Developing Water Conservation Initiatives for School Systems

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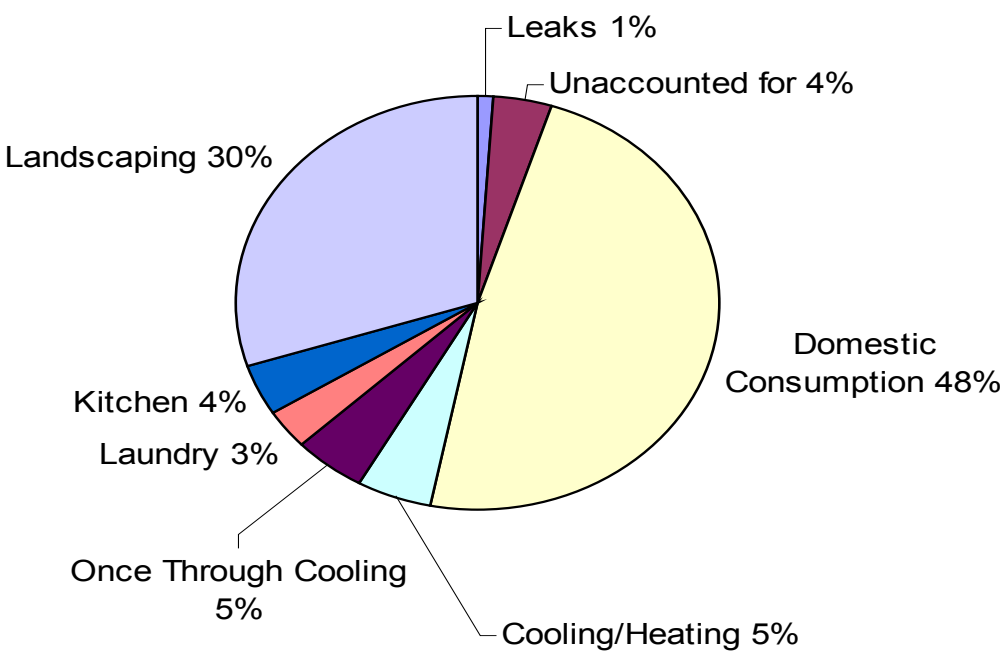
When Does A Water Savings Project Make Sense?

- Moderate Combined Water / Sewer rates of $3.00 per 1000 gallons – 4 to 6 years
- Higher Combined Water / Sewer rates $4.50 Per 1000 gallons – under 4 years

Additional Benefits of Water Savings Program

- Upgrade aging infrastructure
- Meet ADA Requirements
- Typical life span of over 20 Years
- Buy down more expensive energy applications

How Do Schools Typically Use Water?



Savings Opportunities In Schools

- Domestic Water System
- Landscaping
- Cooling & Heating
- Audits with Leak Detection
- Just about anywhere else water is consumed

How do we know the savings are truly going to be there?

- Measurement & Verification is the Key

Domestic Water Conservation

- Federal requirements for water efficient Plumbing
- Went into effect in 1992

Domestic Water Conservation Federal Guidelines

- **Federal Plumbing Fixture Standards**

Toilets -	1.6 gpf*
Urinals -	1.0 gpf*
Lavatory Faucets -	2.5 gpm**
Showerheads -	2.5 gpm**

(gallons per flush)**gpm (gallons per minute)

Domestic Water Conservation

- Typical Employee (staff) use between 20 & 35 gallons per day
- Savings of 25% to 30% readily achievable
- Largest consumer – water closet – 41% of restroom use

Domestic Water Conservation

There are three main types of Water Closets

- Gravity Flush
- Flush Valves
- Pressurized Tank

Domestic Water Conservation

Typical Water Consumption for Toilets

Years Manufactured	Gravity StyleTank	Flush Valve Style
Pre – 1977	5.0 - 7.0 GPF	4.5 - 5.0 GPF
1977 to mid 1990's	3.5 (some 5.0 GPF)	3.5 GPF
Mid 1990's	1.6 GPF Maximum	1.6 GPF Maximum

Domestic Water Conservation

Urinals

- Wash-Down
- Blow-Out
- Maximum Consumption 1.0 GPF

Domestic Water Conservation

Waterless Urinals

- Consumes no water
- Retrofit fits existing Urinal carriers
- Gaining wider acceptance
- Maintenance costs low, but need to be built in

Domestic Water Conservation

Showerheads

- Maximum Flow 2.5 GPM at 80 psi
- Water Sewer & Energy Savings
- Quick Payback

Domestic Water Conservation

Faucets

- Maximum Flow 2.5 gpm at 80 psi
- Can be reduced as low as 0.5 gpm
- Water Sewer & Energy Savings
- Vandal Resistant Available
- Quick Payback

Outside the Domestic Water Realm

- Irrigation
- Kitchen & Food Preparation
- Cooling & Heating
- Audits / Leak Detection

Irrigation

- Release from sewer costs – the measure that keeps paying back
- Automatic Sprinkler Systems
- Water Reels
- Rain and Moisture Sensors
- Xeriscaping

Kitchen & Food Preparation

Equipment Design

Behavioral Changes

Kitchen & Food Preparation Equipment - Dishwashers

- Consume 2 to 7 gallons a minute
- New Water Saving Models Available

Options

- Recirculation of final rinse
- Automatic Shutoffs
- Low Energy Built In Water Heaters

Kitchen & Food Preparation Equipment - Faucets

- Reduce up 60% of Consumption
- Conventional Faucets Can Waste up to 40 gallons per day

Options

- Aerators / Faucet Restrictors
- Automatic Shut-off Faucets
- Foot Activated Faucets

Kitchen & Food Preparation Equipment - Ice Machines

- Water vs. Air Cooled
- Water Cooled Condensers use 10 times water
- Water Cooled – 150 – 300 gallons for 100 lbs ice
- Air Cooled – 10 – 30 gallons for 100 lbs ice
- Need to be able to vent properly

Kitchen & Food Preparation Equipment – Garbage Disposals

- Tremendous waste
- Eliminate Completely
- Use strainers or traps

Kitchen & Food Preparation Behavioral Changes

- Inform Staff of Changes
- Educate Staff proper use of equipment
- Promote Water Efficiency
- Train to recognize leaks
- Reward reporting of leaks

What Do I Do Next?

All this Makes Sense – How Do I Get Started?

Water Management Plan - 1st Step

Develop a Water Use Inventory

- List of water Uses
- Daily Operating Schedules
- Comprehensive Water Survey
- Estimated Water Balance

Water Management Plan – 2nd Step

Identify the Water Management Actions

- Does it Include All Areas of Consumption?
- Does it Include Leaks & Drips
- Identify the #1 Villain
- Make a list of the top 5 or 10 savings opportunities

Water Management Plan – 3rd Step

Economically Feasible?

Determine "True Cost of Water"

- Basic Water Costs
- Basic Sewer Costs
- Environmental Charges
- Seasonal Costs
- Discharge fees

Water Management Plan - 3rd Step

Economically Feasible

Determine the Simple Payback

$$\text{Simple Payback} = \frac{\text{Capital Costs(\$)}}{\text{Net Annual Savings (\$/ Year)}}$$

Implement The Water Management Plan

- Action Plan with a Schedule
- Piggy back onto Energy Project
- Win – Win Situation

Proceed With Installation

Hire Experienced Water Management Contractors

- Offer Performance Guarantees
- Perform Measurement & Verification
- Replacement Parts
- Staff Training