

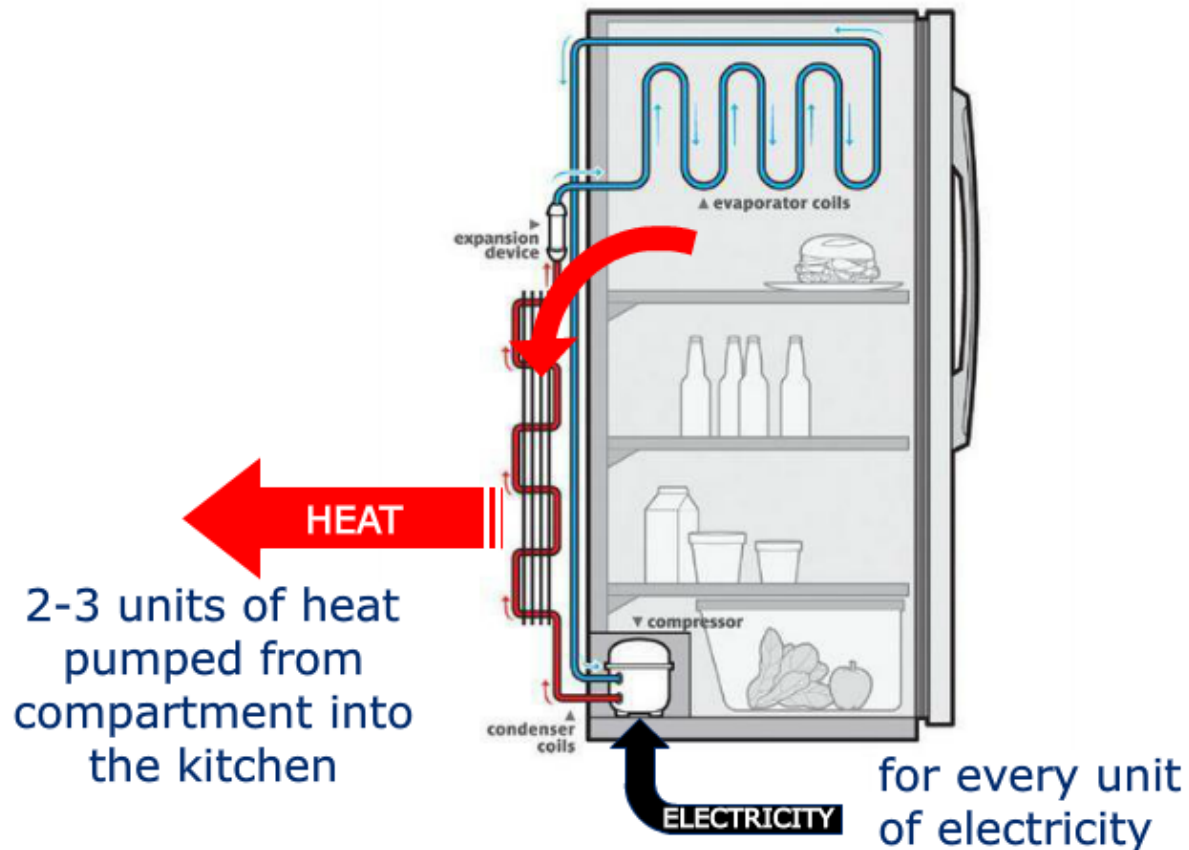
Norwich River Heat

2015 – Council procured a study to examine potential for using River Wensum in conjunction with Water Source Heat Pumps. Purpose – may be used to inform energy statements for riverside development

Two objectives:

- Exploration of the technical and environmental constraints
- Economic assessment of viability

What is a heat pump?

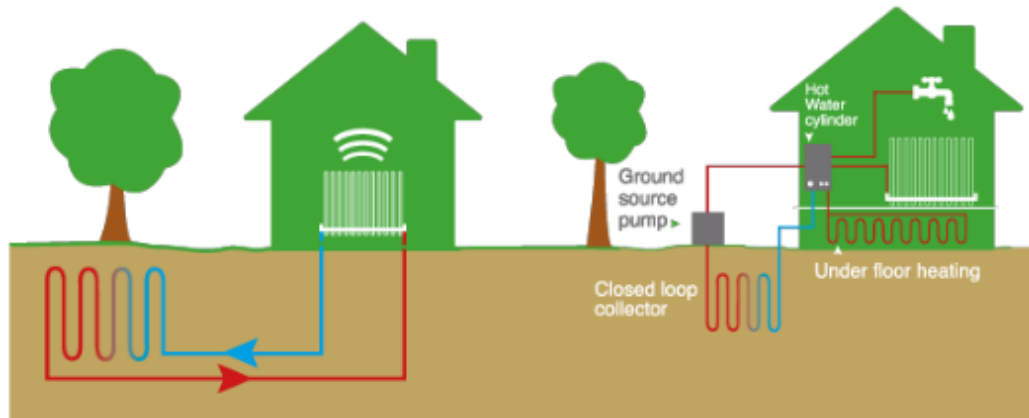


- Transfers heat from the ground into the building in Winter
- Can be reversible to provide cooling in Summer



