The Cost of the Code

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Overview

- Brief introduction to the Code for Sustainable Homes
- Costing research and indicative benchmarks
- Changes in technology cost
- Alternative definitions of zero carbon

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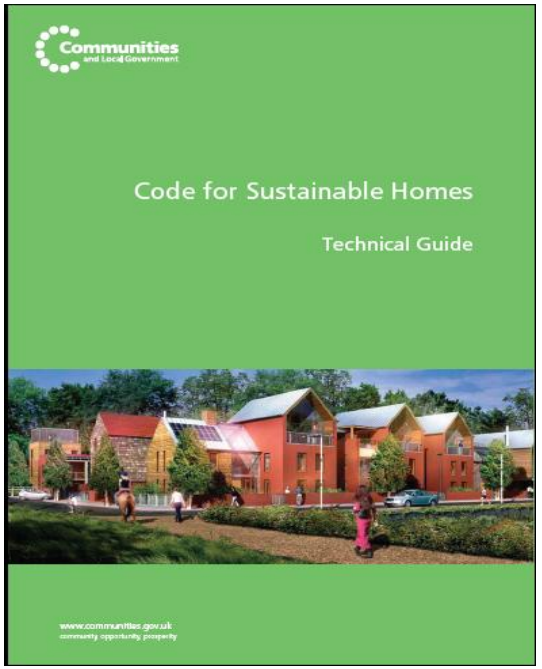
Introduction to the Code for Sustainable homes

- Key part of government housing strategy
- Replaces EcoHomes
  - Owned by government
  - Broader mandate
  - Sets minimum performance standards
  - Six levels of compliance
- Code rating mandatory from May 2008
- Assessment is dwelling specific not site specific



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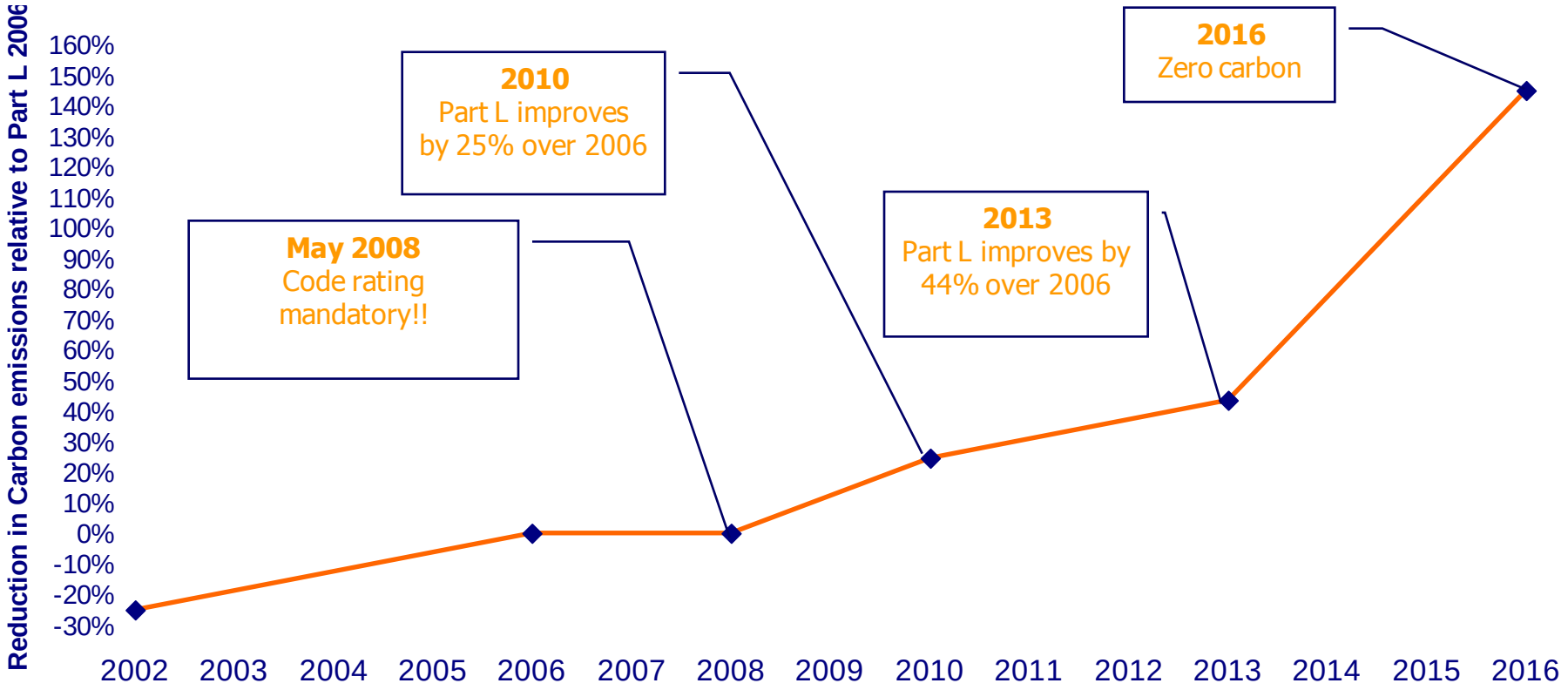
Key dates for housing



