

# The Code for Sustainable Homes

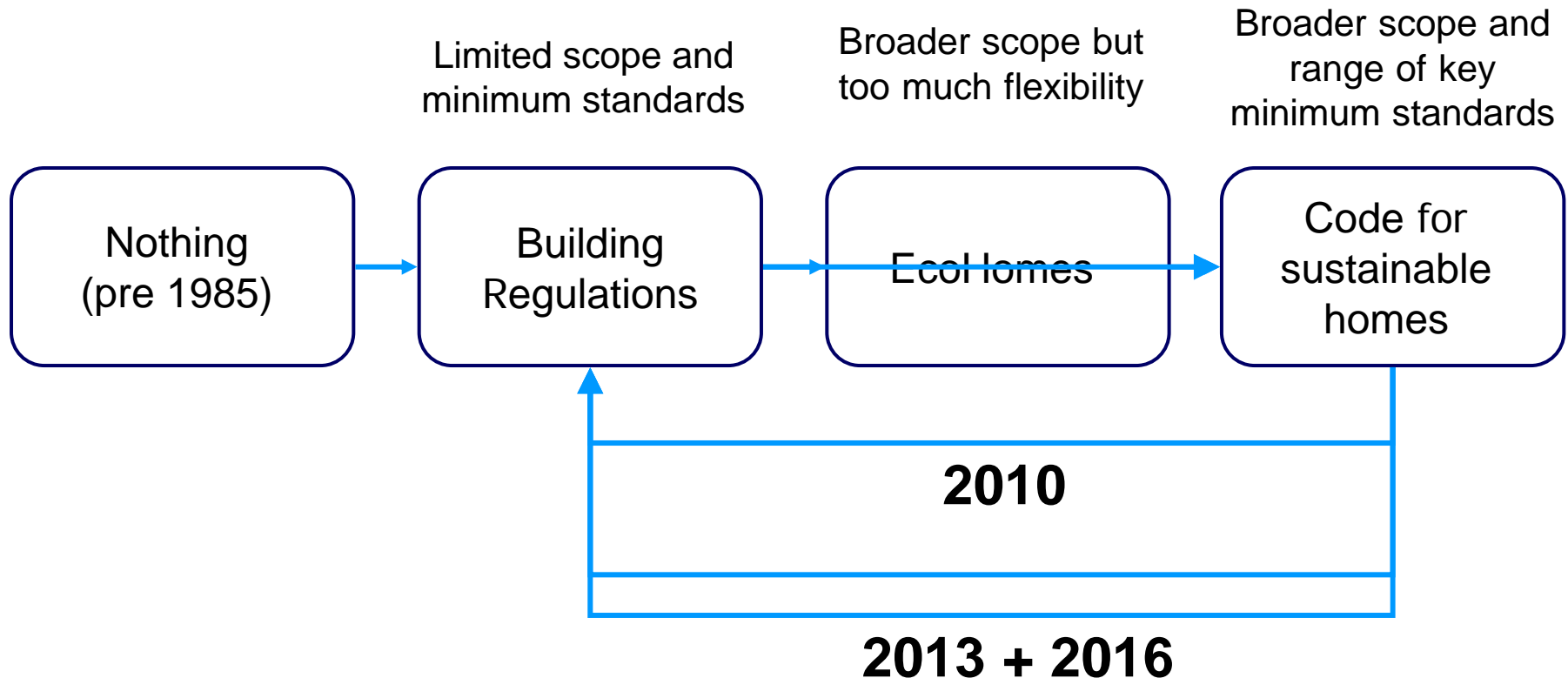
Adam Mactavish

May 2007

