

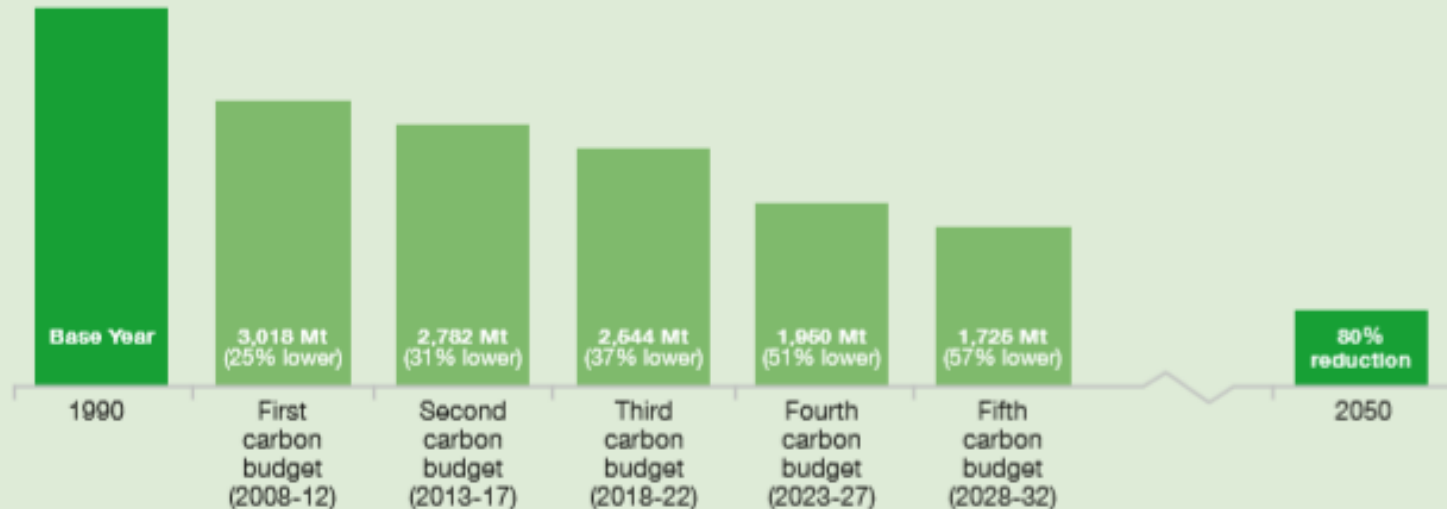
# Innovative Energy Schemes *to Decarbonise Bishop's Stortford*

Chris Dunham,  
Carbon Descent &  
Bishop's Stortford Climate Group



# UK Carbon Reduction Targets

Figure 3: UK carbon budgets and 2050 target<sup>35</sup>



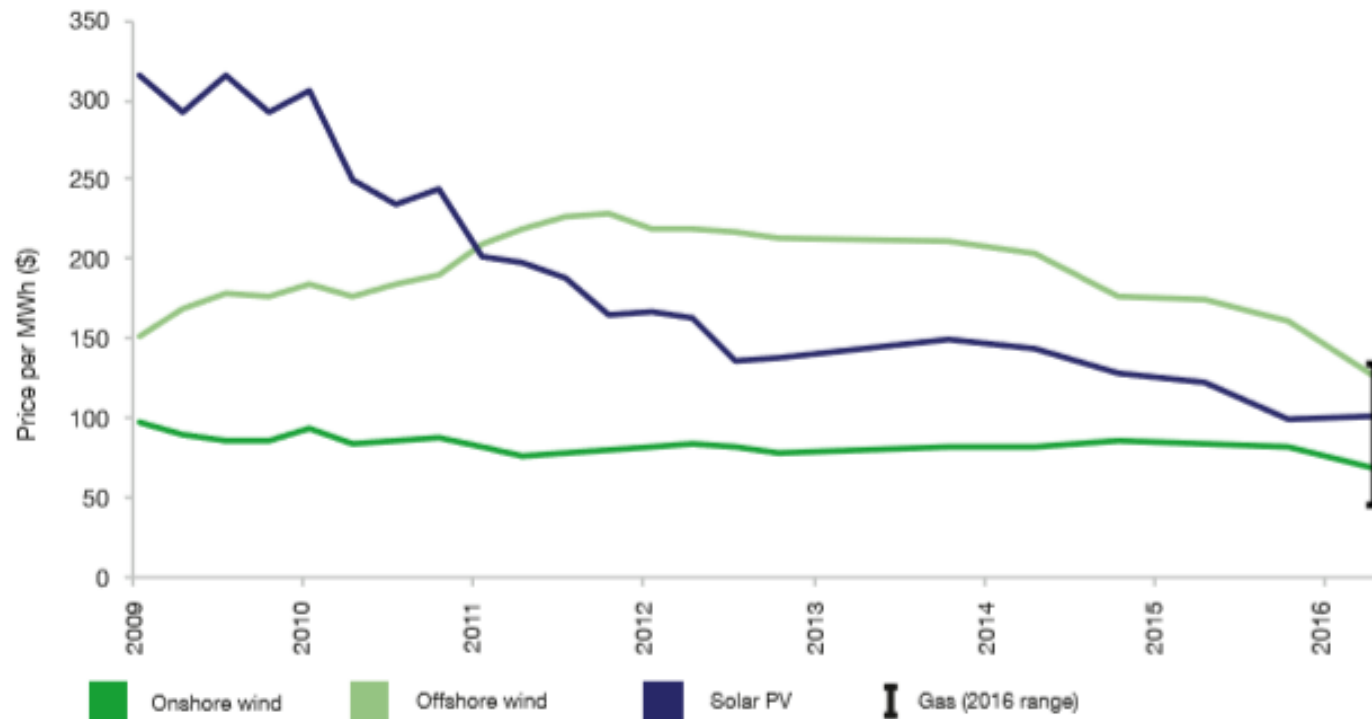
Source: UK legislation; BEIS

- 80% is not shared evenly across sectors
- To hit an overall target of 80% and allow for air travel growth then the building sector will probably need to achieve 100% reduction

