

Are Today's Wastewater Utilities Sustainable?

A 40-Year Retrospective

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NACWA

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*Sustainable Resource Management –
Lessons from Clean Water's Past and
Present*

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Agenda/contents

One Way to Define Sustainability (in the context of POTWs)

A Little Background

What do the Data Say?

Final Thoughts

What is a Sustainable Utility?

SUSTAINABLE WATER SYSTEMS: STEP ONE - REDEFINING THE NATION'S INFRASTRUCTURE CHALLENGE



THE ASPEN INSTITUTE
ENERGY AND ENVIRONMENT PROGRAM

Aspen's Elements of a Sustainable Utility?

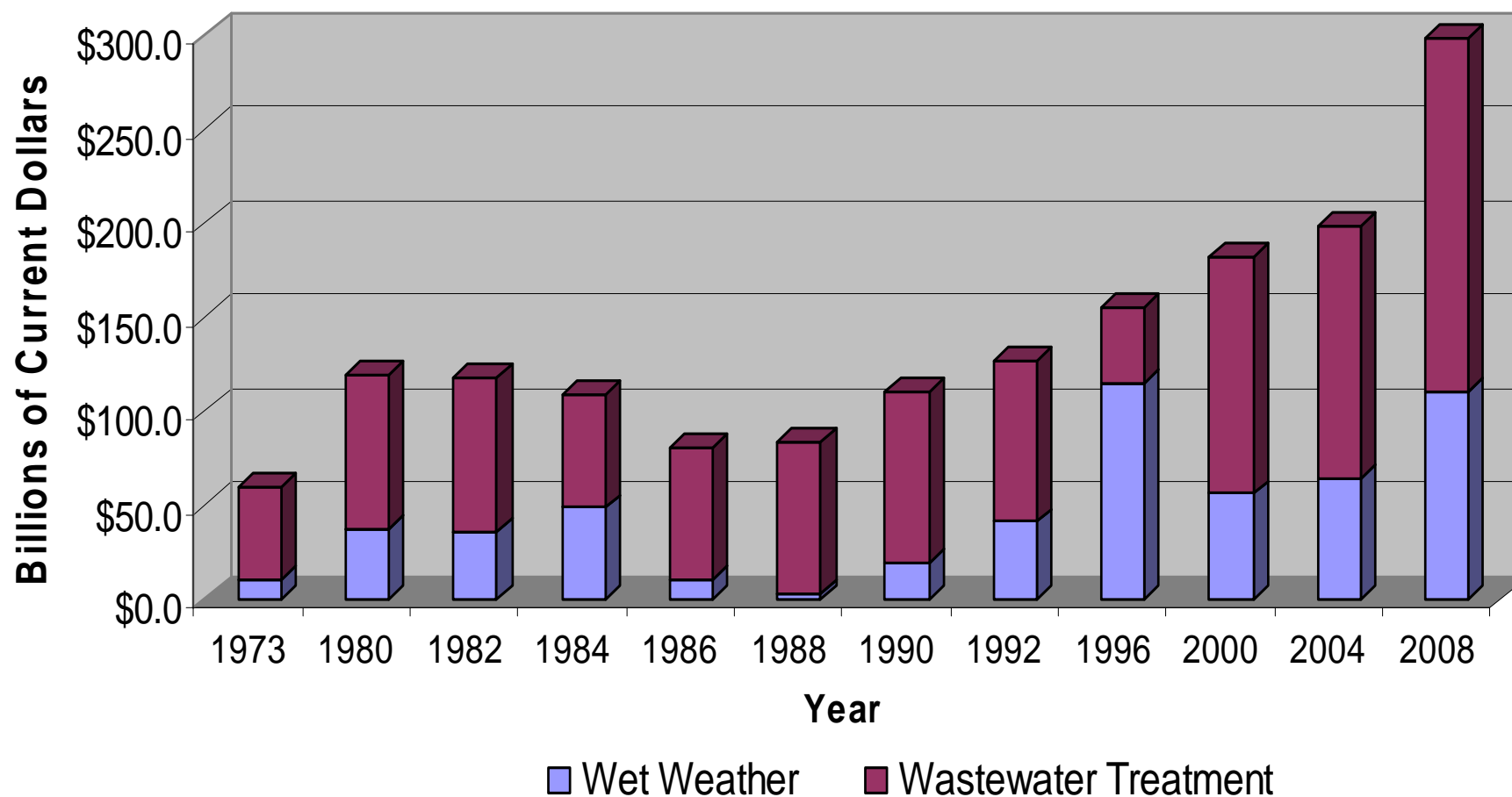
- Transparency
- Good Governance
- Cost of Development
- Security and Emergency Preparedness
- Stewardship
- Climate Change Mitigation/Adaptation
- Modern Plant Operations
- Watershed and Regional Optimization
- Regulatory Optimization
- Affordability
- Public Outreach/Stakeholder Involvement
- Full Cost Pricing
- Asset Management
- Conservation/Water Efficiency
- Energy Management
- Advanced Procurement & Project Delivery
- Environmental Impacts
- Network Optimization
- Workforce Management
- Research & Technological and Management Innovation

