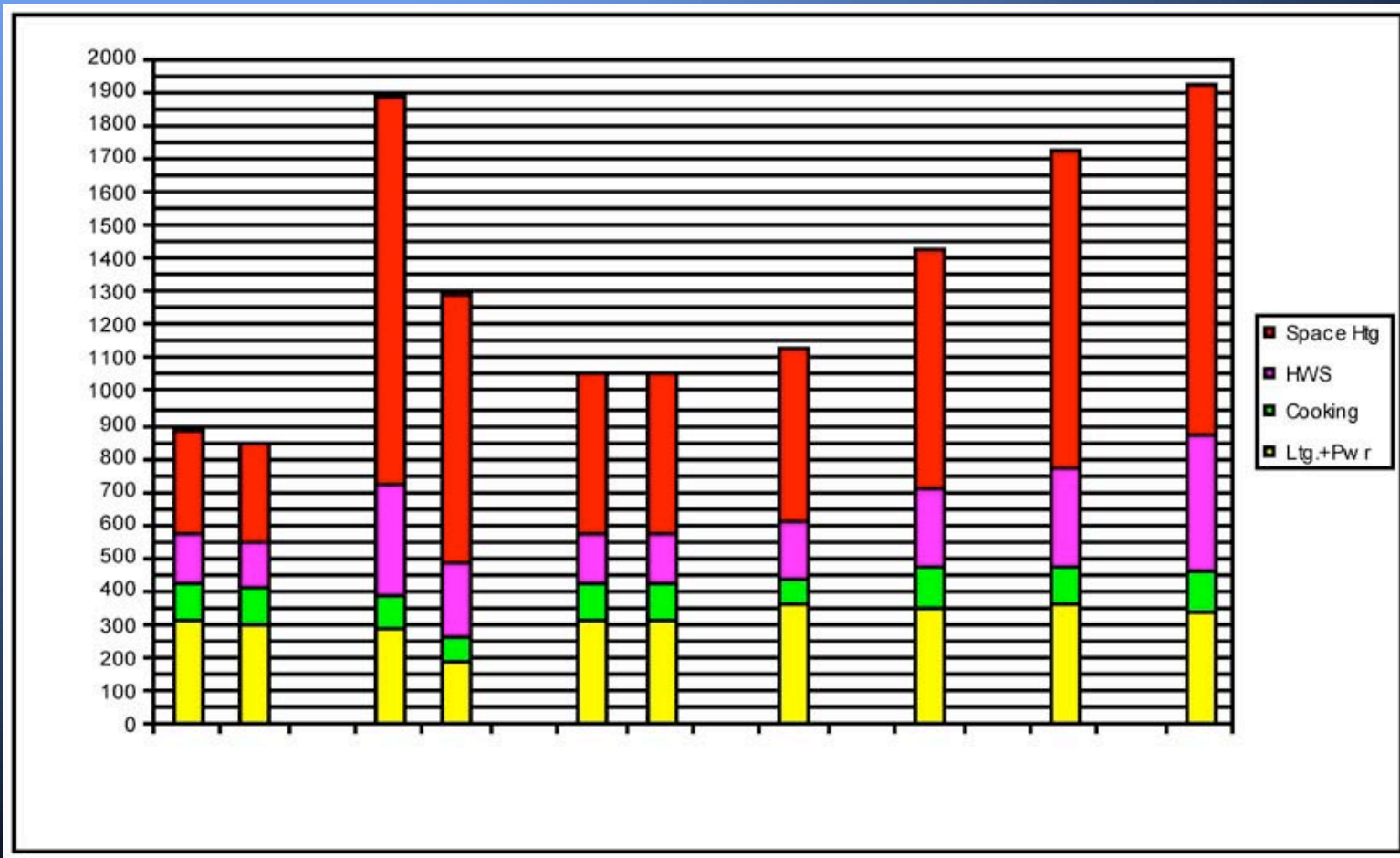
| | Cost (pence) | kg CO ₂ per kWh _{th} |
|------------------------|--------------|--|
| Electricity | 10.23 | 0.430 |
| Coal (70% efficiency) | 4.65 | 0.400 |
| LPG (85% efficiency) | 5.94 | 0.246 |
| Oil (85% efficiency) | 5.63 | 0.299 |
| Gas (85% efficiency) | 3.28 | 0.218 |
| GSHP (330% efficiency) | 2.69 | 0.130 |