# Renewable vs Gas Electricity Generation Cost

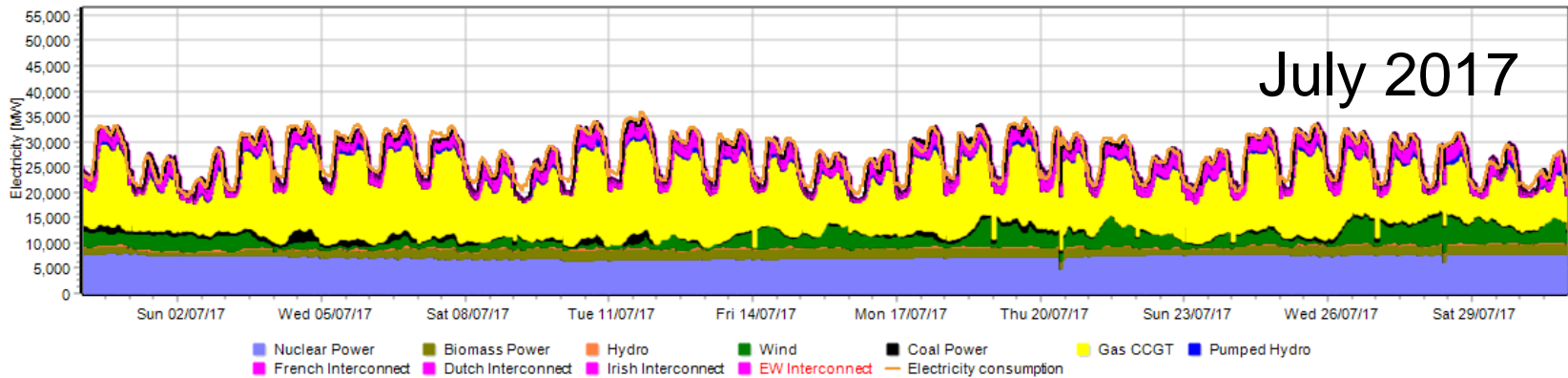
Big challenge is not cost - it's intermittency/back up

