RUBIN MALLOWS WORLDWIDE

The Utility of the Future

What it Means and Why it's Important

Kenneth Rubin

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NACWA

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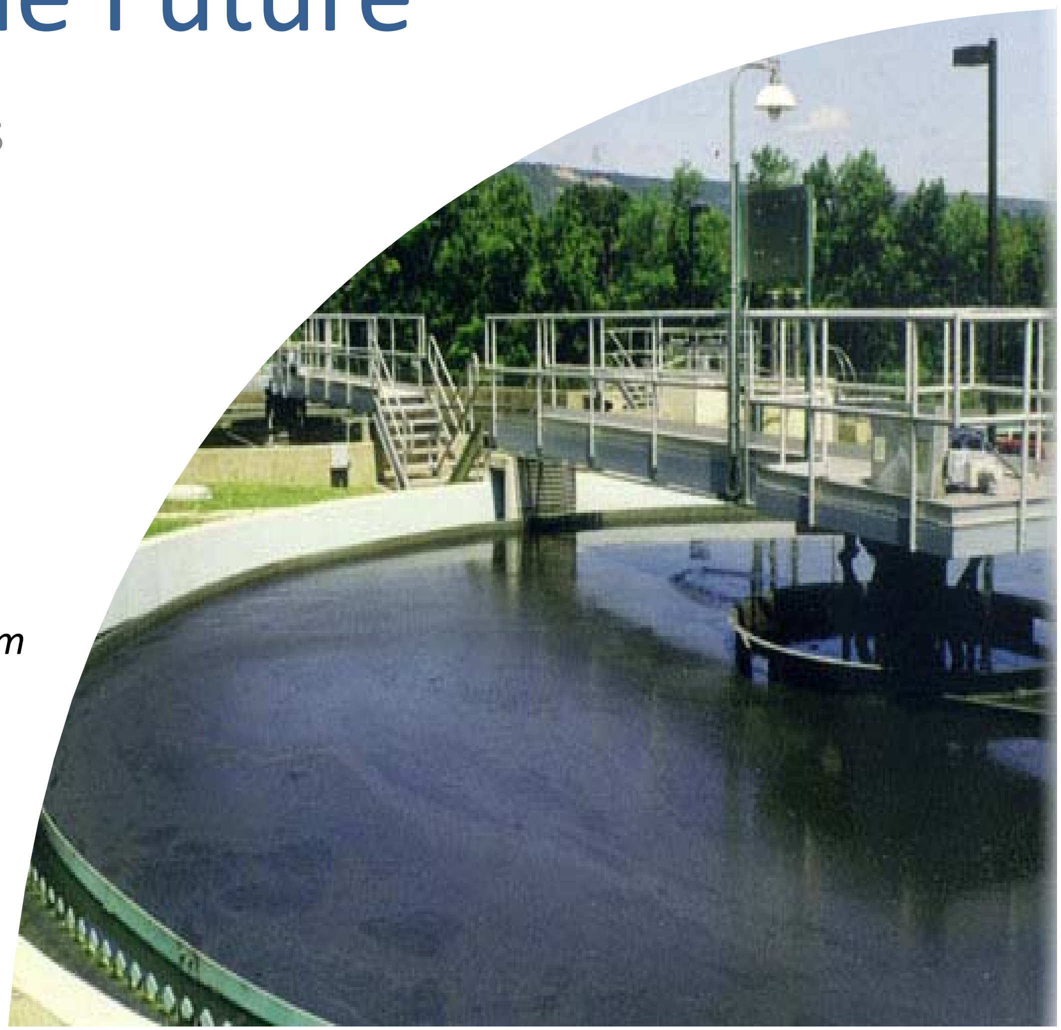


Agenda

- The Utility of the Past
- A Framework to Understand the Utility of the Future
- Why its Important
- What’s Next?

Utility of the Past

The "utility of the past" added value by assuring its customers that it would collect wastewater, move it quickly downstream, treat it to acceptable standards, and dispose of effluent and biosolids without harming the environment.

