

Water Efficiency

Water Management in a Changing Climate

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We need to reduce our demand for potable water. Installing water efficient appliances in existing as well as new buildings combined with behavioural change is the best way to do this.



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The carbon load of water



- It takes 1.2 kWh of (mostly) electrical energy to supply and treat 1m³ of water.
- This results in 0.54 kg of CO₂ per m³ of water
- Be aware of high carbon loads if specifying alternative sources of water



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Does a privatised water supply mitigate against water efficiency?



- The partnership between Water Companies and the public is difficult to achieve unless Government policing is seen to be effective
- High leakage levels from mains supplies sends the wrong message to consumers.
- Announcement of record profits results in consumer indifference to saving water



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Should the UK introduce compulsory metering?



- Only 30% of dwellings in the UK metered
- The EU Water Directive requires all member states to ensure (by 2010) water pricing provides adequate incentives to use resources efficiently.
- Metering produces an immediate 10% reduction in consumption
- Metering without education won't work



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Is the drought in the south east being driven by the showering habits of adolescent girls??

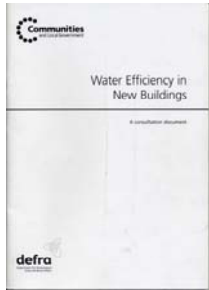


- Address behaviour as well as specifying technical solutions
- Legislation, education and compulsory metering are all vital
- Never underestimate the amount of time adolescents can spend in the shower!



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Water efficiency rating for new buildings



- Will be a “whole building performance” standard. In dwellings maximum consumption to be 120-135 litres per person per day. (Higher than Level 1 of the Code for Sustainable Homes)
- In offices to be 4.5m³ per person per year. (BREEAM credit 1)
- Will probably apply across all areas of England and Wales, whether water stressed regions or not

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The Code for Sustainable Homes

- Reducing water use is required at each level
- Levels 1 and 2 average pcc of 120 litres
- Levels 3 and 4 average pcc of 105 litres
- Levels 5 and 6 average pcc of 80 litres
- Water efficient appliances at levels of 1-4 should suffice; rwh will be required at higher levels.
- Will rwh systems be installed to allow showering habits to remain unchanged??

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Building up a basic level of water efficiency – existing building

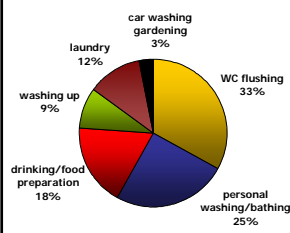
- Decent homes legislation has been a missed opportunity to address water use in existing social dwellings. Bathroom refurbishment can be on a 25 year cycle. Its important to future proof tenants against metering. Use EcoHomes XB to rate existing stock
- Schools for a future programme should address water efficiency
- Businesses can get enhanced capital allowances by installing water efficient technologies from the WTL

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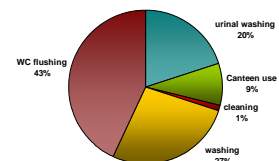
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Average water use is 150 litres per person per day .The quickest wins are in WC and urinal flushing, followed by use at taps

UK domestic water use



UK commercial water use



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Good practice in design

- Good design is important, e.g. reduce dead legs, guard against scale
- Address high water using components first, i.e. WC and urinals consumption
- Reduce demand from taps and showers
- Install automatic mains shut off devices for remote public buildings
- Look at rainwater harvesting or greywater recycling possibilities only after demand is reduced as much as possible
- If alternative sources of water use more energy than 0.6kWh/m³ the carbon efficiency of the water supply is compromised

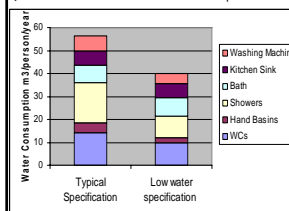
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Reducing demand in dwellings

Breakdown of water use

(Based on EcoHomes water consumption calculator):



Typical Specification	Low Water Specification
6 litre flush WC	4/2.5 litre flush WC
Unregulated taps	Regulated / spray taps
15 litres/minute shower	9 litres/minute shower
normal washing machine	low water washing machine

25% savings are available from simple measures

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Reduce WC Demand

- Replace existing WCs with dual flush low flush WCs. 4/2.5 litre dual flush saves 52m³ water a year for an average household. 6/4 litre dual flush saves 38m³. 4/2.5 litre in public areas saves 5.0m³ water



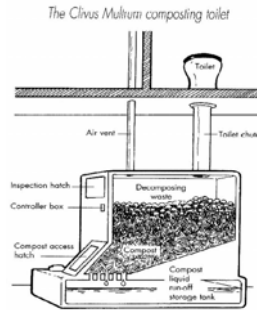
- Specify dual flush WCs in new build. 4/2.5 litres in dwellings saves 26m³ water a year for an average household. 4/2.5 litre in public areas saves 2.5m³ water per person per year.

- Convert existing WCs. Install cistern displacement devices (water savers) or flush reduction mechanisms (dual flush valve or dual flush siphon)

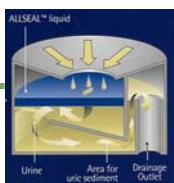


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Compost, don't dehydrate



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Urinals

- An uncontrolled urinal can use 90,000 litres of water per year
- Controlled flushing relating to the occupancy of building (mandatory since 1989 Regs) can save over 66,000 litres per year depending on shut down periods of the building
- Controlled flushing relating to use of urinals (in-line valves allowed under 1999 Water Regulations) can save large amounts of water in low traffic situations
- Waterless urinals use no water. No water means no scale but removal of uric sediment still required. There is a consumables cost which can be quite high

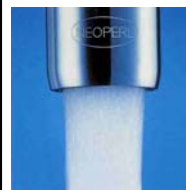


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Specify efficient terminal fittings

- Control flow rates from taps and showers with flow regulators. Give constant flow regardless of pressure fluctuations at 1 bar and above. Prevent starvation at end appliances. Reduce water use
- Specify automatically controlled taps with spray heads in commercial situations regulated to 4 litres/min for basins
- Use flow regulators and aerated heads for showers. 9 litres/min is a good flow rate for showers.



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Saving water in the hospitality sector – Crawley



- Carried out by ech₂o for Crawley Borough Council, funded by SEEDA
- Comprehensive water audits and individualised feedback coupled with proactive action during site visits
- Urinal controls to be fitted free
- Logging of sites to gather data
- Expected direct water savings of 5000m³ a year



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Water savings at Boatmah Walk



- 18 flats
- 396m³ of water saved per year on average. 220m³ savings from WC specification. 176m³ from rainwater specification
- Rainwater estimated to supply 80% of flushing demand on average
- Average overall savings per year are £14.50 (1 bed), £43 (2 bed) and £58 (3 bed)
- Payback for a family of 4 for a 4/2.5 litre flush WC is 2-3 years



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Saving water in schools – a case study

- Existing school in South London 420 pupils. New extension with new WC block.
- 15 x 9 litre flush WCs to stay.
- 7 x uncontrolled urinals to stay
- Rainwater Harvesting potential is 47m³ off the new extension, 236 litres day over 200 day term
- Replace existing 9 litre flush WCs with 6 litre single flush. Saves 454m³/year
- Replace with 4/2.5 litre dual flush. Saves 907m³/year
- Add controls to urinals. Saves 355m³/year

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ech₂o environmental consultancy

ech₂o is an environmental consultancy offering design advice and seminars on all aspects of sustainable water use, low carbon energy systems and environmental choice of materials. Clients include private individuals, community groups, architects, engineers, FE Colleges, Universities, Housing Associations and Local Authorities.

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