Figure 5: Change in global renewable energy costs<sup>57</sup>

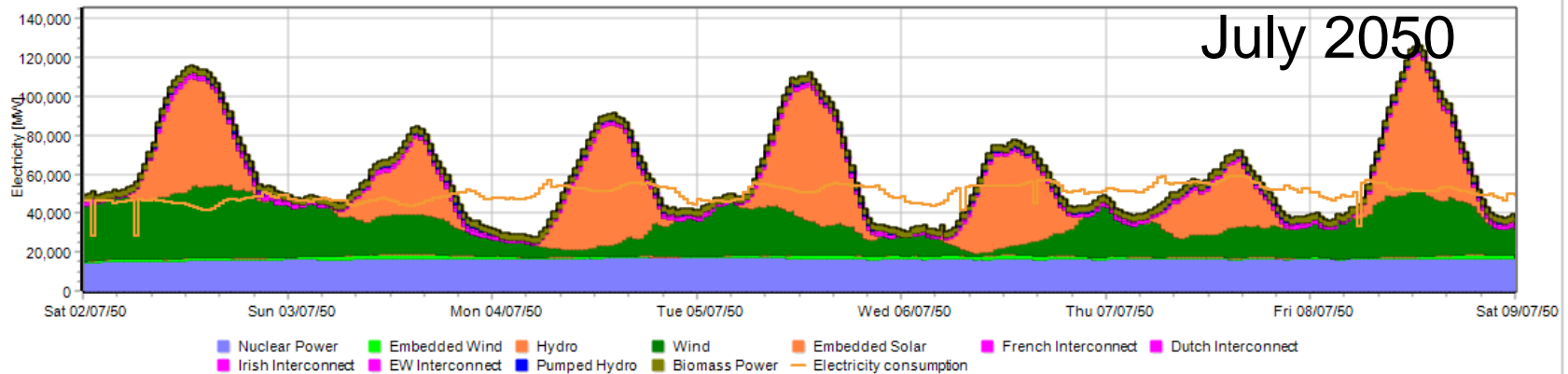


Source: Bloomberg New Energy Finance

# UK Hourly Electricity Production

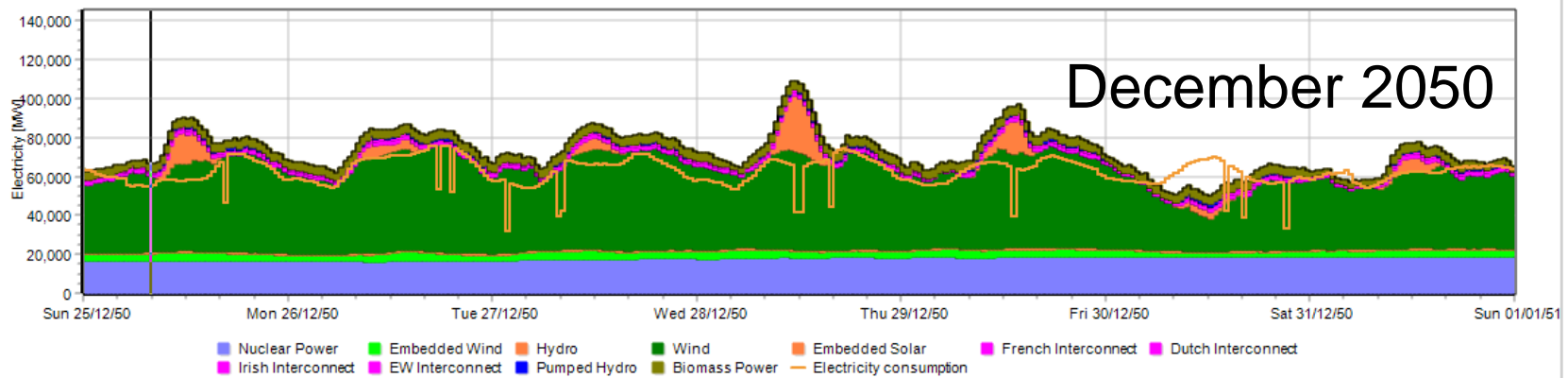
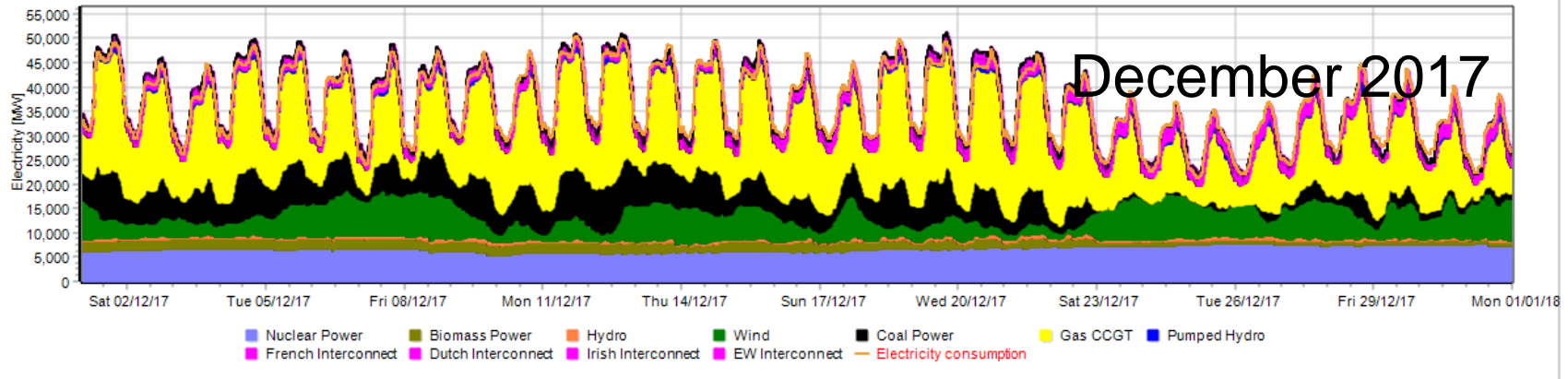


