The Impacts of Water Conservation On Water Works System Expansion Capital Expenditures

(Less Water Demand = More Money)

Drinking Water 1-2-3
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CMAP Coordinated Stakeholder Driven Process → 35 Delegates From NE IL

Water Supply & Demand Analysis For 11 County NE IL Region

Mission Statement:

To consider the future water supply needs of northeastern Illinois and develop plans and programs to guide future use that provide adequate and affordable water for all users, including support for economic development, agriculture, and the protection of our natural ecosystems

Recommended Water Demand Management To Stretch Capacity of Existing NE IL Water Supply Resources
Water 2050 Water-Use Conservation Best Management Practices

- Water Conservation Coordinator
- Water Survey For Residential Customers
- Residential Plumbing Retrofit
- Residential High Efficiency Toilet Replacement Program
- High-Efficiency Clothes Washing Machine Replacement Program
- System Water Audits, Leak Detection and Repair
- Metering With Commodity Rates
- Water Waste Prohibition For Residential & Non-residential Customers
- Efficient Water Use Landscaping For Large Landscape Areas
- Conservation Programs For Commercial, Industrial, and Institutional Accounts
- Public Information Programs
- Retail Conservation Pricing
- School Education Programs
Deferred Capacity Increases Due To Water Use Reduction

Hypothetical Community

<table>
<thead>
<tr>
<th>Year</th>
<th>Baseline</th>
<th>Required Capacity Before Conservation</th>
<th>Delay Downsize</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2030</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2040</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2050</td>
<td></td>
<td></td>
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</tbody>
</table>

Source: AWWA
WWS Planning Overview

- **Supply**
- **Treatment**
- **Storage**
- **Distribution**
WWS Planning Overview

- **Average Day Demand (ADD)**
  Total water use throughout the year divided by # of days in year

- **Maximum Day Demand (MDD)**
  Maximum daily demand within a year

- **Maximum Hour Demand (MHD)**
  Maximum hour of demand throughout year

- **MDD:ADD Ratio**
  Ratio of MDD to ADD
- **Population Projection**
  Develop population projection for planning period

- **Current Trends (CT) Water Use Projection**
  Review historical water use patterns and then develop “business as usual” water use projection for planning period
Water Conservation BMP Evaluation
Evaluate water conservation best management practices applicable to your community

Quantify achievable water use reduction with heightened focus on water conservation
## WWS Planning Overview

### Table No. 3-11: Potential Estimated Water Savings From Water Conservation and Efficiency

City of Batavia, Kane Co., IL

<table>
<thead>
<tr>
<th>Category</th>
<th>Water Saved (MGD)</th>
<th>% Of Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outdoor</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Customers</td>
<td>0.085</td>
<td>2.3%</td>
</tr>
<tr>
<td>New Landscape</td>
<td>0.008</td>
<td>0.2%</td>
</tr>
<tr>
<td><strong>Utility Water - System Losses</strong></td>
<td>0.186</td>
<td>5.0%</td>
</tr>
<tr>
<td><strong>Indoor Residential</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Efficiency Toilets (HET)</td>
<td>0.133</td>
<td>3.6%</td>
</tr>
<tr>
<td>High Efficiency Washing Machines (HEWM)</td>
<td>0.077</td>
<td>2.1%</td>
</tr>
<tr>
<td>Retrofits</td>
<td>0.132</td>
<td>3.5%</td>
</tr>
<tr>
<td><strong>Commercial, Industrial, and Institutional Customers</strong></td>
<td>0.084</td>
<td>2.3%</td>
</tr>
<tr>
<td><strong>Total Estimated Savings</strong></td>
<td>0.706</td>
<td>19%</td>
</tr>
</tbody>
</table>
Outdoor Water Use Reduction
Assume 50% of water use is wasted and 50% of the wasted amount can be saved

Utility Water System Losses Reduction
Assume water loss reduced by 50% or consistent with Non-Revenue Water Reduction Plan

