Thermal Systems of the Future

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Chair of SIRACH
London South Bank University
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: PBL 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?
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<th>Programme</th>
<th>Thermal systems research and innovation</th>
<th>Speaker</th>
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<tr>
<td>9.30-10.15</td>
<td>Thermal Systems Research and Innovation at UoB: phase change material (PCM) based thermal energy storage (TES) Introduction and overview of ERA and T-ERA</td>
<td>Prof. Yulong Ding, University of Birmingham</td>
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<td>Prof. Martin Freer</td>
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<td>10.15-10.35</td>
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<td>10.35-11.05</td>
<td>Thermal Systems R&amp;I at Lboro: thermal energy storage and solar thermal systems</td>
<td>Prof. Phil Eames, Loughborough University</td>
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<td>11.05-11.35</td>
<td>Thermal Systems R&amp;I at Aston: sustainable bioenergy systems</td>
<td>Prof. Patricia Thornley, Aston University</td>
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<td>11.35-12.35</td>
<td>Workshop session: Research challenges for thermal systems</td>
<td>Carol Bond, SIRACH</td>
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<td>12.35 - 1.20</td>
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<td>1.20 - 2.20</td>
<td>Research challenges for thermal systems</td>
<td>Carol Bond, SIRACH</td>
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<td>2.20 - 2.45</td>
<td>Thermal Systems R&amp;I at Warwick: sustainable thermal energy technologies</td>
<td>Prof. Bob Critoph, University of Warwick</td>
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<td>2.45 - 3.00</td>
<td>Transforming our approach to waste heat</td>
<td>Sam Hinmers, Warwick University</td>
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<td>3.55 - 4.25</td>
<td>Business innovation in sustainable thermal systems</td>
<td>Brian Churchyard, Asda</td>
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<td>4.25 – 5.00</td>
<td>Closing address – followed by the tour of T-ERA funded laboratories</td>
<td>Prof. Martin Freer</td>
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Questions and Answers