



Research Challenge 2

To advance performance of novel thermal storage, heat distribution and capture systems



Distribution medium or method

Specification of options and requirements for heat distribution in terms of heat deliver, heat loss and costs.

Characterised experimental laboratory test systems.

Identification of benefits and constraints of different delivery systems.

Storage

Specification of optimum locations and sizes of storage.

Specification of minimum required storage system performance.

Assessment of how storage systems can help meet extreme demand profiles.

Lab prototype storage systems that have a 3-8 times greater useable heat density than water based stores.

Detailed understanding of influence of store sizes, locations and performance metrics on network performance.

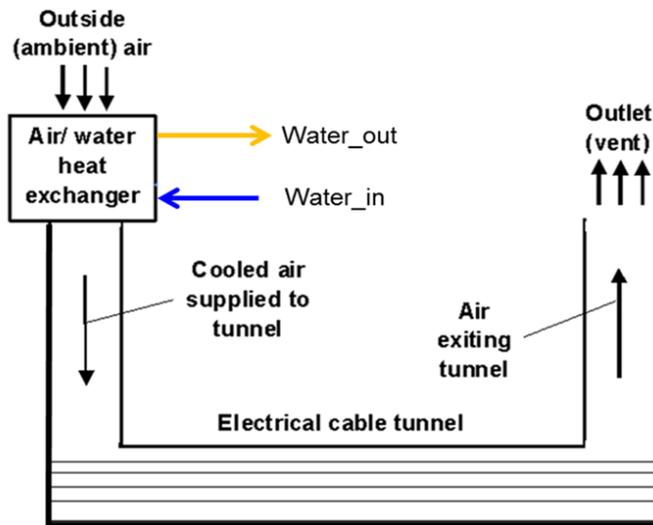
Heat capture

Specification of key operational parameters for heat capture.

Designs for effective heat capture systems for key low carbon heat sources with operational performance, maintenance requirements, predicted operational durability and lifetime.

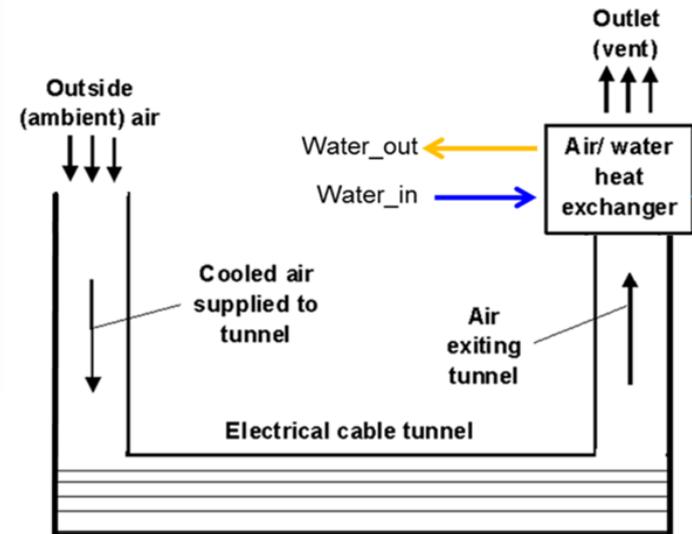
Predictions of heat capture effectiveness for different heat sources.

Electrical cable tunnels investigation with UKPN



- 64.1 to 310.8 kW
- Heat pump COP of > 3 @ 65°C delivery
- Carbon savings of > 50% for the heat recovery system compared with gas boiler heating.

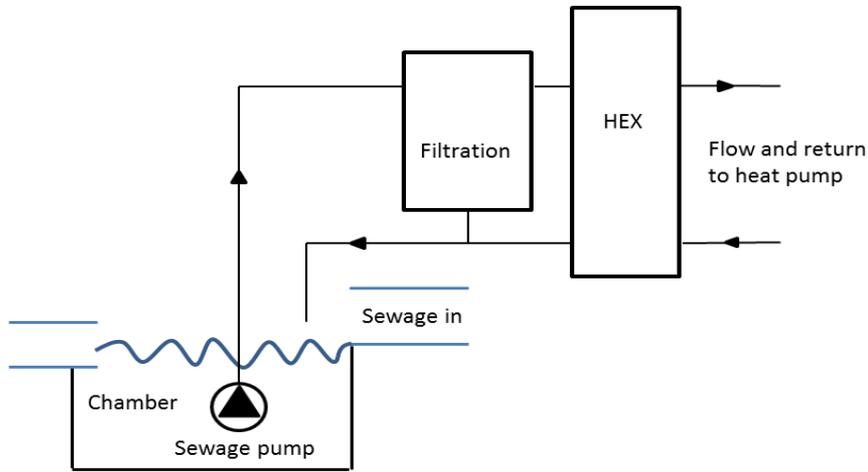
- CIBSE national conference paper submitted 2019
- IIR congress paper submitted 2019