Prices as at: Jan 08, CO₂ figures from Carbon trust

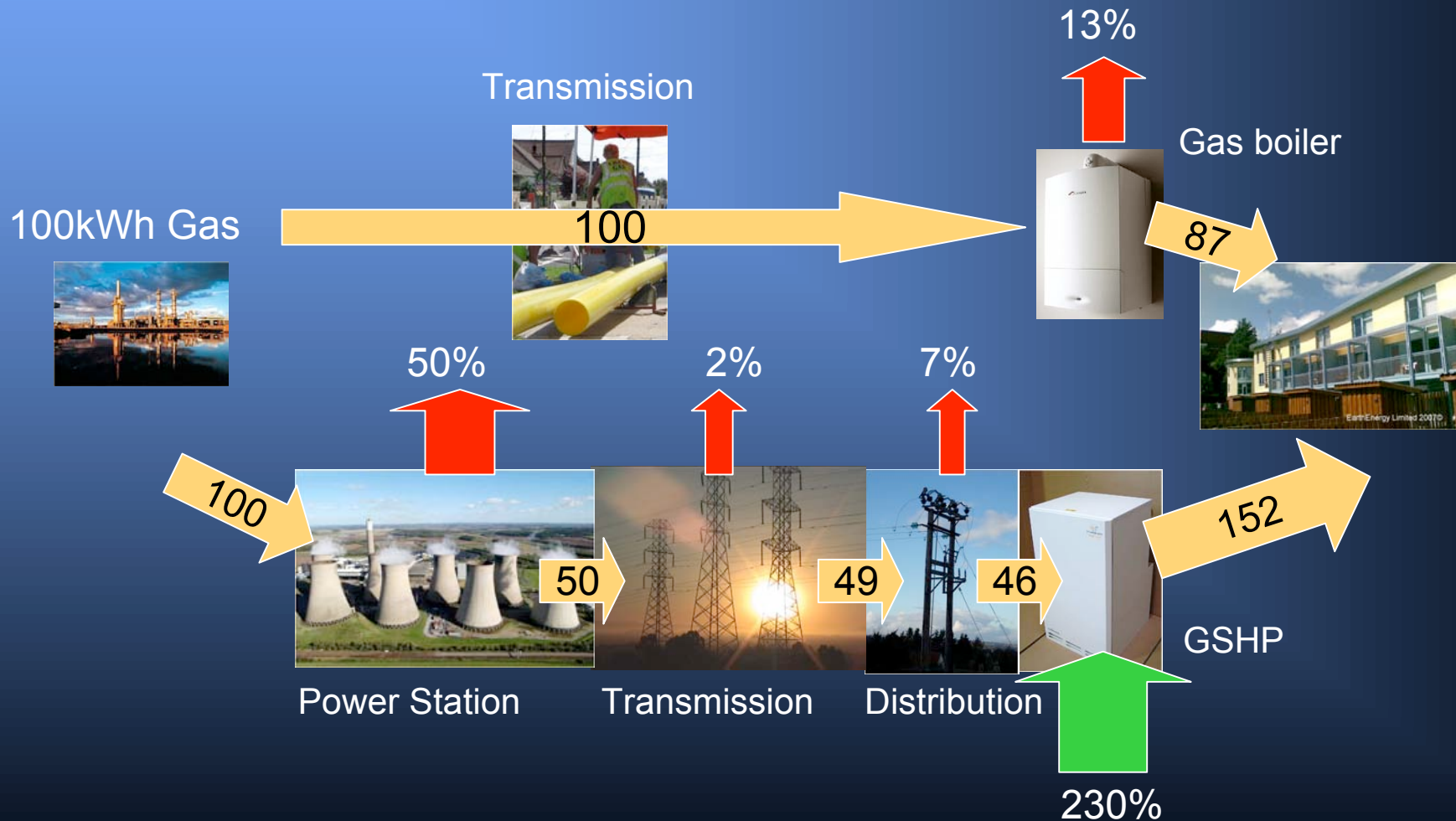
Annual Delivered Energy 63 bungalows in Nottingham