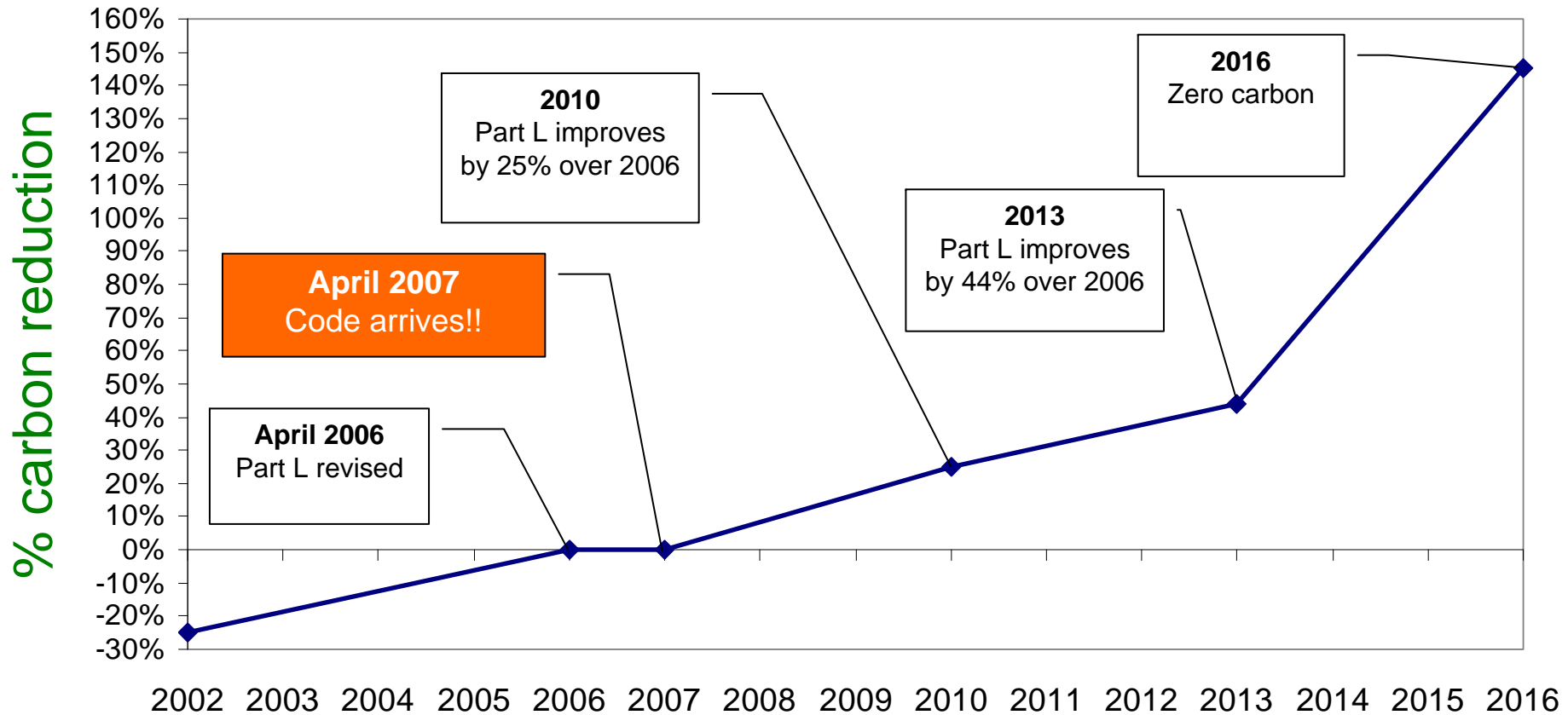


- Context
- The Code
- The Report
- Other factors
- Future developments
- Conclusions