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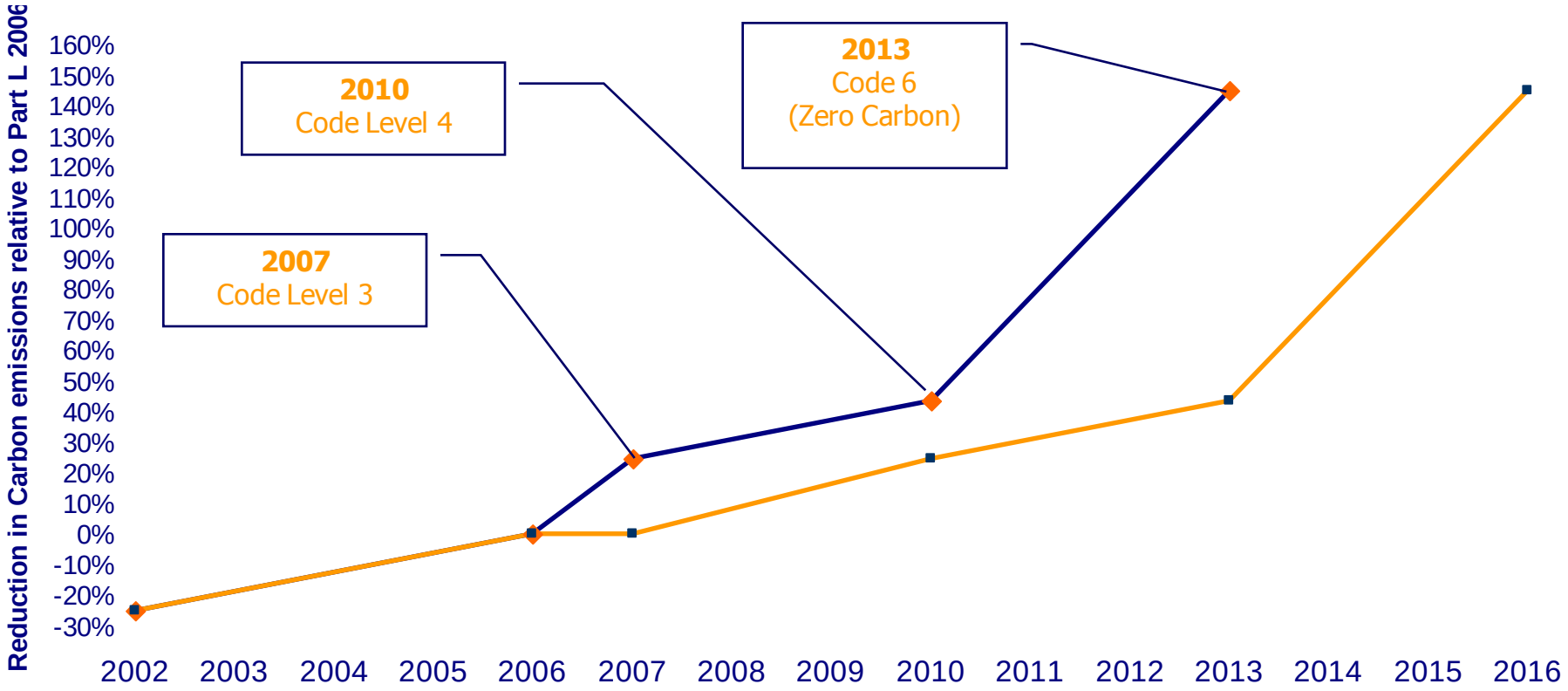
Key dates for housing – English Partnerships



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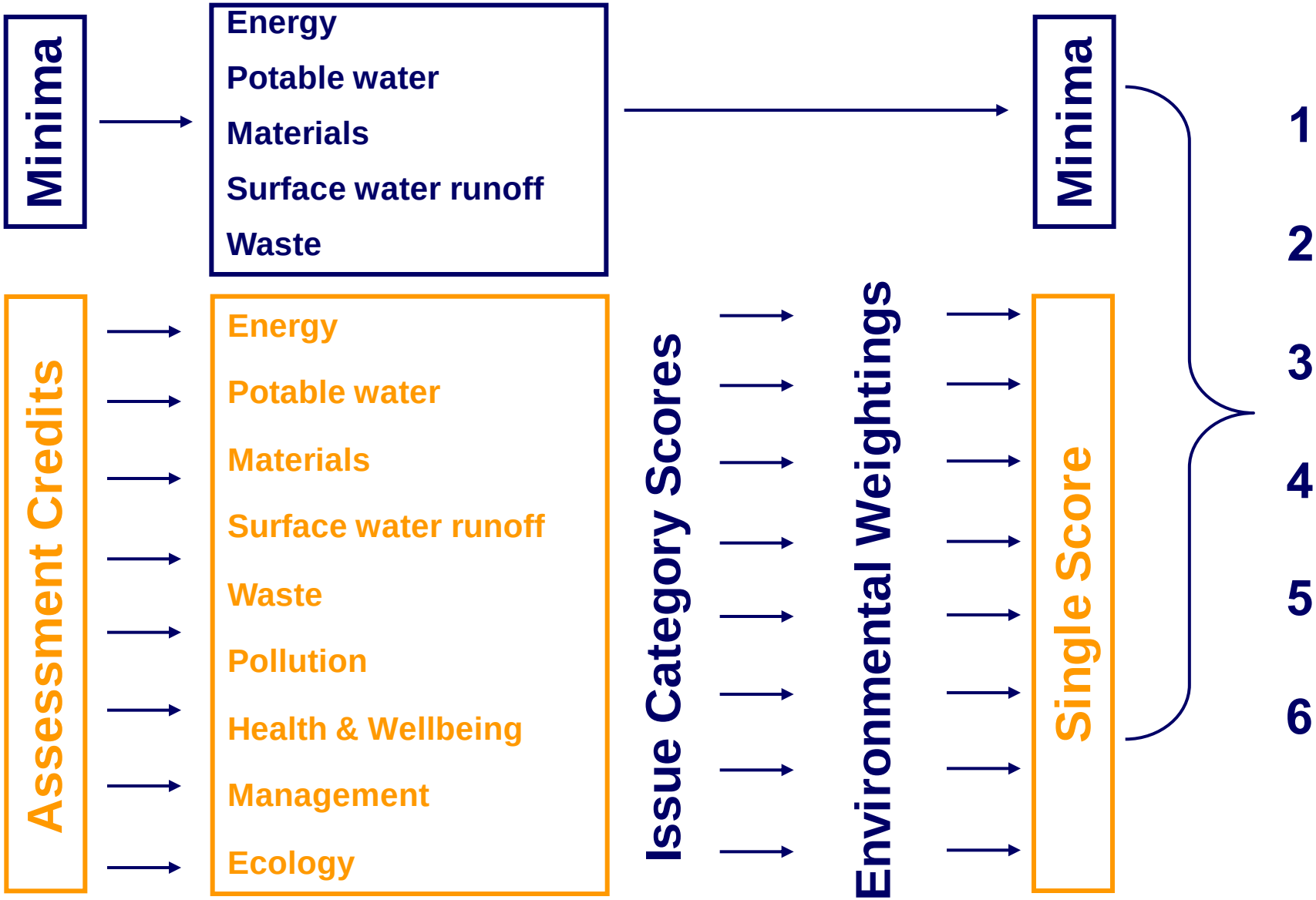
Overview of the Code rating system