External conditions Priorities Heat Electricity Fuels

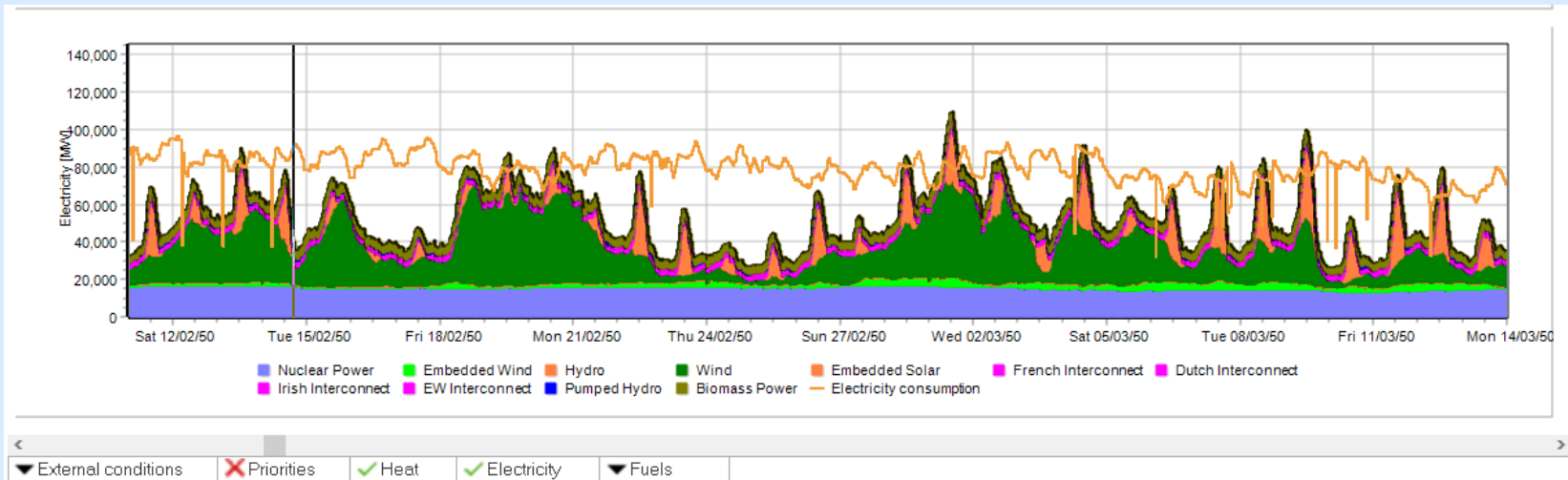


External conditions Priorities Heat Electricity Fuels

# UK Hourly Electricity Production



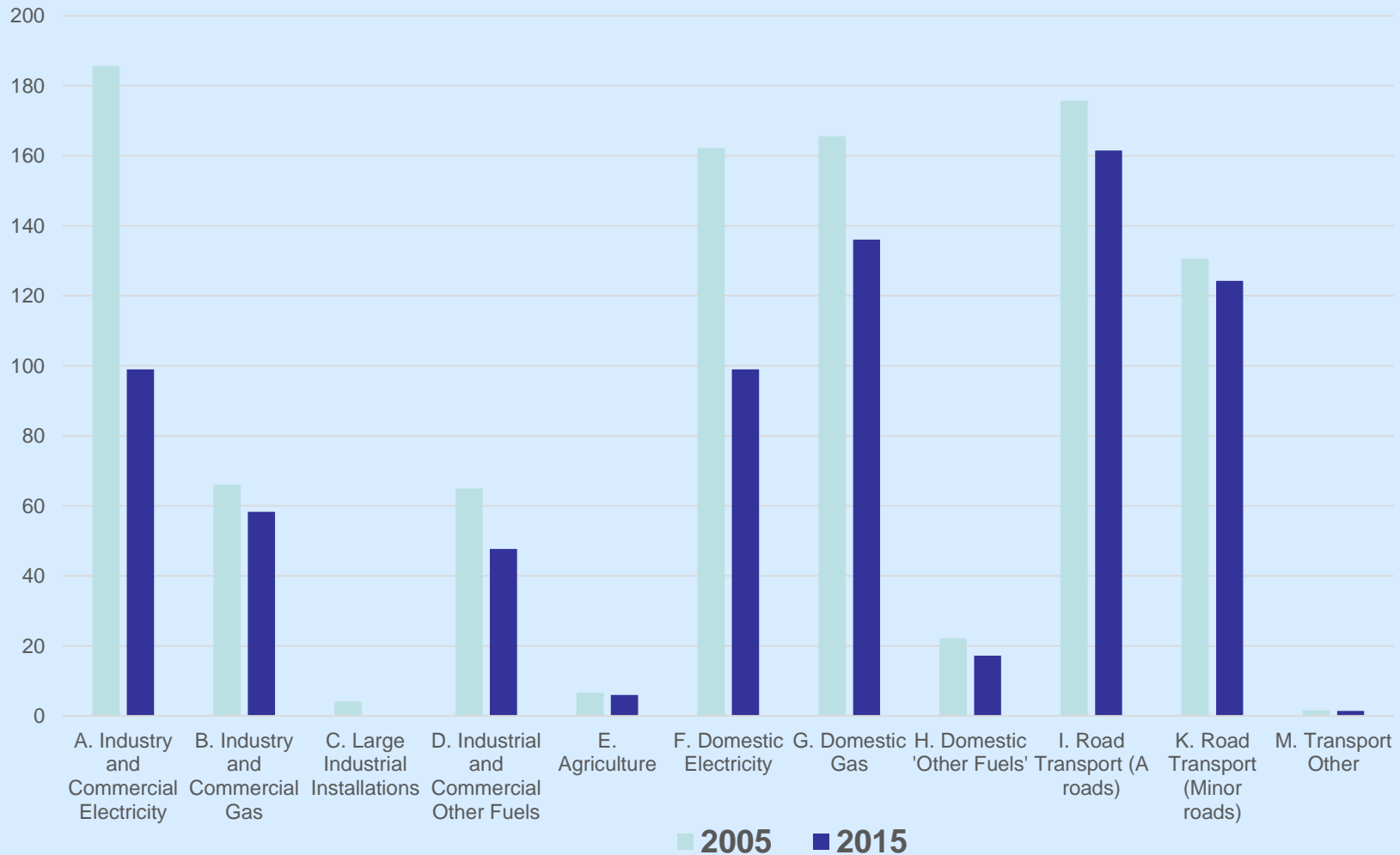
# Feb 2050



# What does this mean for Bishop's Stortford?

# East Herts CO2 Emissions 2005 and 2015

East Herts CO2 Emissions by Sector & Fuel for 2005 and 2015



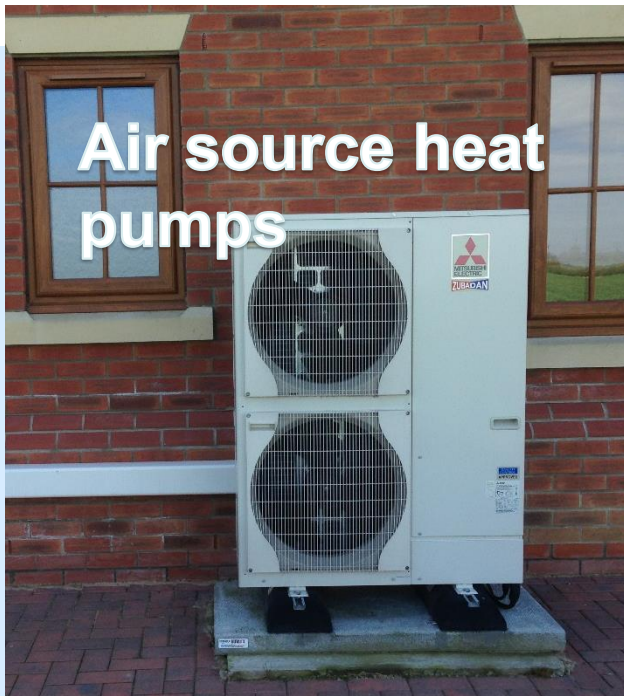


# Electricity Generation

- > Currently just 1% of households in East Herts have PV
- > For BS this is our main opportunity to contribute in terms of elec supply