# Environmental performance standards



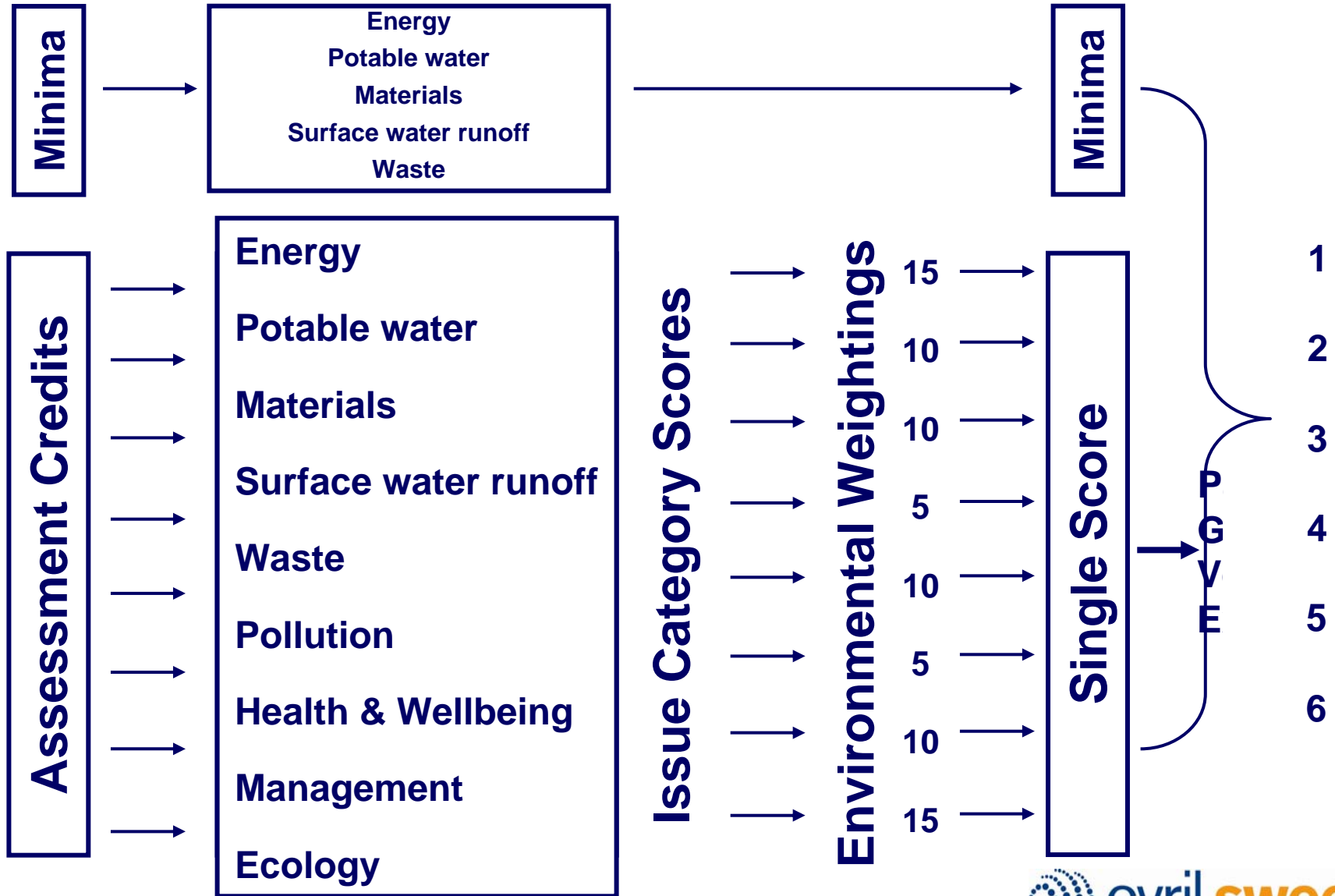
# Timeline





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# Overview of assessment process



# Minimum Standards



	Level					
	1	2	3	4	5	6
<b>Energy</b> (% improvement over ADL1 2006)	10%	18%	25%	44%	100%	neutral
<b>Water</b> (l per bedspace per day)	125	125	105	105	80	80

- Other mandatory requirements:
  - Control of run off
  - Minimum green guide ratings
  - Site waste management plans
  - Provision of waste storage facilities