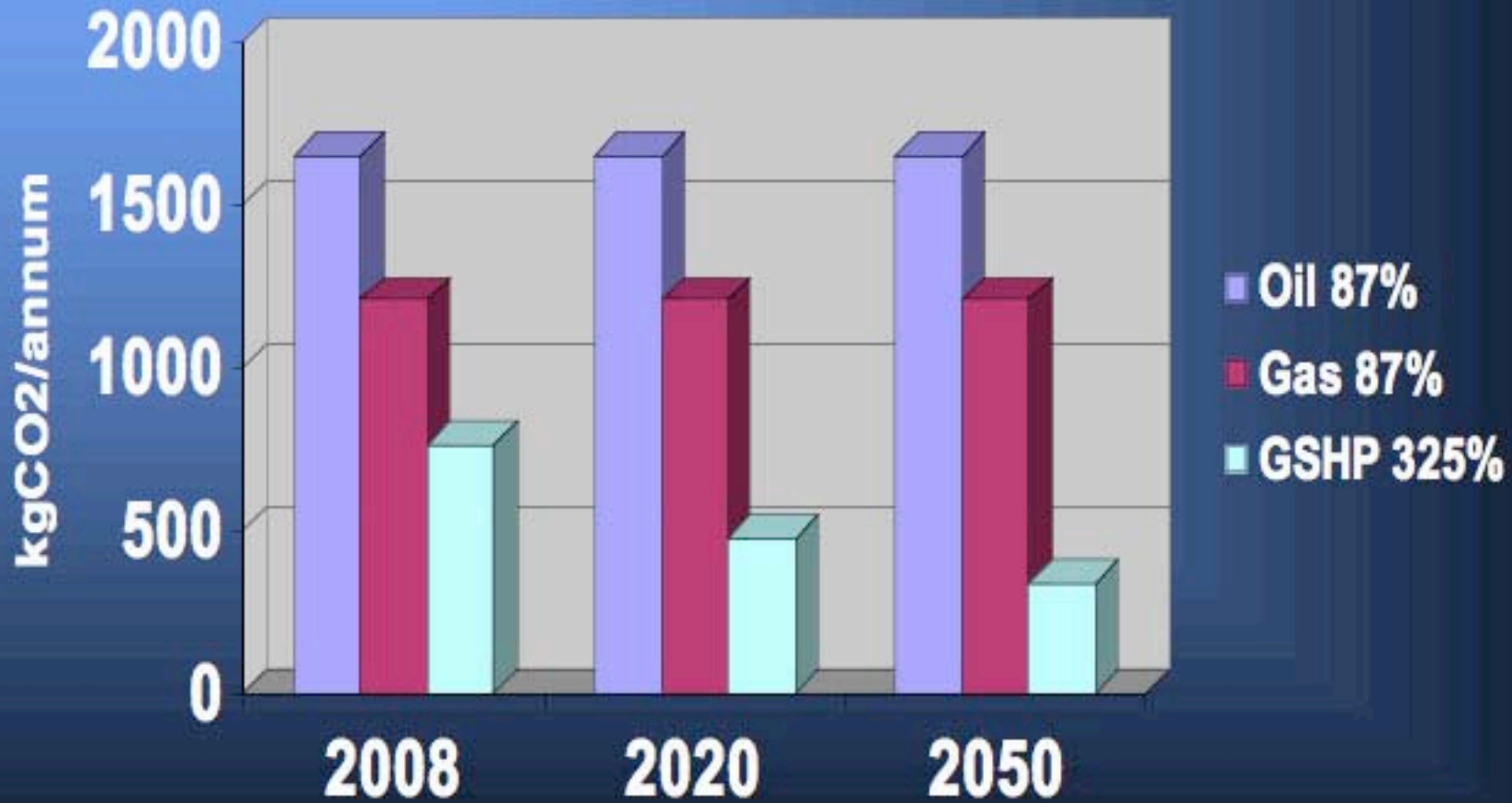
Annual Fuel cost comparison 5kW GSHP typical 3 bed house



Why GSHP?



De-carbonising the grid



LCBP Benchmarks

| £/tonne CO ₂ | Solar PV | Wind turbines <1.5kW | Solar Thermal | Wood boilers | GSHP |
|-------------------------|----------|-------------------------|---------------|--------------|------|
| Electricity | £990 | £1049 | £388 | £106 | £119 |
| Natural Gas | N/A | N/A | £563 | £315 | £212 |
| Oil | N/A | N/A | £489 | £171 | £225 |
| Coal | N/A | N/A | £296 | £83 | £86 |
| LPG | N/A | N/A | £523 | £185 | £263 |

Dispelling the myths

| | |
|--------------------------|---------------------------|
| Expensive | < £8,000 per house |
| Require Space | Single borehole per house |
| No carbon saving | Decarbonise the grid |
| Restricted to underfloor | Any distribution system |
| No Industry Capacity | Transferrable skills |

Low Hanging Fruit

- New Houses
 - Ground loop installed routinely
 - Purchaser choice of heating system
- Existing off-gas housing stock
 - Fuel Poverty, Decent Homes
- Other New Buildings
 - Low rise, car park, playing field