

Thermal Systems of the Future

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Aston University
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THE UNIVERSITY OF WARWICK



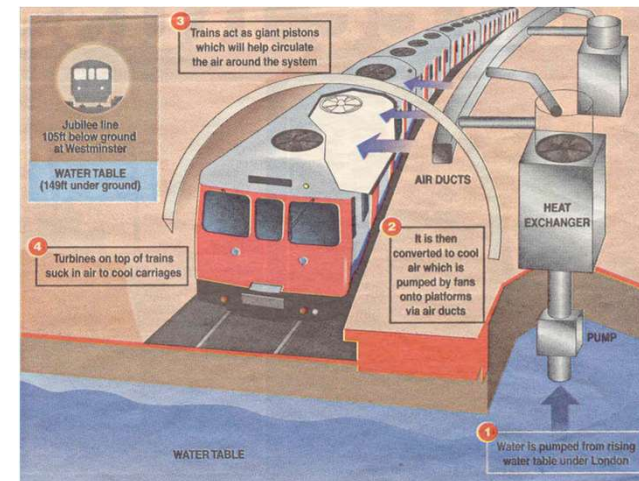
**British
Geological Survey**
NATURAL ENVIRONMENT RESEARCH COUNCIL



**MIDLANDS
INNOVATION**

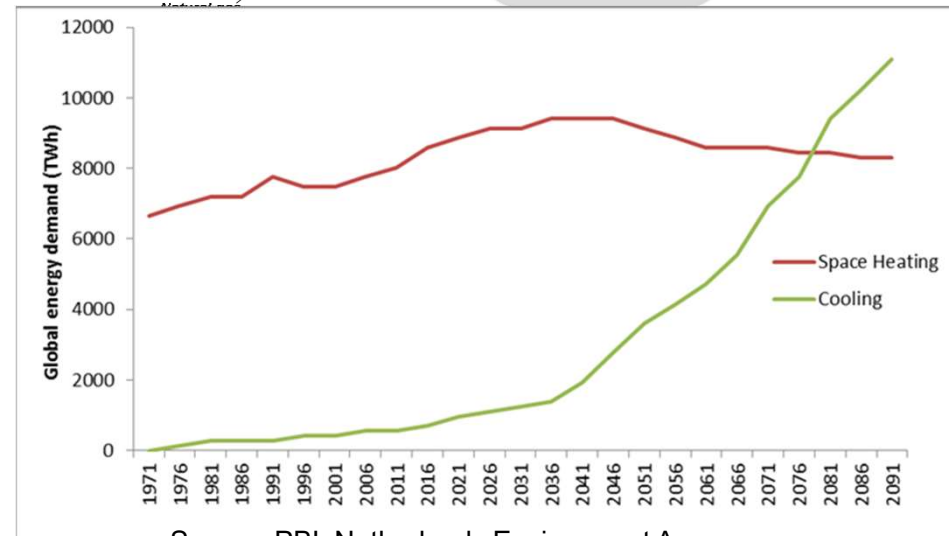
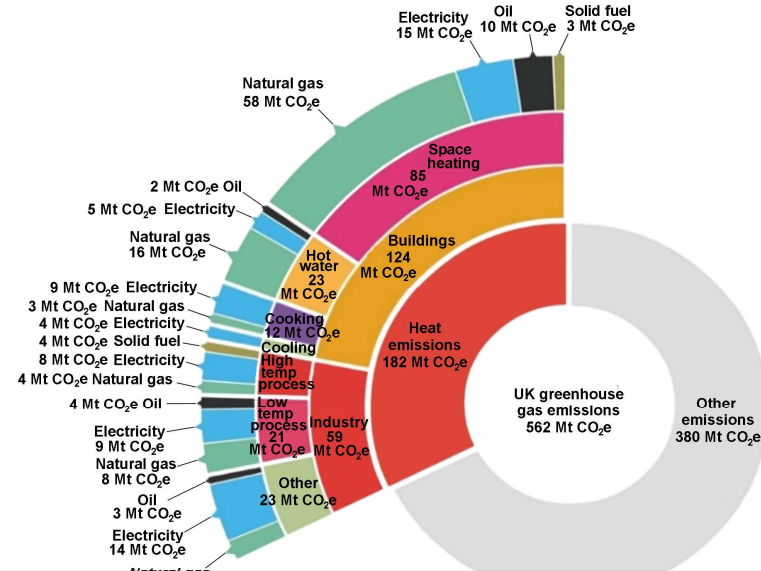
How things have changed?

