Heat: The Technology Context

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Where do you start?

“Heat accounts for approaching half UK CO2 emissions”

DUKES does not explicitly account for heat:
- 2007 figures for energy consumption (ktoe):

<table>
<thead>
<tr>
<th></th>
<th>Coal</th>
<th>Gas</th>
<th>Electricity</th>
<th>Heat</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Industry</strong></td>
<td>1,173</td>
<td>11,760</td>
<td>10,123</td>
<td>692</td>
</tr>
<tr>
<td><strong>Domestic</strong></td>
<td>487</td>
<td>30,090</td>
<td>9,893</td>
<td>52</td>
</tr>
<tr>
<td><strong>Public Admin</strong></td>
<td>5</td>
<td>3,834</td>
<td>1,879</td>
<td>376</td>
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<tr>
<td><strong>Commercial</strong></td>
<td>4</td>
<td>3,091</td>
<td>6,469</td>
<td>9</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>4</td>
<td>1,662</td>
<td>329</td>
<td>0</td>
</tr>
</tbody>
</table>

There are many sub markets and associated technology options
Heat, buildings and technology

End use technology

- Boilers
  - Gas
  - Coal
  - Electricity
  - Oil
- Heat pumps
  - Gas
  - Electricity
- Air conditioning
  - Gas
  - Electricity
- Lighting
  - Electricity
- Appliances
  - Gas
  - Electricity

Demand

- Water heating
- Space heating
- Cooling/Vent’n
- Lighting
- Appliance loads

Efficiency measure

- Building fabric
- Controls
- Management
- Design
- Glazing options
High temperature industries

Energy saving measure  Reduced Demand  End use technologies

- Improved combustion
- Process development
- Furnace/kiln design
- Heat recovery
- Insulation/refractories
- Process control

Combustion

Smelting/Electrolytic

Kilns/Furnaces

Demand
Low temperature industries

Energy saving measure        Reduced Demand          End use technologies

Process development

Drying & separation

Heat recovery

Process control

Service improvements

Drying

Distillation/Evaporation

Process heating/cooling

Ovens/furnaces
However....

- Heat is expensive to buy/produce
  - Saving heat can save money and carbon

- Heat you do not need is difficult to sell or dispose of
  - How do you open up new markets
  - How do you reduce the direct and indirect disposal costs?

- Many ‘efficient heat technologies’ exist and/or may emerge, but the market is complex and entry barriers are high
  - What can we do to facilitate the emergence and widespread deployment of these?