Then, something happened…

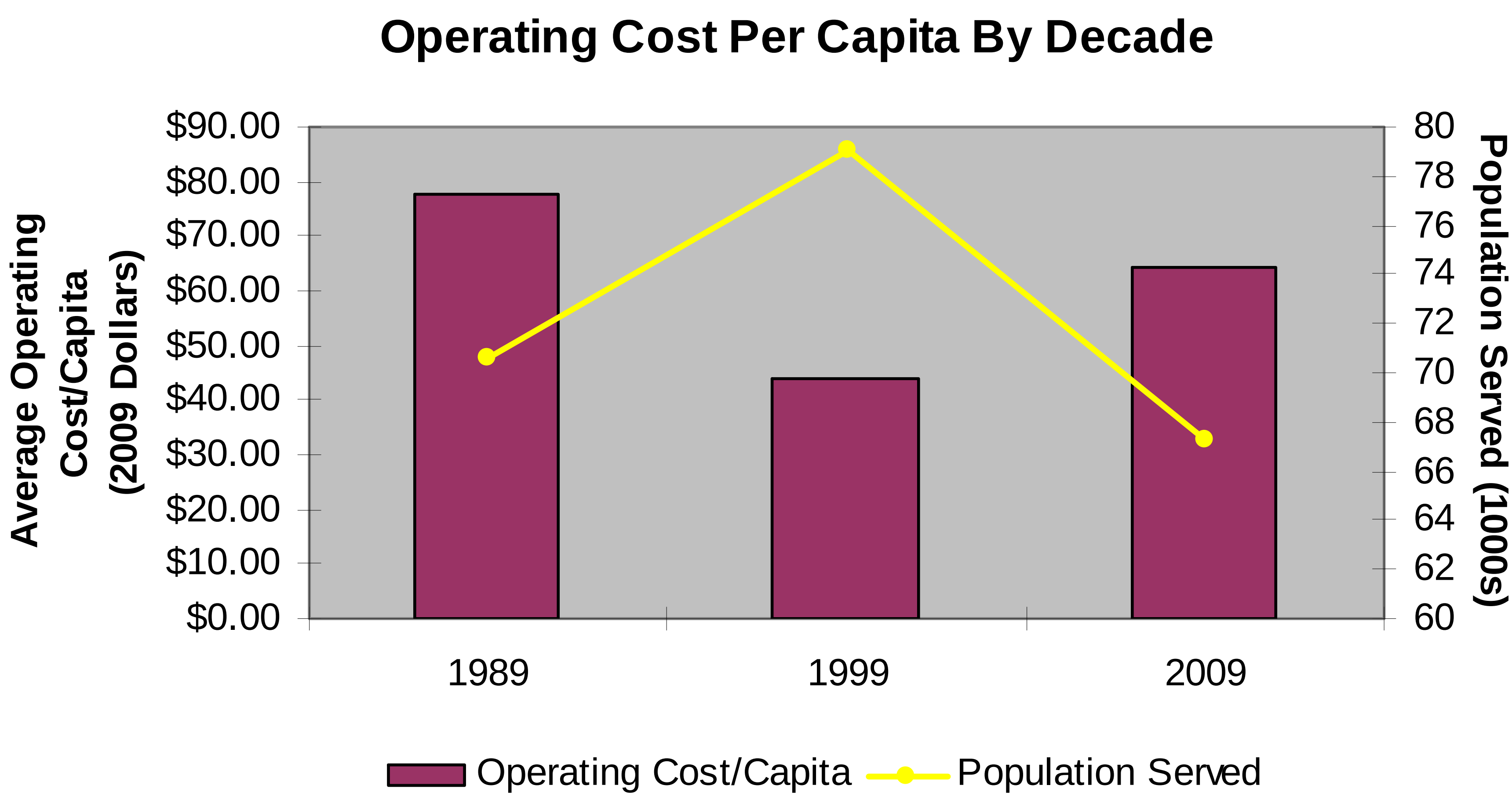
Things Got Complicated

- Demographics took over
- Regulations escalated
- Assets aged
- Finances stretched
- Private interests got aggressive

We realized that markets once thought of as monopolies were indeed, contestable…

Public Utilities Increased Operating Efficiency

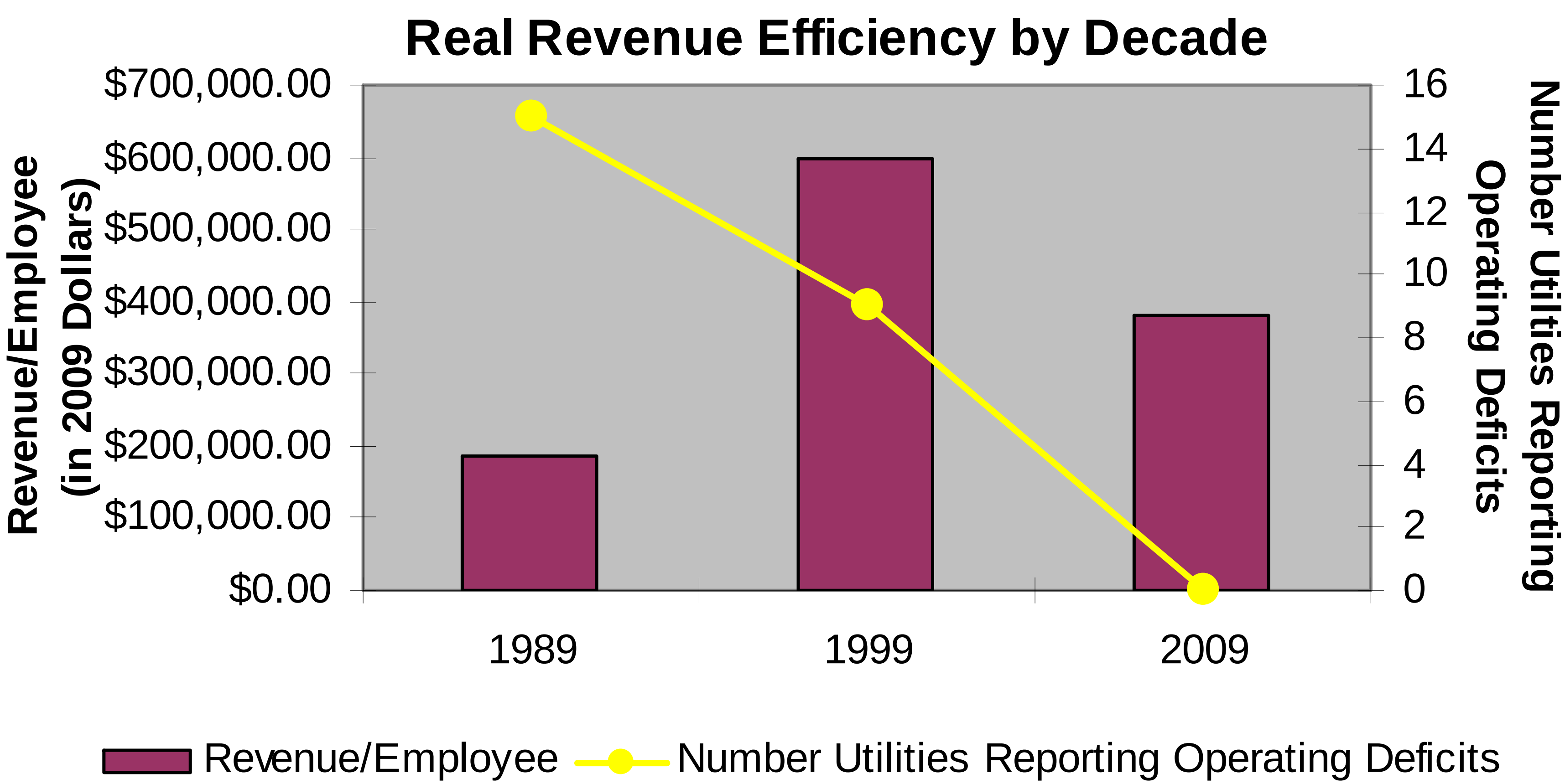
In the 1990s, NACWA utilities increased efficiency of operations by about 45 percent, but rising costs of increasing requirements have eroded about half of those gains this decade.