- 1970s Ron James started research at Heating and Cooling Research at LSBU
- 1999 set up Centre of Air-conditioning and Refrigeration Research with John Missenden
- Focus on sustainability in cooling
- Limited opportunity for research



The Heating & Cooling Challenge

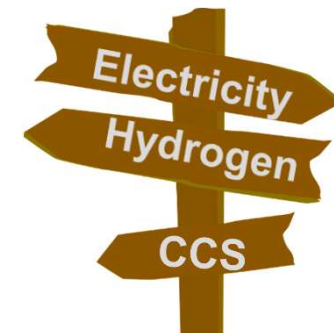
- Heating and cooling are large users of energy and producers of carbon
- Heat responsible for 32% of carbon
- Cooling demand is expected to
 - Grow 50 x by 2100
 - Adding 100GT to 2050
 - Equivalent to 0.5°C of additional warming.
 - Incremental approaches to cooling efficiency are insufficient



Source: BP, Netherlands Environment Agency

The future landscape

- Net Zero – focus on the difficult areas
- Boris “Climate Change is our first priority after....”
- UN Climate action meeting
- Which way for heating and cooling?
 - Electricity
 - Hydrogen
 - Biofuels
 - CCS
- Spending review 2021-2026
- It’s our time to make a difference





Cooling and heating - A mature technology

- The market is stuck
- Systems bought on lowest first cost
- Little to no demand for lowest lifecycle cost
- Consolidated industry with high barriers to entry
- We need to stimulate innovation that disrupts incumbent high carbon technologies

The Role of SIRACH

- Born 2008
- SIRACH is a network to promote sustainable innovation in refrigeration air conditioning and heat pumps.
- Members work together to promote technical innovation for long term profitability together with a cleaner environment.
- Dissemination path for Lot-NET
- Anyone can get involved and contribute.
- Do we have any influence?
- Can we collectively do more?
- What are the challenges moving forward?



Programme	Thermal systems research and innovation	
9.30-10.15	Thermal Systems Research and Innovation at UoB: phase change material (PCM) based thermal energy storage (TES) Introduction and overview of ERA and T-ERA	Prof. Yulong Ding, University of Birmingham Prof. Martin Freer
10.15-10.35	Coffee break	
10.35-11.05	Thermal Systems R&I at Lboro: thermal energy storage and solar thermal systems	Prof. Phil Eames, Loughborough University
11.05- 11.35	Thermal Systems R&I at Aston: sustainable bioenergy systems	Prof. Patricia Thornley, Aston University
11.35 -12.35	Workshop session: Research challenges for thermal systems	Carol Bond, SIRACH
12.35 - 1.20	Lunch	
1.20 - 2.20	Research challenges for thermal systems	Carol Bond, SIRACH
2.20 - 2.45	Thermal Systems R&I at Warwick: sustainable thermal energy technologies	Prof. Bob Critoph, University of Warwick
2.45 - 3.00	Transforming our approach to waste heat	Sam Hinmiers, Warwick University
3.00 - 3.25	Coffee break	
3.25 - 3.55	Systems level integration and future integrated thermal systems	Paul Jordan, Energy Systems Catapult
3.55 - 4. 25	Business innovation in sustainable thermal systems	Brian Churchyard, Asda
4.25 – 5.00	Closing address – followed by the tour of T-ERA funded laboratories	Prof. Martin Freer

Questions and Answers

