A summary of the Zero Carbon Hub’s and Sweet Group’s cost analysis on meeting the Zero Carbon Standard for new homes, published February 2014
The cost of meeting the Zero Carbon Standard
From 2016, all new-build homes will need to meet tough energy efficiency and carbon saving standards. Legislation will require all new homes to achieve zero carbon emissions from regulated energy use. The cost associated with building zero carbon homes is an important topic for house builders, policy makers and other stakeholders.

New analysis by the Zero Carbon Hub published in February 2014 shows that the ‘additional’ costs of building to the Zero Carbon Standard have declined over time, driven by ongoing reductions in the installed cost of solar photovoltaics (PV), better understanding of the costs of delivering highly energy efficient buildings and changes to the detail of the Standard itself – for example, the level of on-site carbon emissions reductions required and the proposed cap on the price of Allowable Solutions.

In many of the scenarios considered, the cost of building to the proposed Zero Carbon Standard has roughly halved since the Hub last published cost estimates in 2011. Furthermore, our projections suggest that costs may continue to fall between 2014 and 2020.

**Cost benchmarks for achieving the Zero Carbon Standard in new homes**

<table>
<thead>
<tr>
<th>HOUSE TYPE</th>
<th>COST OVER PART L1A 2010</th>
<th>COST OVER PART L1A 2013</th>
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<tbody>
<tr>
<td></td>
<td>TOTAL</td>
<td>PER M²</td>
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<tr>
<td>Detached</td>
<td>£8,500-9,500</td>
<td>£72-81</td>
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<tr>
<td>Semi-detached</td>
<td>£4,500-5,100</td>
<td>£59-67</td>
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<tr>
<td>Mid-terraced</td>
<td>£4,100-4,600</td>
<td>£54-60</td>
</tr>
<tr>
<td>Apartments (low-rise)</td>
<td>£2,300-2,500</td>
<td>£42-46</td>
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1. A semi-detached house is assumed to be 76m².
2. The findings highlighted above emphasise the assumed lowest capital cost options for meeting the Standard (‘Scenario 1’ – see later in the leaflet, which involves the use of solar PV as a significant carbon reduction technology).
Achieving the Standard

There are three core requirements which must be met for a home to qualify as zero carbon:

1. **Requirement 1:**
   **Fabric Energy Efficiency**
   The fabric performance of the property must, at a minimum, comply with the Fabric Energy Efficiency Standard (FEES). This is the first step in achieving Carbon Compliance.

2. **Requirement 2:**
   **On site low/zero carbon heat and power**
   Any CO₂ emissions that remain after consideration of fabric performance, heating, cooling, fixed lighting and ventilation, must be less than or equal to the Carbon Compliance limit established for Zero Carbon homes.

3. **Requirement 3:**
   **Allowable Solutions**
   Any remaining CO₂ emissions, from the use of regulated energy sources in the property, must be reduced to zero. This may be achieved through off-site carbon emissions reduction measures, known as Allowable Solutions (the policy is still subject to a government consultation process).

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1. The final standard will not be fully determined until the review of Part L of the Building Regulations for 2016.
A range of technical solutions to meeting the Zero Carbon Standard were considered, all of which should be applicable to most new homes. Specific options included:

**Scenario 1**  
FEES + Efficient gas boiler + PV + AS

**Scenario 2**  
FEES + Efficient gas boiler + SHW + PV + AS

**Scenario 3**  
FEES + ASHP + PV + AS

**Scenario 4**  
FEES + ASHP + SHW + PV + AS

**Scenario 5**  
Advanced energy efficiency + Efficient gas boiler + PV + AS

**Scenario 6**  
Advanced energy efficiency + Efficient gas boiler + SHW + PV + AS

**Scenario 7**  
Advanced energy efficiency + ASHP + PV + AS

**Scenario 8**  
Advanced energy efficiency + ASHP + SHW + PV + AS

*KEY*

<table>
<thead>
<tr>
<th>FEES</th>
<th>ASHP</th>
<th>PV</th>
<th>SHW</th>
<th>AS</th>
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Many other potential solutions could be considered, for example the use of biomass boilers or ground source heat pumps. However, previous analysis has shown that these options are currently less widely applicable than the options listed above.

**Additional costs for Zero Carbon, semi-detached homes above 2010 Part L1A**
Projections to 2020

It is likely that the relative costs of meeting the Zero Carbon Standard will reduce further between 2014 and 2016 and continue to fall through to 2020 and beyond. For a detached house, this might mean that by 2020 the additional cost would be around £5,700-6,300 per home, in 2013 prices and compared to 2013 regulations. For semi-detached and terraced homes the costs would be about £2,900-3,600 and for low-rise apartments £1,900-2,000 per home.

In our analysis we assumed that a Scenario 1-based solution will remain the most cost-effective approach to meeting the Standard. It is impossible to estimate with absolute precision what the costs of building to the Standard could be for every type of house in every scenario. But the review clearly shows a trend of significant cost reductions over time. In the seven years since the Zero Carbon policy was first announced by the government, costs have fallen by tens of thousands of pounds.

However, even though costs are falling, it must also be recognised that the housebuilding industry is in a fragile period of recovery. Industry will need to continue innovating and evolving in order to keep prices as low as possible. The final Zero Carbon Standard implemented by the Government from 2016 must be both stretching – helping to reduce the carbon impacts of new housing – and remain capable of being delivered in a cost-effective manner.

Projections of the cost of meeting the Zero Carbon Standard via the lowest cost route (Scenario 1) for semi-detached homes

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<tr>
<td>Cost above Part L 2013 (£)</td>
<td>4,200</td>
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Allowable Solutions
- Heating and LZC technology
- FEES
Research first published by the Zero Carbon Hub and the NHBC Foundation in November 2013 shows that new homes built to energy efficiency standards, announced by the Government in 2013, could be up to 57% cheaper to run compared to ‘improved’ Victorian homes of a similar size.

Using energy cost data from the Department of Energy and Climate Change’s ‘Energy and Emissions Projections’, our analysis shows that the energy costs associated with running a typical new 4-bed detached house could be around £1,050/year, compared to £2,460 for a Victorian property (which has also benefited from some energy efficiency improvements). This is a difference of £1,410/year in running costs. Similarly, a new 3-bed semi-detached and 3-bed mid-terrace houses could be £890 (53%) and £670 (47%) cheaper to run.

Looking ahead to 2016, savings for consumers could be even larger for new homes being built to the Hub’s proposed Zero Carbon Standard. For example, the cost of running a 4-bed detached house could be as low as £620/year (assuming the householder is claiming the Feed in Tariff).

For more information on annual household energy spends across various build standards, consult the infographic available on our website.

www.zerocarbonhub.org
The Zero Carbon Hub was established in 2008, as a non-profit organisation, to take day-to-day operational responsibility for achieving the government’s target of delivering zero carbon homes in England from 2016. The Hub reports directly to the 2016 Taskforce.

Get in touch to find out how we can assist you

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