# Flexible standards



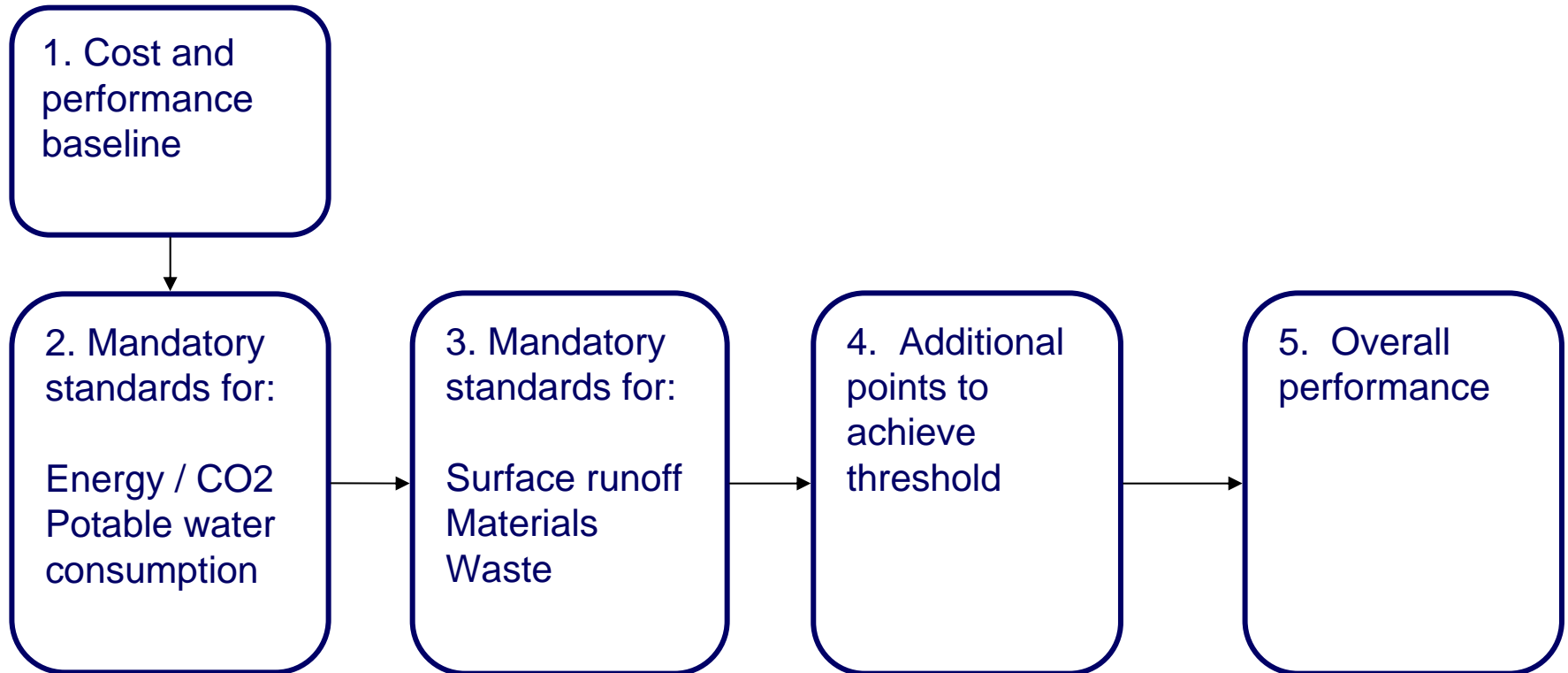
- Ecohomes based standards
- New standards
- Removed standards
  
- Assessment is dwelling not site specific

Level	Points
1	36
2	48
3	57
4	68
5	84
6	90



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# Building up cost estimates





# Minimum energy standards



# Minimum energy standards



	Level					
	1	2	3	4	5	6
<b>Energy</b> (% improvement over ADL1 2006)	10%	18%	25%	44%	100%	Zero carbon



1. Energy efficiency measures followed by solar water heating then photovoltaics and then biomass
2. Energy efficiency measures followed by small scale wind turbines then biomass
3. Use of site wide energy solution (CHP)
4. Suite of measures including whole house mechanical ventilation and proprietary details



- Generic measures
  - Delayed start thermostat
  - Time and temperature controls
  - Improved air tightness (5 m<sup>3</sup>/m<sup>2</sup>/hr)
  - Improved insulation (e.g. between 0.25 and 0.21 kW/m<sup>2</sup>)
- Specific to high rise apartments
  - Removal of electric heating and installation of centralised boiler plant
- Combination of measures sufficient up to Level 2

