

Follow up questions from the TCPA's Green places, successful places webinar: How the Natural Environment can help combat climate change? 27/05/2020

- 1. How compatible can habitats and energy systems be? We saw that greenspaces can be little affected by ground source heat pumps, and how water can be used, what about woodland or wildflower meadows?**

We have not undertaken any investigation of long-term impacts of different heat pump solutions to a range of habitat types. An initial search online did not highlight any direct research in this area although, given they have been in widespread use for 30 years in countries like Sweden, Denmark, Austria and Switzerland, I would guess this has been done. The only relevant paper on wider environmental impact is at https://www.researchgate.net/publication/283849752_Reduction_of_environmental_impacts_of_heat_pump_usage_with_special_regard_on_systems_with_borehole_heat_exchangers

- 2. Is there any scope to gain heat/energy from road surfaces?**

Yes, there is definitely scope to gain and store (inter-seasonally) heat from surfaces that have some form of darker manmade surface like asphalt although roads are not ideal given the congested nature of the sub-surface under many of them plus the costs and impact of work to them. School playgrounds are much more common – see https://www.icax.co.uk/asphalt_solar_collector.html.

- 3. On ParkPower: Interesting! What could the negative impacts of schemes be, particularly on biodiversity? E.g. disturbance of soil structure, cooling of soils, cooling of rivers with hydrothermal extraction, both long term and in installation. What's the longevity of underground installations?**

See answer above that relates to this. The most common concern is the use of water in open loop systems in terms of impact from its extraction and then return to sub-surface aquifer or river. Installations have typical lifespans of 30-40 years and can usually be refurbished to avoid digging new boreholes.

- 4. Does your published work contain any indicative costs that others could use as examples?**

It is difficult to provide costs when there are so many permutations in designing systems. Also the potential for grants and incentives that offset these costs. A good place to start in terms of non-domestic scale heat pump solutions is the Carbon Trust Guide to Heat Pumps which is freely available to download from <https://www.carbontrust.com/resources/heat-pumps-guide>. Domestic heat pump solutions can vary from a few £'000 to £10-15k for a GSHP. Replacing existing gas-based heating systems based purely on a standard financial business case is extremely tough right now due to the low cost of natural gas. These assessments need to consider the externalities of a gas solution in terms of its wider impact – this could be achieved through a carbon tax.

There is some useful planning related information and general background to heat pumps in <https://www.monmouthshire.gov.uk/app/uploads/2015/01/1bAppendix-B-Energy-Fact-Sheets.pdf>

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