Source: NACWA Financial Surveys

But Revenue Efficiency Is Slipping

Operating deficits have been eliminated for all intents and purposes, but the major internal revenue efficiency gains seemed to have peaked.

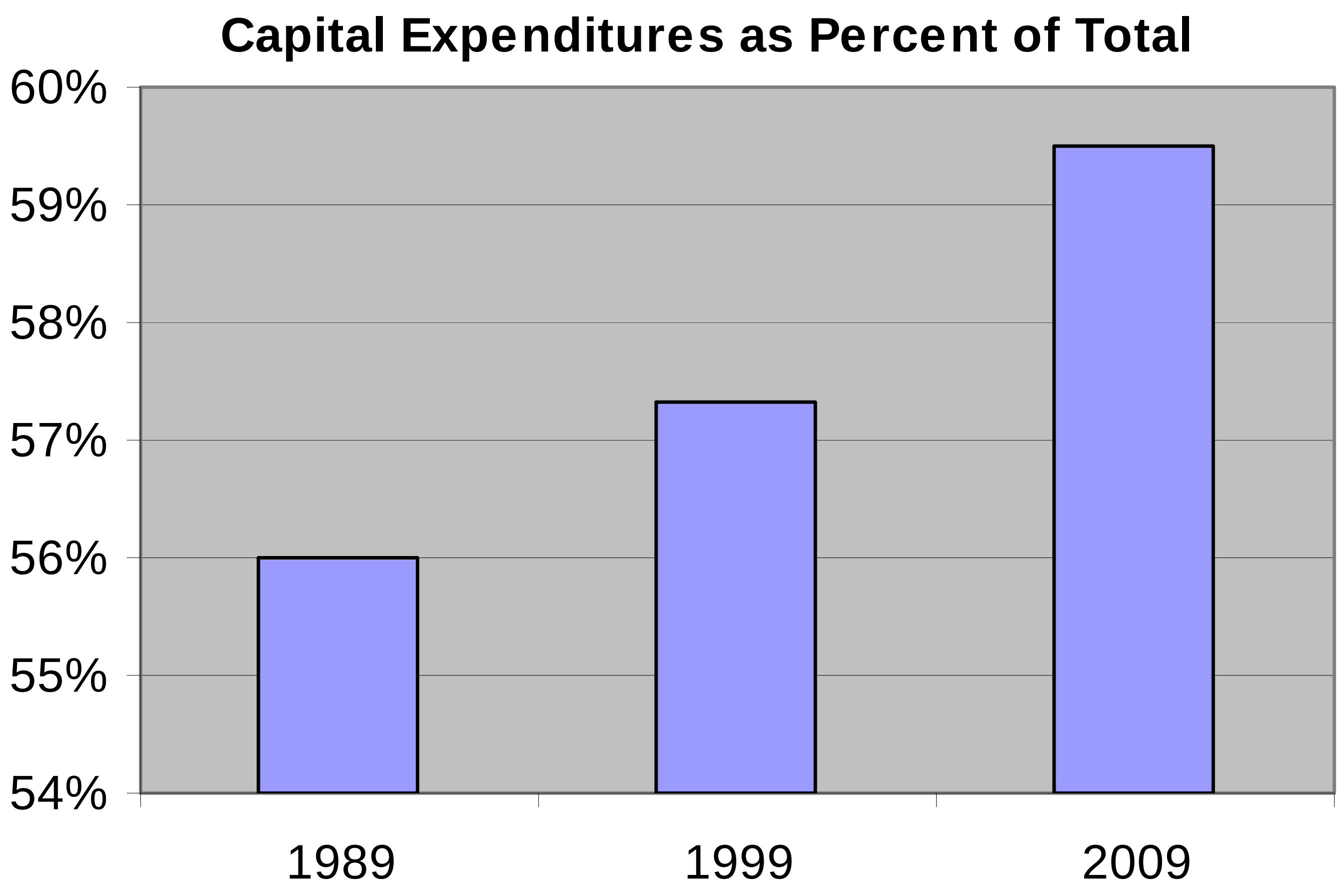


Note: Revenue is total revenue from own sources (excludes intergovernmental loans and grants)

