Household energy bills – impacts of meeting carbon budgets

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BIEE
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1. Why Bills? and some principles in CCC’s approach
2. Current bills and recent increases
3. Drivers of future bills relating to carbon budgets
4. Outlook for energy bills to 2020
Context – Climate Change Act requires Committee to consider impact of carbon budgets on energy supplies and fuel poverty

- Number of households in fuel poverty is rising (2 million in 2004, over 5 million in 2010), predominantly due to rising energy prices
- Fuel poor tend to have energy use at least as high as the non fuel poor:

![Graph showing energy use distribution between not in fuel poverty (Not in FP), in fuel poverty (In FP), and total (Total). The graph displays the percentage of group across different total required energy use 2006 (GJ). The source is BRE modelling for the CCC (2009) based on English House Condition Survey Data 2006.]

Some principles of CCC approach

- Focus on dual-fuel households:
  (don’t conflate with electric heated homes)

- Separate:
  - Electricity / Gas
  - Price / Energy consumption
  - Supporting low-carbon investment / Supporting energy efficiency

- Bills not the only thing that matters!
  - E.g. total cost of carbon budgets, fiscal impact, competitiveness, technology development (see other CCC reports)
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For the typical household, electricity generation costs are around 15% of their bill (i.e. currently around £170). Around 40% of the average bill is from electricity... ...and around 40% of the electricity price is from wholesale costs.
Electricity bill has increased in line with price (+65% 2004-2010)
Gas bill has increased further (90%), despite consumption fall
Factors in energy bill rises from 2004 to 2010

<table>
<thead>
<tr>
<th>Factor</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wholesale gas price – gas</td>
<td>+ £190</td>
</tr>
<tr>
<td>Wholesale costs – electricity</td>
<td>+ £100</td>
</tr>
<tr>
<td>TDM</td>
<td>+ £70</td>
</tr>
<tr>
<td>Energy efficiency funding</td>
<td>+ £45</td>
</tr>
<tr>
<td>Support for low-carbon (i.e. Carbon price and RO)</td>
<td>+ £30</td>
</tr>
<tr>
<td>VAT</td>
<td>+ £20</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>£455</strong></td>
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Drivers of electricity wholesale price
Extra costs from gas & carbon prices, renewables

- Extra costs from gas & carbon prices, renewables
  - 65% existing: +1.5p gas price (44 to 70 p/th)
  - +0.7p carbon price (@ £10 to £30/t)
- 11% off wind (12GW) @ up to 9p/kWh (2 ROCs)
- 10% on wind (15 GW) @ up to 4.5p (1 ROC)
- 6% new bio @ c. 4.5p
- Some other renewables, new nuclear and CCS

Generation share
- Offshore wind
- Onshore wind
- New bio
- Other renewables
- CCS
- New Nuclear
- Existing nuclear
- Existing hydro and bio
- Coal (and other fossil)

Note: 1p/kWh = c. £35 on the average bill
Other factors driving cost increases

<table>
<thead>
<tr>
<th>Low-carbon Factors</th>
<th>Impact</th>
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<tbody>
<tr>
<td>ENSG transmission upgrades</td>
<td>+ 0.1 p/kWh</td>
</tr>
<tr>
<td>Smart meters</td>
<td>+ 0.2 p/kWh</td>
</tr>
<tr>
<td>Energy efficiency funding</td>
<td>-</td>
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</tbody>
</table>

Current funding of £50 per household could fund e.g. 2 million solid wall insulations by 2020

Other Factors

<table>
<thead>
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<th>Impact</th>
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<tbody>
<tr>
<td>Supplier cost and margin</td>
<td>-</td>
</tr>
<tr>
<td>Other TDM</td>
<td>+ 0.5 p/kWh</td>
</tr>
<tr>
<td>VAT</td>
<td>+ 0.3 p/kWh</td>
</tr>
</tbody>
</table>

- £5 billion investment (latest estimate £9bn)
- 5% return over 40 years
- Spread over all demand

Gas price in heating +20% gas costs (£125)
Scope for energy reductions

Factors not requiring policy

Weather – 2010 gas consumption around 15% higher because of cold weather
Boiler replacement – end-of-life replacement would give 6% reduction

Additional measures

*Heating – potential 8% reduction*
- Lofts and cavities – 5%
- Other physical measures – 1%
- Use of heating controls – 4%

*Electricity – potential 19% reduction*
- Lighting – 4%
- Appliances – 14%
- Behaviour change – 1%

Effective policies required to unlock savings
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A word on non-typical households

- 7% with oil, LPG and solid fuels likely to see similar impacts to gas-heated homes
  - Particular opportunity from RHI (e.g. we model 60% of measures in these households)

- 9% with electric heating potentially worse off
  - Note that data is poorer here
  - Tariff arrangements less straightforward
  - Electricity use probably 3-4 times higher
  - Next steps: Improve understanding, targeting for EE and RHI, consider preferential tariffs?
CCC conclusions in December 2011 paper on bills

- **Recent increases** in bills from 2004 to 2010 (£455) were primarily due to factors unrelated to climate policy (which contributed £75).

- We expect **carbon policies** to add around £110 to the average dual-fuel bill by 2020, mainly due to support for investments in low-carbon power generation.

- We identify significant potential for **energy efficiency** to reduce bills:
  - However, these are currently uncertain and require effective policies.
  - If unlocked they would offset carbon policy costs.

- Households with **electric heating** could be disproportionately affected by low-carbon costs.