Code performance requirements

Code Levels	Total points (score out of 100)	Minimum energy (% improvement on Part L1a)	Minimum water (litres per bedspace per day)
Level 1 ★	36 points	10%	120 litres
Level 2 ★★	48 points	18%	120 litres
Level 3 ★★★	**57 points**	**25%**	**105 litres**
Level 4 ★★★★	68 points	44%	105 litres
Level 5 ★★★★★	84 points	100%	80 litres
Level 6 ★★★★★★	90 points	Zero carbon	80 litres

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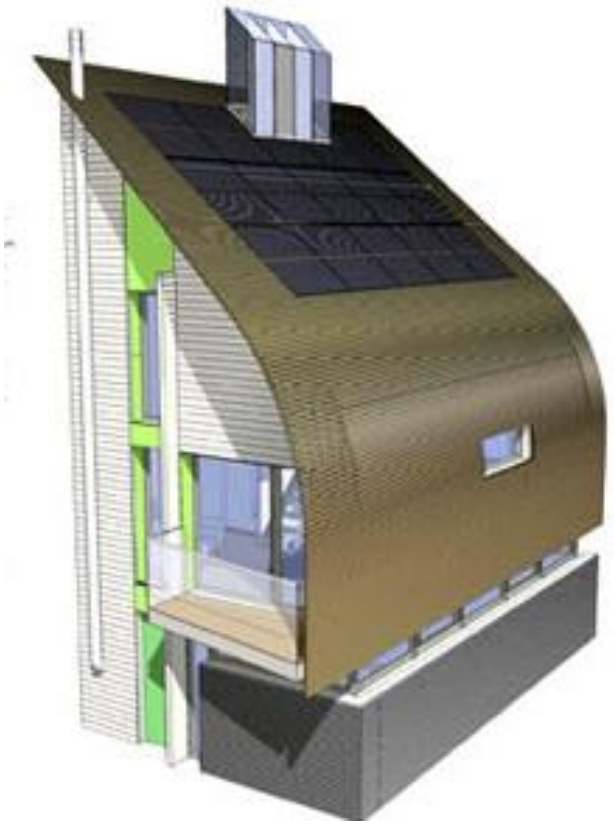
How is the Code affecting new housing?



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Implications

Provide a shed as secure cycle storage

£845

Increase insulation in roof and walls

£684

Provide extra sockets and phone lines in one bedroom to accommodate a home office