Source: NACWA Financial Surveys

As Utilities Confront Capital Replacement

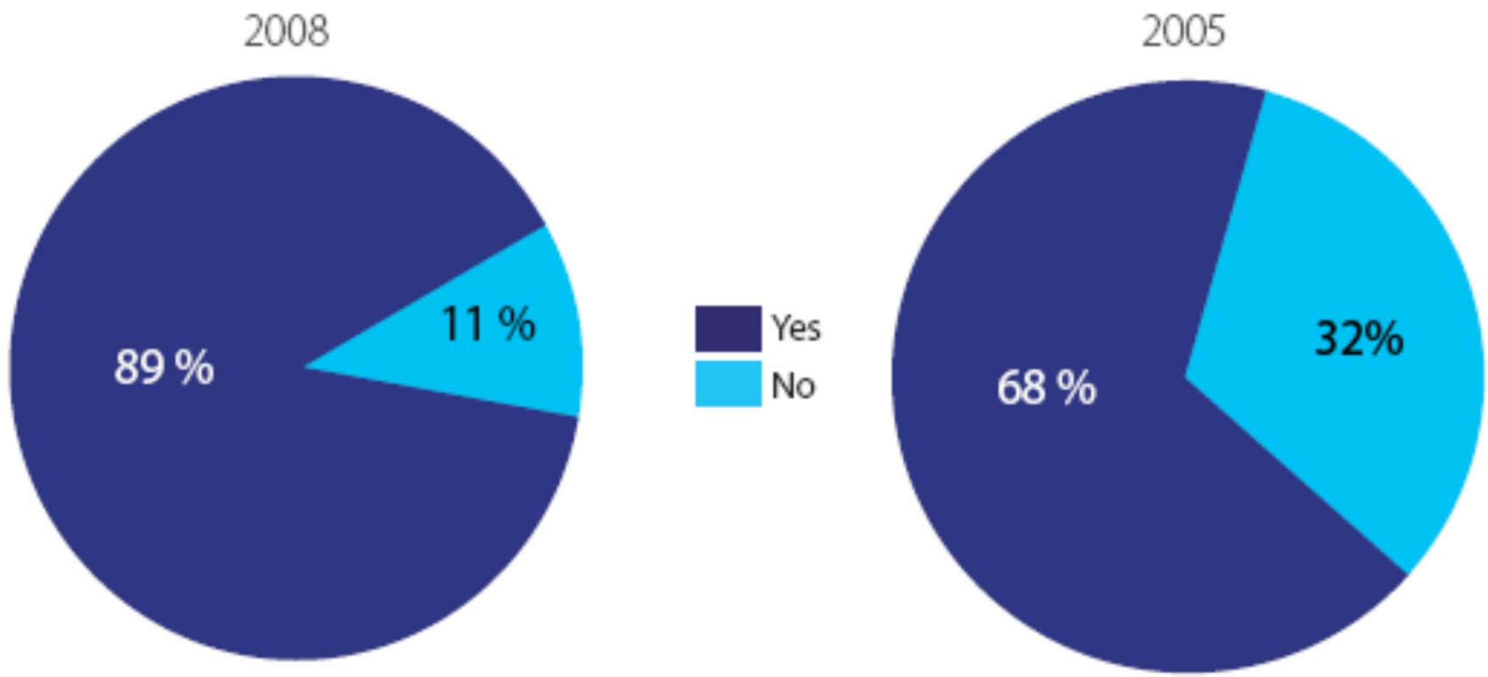
Wastewater utilities devote an increasing proportion of expenditures to capital plant, a result of increasing environmental and service level requirements and an aging infrastructure, in turn, creating new demands for capital efficiencies.



Source: NACWA Financial Surveys

So, Utilities Respond on the Capital Side

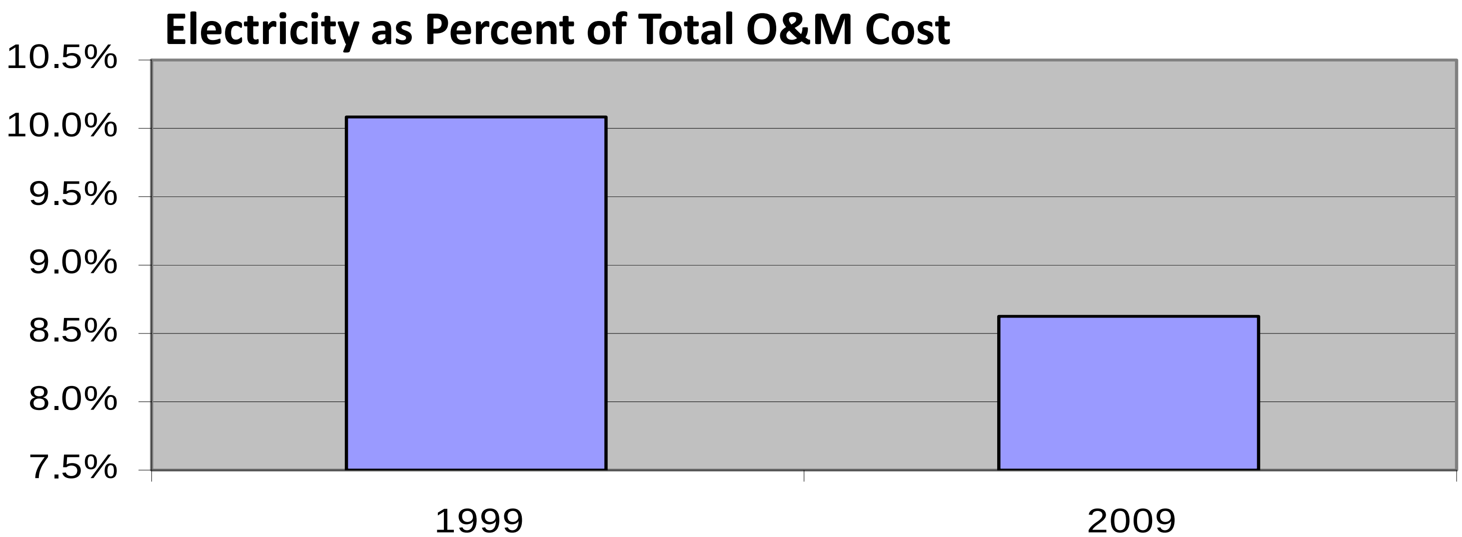
Percent of NACWA members that have implemented an "asset management system," defined as an integrative process that enables a utility to determine how to minimize life cycle costs of owning and operating infrastructure assets while meeting customer service demands

