## Water Conservation BMPs: Residential Plumbing Retrofits

RWSPG Meeting
March 25, 2008

## Residential Plumbing Retrofits <br> Presentation Overview

- Definition
- Retrofit Trio- Toilets, Showerheads, Faucets
- Benefits of Retrofits
- Water savings information
- The Public and Retrofits-Distribution
- Case Studies
- Sample Recommendation Statements


## Residential Plumbing Retrofits Definition

- Upgrade or modify inefficient plumbing fixtures in residences...
- Toilets
- Showerheads
- Faucets
- Kitchen
- Bathroom



## Homes and EPACT 1992

- Energy Policy Act of 1992
- Toilets 1.6 gallons per flush
- Showerheads 2.5 gallons per minute
- Faucets 2.5 gallons per minute
- Homes built before 1994=Retrofit Potential


## Retrofit Trio



## Toilet Retrofits

## Requirement:

- 1.6 gallons per flush

Toilet water use history

- 1950s >>>> 7 gallons per flush
- 1960-70s >>>> 5.5 gallons per flush
- 1980s >>>>3.5 gallons per flush
- FUNFACT: Replacing ONE 3.5-gallon toilet with a 1.6-gallon toilet could save an average of 2 gallons-per-flush, totaling a household savings of 12,000 gallons of water per year.


## Toilet Types

- Gravity Tank Toilets
- Flushometer Valve Toilets(no tank)
- Commercial
- City of Chicago
- Installation costs
- Homeowner vs. professional plumber



## Toilet Retrofits

## Devices:

- HydroClean toilet fill valve
- Balance water in tank and bowl
- Replace toilet flappers
- Cause links/water loss



## Benefits:

- HydroClean water savings-36\% of daily
- Flapper water savings 0.5-1.5 gallons per flush
- Detect leaks
- Few gallons to 100 gpd
- 25\%


## Showerhead Retrofits

## Requirement:

- 2.5 gallons per minute at 80 psi or 2.2 gpm, 60 psi


## Device:

- Complete replacement of showerhead
- Cost: \$4-\$8
- Wall-mounted
- Other Options
- Shut off valves
- Flow restrictors-disk inserts


## Benefits:

- Water savings-up to 2.6 gallons per minute
- Multiple settings



## Faucet Retrofits

## Requirement:

- 2.5 gallons per minute at 80 psi (2.2 gpm, 60 psi )


## Device:

- Faucet aerators
- Tip of the faucet
- Cost: \$. 50 to $\$ 3$
- Faucet replacement (\$50\$250)


## Benefits:

- Water savings-0.5-2.0 gallons per minute
- Fix drips


## Why Retrofit?

- Cost Effective
- Better fixtures and performance
- Water savings
- Energy savings




## Water savings

- Utility
- Less water pumped/treated to and from home
- Homeowner
- Less water used, lower water bill


## Energy savings

- Utility
- Less energy needed to pump and treat water
- Homeowner
- Less energy needed for hot water
- Shower (671-42 kWh per capita per year)
- Faucet (112-393 kWh per capita per year)

- Toronto Example: \$30-\$45 per person per year


## The Public and Retrofits

What is distributed:

- Retrofit kits with leak detection
- Free to customer


Distribution Methods:

- Designated pick up location-Depots
- Mass Mail outs
- Rebates
- Door-to-door
- Direct Install
- Community groups


## Case Studies

- Connecticut
- Massachusetts
- California Urban Water Conservation Council
- Santa Cruz, CA
- RWSPG Area



## Connecticut

- Law requires water suppliers serving > 1,000 people or 250 service connections
- Offer free kits to all customers
- Distributed 626,439 kits to 616,708 households.
- Participation rate of $56 \%$
- Portland, CT was able to reduce the number of new wells it needed from 7 to 2 .


## Showerheads in Massachusetts

- Athletic facility
- 35 low-volume 2.5 gallons per minutes (gpm).
- Water savings totaled 328,000 gallons a year.
- Initial cost of \$300
- Annual savings of \$3,300 from reduced water, sewer, and hot water energy costs,
- Payback -one month.
- Multi-family retrofit scenario-potential


## California Urban Water Conservation Council

- Residential Plumbing Retrofits-188 members reporting
- Since 1999-SF/MF
- 933,000 million showerheads
- 170,000 toilet displacement devices
- 65,000 flappers
- 1.2 million faucet aerators
-Total Water Savings=71, 233 AF (1992-2008)


## Santa Cruz, CA

## Plumbing Fixture Retrofit Regulation

- All residential, commercial, and industrial buildings receiving water from the City of Santa Cruz are required to be retrofitted completely with low consumption plumbing fixtures at the time of sale of the property. Under new City and County regulations, the seller is responsible for:
- 1. Replacing any toilets, urinals, and showerheads that do not meet the following low consumption standards:
- Toilets 1.6 gallons per flush
- Urinals 1.0 gallons per flush
- Showerheads 2.5 gallons per minute maximum
- 2. Having the plumbing fixtures inspected and obtaining a Water Conservation Certificate from the Water Department, and
- 3. Disclosing retrofit requirements to the buyer of the property, before the property changes ownership.


## RWSPG Area



Chicago Metropolitan
Agency for Planning

## Rent vs. Own



## Residential Plumbing Retrofit Summary

- Toilets, showerheads and faucets > 50\% water use
- Retrofit Kits
- Significant water savings
- Target $=$ Pre1994 homes
- Not behavior just more efficient


## Sample Recommendation Statement

## Residential Plumbing Retrofit <br> Sample Recommendation Statement

- Every utility will collect relevant data (ex. Pre-1994 build date) on housing stock within its service area in order to estimate the number of potential units in need of plumbing retrofits.
(1 of 3 )


## Residential Plumbing Retrofit <br> Sample Recommendation Statement

- Develop a marketing strategy to reach and provide 50\% of those potential units (within 5 years) with retrofit kits and some form of installation assistance.
(2 of 3 )


## Residential Plumbing Retrofit <br> Sample Recommendation Statement

- Track the type and number of retrofits completed, devices distributed, program costs and estimated water savings.
(3 of 3 )


