



# LoT-NET Workshop

G. Atkinson, STET, The University of Warwick

Friday 13<sup>th</sup> December 2019 | School of Engineering, The University of Warwick



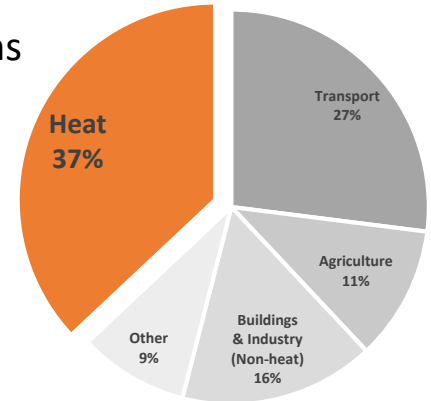
WARWICK  
THE UNIVERSITY OF WARWICK

# Next-generation ammonia adsorption heat pump cycles and technology



## Why are we interested?

- Emissions from heat are still the biggest contributor to UK emissions (hot water 4% & space heating/cooling 17%).<sup>[1]</sup>
- 85% of UK households use natural gas for space heating.<sup>[1]</sup>
- Sorption heat pumping technologies offer:
  - Potential in reducing CO<sub>2</sub> emissions associated with domestic heating by improving end use efficiency.
  - Consumer familiarity with systems designed with the ‘look and feel’ of a gas boiler in the UK market.



**Fig. 1** Estimated UK emissions attributable to heating, 2016 <sup>[1]</sup>.

## Principle of operation

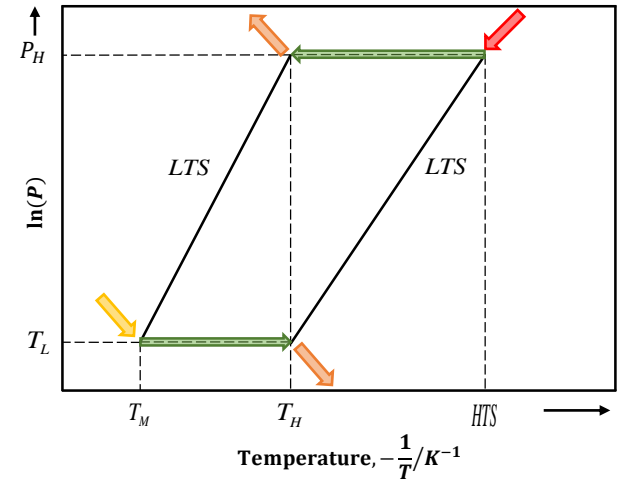
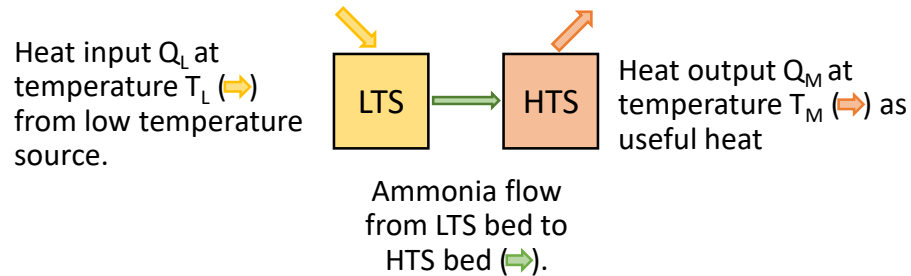
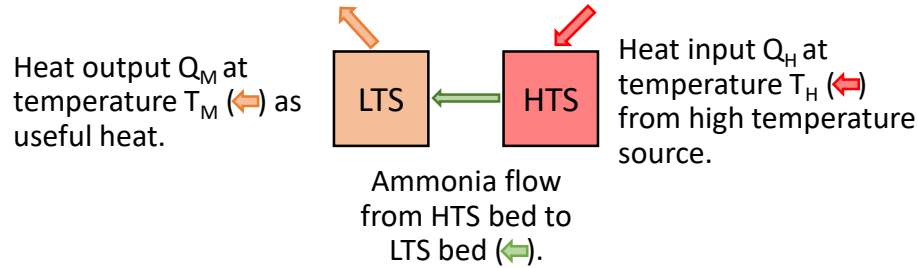


Fig. 2 (Approx.) Clausius-Clapeyron diagram for a 2-salt heat pump operation.

## Plan of action

- MATLAB® modelling of a 2-bed system
- Experimental validation of the simulation results.
  - Manufacture of a PoC machine
  - Testing with the ThermExS facilities in STET
- Further modelling and potential to develop a simulation of a more complex cycle.
- Overall feasibility of the technology for the UK market (and further afield)



Fig. 3 ThermExS facilities in use at Warwick.<sup>[2]</sup>

**Thank you for your attention**