What is a Sustainable Utility?

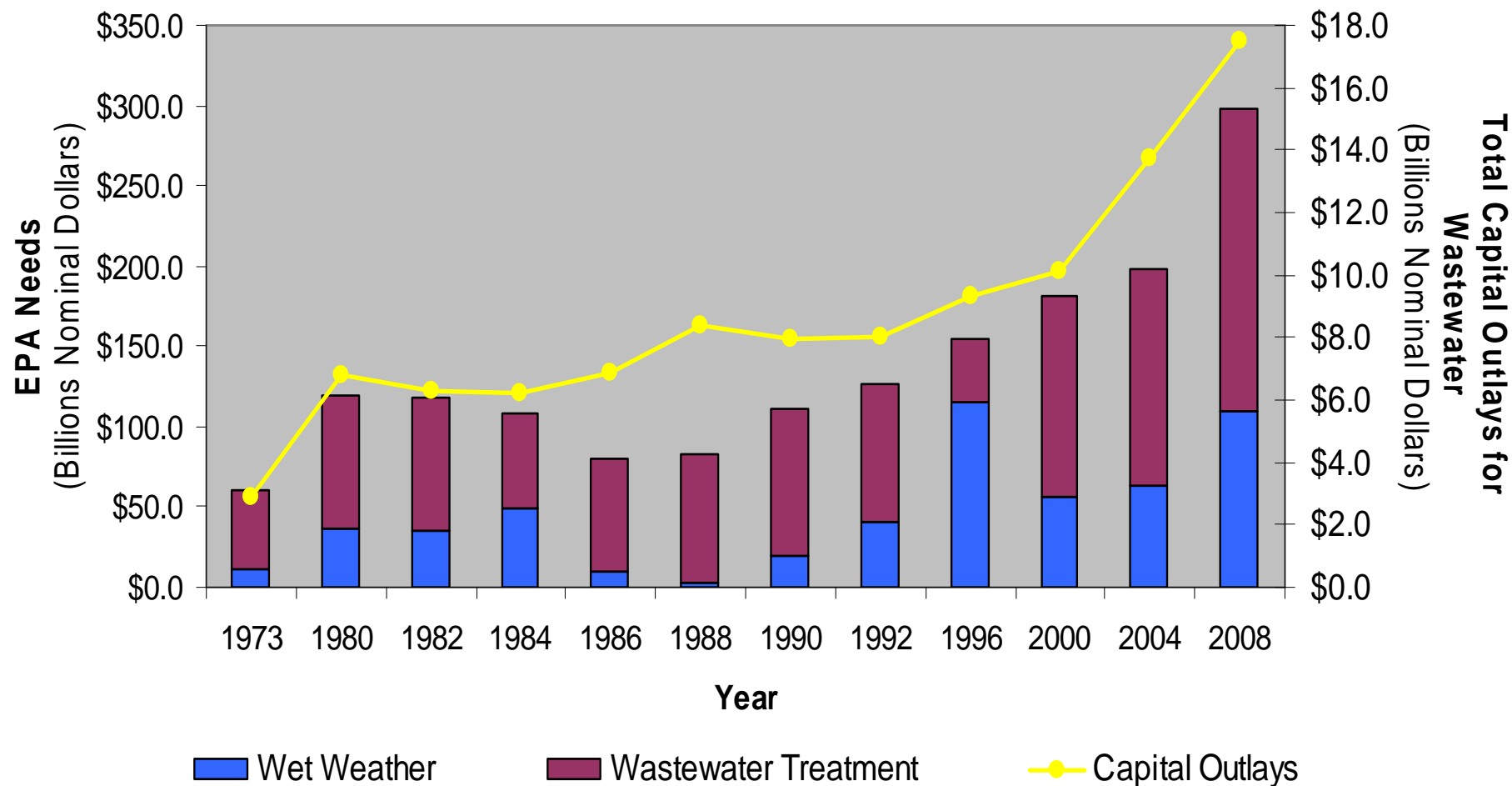
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A Little Background...