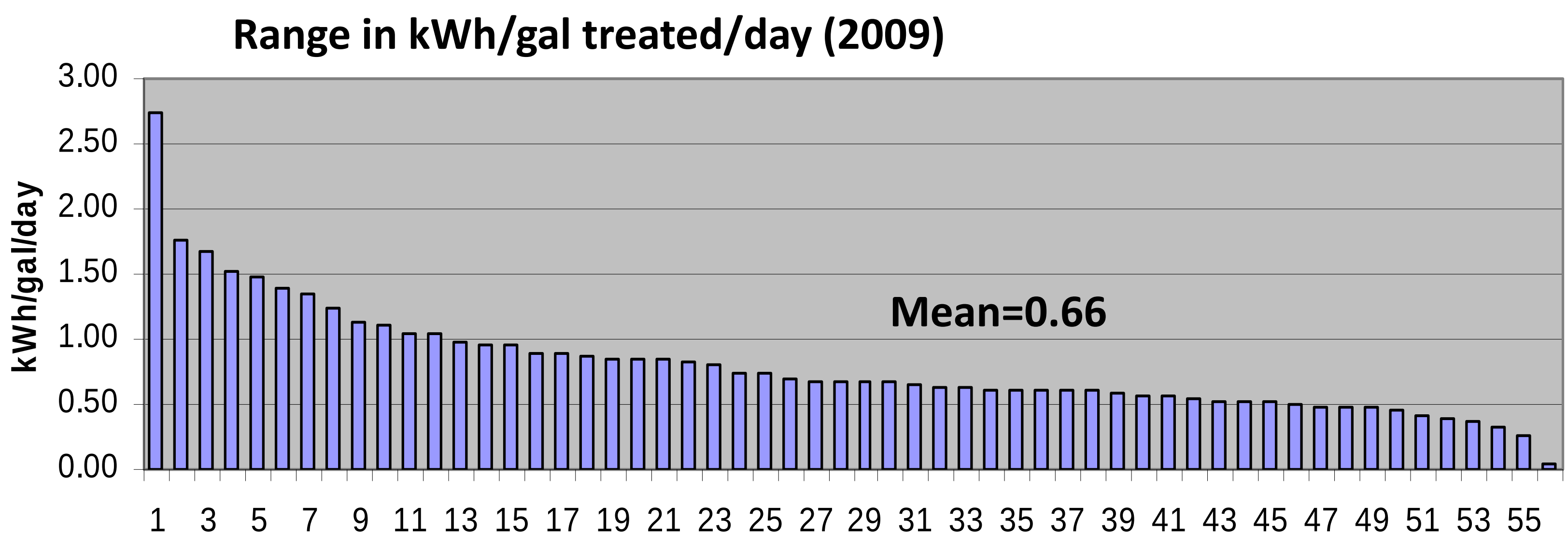


N=92

Source: NACWA 2009 Financial Survey

Response Begins on O&M As Well