Ground Source

Ground to Water

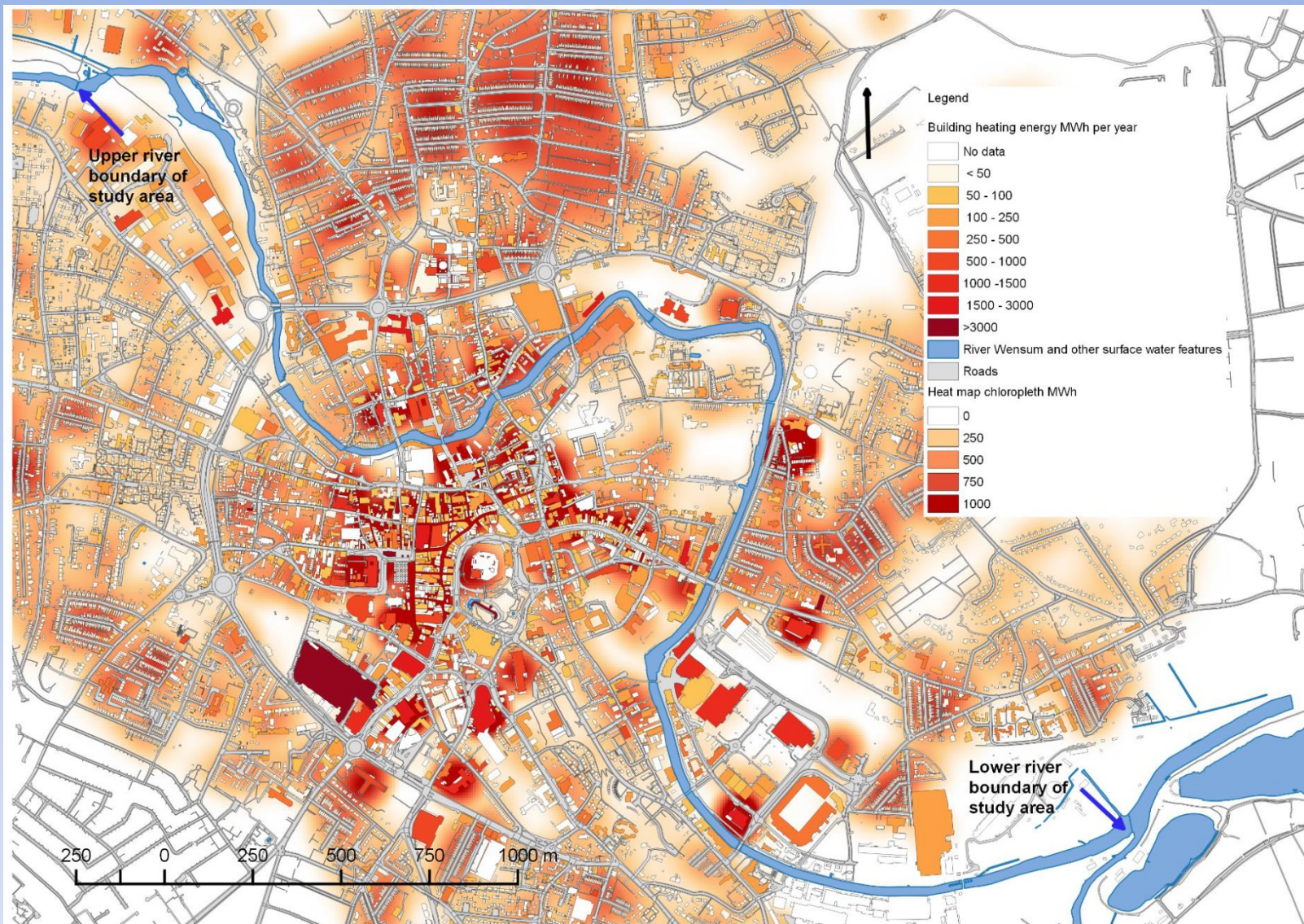




Kingston Heights (River Thames) 137 apartments (56 for Affinity Sutton)







National Heat Map – copyright Centre for Sustainable Energy

www.cse.org.uk

ADAPT study - technical and environmental constraints

- River temperature and flow rate were measured (less energy is available if water is cooler and flow is low)
- Extracting heat means there is a temperature differential between abstracted and returned water
- This differential, and the total volume of water available determines the total heat available

