Our overall goal
The Calculator helped outline 4 ways of getting there:

1. Higher renewables; more energy efficiency
2. Step-change in behaviour, renewable technology costs and storage
3. Step-change in CCS technology, in power and industry applications
4. No game-changing technology cost breakthrough in power

- Higher nuclear; less energy efficiency
- Core MARKAL
- Higher CCS; more bioenergy
## 4 scenarios in more detail

<table>
<thead>
<tr>
<th></th>
<th>Core MARKAL</th>
<th>Higher renewables; more energy efficiency</th>
<th>Higher nuclear; less energy efficiency</th>
<th>Higher CCS; more bioenergy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electricity</strong></td>
<td>33 GW nuclear 18 GW wind 28 GW other CCS 27 GW other renew 33 GW back-up gas</td>
<td>16 GW nuclear 82 GW wind 13 GW CCS 14 GW solar 10 GW marine 24 GW back-up gas</td>
<td>75 GW nuclear 20 GW wind 2 GW CCS 2 GW hydro 11 GW back-up gas</td>
<td>20 GW nuclear 28 GW wind 40 GW CCS 2 GW hydro No back-up gas</td>
</tr>
<tr>
<td><strong>Buildings</strong></td>
<td>Heating mix of heat pumps, resistive heat, biomass pellets, district heat</td>
<td>7.7m SWIs, 8.8m CWIs, 100% house-level heating systems</td>
<td>5.6m SWIs, 6.9m CWIs, 90% house-level heating systems, 10% network-level</td>
<td>5.6m SWIs, 6.9m CWIs, 50% house-level heating systems, 50% network-level</td>
</tr>
<tr>
<td><strong>Transport</strong></td>
<td>75% ULEVs, unclear on modal shift</td>
<td>100% ULEVs, high modal shift</td>
<td>80% ULEVs, 20% ICEs, low modal shift</td>
<td>65% ULEVs, 35% ICEs, medium modal shift</td>
</tr>
<tr>
<td><strong>Industry</strong></td>
<td>Medium growth, over half of emissions captured by CCS</td>
<td>Medium growth, 48% of emissions captured by CCS</td>
<td>Medium growth, 0% of emissions captured by CCS</td>
<td>Medium growth, 48% of emissions captured by CCS</td>
</tr>
<tr>
<td><strong>Bioenergy and land use</strong></td>
<td>~350 TWh of bioenergy, low ambitions on land mgmt</td>
<td>181 TWh of bioenergy, low ambitions on land mgmt</td>
<td>461 TWh of bioenergy, high ambitions on land mgmt</td>
<td>471 TWh of bioenergy, medium ambitions on land mgmt</td>
</tr>
</tbody>
</table>
What this means for a sector

Projected deployment of low carbon generation over the first three carbon budgets and illustrative ranges of deployment potential in the fourth carbon budget period and in 2050

- CB1
- CB2
- CB3
- CB4

Projected low carbon generation over the first four carbon budget periods
- Range of additional low carbon generation during the fourth carbon budget period
- Illustrative range of low carbon generation in 2050

Around 40–70 GW of new low-carbon capacity will be needed by 2030, in addition to 10 GW of existing capacity that will still be operating.
Calculator showed a need to almost double electricity production by 2050.
And it showed that action was not always more expensive than doing nothing.
Nuclear or no nuclear?
Briefing new Ministers