



**WATER**  
**RESOURCES**  
**UTILITY** OF  
**FUTURE** THE

# UTILITIES TODAY: WORLD CLASS SOPHISTICATION

- Deliver services to 90+ % of the US population
- Manage more than \$500 billion in net assets
- Finance some \$25 billion a year capital investments
- Responsible for a workforce of about 50,000
- Remove more than 90% of organic inputs, estimated 55% of nutrients, and nearly all harmful bacteria
- Account for less than 10% of remaining water quality impairment of the nation's rivers, streams, lakes, reservoirs, and coastal shoreline and only about 30% of impaired estuaries

# 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



# UOTF A NEW PARADIGM

Past	Future
Handlers of wastewater	Managers of sustainable resources
Seeking permit compliance	Watershed-scale environmental leaders seeking least-cost, highest return solutions
Engineers designing treatment plants	Regional planners of weather-resilient, green communities
Isolated public service units	Integrated members of economically thriving local communities

# WELCOME TO THE WATER RESOURCES UTILITY OF THE FUTURE

Motivation	Activity	Innovation
Reduce Cost	Energy Efficiency	• Energy Efficient Equipment & Networks
	Energy Recovery	• Methane & Hydrogen Recovery, Heat Recovery
	Operating Efficiency	• Automation and Smart Operations, Asset Management, Sourcing
Increase Revenue	Water Reuse	• Industrial Cooling, Recharge, Landscape, Golf Course Irrigation
	Materials Recovery	• NH <sub>4</sub> , P Compounds, N Compounds, Metals
	Materials Conversion	• Bioplastics, Pyrolysis Fuel Oil, Algal Biomass, Solid Fuels, Fertilizers
	Biosolids Reuse	• Liquid Fertilizer
	Energy Generation	• Photovoltaics, Wind Turbines
Support Community & Economy	Growth Planning	• Sectoral Expansion, Targeted Upgrades, Managed Package Plants
	Community Partnering	• NPS Controls, Biowaste Conversion To Methane, Green Infrastructure

# WHAT'S BEHIND THE PARADIGM SHIFT?

- We're way out on the unit removal curve
- Traditional inter-governmental partnership that recognized public goods nature of clean water has nearly disappeared
- The CWA regulatory regime was built for an economy and an ecology that's now 40 years old and out of date
- With deleveraging balance sheets and an environment of “no new taxes” clean water agencies struggling to make ends meet



# A WORD ABOUT PROCESS

- Collaborative effort of NACWA, WEF, and WERF
- Pretty quick turnaround – started in September finished late December
- Steering Committee – Nine members, three from each sponsoring organization
- Task Force – 48 members from across the industry: 31 utilities (mostly public, but couple of IOUs), 9 consultants, 4 academics, and 4 technology firms

# BLUEPRINT: CREATE A VISION FOR AN ENVIRONMENT OF INNOVATION

- Identify a range of changes to legislation, administrative practices, and programmatic structures
- Identify things clean water agencies are already doing and suggest more of it as well as more widespread adoption
- Call for some bold, transformative thinking around new ways of doing business

# GREAT STORY, SO WHY DO WE NEED HELP?

- Fundamentally the market is working and will likely continue to work, but in a slow, clunky, and geographically uneven way
- Without help, transaction costs will be needlessly high, technology adoption rates will be needlessly slow, communities and politicians will be under-informed, and the benefits shown here won't be captured
- The UOTF is being held back by certain structural barriers and resistance to change: regulatory pressure, fiscal pressure, political pressure, and risk of technology failure

# 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 21<sup>st</sup> 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 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

# 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





# UOTF PRODUCTIVITY IMPROVEMENT

Use process/decision support tools such as Lean, Six Sigma, & 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

# 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 21<sup>st</sup> 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



# **WATER RESOURCES UTILITY<sup>OF</sup> THE FUTURE**

Read the full text of *Water Resources Utility of the Future: A Call to Federal Action* at:  
[www.nacwa.org/utility-of-the-future](http://www.nacwa.org/utility-of-the-future)