
How is regulation driving sustainable water solutions?

Regulations Revealed - Ecobuild 2011

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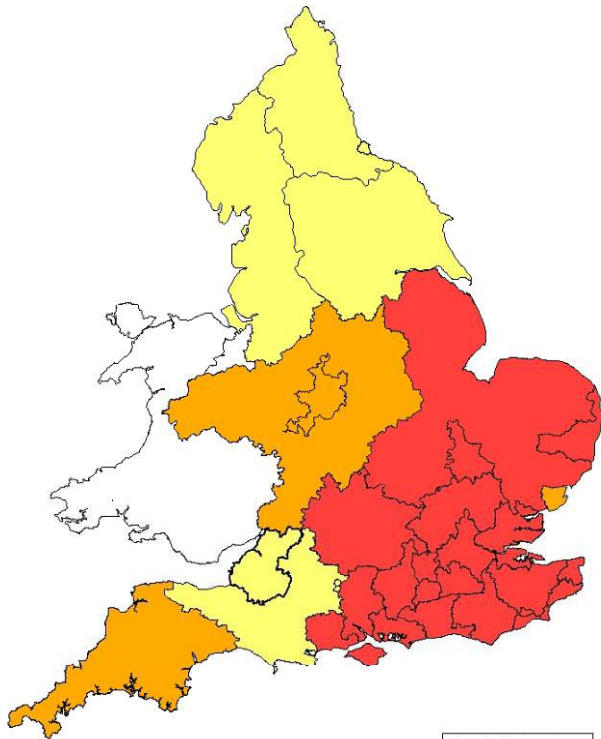


Who are ech₂o and what do we do?

- We are environmental consultants specialising in sustainable water strategies and low carbon or renewable technologies.
- We work in new build or existing buildings.
- We work with occupants of the building to change their behaviour as well as identifying the best technological solutions.
- Our clients include local authorities, housing associations, schools and colleges, water companies, architects, community groups, and householders.



We need to reduce our demand for mains water and to control storm water run off



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Environment Agency, 100026390, 2007.



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We need to know the carbon load of water



- CO₂ emissions from 1m³ of hot water are 7kgCO₂ or more.
- It takes 1.2 kWh of (mostly) electrical energy to supply and treat 1m³ of mains water.
- This results in 0.7 kg of CO₂ emissions per m³ of mains water used (includes leakage)
- Carbon emissions from the water supply industry are only 0.6% of total UK emissions but when we add domestic hot water use this figure rises to 6%.

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Supportive legislative drivers

- BREEAM – introduced 1998
- Water Framework Directive - 2000
- Permission to install dual flush valve operated WCs - Jan 2001
- Enhanced Capital Allowances by installing water efficient technologies from the Water Technology List - 2003 www.eca-water.gov.uk
- Requirement for condensing boilers in dwellings – introduced 1st April 2005
- Code for Sustainable Homes – introduced April 2007
- Renewable Heat Incentive (???) – due June 2011



Other legislative drivers

- The Decent Homes standard 2000
- The control of legionella bacteria in water systems 2001
- Part G of the Building Regulations - updated on April 6th 2010
- Renewable Heat Incentive (???) – due June 2011

Part G - Regulation 17K

- First time the Building Regulations have addressed water efficiency. Applies to dwellings only
- Potential consumption of *wholesome water* must not exceed 125 litres per person per day.
- Show compliance by using the water efficiency calculator at:
<http://www.wrcplc.co.uk/partgcalculator/calculator.aspx>
- Download a critique at www.ech2o.co.uk



The water calculator 1

- The water calculator was originally designed for the Code for Sustainable Homes. Changed in August 2009 following a lot of dissatisfaction from various stakeholders with the original calculator.
- Assumptions are made on usage of appliances. 5.6 minute shower, a bath 50% full, just under 5 WC flushes. If a shower and a bath assumes an 80/20 usage split.
- Calculated usage at sink ranges from 11.24 to 13.00 litres/person/day (2 - 6 litres/min)
- Calculated usage at basin ranges from 4.74 to 11.06 litres/person/day (2 – 6 litres/min).



The water calculator 2

- Default figures for washing machine and dishwasher if not installed.
- Waste disposal unit has a water use attached to it of 3.08 litres per person/day.
- Inefficient water softeners (using more than 4% for replenishment) will add to the load.
- No penalty for en-suite bathrooms.
- **Total usage is multiplied by a “normalisation factor” of 0.91**

Specification 1 - High Spec House - PASSES

Appliance	Details of flow rate or volume	Total litres
WC x 5	Dual flush 4/2.6 litres	13.54
Basin x 5	4.0 litres/min at all basins	7.90
Shower x 4	2 x 15 litres/min, 2 x 8 litres/min	50.26
Bath x 4	2 x 210 litres and 2 x 200 litres	23.10
Sink x 2	6 litres/min at all sinks	13.00
Washing machine	None specified (default used)	17.16
Dishwasher	None specified (default used)	4.50
Water softener	Efficient model	0.00
Waste disposal	Installed	3.08
Total	(131.71 pre 0.91 normalisation factor)	119.85
Outside use	Jacuzzi, swimming pool, garden irrigation	5.00
Total	For Regulation 17K	124.90

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Specification 2 Small Flat - FAILS

Appliance	Details of flow rate or volume	Total litres
WC x 2	Dual flush 6/4 litres	20.60
Basin x 2	4.0 litres/min at all basins	7.90
Shower x 1	10 litres/min	43.70
Bath x 1	210 litres	23.10
Sink x 1	6 litres/min	13.00
Washing machine	None specified (default used)	17.16
Dishwasher	None specified (default used)	4.50
Water softener	None	0.00
Waste disposal	Installed	3.08
Total	(133.04 pre 0.91 normalisation factor)	121.06
Outside use	None (No outside space)	5.00
Total	For Regulation 17K	126.1

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Not so “water smart”

- The water calculator for Part G allows homes with multiple bathrooms to use power showers and still be classified as “water smart”.
- It allows Jacuzzis, external hot tubs and swimming pools to be specified without any impact on supposed water use at that dwelling.
- But, a swimming pool 8m by 4m by 1.5 m deep requires 48m³ of water to fill it up, which is 6.6 years worth of outside use at 5 litres per day for a family of four.
- If you have no outside space the calculator still calculates 5 litres use per day.