# Options for Heat





# Thermal Storage in District Heating

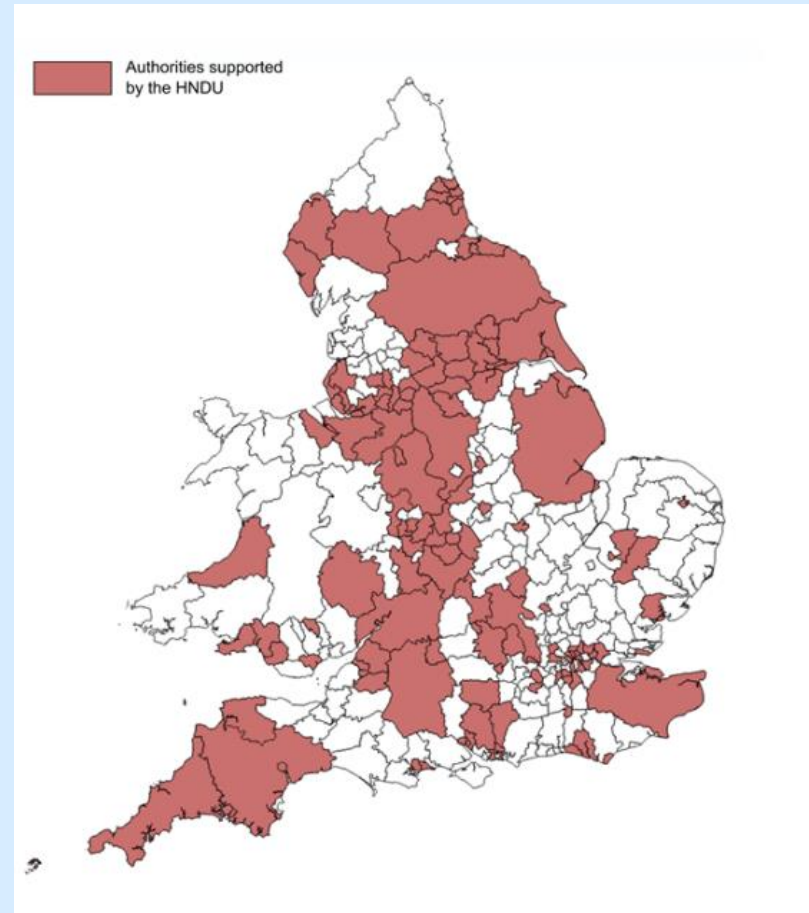


# Costs Compared

Scenario	Gas Cost p/kWh	Elec Cost £/MWh	Efficiency	Carbon Capture Cost £/MWh	Cost of heat £/MWh	
Individual gas boilers (not an option)	£45		90%		£50	
Individual elec heat pumps		£150	250%		£60	
Large elec heat pumps with DH		£70	300%		£23	
Hydrogen from electrolysis		£70	60%		£116	
Hydrogen from methane with carbon capture	£15	£70	64%	£56	£81	
Scenario	Installation Cost per house	Typical Heat Demand MWh	Lifetime	Installati on Cost £/MWh	Total Cost of Heat £/MWh	Grid Value
Individual gas boilers (not an option)	£2,500	18	15.00	£9	£59	N
Individual elec heat pumps	£7,000	18	20	£19	£69	N
Large elec heat pumps with DH	£12,000	18	50	£13	£37	Y
Hydrogen from electrolysis	£2,500	18	15	£9	£125	Y
Hydrogen from methane with carbon capture	£2,500	18	15	£9	£90	Y

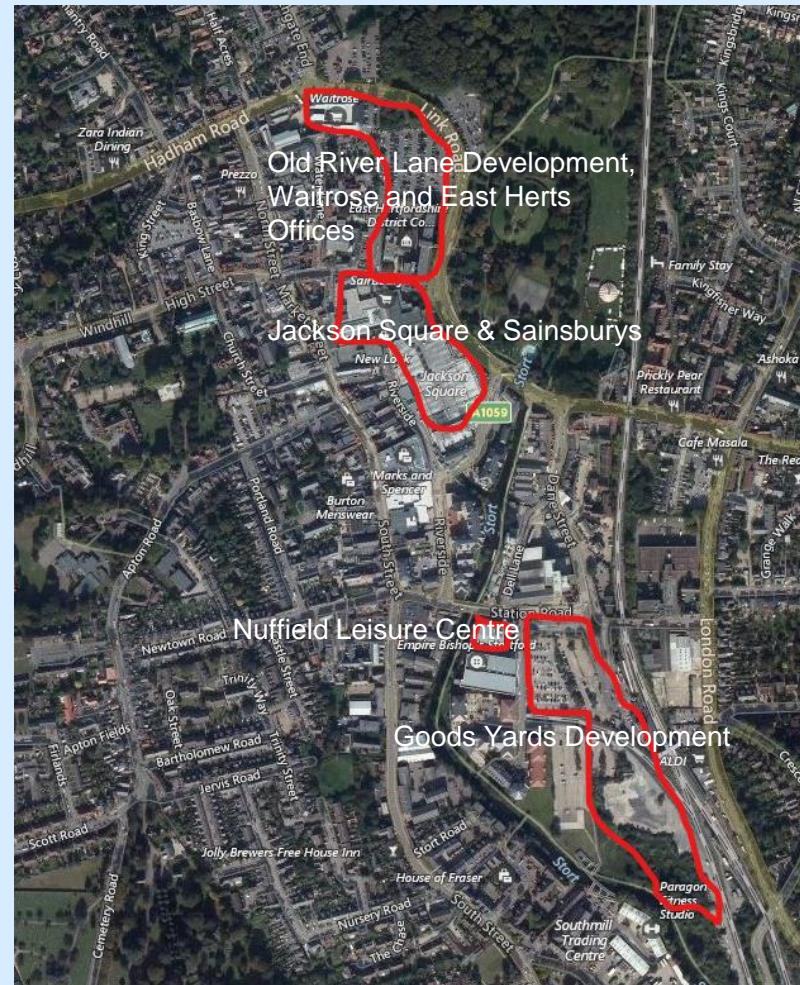
# Would District Heating Work in BS?