£150

Provide PIRs and low wattage bulbs for external lighting

£160

Provide 'A' rated white goods

£0

Considered cost neutral as buyer will pay for these items

Install low NOx boiler

£230

Insulation to be pentane/CO_2 blown or mineral wool

£0

Install water butt

£165

Specify aerated taps

£63

Specify dual 6/4 l flush toilets and 9-12 l/min shower

£0

Provide rainwater recycling

£2500

Allow for a pre-completion sound test

£300

Replace chipboard in floors with plywood boarding

£179

Timber to be certified as being responsibly sourced

£0

Replace uPVC windows with aluminium coated, timber windows

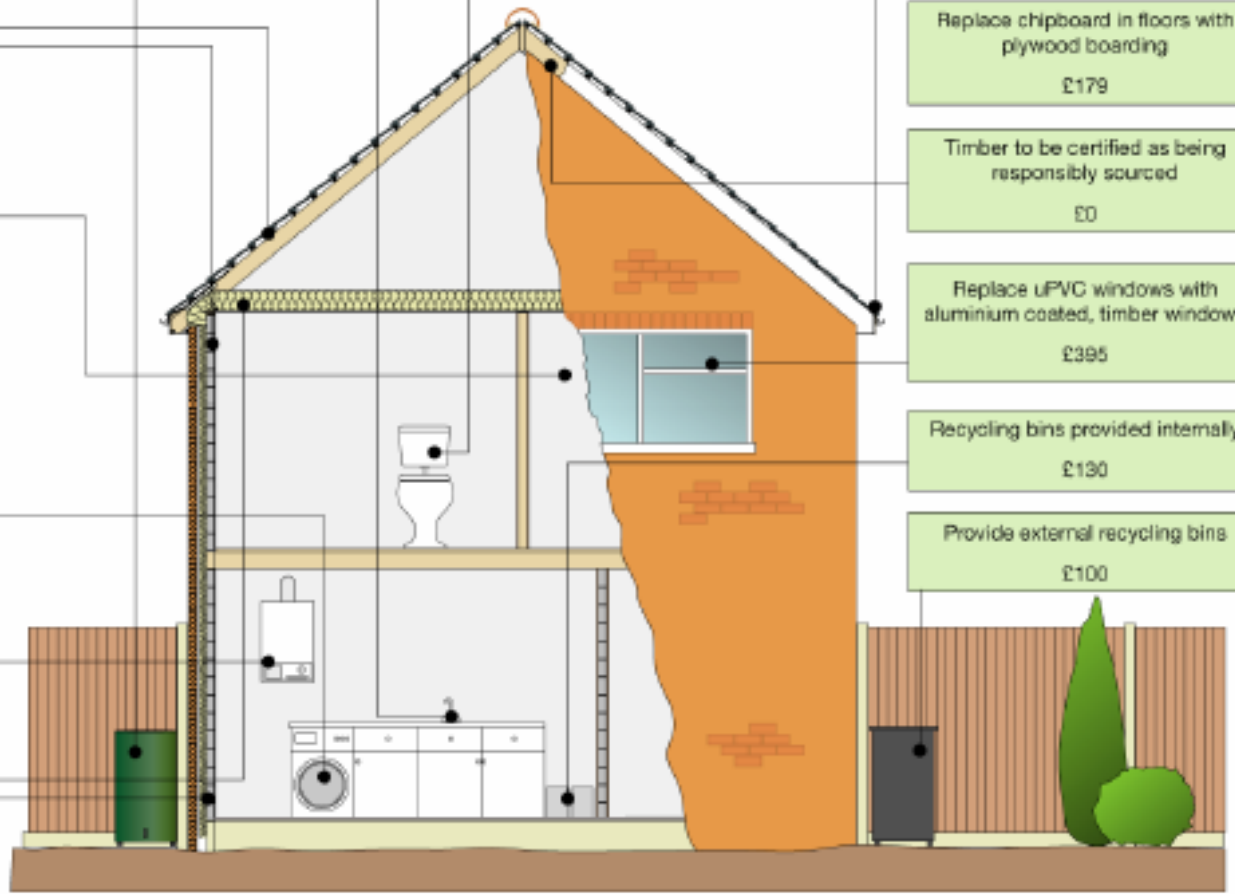
£395

Recycling bins provided internally

£130

Provide external recycling bins

£100



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Cost benchmarks

Europe Economics

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Costing research - method

1. Select 4 house types
2. Establish cost and performance baseline (Part L 2006)
3. Identify environmental enhancements (energy, water and other)
4. Cost analysis of enhanced specifications
5. Application to different development scenarios
6. Review of measures to reduce costs

Europe Economics

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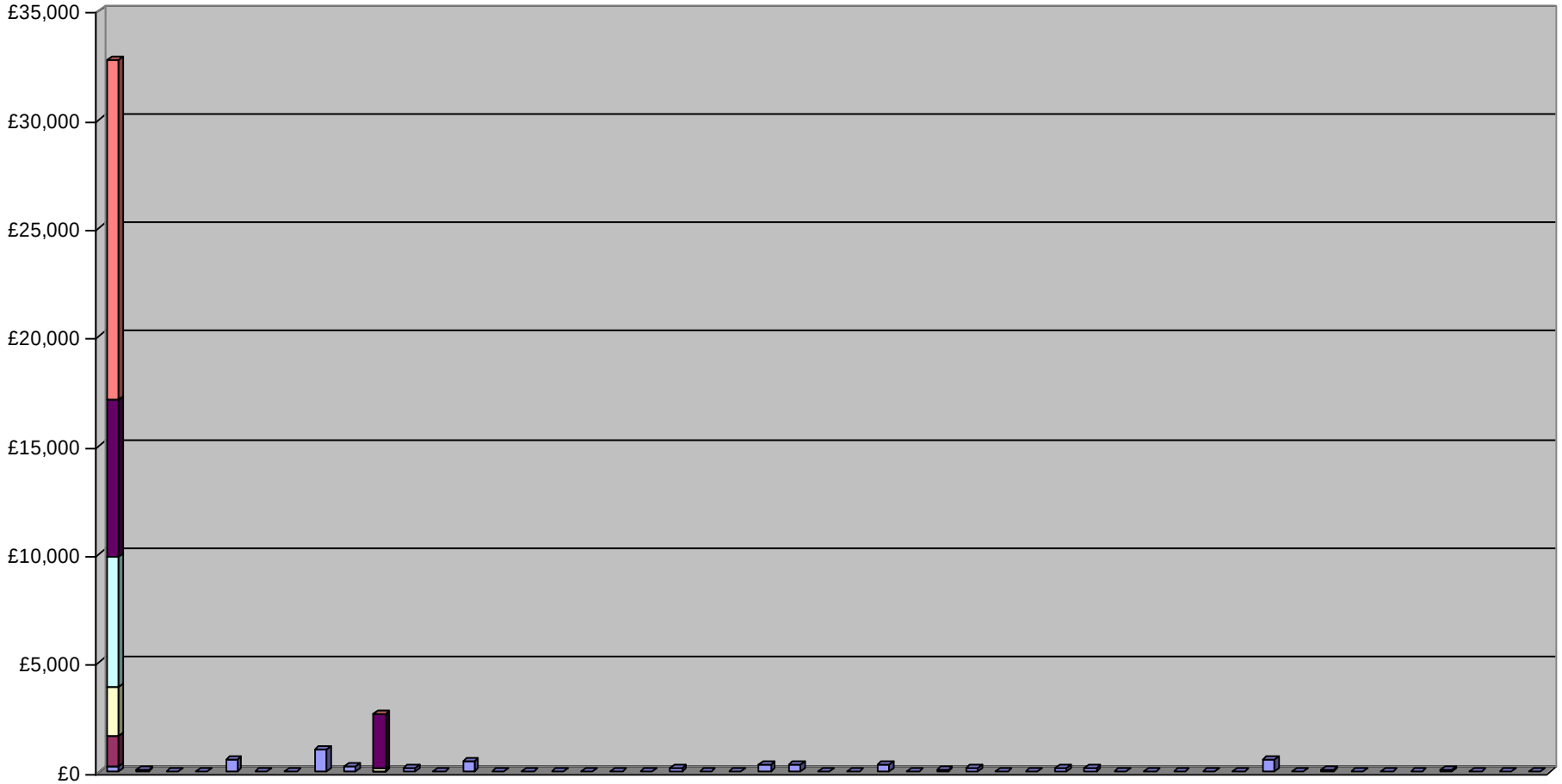
Energy is key