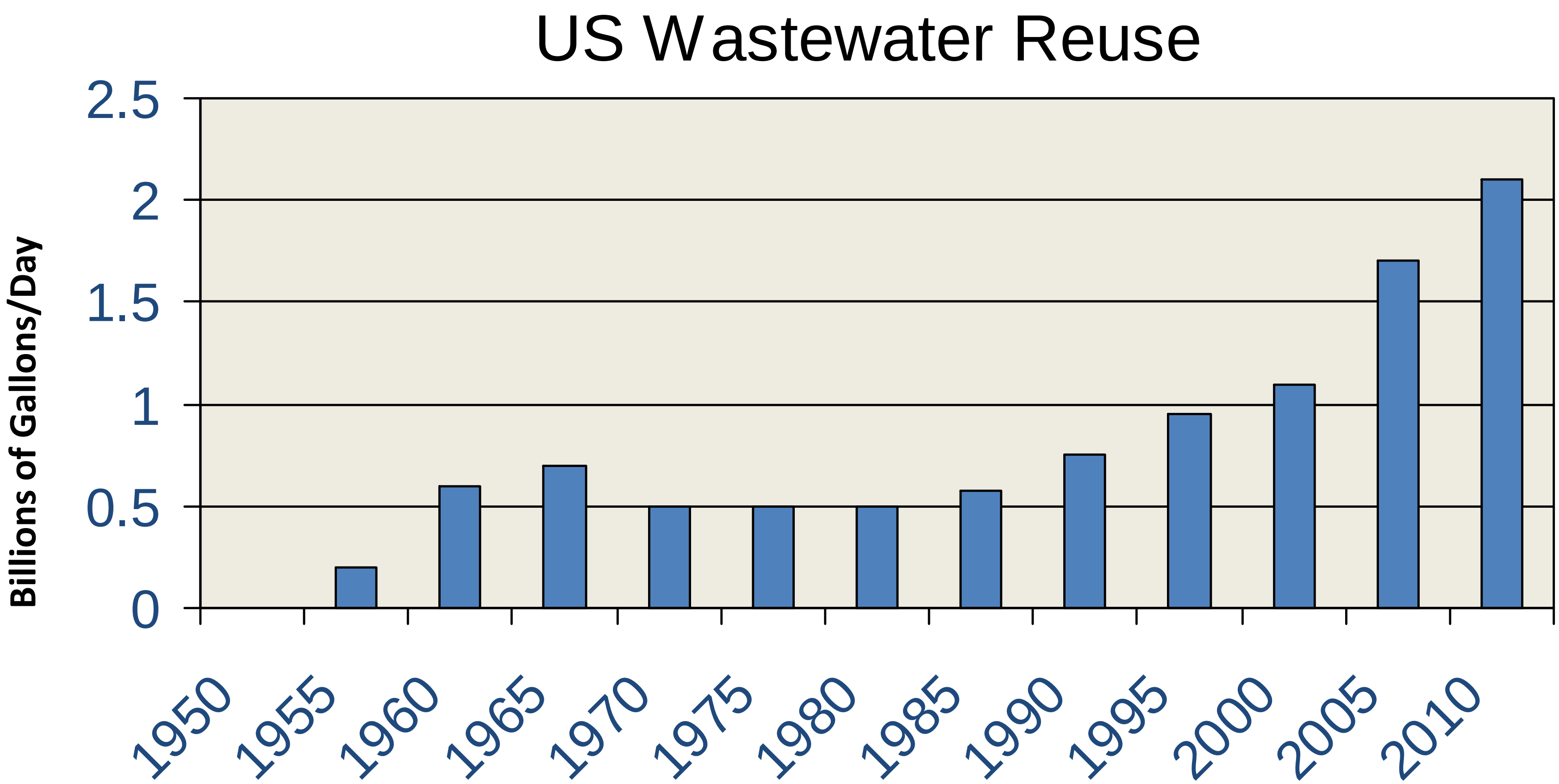




Source: NACWA Financial Surveys

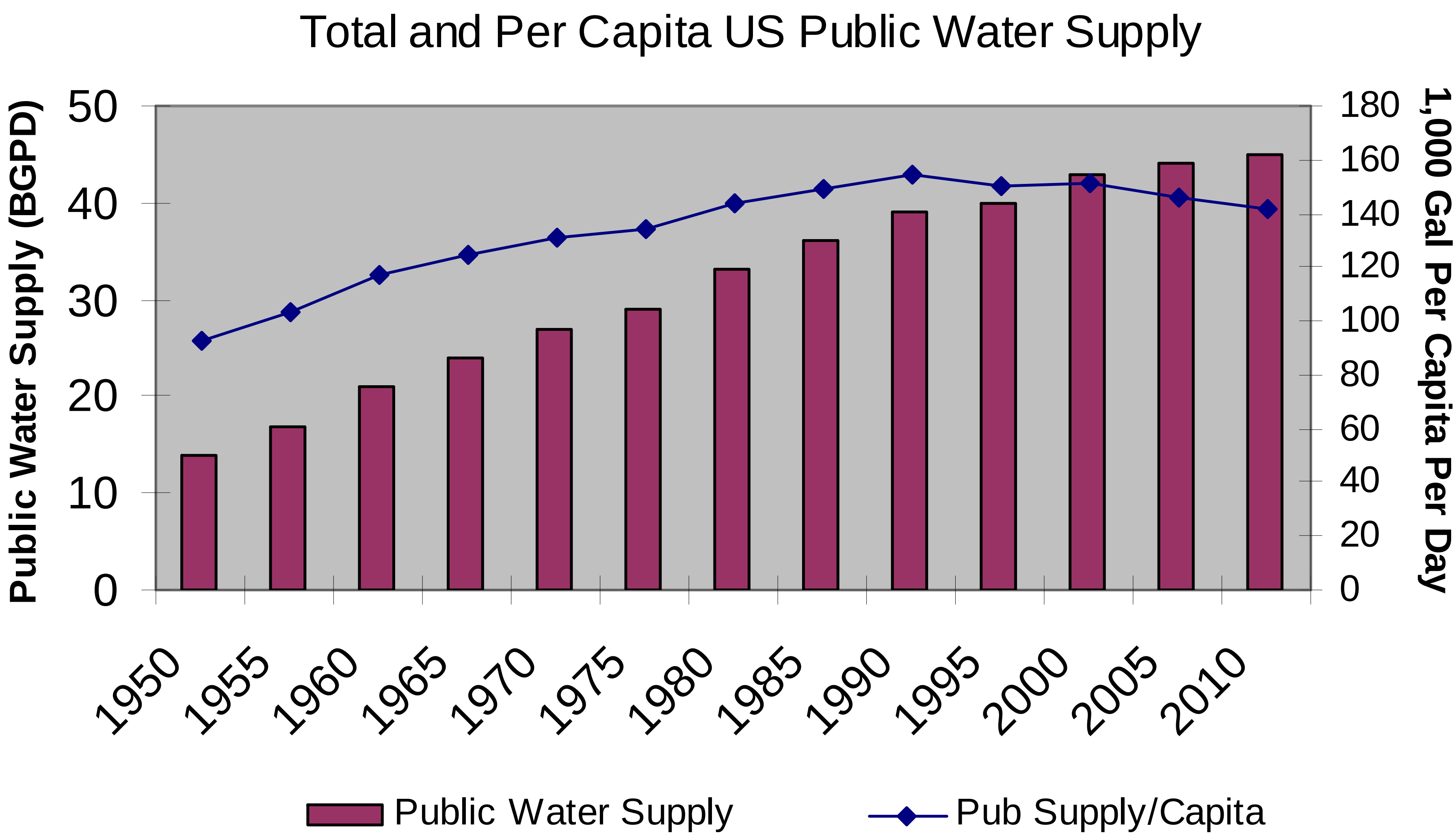
Reuse Kicks in: Revenue Generator?