A prescriptive standard is needed for “water smart” homes

- A prescriptive standard (such as the AECB Water Standard) with maximum flow rates for appliances would be a far more robust way to reduce water use in new buildings. www.aecb.net

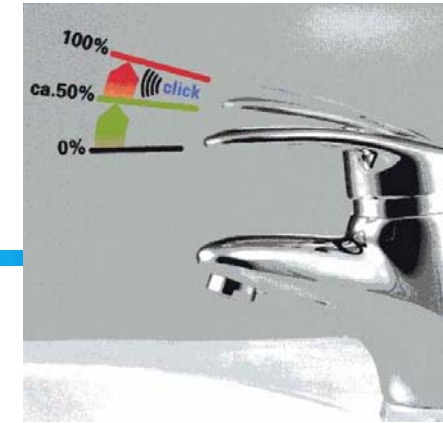
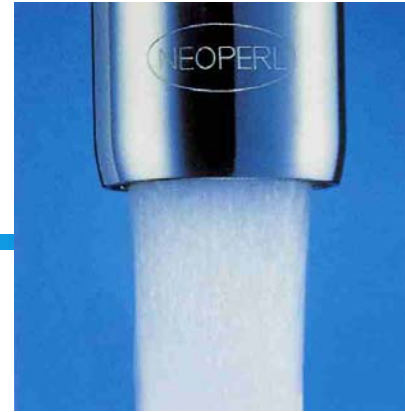
The control of legionella bacteria in water systems 2001

- An approved Code of Practice
- Lays the responsibility on employers to make a risk assessment
- Risk averse climate leads to thermal disinfection of hot water systems
- Heating water to 70 degrees C. Requirement of 60 degrees C for 5 (to 30!) minutes at all tap outlets



Water Efficiency Rating		
VERY EFFICIENT - LOWER WATER USE		
SHOWER	Water Use	This Product
Shower flow rate (litres per minute)		
6 or less		
8 or less		
10 or less		
13 or less		12.0
Greater than 13		
HIGHER WATER USE		

www.water-efficiencylabel.org.uk



The Code for Sustainable Homes – Making Water Efficiency Sexy!



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Compliance with the Code for Sustainable Homes

- Levels 3 and 4 are attainable by installing water efficient appliances. Rainwater harvesting (or greywater recycling) is currently required to meet levels 5 and 6.
- This leads to a specification of higher flow rates at showers, which results in greater hot water use in the dwelling and higher carbon loads.
- The Code should be changed so that all levels can be met by water efficient appliances
- Download an in-depth analysis at www.ech2o.co.uk



BREEAM - Reducing demand for water in public and commercial buildings

- BREEAM credits for offices and schools are:
 - 4.5 - 5.5m³/person/year = 1 credit
 - 1.5 – 4.4 m³/person/year = 2 credits
 - less than 1.5 m³/person/year = 3 credits
- For other buildings the requirement is to: provide evidence that the specification includes taps, urinals, WCs and showers that consume less potable water in use than standard specifications for the same type of fittings
- Also credits leak detection, pulsed water meters, proximity detection shut off in toilet areas, rainwater harvesting and greywater recycling systems.



Requirement for condensing boilers

- Introduced April 2005
- Crucially for retrofits as well as new build
- 1.5 million boilers a year at an average efficiency of 88-90%
- May require vertical flue extensions
- Condensate drain should be run internally



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The Renewable Heat Incentive

- For heat generating renewables from June 2011. Includes solar thermal, heat pumps, wood pellets for hot water at the domestic scale
- Funded by the treasury through taxation. (£860m 2011-2014)
- Makes pay back periods far more appealing to building owners. 10 years payback or less
- To be based on deemed “generation”
- Could make hot water more sustainable or less sustainable



Renewable heat incentive at the domestic scale (proposed)

Renewables	Size	Feed-in tariff p/kWh for years 1 + 2	Deemed or metered	Term in years
Solar thermal	Up to 20kW	18.0	Deemed	20
Solid biomass	Up to 45kW	9.0	Deemed	15
Ground source heat pump	Up to 45kW	7.0	Deemed	23
Air source heat pump	Up to 45kW	7.5	Deemed	18

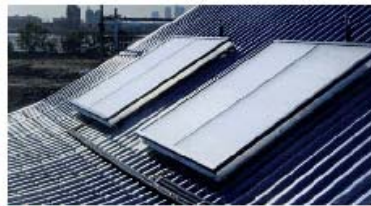




ech₂o consultants ltd work with a range of stakeholders to successfully incorporate sustainable water and low carbon solutions into the built environment.



www.ech2o.co.uk



The South East is Under Water Stress

A glass of beer with a cracked texture on the surface, symbolizing water stress.

Use Water Sparingly

SEEDA South East England Development Agency **M&A** McCarthy Massey **ech₂o** www.ech2o.com

'Saving water in the hospitality sector' www.ech2o.com