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Carbon Saving Technologies

- Onsite technologies
  - EST Best practice energy efficiency
  - EST Advanced practice energy efficiency (HLP <0.8)
  - Solar water heating (4 m_2)
  - Photovoltaics (small scale, large scale, combined system)
  - Biomass community heating
  - Biomass CHP (high and low application)
  - Gas fired CHP (high and low application)
  - Ground source heat pumps
  - Micro wind (1.5 kW)
  - Medium scale wind (50kW)
  - Large scale wind (2MW)
- Offsite (through purchase of ROCs)

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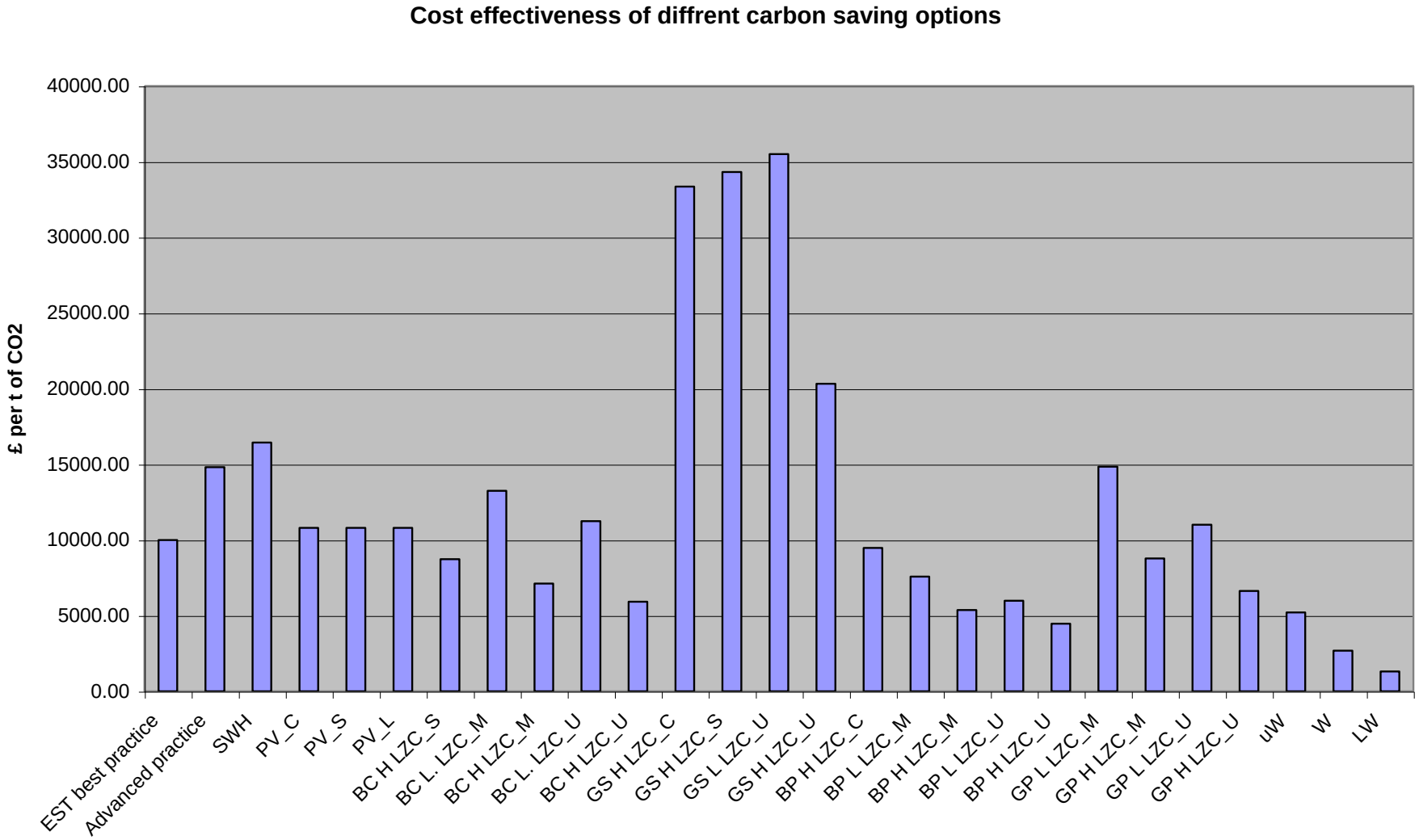
Carbon effectiveness