- > General approach is to establish initial scheme based on “anchor loads” eg newbuild, public buildings, leisure centres etc
- > And expand from there
- > Govt funding for district heating feasibility studies





# Heating & Cooling Anchor Loads



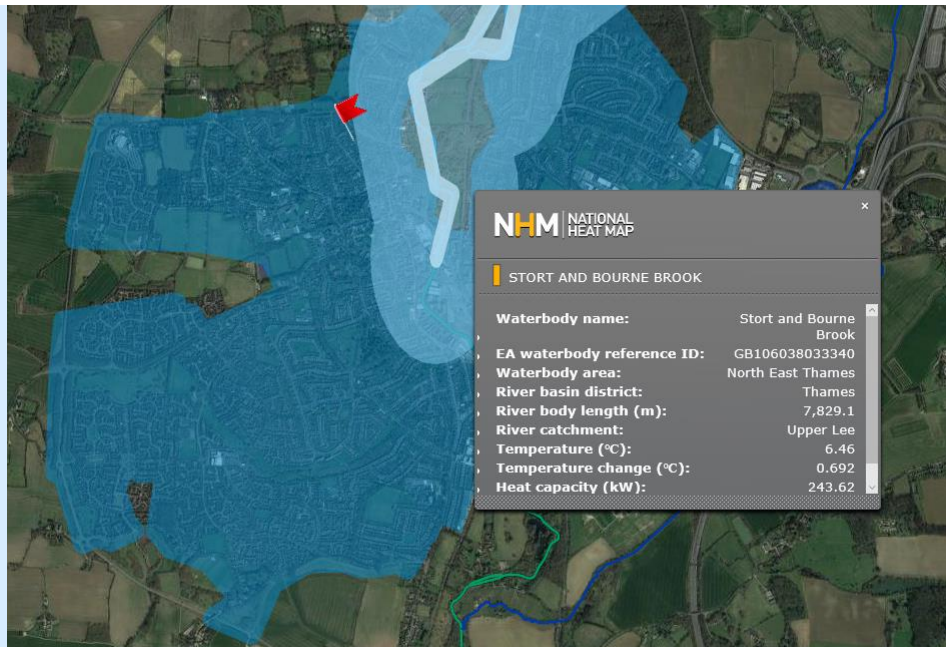


# Goods Yard Energy Strategy

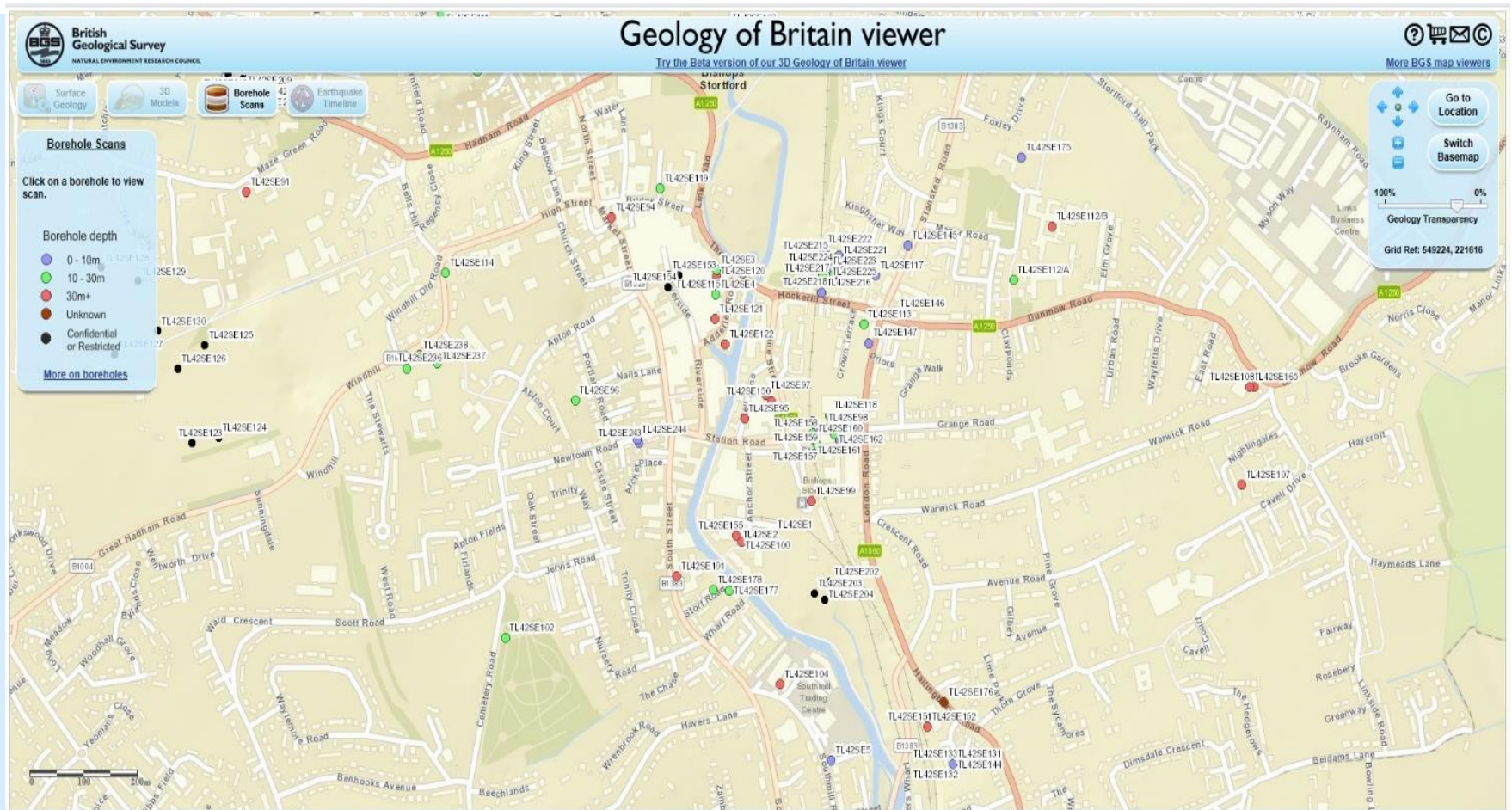
Hurley Palmer Platt

Energy Strategy

Vertical piping	Is the ground suitable for vertical piping? Can underground obstacles be avoided?	TBC
Plant room	Is there space allowed for a GSHP and associated auxiliary equipment?	Yes
<b>Water-source Heat Pump</b>		
Resource	Is there an available water source close to the site?	No
Access	Can the available water source be accessed?	No
<b>Air Source Heat Pump</b>		
Roof space	Is there available roof space for air-source heat pumps?	No (resi) Yes (hotel)



