Utility of the Future (UOTF): From Blueprint to Advocacy

Tom Sigmund, NEW Water

NACWA Winter Meeting

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UOTF...What Does it Look Like?

Treatment plants become energy self-sufficient or a net energy producer...
UOTF... What Does it Look Like?

Cities are redesigned... from below ground up... to become extensions of the treatment and supply system.
UOTF...What Does it Look Like?

Watershed management is as important as the formal treatment system.
Welcome to the Water Resources Utility of the Future

<table>
<thead>
<tr>
<th>Motivation</th>
<th>Activity</th>
<th>Innovation</th>
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<tbody>
<tr>
<td>Reduce Cost</td>
<td>Energy Efficiency</td>
<td>• Energy Efficient Equipment &amp; Networks</td>
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<td>Energy Recovery</td>
<td>• Methane &amp; Hydrogen Recovery, Heat Recovery</td>
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<td>Operating Efficiency</td>
<td>• Automation and Smart Operations, Asset Management, Sourcing</td>
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<td>Increase Revenue</td>
<td>Water Reuse</td>
<td>• Industrial Cooling, Recharge, Landscape, Golf Course Irrigation</td>
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<td>Materials Recovery</td>
<td>• NH₄, P Compounds, N Compounds, Metals</td>
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<td>Materials Conversion</td>
<td>• Bioplastics, Pyrolysis Fuel Oil, Algal Biomass, Solid Fuels, Fertilizers</td>
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<td>Biosolids Reuse</td>
<td>• Liquid Fertilizer</td>
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<td>Energy Generation</td>
<td>• Photovoltaics, Wind Turbines</td>
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<td>Support Community &amp; Economy</td>
<td>Growth Planning</td>
<td>• Sectoral Expansion, Targeted Upgrades, Managed Package Plants</td>
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<td>Community Partnering</td>
<td>• NPS Controls, Biowaste Conversion To Methane, Green Infrastructure</td>
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UOTF a New Paradigm

<table>
<thead>
<tr>
<th>Past</th>
<th>Future</th>
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<tr>
<td>Handlers of wastewater</td>
<td>Managers of sustainable resources</td>
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<tr>
<td>Seeking permit compliance</td>
<td>Watershed-scale environmental leaders seeking least-cost, highest</td>
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<td>return solutions</td>
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<tr>
<td>Engineers designing</td>
<td>Regional planners of weather-resistant, green communities</td>
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<td>treatment plants</td>
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<td>Isolated public service</td>
<td>Integrated members of economically thriving local communities</td>
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<td>units</td>
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UOTF Legislative Actions

• Fully support public and private enterprises as they make the transition to the UOTF

• Sanction watershed-based solutions to water quality challenges

• Encourage water reuse and conservation where feasible

• Enable full recovery of waste heat and energy
UOTF Legislative Actions

• Create a Congressional UOTF caucus to collaborate with industry and other subject experts

• Create a new national infrastructure resiliency funding program in response to extreme weather events
UOTF Legislative Actions

• Craft a 21st Century Watershed Act that builds on 40 years of Clean Water Act achievements, but embraces UOTF initiatives more fully:
  – Redefine Publicly Owned Treatment Works in a manner that recognizes it as a resource provider
  – Extend permit terms or offer more flexibility for projects that employ resource recovery activities like water recycling
  – Make water reuse an eligible activity to receive federal financial aid
UOTF are Resource Managers

Green Bay Metropolitan Sewerage District’s Resource Recovery and Electrical Energy (R2E2) Project: Energy balance graphic depiction, year 2035 average
UOTF Financial and Risk Allocation Actions

- Focus disparate federal programs on UOTF objectives
- Maximize efficient water use and reuse for new government buildings
- Stimulate the pace of technology innovation with a new advanced R&D program for clean water
- Implement pooled risk-sharing strategies and reciprocity for technology approval across all states
Reuse as a Revenue Generator

About 6% of total municipal wastewater effluent in the US is reclaimed for landscape irrigation and recharge. Four states – CA, AZ, TX, and FL – account for 90% of reclaimed wastewaters.

Source: USGS and other sources
UOTF Institutional or Programmatic Changes

• Stronger support for green infrastructure to frame a broader conversation about fundamental urban design

• Integrated watershed planning that engages the public, civic leadership, potable water utilities, and infrastructure professionals to make better decisions
Why the Watershed Matters

Photo credit: Steve Sello
April 2011
How Bad It Can Get
Plowing Through Waterways Allows Sediment and Nutrients to Leave Fields
Desired Conditions
Adaptive Management Facilitates Watershed Improvements

• Regulatory compliance strategy for point sources

• Partnerships formed in the watershed to balance load reductions by point and nonpoint sources

• Reduce pollutant discharges through the most cost-effective methods

• Point sources are afforded flexibility

• Requires demonstration of eventual compliance with ambient water quality criteria of receiving water
UOTF Productivity Improvement

- Use process/decision support tools such as Lean, Six Sigma, and sustainability-driven environmental management systems
- Use social media and smart technology to interact with stakeholders and better deliver services
- Standardize operator certification to create a better trained and more mobile workforce
UOTF Advocacy, R&D, Education, and Outreach

• Key roles for NACWA, WEF, WERF, and EPA
• Support focused, collaborative research
• Advocacy for legislative change
• Advisory services to regulators
• Enhance public information and participation
• Knowledge base platform to detail and update the latest UOTF technologies and practices
The Industry of the Future

• Managers of valuable resources
• Maximize net benefits (environmental and community) in the form of reduced cost and increased revenue
• Driven by triple bottom line business case analysis
• Develop strong partnerships with external stakeholders and use those partnerships to achieve goals
New Brand, New Attitude

- Reframe the conversation through branding
UOTF as a Force for Change

- National in scope
- Subsidiaries everywhere
- Employ millions
- Assets in the trillions
- Invest $100 billion annually
- Collaborative effort with NACWA, WEF, and WERF
Bold, Transformative Thinking Required

- Realize most effective solutions often involve others outside the utility's direct control
- A 21st Century Watershed Act must be enacted to support these initiatives
- Clean Water Utilities become leaders in the watershed community seeking to deliver maximum environmental benefits at the least cost to society
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