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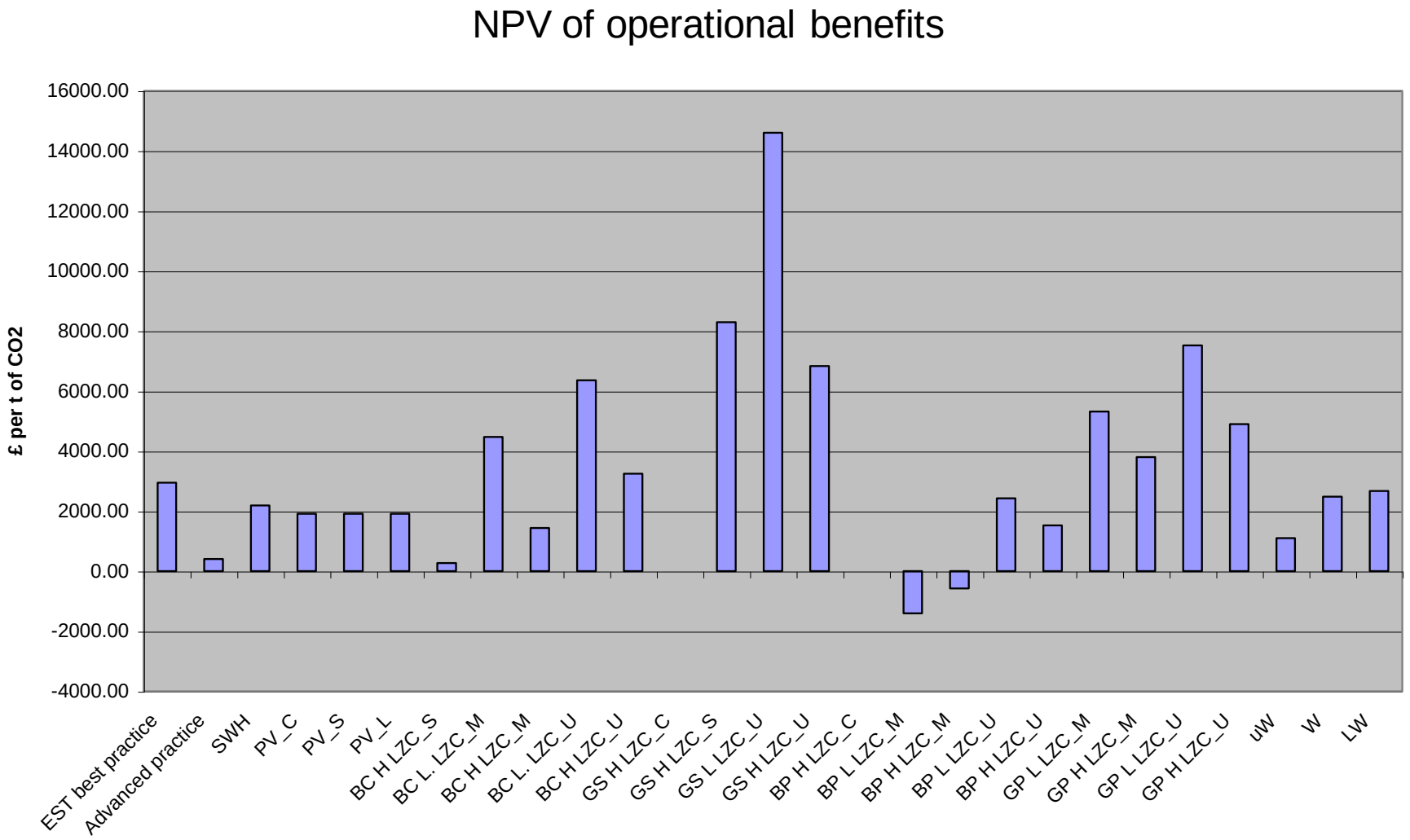
Operational costs and benefits



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Achieving Energy for Code L3

- Generic measures
  - Delayed start thermostat
  - Time and temperature controls
  - Improved air tightness (5 $m^3/m^2/hr$)
  - Improved insulation (e.g. between 0.25 and 0.21 kW/m^2)

- Combination sufficient up to Level 2

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Subsequent measures for level 3

- Scenario 1 - renewables
  - 4 m^2 solar hot water with PV pump
- Scenario 2 – energy efficiency
  - Whole house heat recovery (85% efficient + specific fan power of 1w per second)
  - Proprietary construction details (les thermal bridging)
  - Improved air tightness (3 $m^3/m^2/hr$)

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Indicative energy costs at Level 3

House type	Detached house	Terraced house	Flat
Renewables	£4,000	£3,700	£2,900
Energy efficiency	£4,500	£3,950	£3,950

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At levels 4, 5 and 6

Code level	Carbon Saving (%)	Small scale		Large scale high density	
		Technology	Cost	Technology	Cost
House					
4	44	Best practice energy efficiency and PV	£11k	Biomass heating	£8k
5	100	Biomass heating and PV	£22k	Biomass CHP	£14.5k
6	Zero Carbon	Advance practice energy efficiency, PV and biomass heating	£40k	Advance practice energy efficiency, PV and biomass CHP	£31k
Flat					
4	44	PV and Best Practice energy efficiency	£5k	Biomass heating	£5k
5	100	Best practice energy efficiency and Biomass	£12k	Biomass CHP	£8k
6	Zero Carbon	Advance practice energy efficiency, PV and biomass CHP	£18.5k	Advance practice energy efficiency, PV and biomass CHP	£17k