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

And Water Use Trends Reverse



Source: US Geological Survey

Welcome to the “Utility of the Future”

PAST	Collect, Remove, Treat, Dispose Safely		
FUTURE	Reduce Cost	Energy Efficiency	• Energy Efficient Equipment & Networks
		Energy Recovery	• PV, Wind Turbines, Methane & Hydrogen Recovery, Heat Recovery
	Increase Revenue	Water Reuse	• Cooling, Recharge, Landscape, Golf Course Irrigation
		Materials Recovery	• NH_4, P Compounds, N Compounds, Metals (LI, MN, ZN, AU, AG)
		Materials Conversion	• Bioplastics, Pyrolysis Fuel Oil, Algal Biomass, Solid Fuels, Fertilizers
		Biosolids Reuse	• Liquid Fertilizer
	Support Community & Economy	Growth Planning	• Sectoral Expansion, Targeted Upgrades, Managed Package Plants
		Community Partnering	• NPS Controls, Biowaste Conversion To Methane

Triple Bottom Line Results

		Example Processes	Environmental Effects	Utility Effects	Community Effects
Reduce Cost	Energy Efficiency	• Energy efficient equipment & networks • Photovoltaic installations • Wind turbine installations	• Reduced consumption of fossil fuels • Reduced greenhouse gas emissions • Reduced air pollution	• Reduced energy demand • Reduced operating costs	• Reduced imports/better trade balance • Enhanced investment in R&D • Creation of technology jobs • Increased household incomes • Increased local GDP • Increased local tax receipts
	Energy Recovery	• Methane production form biosolids • Hydrogen production from biosolids • Recovery of heat • Hydrokinetic energy recovery	• Reduced consumption of fossil fuels • Reduced greenhouse gas emissions • Reduced air pollution		
Increase Revenue	Water Reuse	• Supply of treated effluent for cooling • Recharge of effluent to groundwater • Effluent for landscape, golf course irrigation	• More fresh water for higher valued uses • Less salt water intrusion • Reduced discharges to cleaner waterways	• Creation of new revenues • Reduction of biosolids disposal costs	• Reduced imports/better trade balance • Enhanced investment in R&D • Creation of technology jobs • Increased household incomes • Increased local GDP • Increased local tax receipts
	Materials Recovery	• Ammonia recovery • Phosphorus compounds recovery • Nitrogen compounds recovery • Metals recovery (LI, MN, ZN, AU, AG)	• Reduced loadings to cleaner waterways • Healthier ecosystems		
	Materials Conversion	• Bioplastics production from biosolids • Pyrolosis of biosolids to fuel oil • Algal biomas fuel production • Biosolids solid fuel to replace coal • Biosolids fertilizer pellets & soil conditioner	• Less landfilling • Less mining and burning of fossil fuels • Reduced net carbon emissions		
	Biosolids Reuse	Use of biosolids slurries as liquid fertilizer	• Less landfilling • Better absorption of nutrients, less runoff		
Support Community & Economy		• Upgrades & expansions to handle new flows • Sewer extensions for industrial expansion • Managed package plants to replace septic systems • Implement NPS Controls	• Less groundwater contamination • Less septage overflow to waterways • Reduced nutrient loads to waterways	Stronger community partnerships	• Creation of manufacturing jobs • Increased household incomes • Increased local GDP • Increased local tax receipts
		• Convert community Bio-waste to electricity	• Reduced landfill demand • Reduced methane emissions	• Reduced electric bills • Increased tipping fee revenue • Reduced grease sewer blockages	

FOG Methane at East Bay MUD

- Accepts sewage, food scraps and grease from local restaurants, and waste streams from wineries and poultry farms
- Reduces volume of food waste by 90%
- Saves $3 million a year in electricity costs
- Plant is energy independent and sells electricity back to the grid – first of its kind

- Prevents significant methane releases to the environment
- Qualifies for carbon reduction credits