# Subsequent measures for level 3

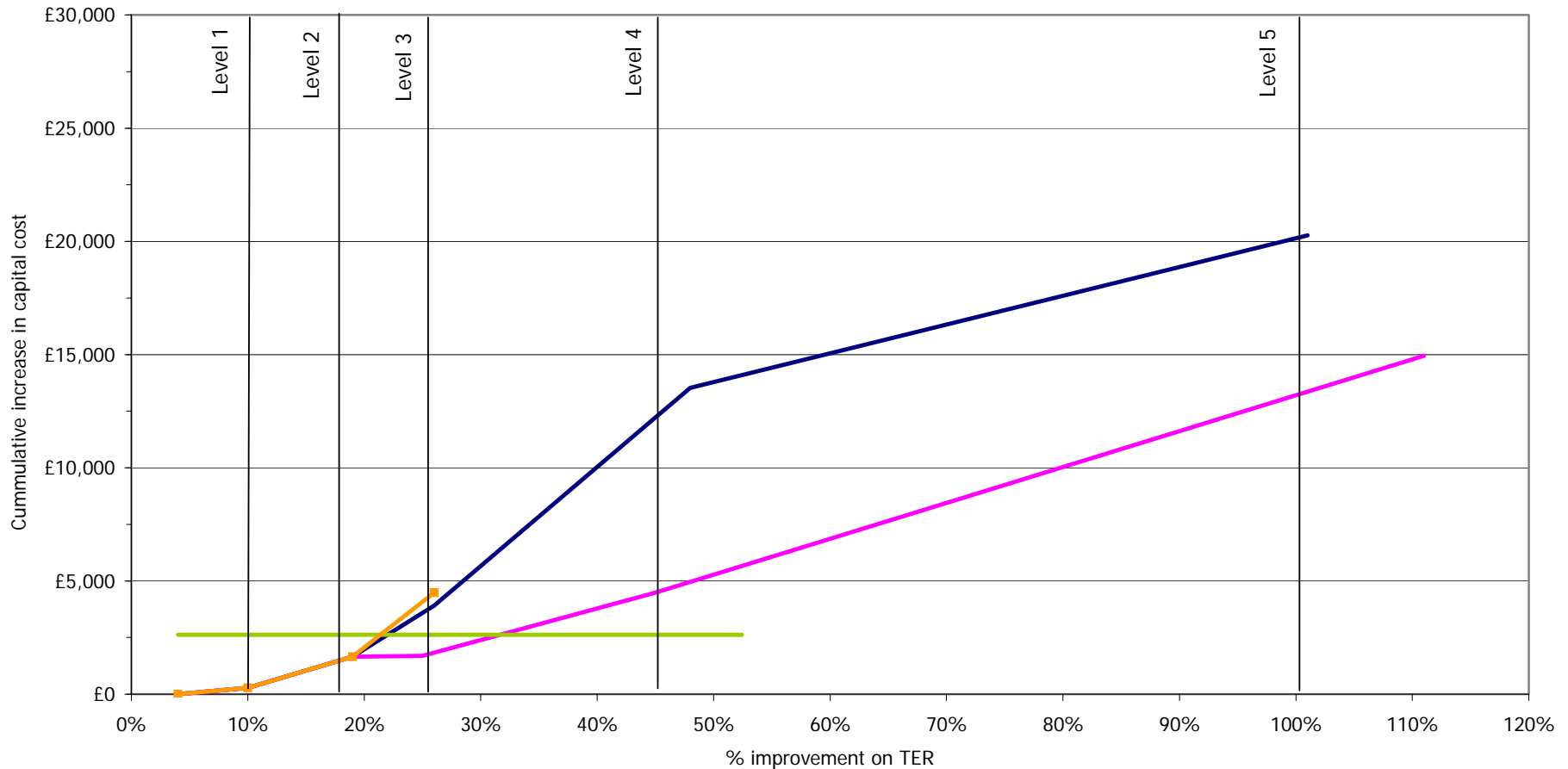


- Scenario 1
  - 4 m<sup>2</sup> solar hot water with PV pump
- Scenario 2
  - 1.5 kW wind turbine (assume 1,100 kWh per year)
- Scenario 3
  - Site wide CHP
- Scenario 4
  - Whole house heat recovery (85% efficient + specific fan power of 1w per second)
  - Proprietary construction details (less thermal bridging)
  - Improved air tightness (3 m<sup>3</sup>/m<sup>2</sup>/hr)