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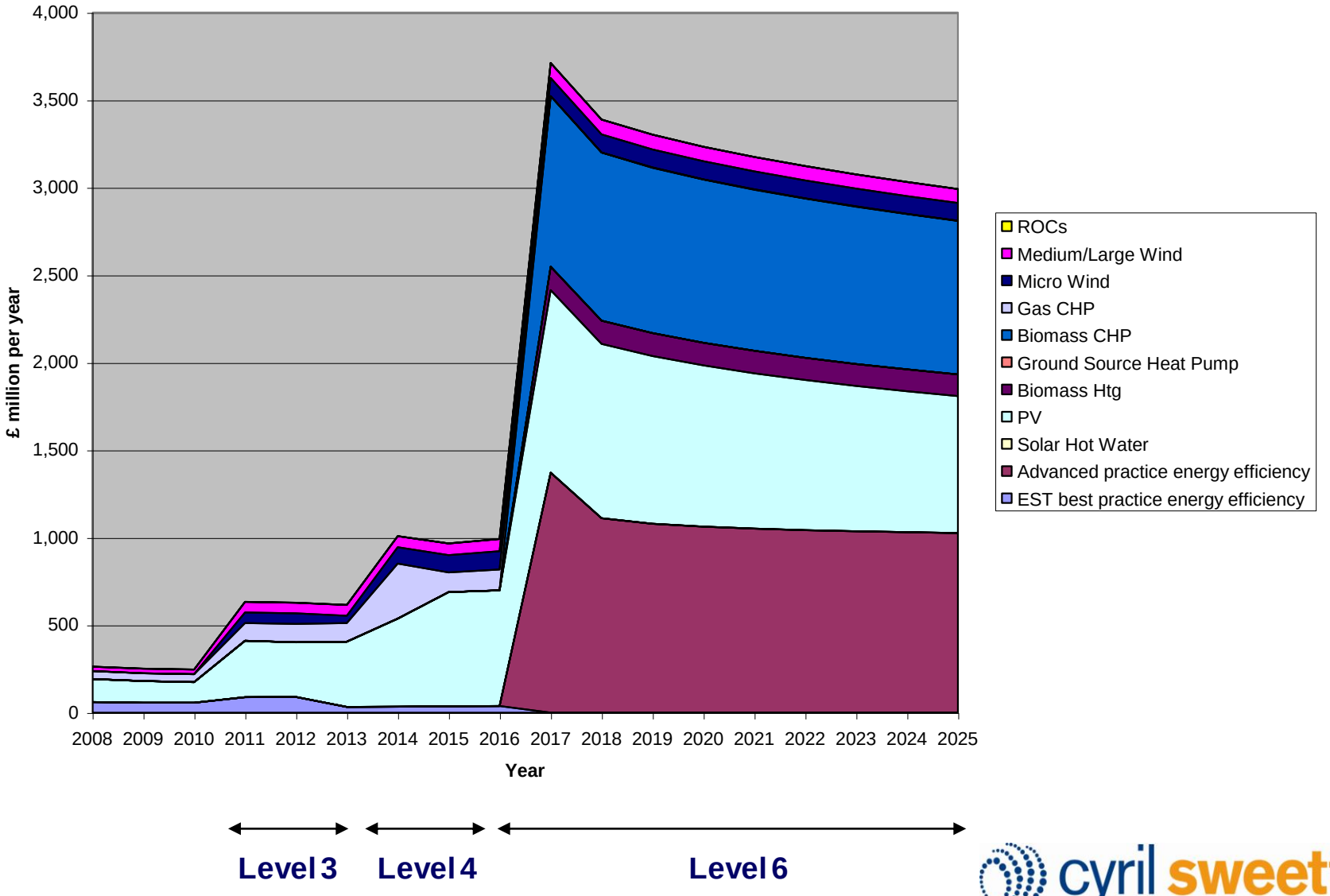
National technology mix



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Key messages

- Scale and density are important factors after Level 3
- Large scale wind is lowest cost where practicable
- Possible to achieve level 3 without renewables
- Solution needs to be considered in light of PPS 22 based requirements
- Major spike in demand for PV and Biomass systems

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Low, med and high cost credits

Free	**£0**	• External lighting • Env impact of materials (roof, floor walls) • Responsible sourcing	• View of sky • Insulation with low GWP • Considerate constructors scheme
Low	**<£100**	• Home user guides • Composting facilities • NOx emissions	• Sorting and recovering construction waste • Low energy lighting (>75%) • Providing drying space
Med	**<100 to £250**	• Minimum daylight factors • External water consumption • Internal and external recycling facilities	• Providing home office facilities
High	**>£250**	• Eco-labelled white goods (providing) • Cycle storage • Management of surface runoff	• Lifetime homes • Responsible sourcing of materials (highest levels) • Flood risk management (in high flood risk areas)