Phosphorus Recovery at Hampton Roads

- Ostara Nutrient Recovery Technologies' Pearl process
- Recovers 85% N and 40% P
- Converts to Crystal Green slow release fertilizer
- No additional costs to HRSD
- Significant savings to ratepayers
- Increases plant efficiency
- Replaces mined P fertilizer at fraction of its cost
- Significant reduction in carbon footprint
- Also at Portland OR, York PA, Saskatoon BC, London UK

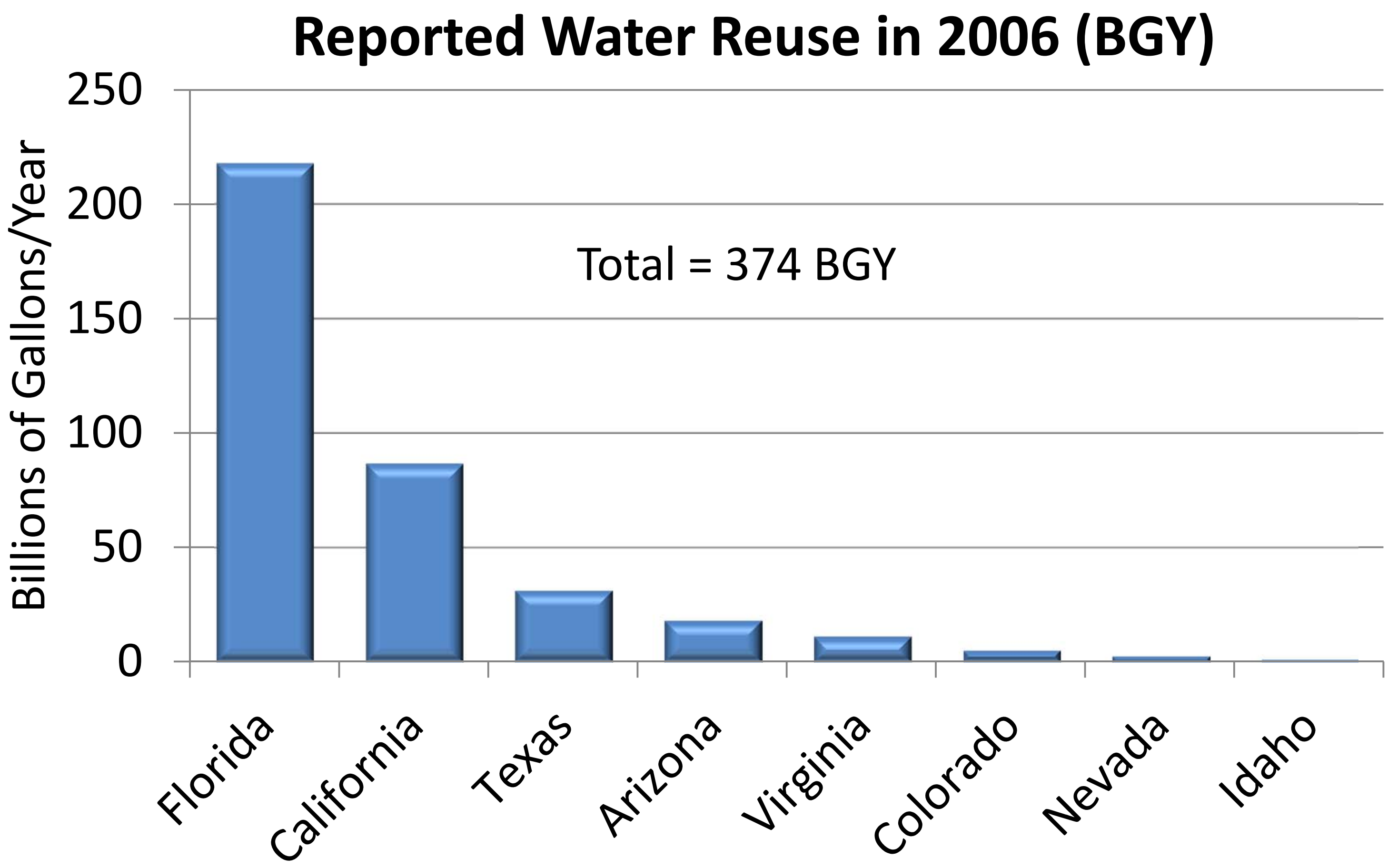
Solar PV in Lots of Plants

- Boulder, CO
- Pueblo, CO
- Telluride, CO
- Corvallis, OR
- Raleigh, NC
- Phoenix, AZ
- Pima County AZ
- San Diego County, CA
- Tulare, CA
- Charlotte, NC
- Hackettstown, NJ
- Philadelphia, PA
- Oroville, CA
- Nantucket, MA

Wind Turbines in Lots of Places

- Atlantic County, NJ
- Bayshore, NJ
- Browning, MT
- Guthrie, OK
- Narragansett Bay, RI
- Muskegon County, MI
- Fall River, MA
- Falmouth, MA
- Cascade ,WI
- Evansville, WI
- El Dorado, KS
- Perry, IA
- MWRA, MA
- Ashtabula, OH

Wastewater Reuse



Source: Water Reuse Foundation

Why is UOTF Important?

- Improves contribution of wastewater utilities to their own bottom line, the environment broadly, and the community they serve
- Brand value on a win-win solution
- Insight on best practices to benefit everyone
- Leadership and partnerships with other water and wastewater organizations

Platform of reform initiatives: policy, legislation, partnerships, finance.

In Case We Think We Know All the Answers….

Video: Taking the Waste Out of Wastewater
http://tinyurl.com/dxuouar