<b>Code Level</b>	<b>Cost Range £ per unit</b>
3	£1,700 to £6,000
4	£5,000 to £16,000
5	£14,000 to £33,000

# Costs against carbon emissions



- Scenario 1: Initial energy efficiency followed by solar water heating
- Scenario 2: Initial energy efficiency followed by small scale wind turbine
- Scenario 3: Use of shared site wide infrastructure (CHP)
- Scenario 4: Improved air tightness, mechanical ventilation and proprietary construction details



# Minimum water standards



# Minimum water standards



	Level					
	1	2	3	4	5	6
<b>Water</b> (l per bedspace per day)	125	125	105	105	80	80



- Calculation method different to EcoHomes 2006
- Technologies required
  - Dual low flush WCs (4/2.5 ltr per flush)
  - Flow regulated taps
  - Low flow showers (8 ltr per minute)
  - Undersized baths
  - Water efficient appliances
- At levels 5 and 6, either
  - Greywater recycling
  - Rainwater harvesting

# Costs of meeting water standards



<b>Code Level</b>	<b>Cost Range £ per unit</b>
1 and 2	Nil cost effect
3 and 4	Circa £125
5 and 6	Circa £800 (flats) to £2,700 (houses)



# Other standards





- Broadly the same as EcoHomes
- Focus on key design features, e.g.
  - Daylighting
  - Waste and cycle storage
  - Material specs
- At levels 5 + 6 costs associated with ‘flexible points’ become more significant

# Costs of meeting other credits



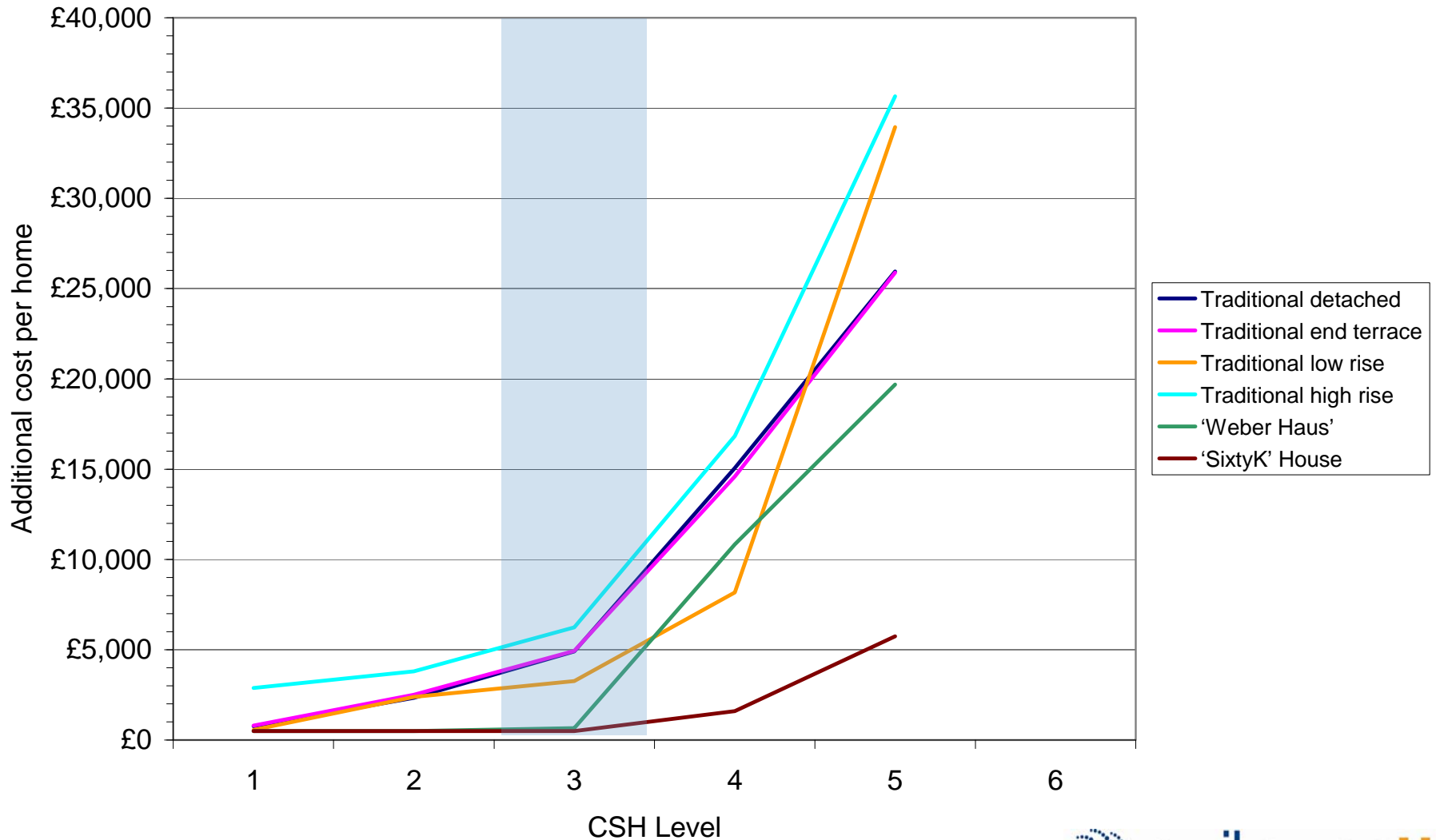
<b>Credits</b>	<b>Cost Range £ per unit</b>
<b>Other mandatory</b>	<b>Circa £500</b>
<b>Flexible</b>	<b>Variable (£0 to £500 per item)</b>