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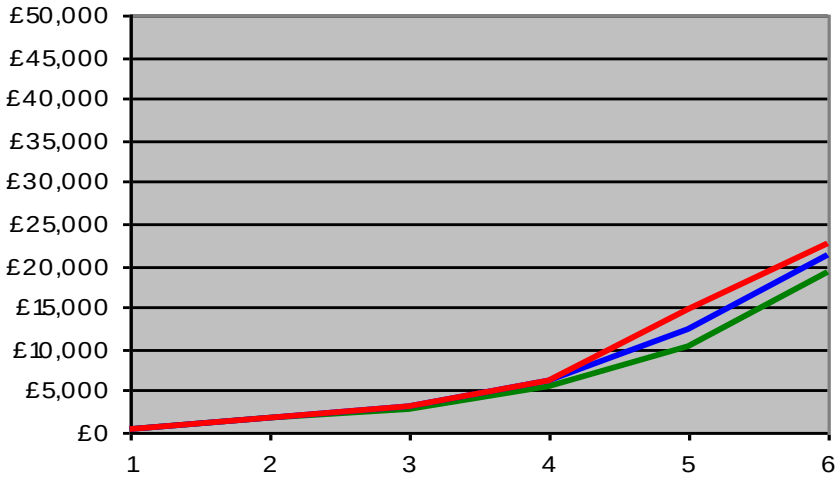
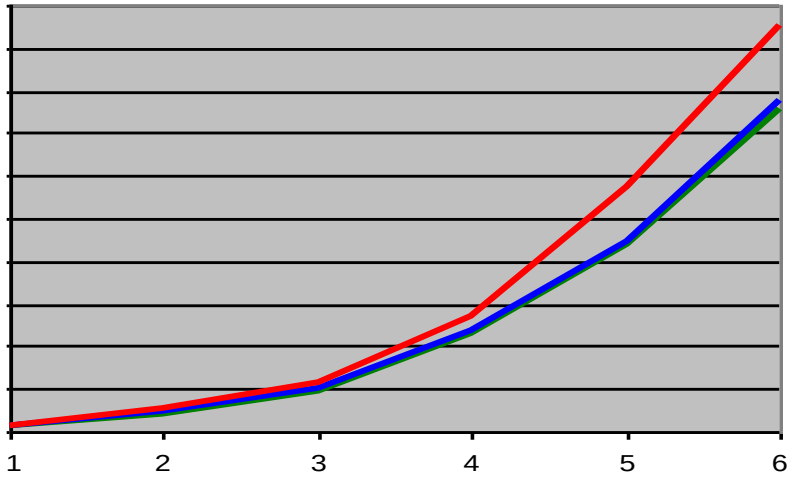
Overall costs

Flat



Detached House



- Best Case (Urban regeneration scenario with low ecological value and low flood risk)
- Medium Case (Market Town scenario with medium ecological value and low flood risk)
- Worst Case (City infill scenario with high ecological value and medium / high flood risk)

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Risks

- Availability / reliability of key technologies
  - Biomass CHP
  - Wind energy
- Fuel price – biomass
- Non performance and liability
  - Air tightness
  - Sound insulation
  - Micro wind
- Long term maintenance on smaller sites

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Other considerations

- A buildable solution - can current suppliers deliver?
- Use of a standardised solution?
- Getting support from the supply chain
- Managing project information for post construction assessment

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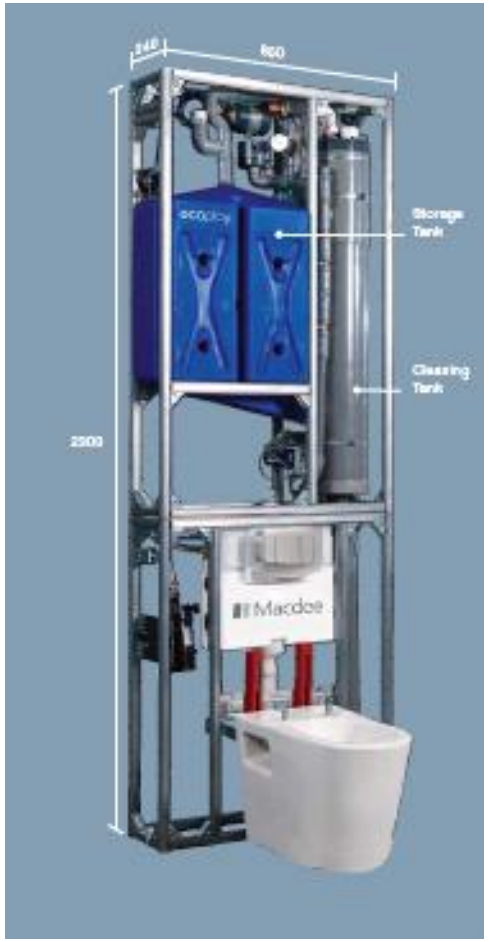
Costs over time

- Marginal costs will fall as Building Regs. change
- Cost of energy compliance reduce by 10% and 25% by 2016
- Costs of niche products will fall as their market expands
- Many e/o costs will disappear as market responds, e.g.
  - Robust details
  - Low energy lighting
  - Responsible material sourcing



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Alternate definitions of zero carbon

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Different energy scenarios

Easier	Harder
• Removal of secondary heating • Credit for energy efficient appliances and lighting	• Efficiency of MVHR systems • Carbon differential between onsite and grid electricity • Availability of bioCHP

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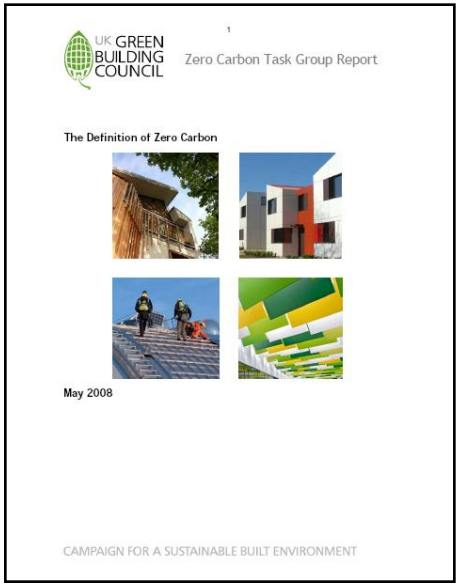
Implications for Code compliance

- Removal of SAP differential
  - Reduces the 'carbon effectiveness' of PV and wind by ~25%
  - Requires much larger area of roof for PV
  - Even more significant for gas CHP
  - No effect solar water or biomass systems
- UK GBC review identified that up to 80% of homes might not be able to achieve zero carbon
- Currently modelling implications of a range of alternate options



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Conclusions for a Code strategy

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Conclusions

- Costs dominated by energy standards
- Small / low density sites have higher costs
- Major change in approach needed beyond level 3
- Permeates all aspects of the home building process
- Marginal impact will reduce as regulations change and markets adapt

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