

Table 3 Costs of achieving carbon targets for a traditional detached house compared with 2006 house

Code level	Measure	DER kg CO ₂ m ²	% improvement	Cumulative (£)	Code points for each level	Cumulative code points
Scenario 1 Initial energy efficiency followed by solar water heating, PV and biomass						
Baseline		23	4	0		
1	Add delayed-start thermostat Add zoned time and temperature control to heating system and timed and thermostatic control to hot water system	21.5	10	275	1.18	1.18
2	Reduce air permeability to 5m ³ /m ² /hr Upgrade boiler to high efficiency (91.3%) condensing boiler Reduce U-value of external walls to 0.25 and of windows to 1.5W/m ² K	19.3	19	1,648	4.72	5.90
3	Add 4 m ² flat-panel solar water heater with PV powered pump	17.5	26	3,916	3.54	9.44
4	Reduce U-value of external walls to 0.21 and of windows to 1.3W/m ² K Add 1kW photovoltaic array	12.34	48	13,525	4.72	14.16
5	Add 15kW biomass heating system (woodchip/pellet), omit solar water heater	-0.31	101	20,270	7.08	21.24
Level six has not been considered in this report as a definition of a zero-carbon home was not available at time of publication						
Scenario 2 Initial energy efficiency followed by small-scale wind turbine and biomass						
Baseline		23	4	0		
1	Add delayed start thermostat Add zoned time and temperature control to heating system and timed and thermostatic control to hot water system Reduce air permeability to 5m ³ /m ² /hr	20.9	12	275	1.18	1.18
2	Install one 1.5kW wind turbine (1,100kWh per year) for every 4 homes	19.3	18	984	2.36	3.54
3	Install additional 1.5kW wind turbines (1,100kWh per year) to level of one for every 2 homes	17.9	25	1,693	3.54	7.08
4	Upgrade boiler to high efficiency (91.3%) condensing boiler Reduce U value of external walls to 0.25kW/m ² Add additional 1.5kW wind turbines (1,100kWh per year) so that every home has one turbine	13.2	45	4,484	7.08	14.16
5	Reduce U-value of windows to 1.3kW/m ² and external wall to 0.21kW/m ² Add 15kW biomass heating system	-2.5	111	14,943	7.08	21.24
Scenario 3 Use of shared site wide infrastructure (CHP)						
Baseline		23	4	0	0	0
4	Combined heat and power across a mixed site of at least 200 units	11.4	52.42	2,622	10.62	10.62
Scenario 4 Improved air tightness, mechanical ventilation and proprietary construction details						
Baseline		23	4	0	0	0
1	Add delayed-start thermostat Add zoned time and temperature control to heating system and timed and thermostatic control to hot water system	21.5	10	275	1.18	1.18
2	Reduce air permeability to 5m ³ /m ² /hr Upgrade boiler to high efficiency (91.3%) condensing boiler Reduce U-value of external walls to 0.25 and of windows to 1.5kW/m ²	19.3	19	1,648	4.72	5.90
3	Proprietary construction details (0.04 × total exposed surface area) Reduce air permeability to 3m ³ /m ² /hr and add balanced whole house ventilation system with heat recovery (specific fan power of 1Ws) It is not possible to achieve more than code level three using this scenario	17.5	26	4,481	2.36	8.26