# Borehole Register





# Example yield – Dell Lane

Geological Survey British Geological Survey British Geological Survey

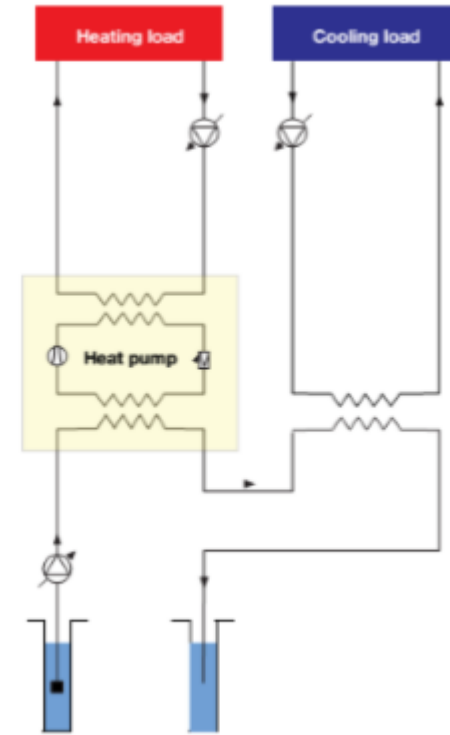
222/279 Messrs. Denskins Watford Brewery Ltd., The Maltings, Dell Lane, Bishop's Stortford. (Disused)

Surface +189. Shaft 18 × 6; rest bore. Lining tubes: 178 × 8 in from surface; 37 × 6 in from 178 down. Water struck at -121. R.W.L. +178. Venison, Feb. 1953. R.W.L. +182½. P.W.L. +169½ (after 6 h.). Yield 4,800 g.p.h. Electric pump. Hardness: P. O. T. 255. Anal. Mar. 1953.

Sand and Gravel (Buried channel)	...	203	203
Uck )	...	122	325
Mck )	...		

- 4800 gallons per hour when operational at depth of 96m.
- This equates to around 6litres per second.
- Two pairs of boreholes with a delta T of 6degrees C would allow for an approximately 500kWth heat pump