High Efficiency Toilets, Washing Machines & Fixture Retrofits
Assume 90% of households built pre-1994 convert

Commercial, Industrial & Institutional Water Use Reduction
Assume 15% of CII water use is non-process and 50% of that water use amount would be reduced
Less Resource Intensive (LRI) Water Use Projection
Utilize predicted water use reduction calculation to define LRI water use projection for planning period
WWS Planning Overview

- **Needs Assessment Calculation**
  Determine supply, treatment, storage and distribution needs for CT and LRI water use projections

- **Cost Estimates**
  Develop cost estimates for CT and LRI improvements

Quantify cost savings for LRI commitment
Village of Algonquin

- **Population**
  - 2010: 30,046
  - 2040: 51,656

- **Water Supply System:**
  - Wells With Iron Removal
  - WTPs

- **Water Use**
  - Current MDD:ADD: 1.75
  - CT: 95 gpcd
  - LRI: 81 gpcd (15% Reduction)

- **Needs Assessment**
  - CT: Four (4) Wells & 2.5 MG Storage
  - LRI: Two (2) Wells & 1.5 MG Storage

- **Computed Capital Cost Savings:** $6.4M
City of Elgin

- **Population**
  - 2010: 108,000
  - 2040: 202,500

- **Water Supply System:** Fox River Intake, Wells & 2 – Lime Softening WTPs

- **Water Use**
  - Current MDD:ADD: 1.41
  - CT: 115 gpcd
  - LRI: 95 gpcd (17% Reduction)

- **Needs Assessment**
  - CT: Five (5) Wells & 2.0 MG Storage
  - LRI: Three (3) Wells & 0 MG Storage

- **Computed Capital Cost Savings:** $16.0M
Village of Huntley

- **Population**
  - 2010: 24,291
  - 2040: 58,997

- **Water Supply System:** Wells with Cation Exchange WTPs

- **Water Use**
  - Current MDD:ADD: 2.16
  - CT: 90 gpcd
  - LRI: 77 gpcd (15% Reduction)

- **Needs Assessment**
  - CT: Eight (8) Wells/WTPs & 4.3 MG Storage
  - LRI: Four (4) Wells/WTPs & 2.0 MG Storage

- **Computed Capital Cost Savings:** $32.8M
City of Aurora Water Conservation Ordinance (WCO)

- **Section 48-31 of Code**
  - Even/Odd Water Restriction Based on Home Address
  - Watering Permitted 6:00 AM – 9:00 AM & 6:00 PM – 9:00 PM On Day
  - Permanently Installed Systems Follow Same Times
  - Sod Installation Prohibited In July and August (Special Sod Watering Permit Allowed Rest of Year)
  - Watering Not Permitted On July 31st and August 31st
Summer Water Use Reduced By 20 gpcd (4.0 MGD) → $7.5M Capital Cost Savings
Implementation Realities

- Planned Water Use Reduction Per Demand Management Strategy
- Unplanned Water Use Reduction Trend
Exhibit 4-3: Historical Billed Water Use by Fiscal Year With Trend Line (GPCPD) (2001-2017)
Village of Montgomery, Kane & Kendall Cos., Illinois

Note: 2.33% decrease is based on straight-line decrease over 16 years (2001-2017).
Historic and Projected Billed Water Use

- Residential
- Commercial
- Trend (Residential)
- Trend (Commercial)

2.0% trend
The Great Conundrum

- Demand Management Success
  - Long Term Capital Savings
  - Short Term Revenue Reduction

- Items to Consider
  - Be Prepared to Adjust Rates
  - Education
Resources

Water Conservation Programs – A Planning Manual (M52)  

Alliance for Water Efficiency  
(http://www.allianceforwaterefficiency.org/)

IEPA Water Sense  
(https://www.epa.gov/watersense)

Water Research Foundation  
(http://www.waterrf.org/Pages/Index3.aspx)

Northwest Water Planning Alliance  
(www.nwpa.us)
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