Trends in Water Efficiency

SEPA AWWA

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American Water
Outline

• Overview

• Residential Trends

• Water Efficiency and Conservation

• Benefits of Water Efficiency

• Policy Considerations

• Conclusions
About American Water

- American Water provides service to approx. 14 million people
- Comprised of approx. 375 individual water systems, ranging in size from 25 customers to over 350,000 customers
  - Operate as regulated utility in 16 states
  - Wide range of sources of supply, customer makeup, and demographics
- Issues facing American Water systems are representative of those impacting water industry as a whole
Pennsylvania American Water

- Subsidiary of American Water Works Co. Inc.
- Roots date back to early 1800s, Incorporated in 1904
- Largest regulated water and wastewater service provider in PA
- Serving approximately 2.3 million people in 36 counties
- Approximately 1,000 employees
- Customer base:
  - Approx. 654,000 water customers
    - 92% residential
    - 7% commercial
    - 1% industrial/other
  - Approx. 55,000 wastewater customers
Water Use Characteristics

- **American Water’s regulated businesses:**
  - **Residential** Customers comprise 91% of the customer base and about 55% of the sales volume
  - **CII** customers comprise only 7% of the total customer base and over 24% of total water sales volume
  - **SFRS** are less than 1% of the customers but 15% of the sales volume
Residential End Uses of Water

Hot and Cold Water Use Percentages for Homes

LEAKS
Showers
Faucets
Clothes Washer
Dishwasher
Bath

0 10 20 30 40 50 60 70 80 90 100

Hot Water
Cold Water

Reference:
http://www.waterrf.org/Pages/Projects.aspx?PID=4309
Water Efficiency vs. Water Conservation

Water conservation
- Doing with less, doing without and sacrificing
- Voluntary and mandatory restrictions

Water efficiency
- Improved technologies and practices that deliver equal or better service with less water
- Saves consumers money, protects the environment and enhances the economy
Declining Trends in Water Usage

- Energy Policy Act of 1992 (effective in 1994);
- Energy Policy Act of 2005 (effective in 2006); and
- Executive Orders 13423 and 13514

Increasing conservation ethic and awareness

High Efficiency plumbing fixtures and indoor appliances

Elasticity to water and sewer rate increases

Economic conditions

DECLINING WATER USAGE PER CUSTOMER
Background – Flow rates from different appliances

<table>
<thead>
<tr>
<th>Type of Use</th>
<th>Pre-Regulatory Flow*</th>
<th>New Regulatory Standards and Flows</th>
<th>WaterSense / ENERGY STAR Current Specification+</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>New Standard (maximum)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Federal Standard</td>
<td>Year Effective</td>
</tr>
<tr>
<td>Toilets</td>
<td>3.5 gpf</td>
<td>1.6 gpf</td>
<td>U.S. Energy Policy Act</td>
</tr>
<tr>
<td>Clothes washers**</td>
<td>41 gpl (14.6 WF)</td>
<td>≈26.6 gpl (9.5 WF)</td>
<td>Energy Independence &amp; Security Act of 2007</td>
</tr>
<tr>
<td>Showers</td>
<td>2.75 gpm</td>
<td>2.5 gpm at 80 psi</td>
<td>U.S. Energy Policy Act</td>
</tr>
<tr>
<td>Faucets***</td>
<td>2.75 gpm (1.5 gpm)</td>
<td>2.5 gpm at 80 psi</td>
<td>U.S. Energy Policy Act</td>
</tr>
<tr>
<td>Dishwashers</td>
<td>14.0 gpc</td>
<td>6.5 gpc for standard; 4.5 gpc for compact</td>
<td>Energy Independence &amp; Security Act of 2007</td>
</tr>
</tbody>
</table>

**Abbreviations Used**

- gpf - gallons per flush
- gpl - gallons per load
- W.F - Water factor or gallons per cycle per cubic feet capacity of the washer
- gpc - gallons per cycle

** Average estimated gallons per load and water factor (see calculations)
*** Regulation maximum of 2.5 gpm at 80 psi, but lavatory faucets available at 1.5 gpm maximum (see calculations)
Residential Trends

Pennsylvania American
Residential Sales Per Customer
(10-Year Winter Trend)
Water Efficiency is a Long Term Demographic Trend

Is the trend ending?

- Based on an assumed appliance and fixture lifetime, continued progress is expected for another 10-15 years or more.
- High efficiency clothes washer and dishwasher technology has only recently become regulated.
- Other drivers such as elasticity, conservation ethic, etc. are still showing impacts.
- The theoretical usage is 38 gallons/capita/day for fully conserving indoor household consumption (compared to current usage of approx. 72 gal/capita/day).

Our conclusion is that, in most places, the trend will not end soon.
PA Water Efficiency Program

- PA American Water has a low-income customer water efficiency program
  - Budget of about $100,000 annually
  - PA partners with Dollar Energy Fund, provides approximately 1,200 kits per year
  - If customer qualifies through DollarEnergy, PAW provides minor plumbing repairs, retrofit kits (including showerheads, faucet aerators, and leak dye tablets)
Water Efficiency can reduce supply and treatment capital needs

Projected Demand – Without Incorporating Declining Use Trend
Projected Demand Based on Declining Use Trend

Supply and demand (MGD) vs. Years

- Delayed Expansion
- Smaller Expansion

Water Efficiency can reduce supply and treatment capital needs.
Water Efficiency programs can accelerate the savings

• Many Energy Utilities are provided Demand Side Management funding from their Utility Commissions for Energy Efficiency programs

• Hot water savings could offer opportunities for water and energy utilities to collaborate
  ♦ Efficiency kits and education content could include lighting (CFL's or LED), Water Saving Measures - High Efficiency Shower Head, and Faucet Aerators
Benefits of Water Efficiency

• Helps to maintain source water supplies

• Allows more water for passing flows, environmental benefit, or drought reserve

• Reductions in power consumption, chemical usage, and waste disposal helps with:
  - Water utility operating costs
  - Environmental benefits, such as reduced carbon footprint and waste streams

• Water is heavy to pump – nearly a ton of product is delivered to each customer every day
Policy Considerations

- Benefits of a revenue stabilization mechanism
  - Sets a regulatory climate that aligns the utility’s interests with the State’s interest in water efficiency – win/win.
  - Removes the utility’s incentive to promote sales
    - Allows utility management to refocus on least-cost investment decisions
  - More closely aligns the utility’s revenues with costs
  - May lead to less frequent rate cases
Conclusions

• Reduced water consumption has environmental and economic benefits for consumers

• Water efficiency trend is likely to continue for at least 10-15 more years

• Encourage Water Efficiency
  • In 2016, American Water provided 33,000 conservation kits of various types.

• Incorporate into capacity planning & supply optimization (system specific)

• Implement rate policies and practices that align the State’s and utility’s interests.
Questions?