# Example well heads

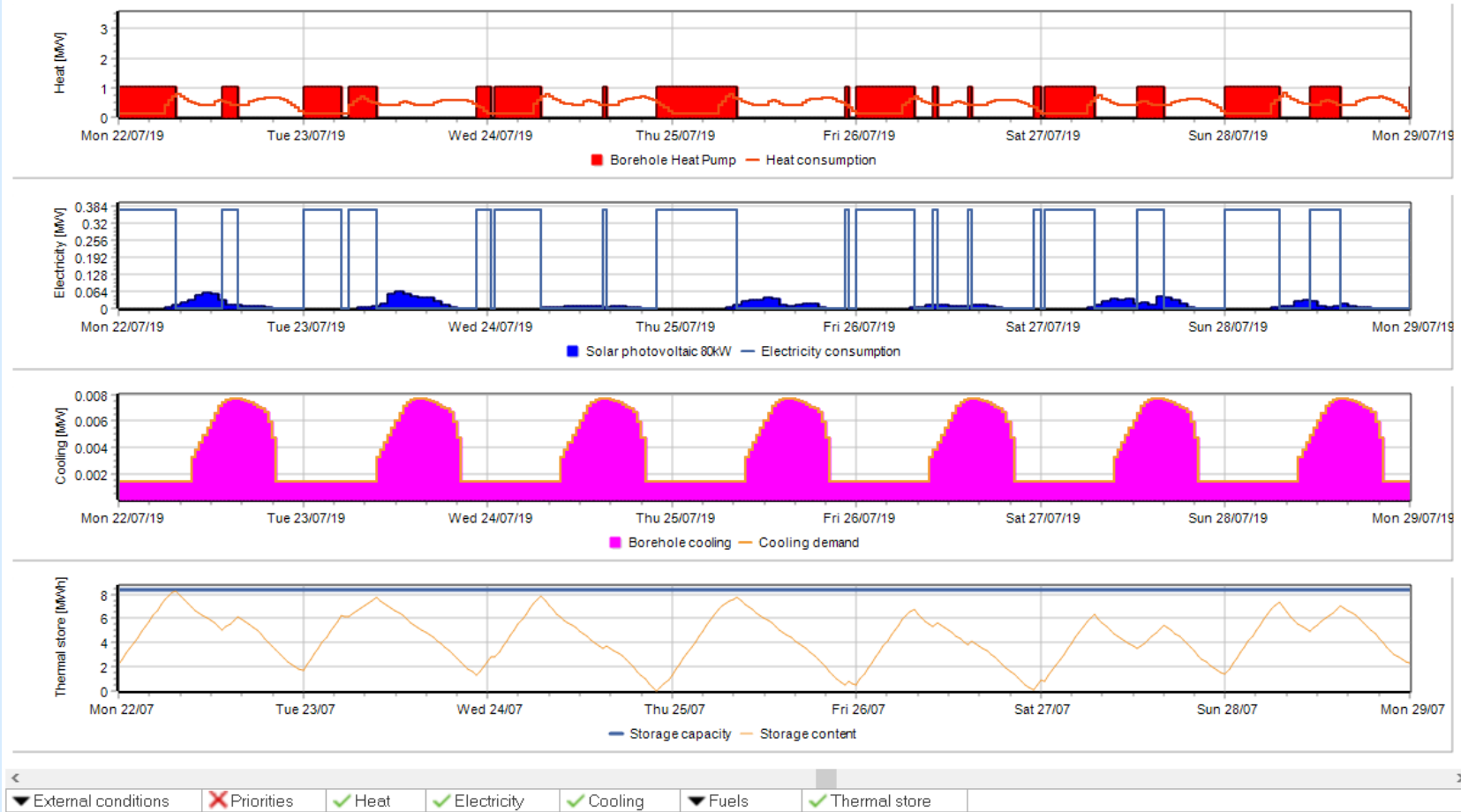


Well head can be flush with the ground and covered in artificial turf

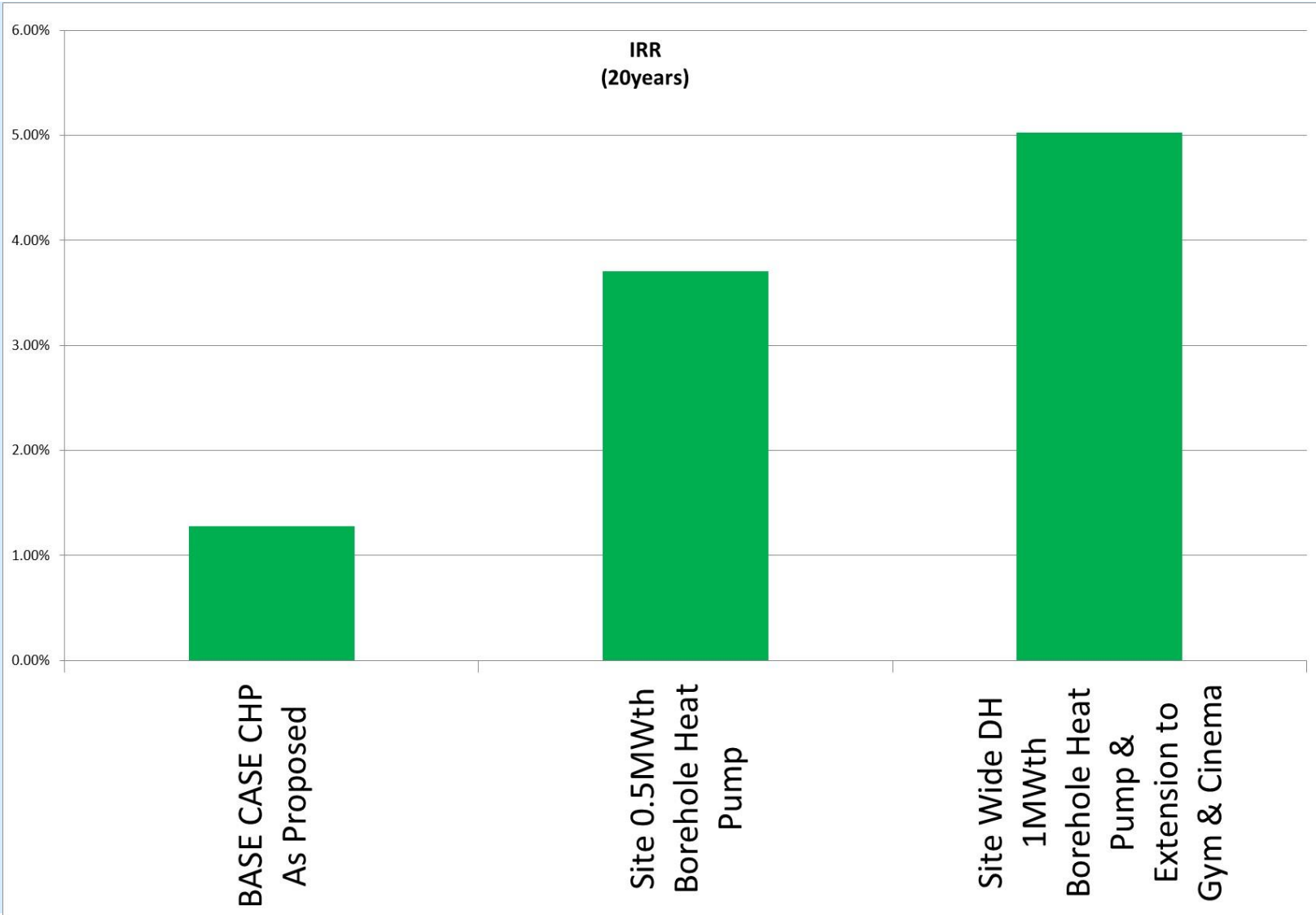


Courtesy of IFTECH

# Goods Yard Heating & Cooling - Summer Week



# Internal Rate of Return



# Conclusions

- > Goods Yard Planning Conditions are being drafted now by East Herts Planners  
[Kevin.Stepto@eastherts.gov.uk](mailto:Kevin.Stepto@eastherts.gov.uk)
- > Large-scale heat pumps and district heating (and cooling) arguably the cheapest option
- > Bishops Stortford needs a strategic view of energy use for new buildings – and existing buildings

# Contact Details

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Delivering a Sustainable Future