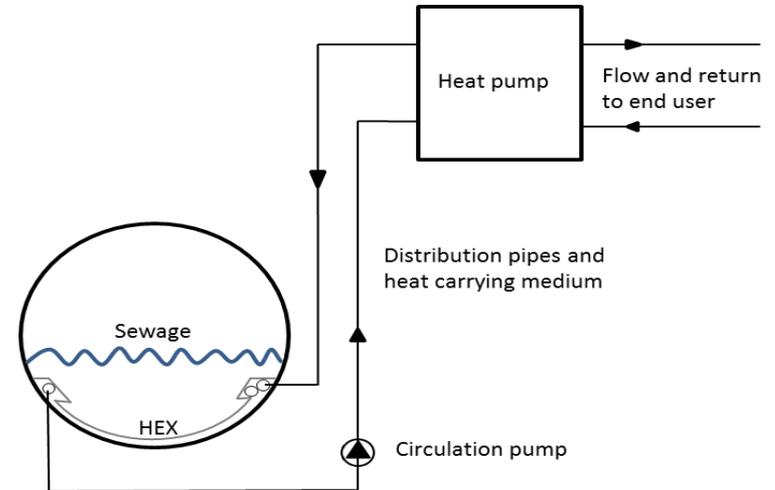
- ~ 300 kW
- Heat pump COP of ~4 @ 65°C delivery
- Carbon savings of 62-65.6% for the heat recovery system compared with gas boiler heating.

Investigation of Sewers with Thames Water

Active method



Passive method



HeatFUEL – Heat From Underground Energy London



ISLINGTON



- CIBSE national conference paper submitted 2019
- IIR congress paper submitted 2019
- Invited to youth leaders council at MI-4

Islington Bunhill 2 – Heat network

PhD investigating real life performance of the ventilation shaft heat recovery system.



LOT-NET The LOT-NET logo, featuring the text "LOT-NET" in a bold, black, sans-serif font, followed by a circular icon with a red and blue arrow forming a clockwise loop.

Heat from Sub-stations

- 300,000 in the UK
- Typical heat available is 0.3% of rating
- Some operating at 80C



Portable latent heat storage to facilitate integration of industrial waste heat into UK district heating networks

Milton Keynes District Heat Network.