# Overall costs



# Overall costs



# Overall cost implications of Level 3



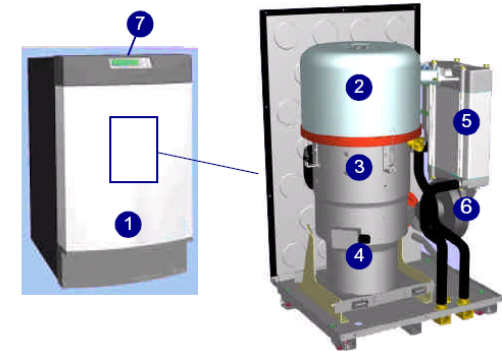
<b>Dwelling type</b>	<b>Cost Range % increase over Part L 2006</b>
<b>Houses</b>	<b>3% to 7%</b>
<b>Flats</b>	<b>2% to 5%</b>
<b>D for M</b>	<b>1% to 2%</b>



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- Planning policies
  - PPS 22 (renewable energies)
  - PPS 25 (flood risk)
  - Amendments to PPS 1 (climate change)
- Sustainable construction policies / SPD
  - Many regional and local authorities are planning/have implemented their own energy policies and targets
- RDA's





- Highly variable with technology type
- Many still niche, e.g.
  - Small scale wind turbines
  - Phase changes heat storage
  - Greywater / rainwater systems
- Installers / subcontractors relatively inexperienced



# Potential cost reductions



- Innovation in approach and design
- Use of new technologies and construction methods
- Grants and Bulk Purchasing agreements
- Cost reduction from increased market size (experience curves)
- Site wide approaches and the growth of ESCO and MUSCO services



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- Major step beyond Code level 5
- If on-site will require major use of biomass CHP, photovoltaics or wind
- Potential to use offsite renewables provided it is additional
- Use of energy efficiency backstops
- ESCO/MUSCO



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- Diverse range of solutions
- Broad cost parameters
  - from 1% to 7%
- Beyond Level 3 the code necessitates a major change in approach
- Cost savings from innovation are amplified
- Initial increase in costs but these should reduce as markets adapt



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