EPA's 20-Year Wastewater Needs



A Little Background...



Why Do We Observe this Trend?

Mechanics:

- Sampling and data collection techniques improve over time
- Utilities gain sophistication in asset management and capital cost forecasting

Regulations:

- Regulations expand in coverage (stormwater, CSOs, air quality, biosolids...)
- Regulations tighten on limits (advanced nutrient removal, TMDLs, zero discharge)

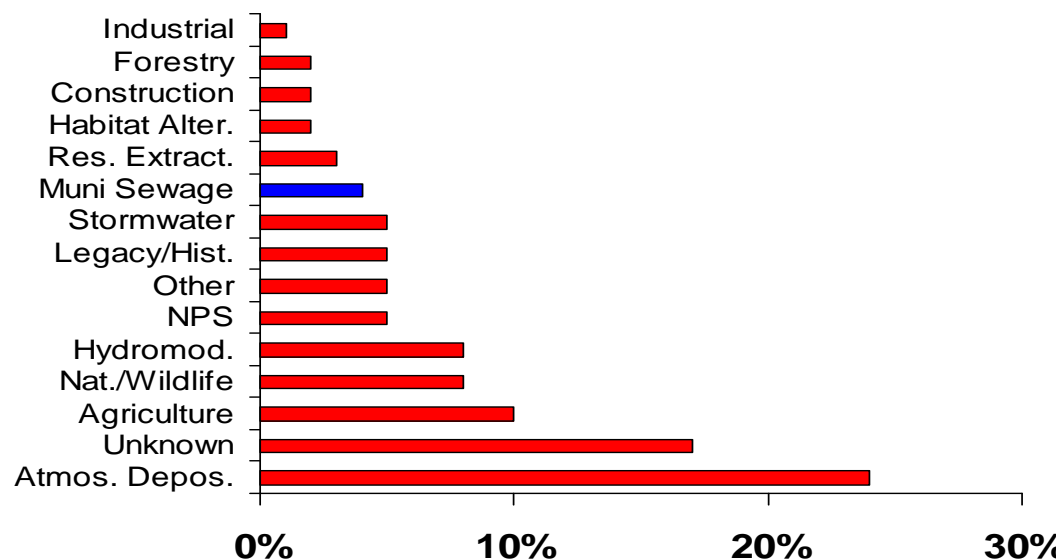