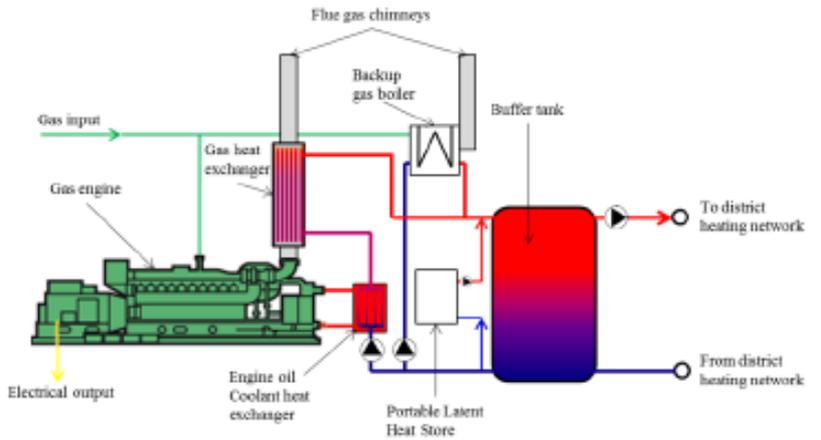
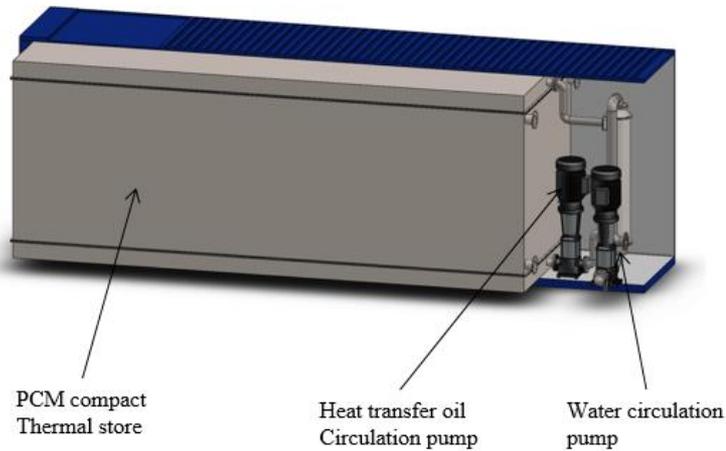
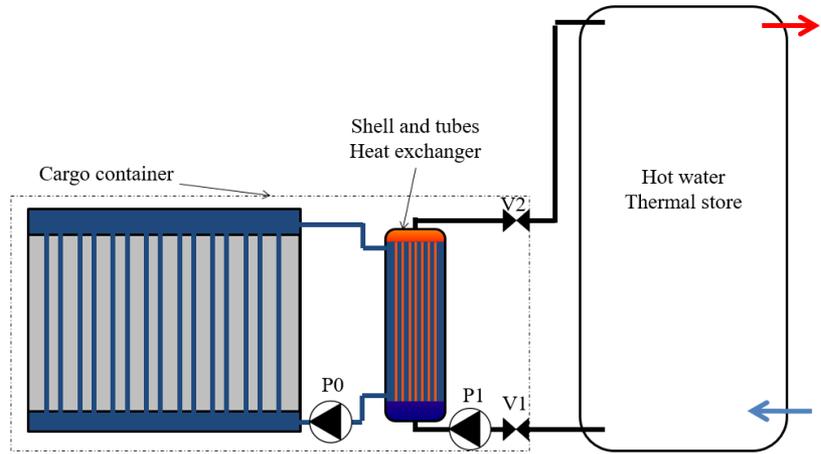
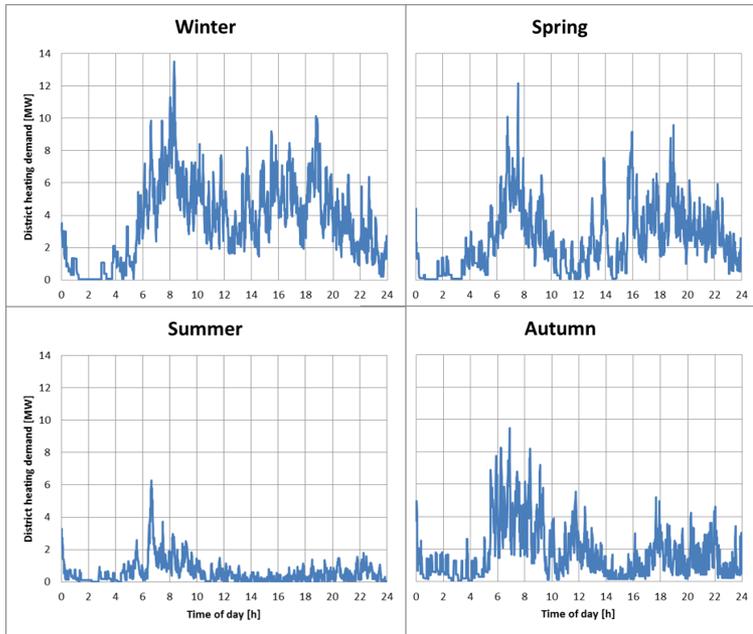
Heat Source Rugby Cement Factory.

Waste heat recovery from flue gas to a modular 2MWh capacity PCM (magnesium chloride hexahydrate) store working between 85 and 125°C in a 25 foot cargo container.

Distance between source and demand 72km.

Charged in 12 hours discharged in 6 hours.

3 scenarios modelled, A) no thermal stores, B) a set of 3 stores being cycled, C) 3 sets of 3 stores being cycled.



Gas boiler use reduced by 54% for scenario C compared to A.
 Total carbon savings 13.4%