Warming / cooling of river could potentially lead to ecological impacts:

- Spawning / migration of fish – eels, salmon
- Impacts on invertebrates

No significant environmental constraints on using Wensum as a heat source

Other constraints on water abstraction include the need to maintain navigation on the river



**GSK
(Brentford)**

Economic modelling

Two case studies used:

- New build - St Anne's Wharf
- Retrofit - St James House (NCC sheltered housing)

Based on the heat requirements of these examples, plant was specified

Specification of plant was subcontracted to RA Brown heating engineers

Counterfactual scenario – high efficiency gas boilers

Various sensitivities modelled in both cases:

- Electricity prices
- Gas prices
- Heat sale price

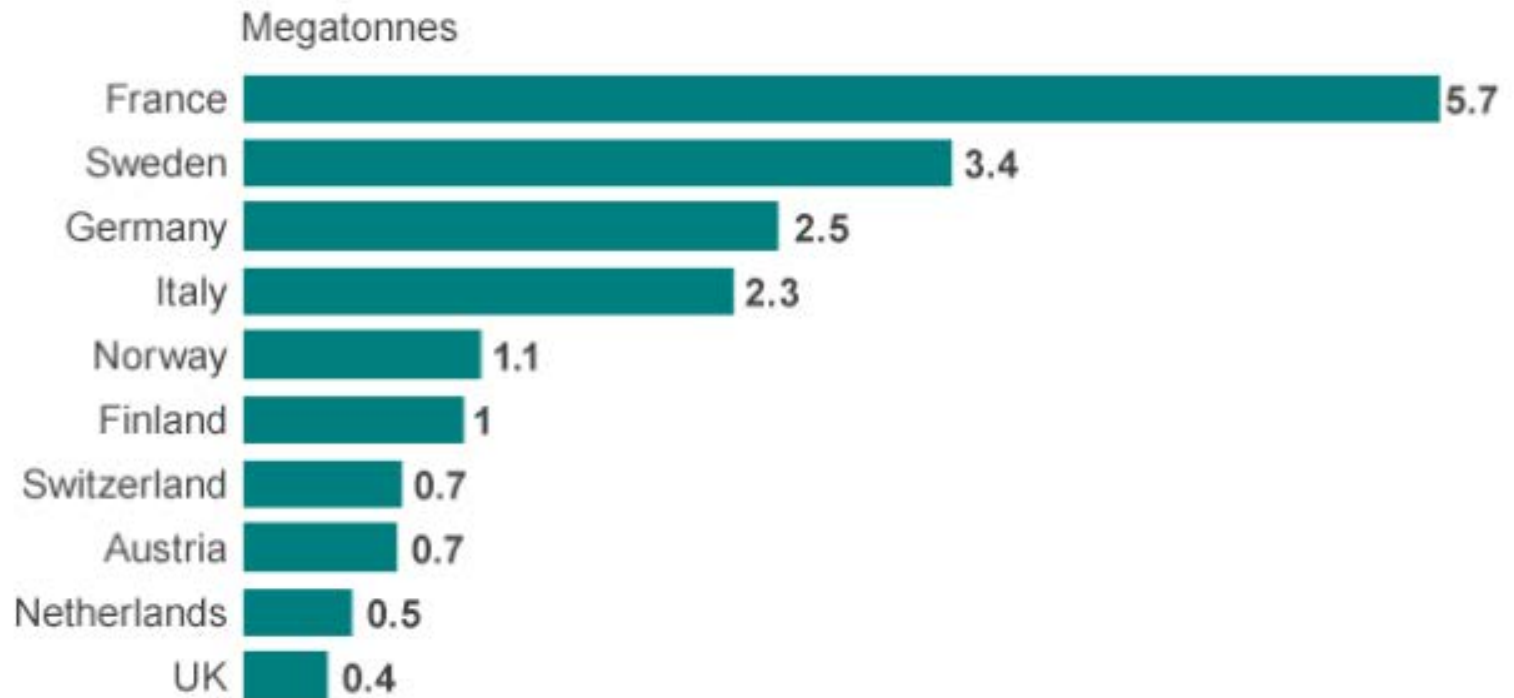
St Anne's Wharf

	WSHP best case	WSHP worst case	Natural gas best case	Natural gas worst case
Simple payback	8.4 years	17.4 years	9.5 years	49.1 years

St James House retrofit (gas price based on price obtainable by NCC)

	WSHP (next to river)	WSHP (300m distance)	Natural gas
Simple payback	12 years	15.8 years	7 years

Greenhouse gases saved by domestic heat pumps: Top 10 European countries, 2013



Source: European Heat Pump Association

BBC