Economics of Water: Solving problems without rate or tax increases

Solutions for Efficiency in a Down Economy

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Water Scarcity In The United States

In the next few years (by 2013), 36 states expect water shortages. Cheapest water is your current source. Alternate Source Costs?

Southeast
- Water Wars
- Water Stewardship Act
- EPA Sanctions
- Nutrients & Drugs
- Consumptive Use
- Water Stewardship is Necessary!

Electricity & Water rates may soon increase by 50%+
Combined Water and Sewer Rates

- Service Regions:
  - Central
  - East Central
  - MidAtlantic
  - Northeast
  - Northwest
  - South
  - Southeast
  - West

- Combined Charges:
  - 3,200 to 7,300
  - 2,600 to 3,200
  - 2,100 to 2,600
  - 1,800 to 2,100
  - 1,500 to 1,800
  - 0 to 1,500

- Key geographies with high water & sewer rates:
  - California
  - Texas
  - New York

JCI GIS Solutions 7-15-2009
Height of the Drought

August 21, 2007
Valid 7 a.m. EST

D0 Abnormally Dry
D1 Drought - Moderate
D2 Drought - Severe
D3 Drought - Extreme
D4 Drought - Exceptional
Do you remember Lake Lanier just a few short years ago?
Lake Norman, NC
U.S. Drought Monitor
Southeast

Drought Conditions (Percent Area)

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>D0-D4</th>
<th>D1-D4</th>
<th>D2-D4</th>
<th>D3-D4</th>
<th>D4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>26.21</td>
<td>73.79</td>
<td>59.43</td>
<td>39.29</td>
<td>24.34</td>
<td>8.11</td>
</tr>
<tr>
<td>Last Week (02/14/2012 map)</td>
<td>25.86</td>
<td>74.14</td>
<td>59.78</td>
<td>40.41</td>
<td>27.91</td>
<td>10.41</td>
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<tr>
<td>3 Months Ago (11/22/2011 map)</td>
<td>40.37</td>
<td>59.63</td>
<td>47.52</td>
<td>34.31</td>
<td>23.65</td>
<td>0.00</td>
</tr>
<tr>
<td>Start of Calendar Year (12/27/2011 map)</td>
<td>40.38</td>
<td>59.62</td>
<td>43.05</td>
<td>28.62</td>
<td>18.71</td>
<td>0.00</td>
</tr>
<tr>
<td>Start of Water Year (09/27/2011 map)</td>
<td>42.24</td>
<td>57.76</td>
<td>41.82</td>
<td>31.77</td>
<td>23.48</td>
<td>0.00</td>
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<tr>
<td>One Year Ago (02/15/2011 map)</td>
<td>6.18</td>
<td>93.82</td>
<td>66.90</td>
<td>22.50</td>
<td>3.35</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Intensity:
- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.
THE HYDRO-ILLOGICAL CYCLE

CONCERN → PANIC → RAIN → AWARENESS → APATHY
Water Conservation is Key . . .

GA Strategy:  Capture, Control & Conserve
Water Use Cycle
WWTP Energy Usage

- Aeration: 54.1%
- Wastewater Pumping: 14.3%
- Anaerobic Digestion: 14.2%
- Lighting & Buildings: 8.1%
- Belt Press: 3.9%
- Clarifiers: 3.2%
- Grit: 1.4%
- Screens: 0.0%
- Return Sludge Pumping: 0.5%
- Gravity Thickening: 0.1%
Energy and water are interdependent

Electricity production requires over 40% of all daily freshwater withdrawals

Water and wastewater utilities account for 30-40% of the electricity used by mid-sized cities

Source: EPA
this is called the "energy-water nexus"
Consider both water and energy when looking for efficiencies

According to the EPA…

In many parts of the country, letting your faucet run for 5 minutes . . . uses about as much energy as letting a 60-watt light bulb burn for 14 hours!

An average person consumes 100 gallons/day Powering favorite appliances requires 250 gallons/day!

