



## High Level Water Source Heat Map

### Rationale for developing this map:

Most gas consumed in the UK is consumed to meet our heating needs. The Government is keen to develop and establish a role for lower carbon forms of heating and to maximise their contribution in safeguarding the UK's energy security and cutting greenhouse gas emissions. The Government set out our overall plans in the Government's 2013 policy paper *The Future of Heating, Meeting the Challenge* (<https://www.gov.uk/government/publications/the-future-of-heating-meeting-the-challenge>).

Our vision for decarbonisation of heating involves a number of low carbon technologies, but our modelling shows that there is a particularly important role for heat pumps and for heat networks. We are particularly interested in deploying water source heat pumps as part of heat networks projects, where heat pumps provide low carbon and renewable heating to a number of different buildings through a network of pipes.

### The High Level Water Source Heat Map:

The high level water source heat map summarises the result of a high level assessment of around 40 urban rivers with the highest potential for water source heat pump deployment, for both heating and cooling purposes. The map does this by identifying areas of high heat demand, adjacent to rivers with sufficiently high flow rates. The map also provides a **high level** indication of locations sensitive to environmental factors, which may provide a further constraint to development. This map has been developed for local authorities, community groups and private developers in order to highlight the opportunities for deploying this innovative technology at larger scales (i.e. for heat networks).

The aim of the map is to raise awareness of this untapped potential and to encourage stakeholders to consider water source heat pumps as an option when planning for local, sustainable energy solutions. We are aiming to deliver a more detailed water source heat map in the winter. This will form an important part of the new National Heat Map (<http://tools.decc.gov.uk/nationalheatmap>), which is currently being further developed.

In addition, a number of constraints were assumed for this map and these effectively sets limits on the technical potential for extracting energy shown in the map – but



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these are indicative only and have been set only to differentiate between areas of higher or lower potential:

1. A physical constraint of 1km between heat pumps, which have been assigned a limit of 20MW capacity. This is based on the assumptions used in the GLA's Secondary Heat Study, published in March 2013 (can be accessed here: [http://www.london.gov.uk/sites/default/files/130220%20031250%20GLA%20Low%20Carbon%20Heat%20Study%20Report%20Phase%201%20-%20Rev01\\_0.pdf](http://www.london.gov.uk/sites/default/files/130220%20031250%20GLA%20Low%20Carbon%20Heat%20Study%20Report%20Phase%201%20-%20Rev01_0.pdf)).
2. 20MW represents a typical capacity required for a large heat network scheme (although it is much larger than any existing water source heat pump in the UK). Spacing of 1km recognises the constraints on available land for an energy centre and for access to a water course.
3. River temperature (mixed river water delta T) cannot vary more than 2 degrees, for either heating or cooling.
4. Water source heat pump location constrained to areas where heat demand exceeds 5 -10kWh/m<sup>2</sup>.
5. Environmental conditions where water source heat pump installation might be more difficult, e.g. salmonid areas.

### Points to note:

- **Delta T for return temperature:** Delta T is the difference in local water temperature caused by a heating or cooling medium, as it enters and leaves the water system. Temperature changes can impact on salmon and other fish adversely. To reduce the risk of such effects, a maximum variance for mixed water delta T of 2°C in the temperature has been imposed.
- For consenting of actual installation, developers will need to follow all due processes required by the Environment Agency and other bodies. The licensing of individual schemes will be determined on the basis of site specific conditions and within the existing water abstraction regulation regime.



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- Temperature limits for discharged water are likely to vary according to the designation of a river as cyprinid or salmonid, derived from the EU Freshwater Fish Directive (repealed). These designations have been indicated for the specific locations named on the map but may vary elsewhere in the catchment.