Source: EPA
Water and energy efficiency work together

- Energy and water efficiency improves waterways and our environment while improving the bottom line

- Using less water means:
  - Saving your utility plants from having to pump water
  - Saving greenhouse gas emissions from your utility plants
  - Reducing water being treated at your wastewater facility
  - Reducing water loss
  - Saving contamination from returning to our waterways
  - Expanding your utility services with the same amount of resources
    - Supply more homes while managing rate & tax structures
    - **Reducing operating costs and may save jobs**
Water & Energy Improvement Measures

- AMR/AMI (Automated Meter Reading)
- Accurate Meters
- Metering All Usage
- Right size and/or type meter
- Leak Detection
- Tighter system pressure control
- Data Analysis (Business Review Services)
- Finding and correcting errors in the billing system
- WTP & WWTP Improvements
- Conservation Programs For All
  - Landscape-Faucets-Toilets-Appliances-HVAC
Common Problems Faced by Utilities

Lost billable revenue from inaccurate water meters

High amounts of Non-Revenue Water (NRW) & aging infrastructure

Current meter reading programs are expensive & inefficient

Facilities, pipe & equipment are failing

- In ground assets
- Motors, pumps, drives, blowers
- Aged & undersized plants

**Funding sources are scarce or non-existent**

**PERFORMANCE INDICATORS**

**Financial Indicators**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRW as % by volume of Water Supplied</td>
<td>55.4%</td>
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<tr>
<td>NRW as % by cost of operating system</td>
<td>19.1%</td>
</tr>
<tr>
<td>Annual cost of Apparent Losses</td>
<td>$2,886,084</td>
</tr>
<tr>
<td>Annual cost of Real Losses</td>
<td>$2,028,504</td>
</tr>
</tbody>
</table>

The danger of being a meter reader

DOGS, ELECTRIC FENCES, SOMETIMES GUNS AMONG JOB’S HAZARDS
Water Infrastructure Funding Sources

- **Federal Funds**
  - ARRA
  - EPA
  - Dept of Energy

- **State Funds**
  - GEFA: Revolving Loans & Grants

- **Local Government Funds**
  - Capital Budgets / CIP
  - Debt Structures (General Obligation Bonds & Revenue Bonds)
  - Rates & Tax Payers

- **Performance Contracting & Public Private Partnerships**
Performance Based Contract

Enabled by GA State Statute . . . Self-Funding Vehicle

- Allows improved efficiency to pay for upgrades
- Streamlines procurement
- Self funding vehicle
  - Budget Neutral
  - Guaranteed Outcomes
- Proven in GA and across the US
- Minimizes risk
- Reduces Non-Revenue/unaccounted Water
- Increases billable usage
- Reduces Operations & Maintenance (O&M) costs
- Saves Energy and optimizes your water/wastewater facilities

We’re making your city better!

New utility meters are being installed throughout the city.
Watch for more information in your local media or go to www.chanute.org

Questions?
Call 431-5200

Johnson Controls
Self Funded Solutions & Positive Cash Flow for Water Utilities

Utility Savings Impact
Efficiency Gains – Meter Upgrades, Energy Savings, Leak & Asset Management Programs

Cumulative Cash Flow

In these economic times, Performance Contracting is worth consideration

Funding for additional infrastructure projects!
Case Study: City of Tulare, CA

Water Distribution System
- 5,347 new water meter services
- 10,189 new water meters
- Mobile AMR system
- Large water meter typing
- Large water meter set improvements

Facilities
- HVAC equipment replacement
- Energy-efficient windows and roofs
- Water conservation fixture installation
- Energy-efficient lighting systems

Other
- Energy-efficient street, traffic, & area lighting systems retrofit
- 30 kW photovoltaic system at wastewater treatment plant

Guaranteed Benefits over Term: $13,900,000
Water Resources

Georgia’s State Water Planning Website: http://www.georgiawaterplanning.org/index.php

Metropolitan North Georgia Water Planning District http://www.northgeorgiawater.com/

GA Water Planning District Councils http://www.georgiawaterplanning.org/documents/water_basin_map.pdf

GA Dept of Natural Resources & Dept of Environmental Protection – Water http://www.georgiaepd.org/Documents/index_water.html


US EPA - Water: http://water.epa.gov/drink/

Georgia Association of Water Professionals (AWWA / WEF): http://gawp.org/

Georgia Rural Water Association: http://www.grwa.org/
Where can I find more information?

http://www.johnsoncontrols.com/WATER
Any Questions?

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