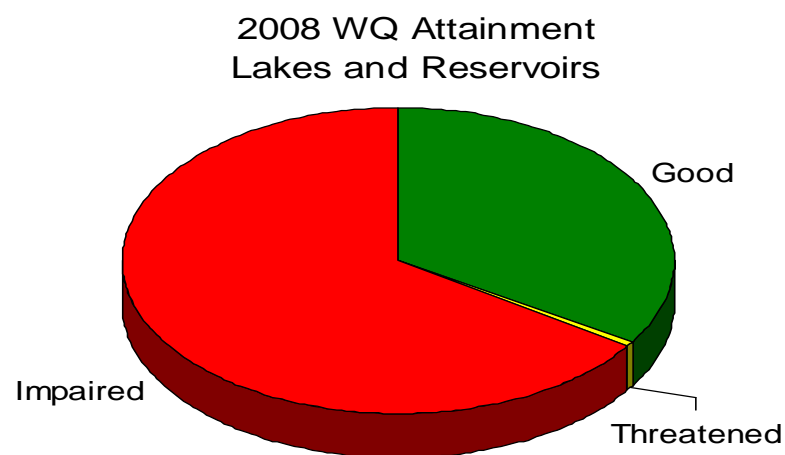
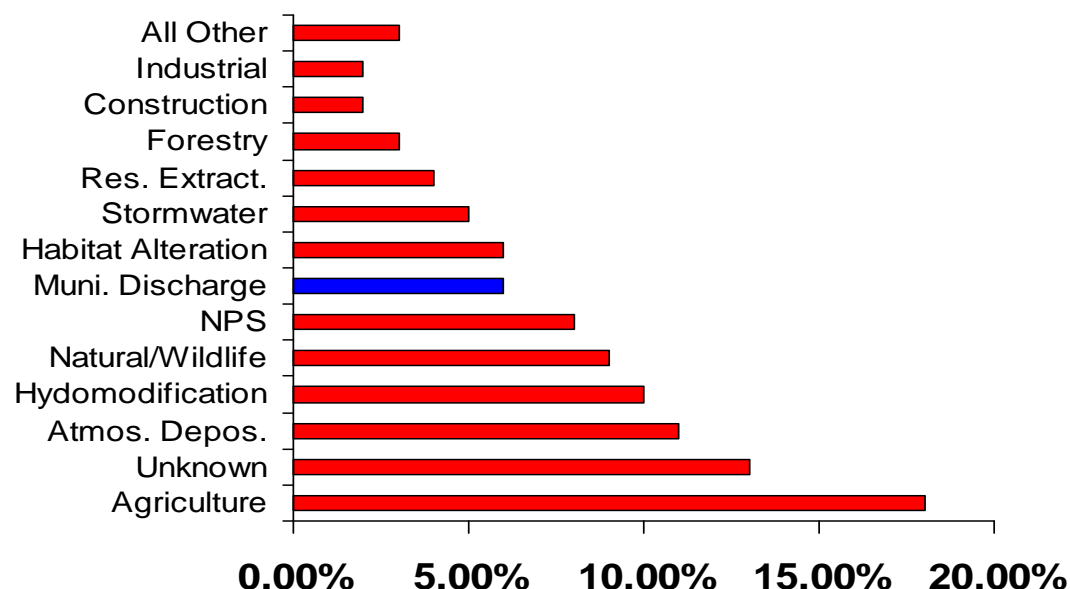
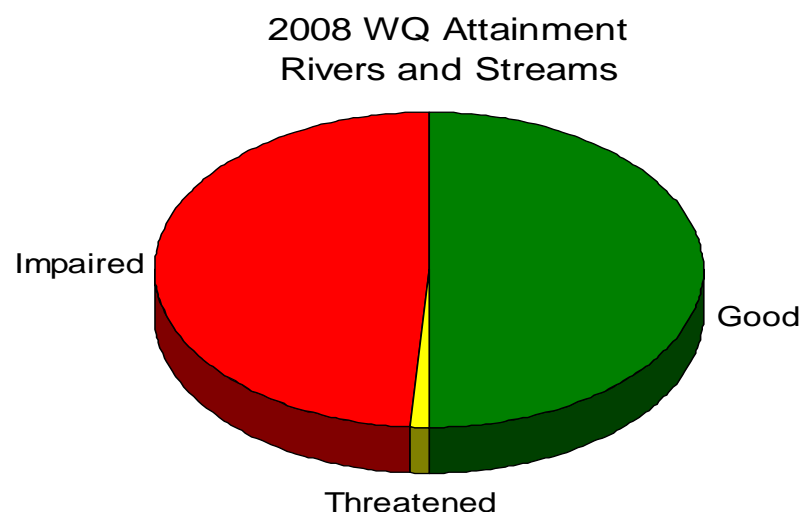
Economics/Demographics:

- GDP growth/expansion generally puts upward pressure on demand (while other factors reduce demand)
- Demographics change dynamics around system expansion and replacement

Technology and Innovation:

- Replacement is expensive
- Unit costs increase as you go out the “removal curve”
- Few new technologies, relatively speaking

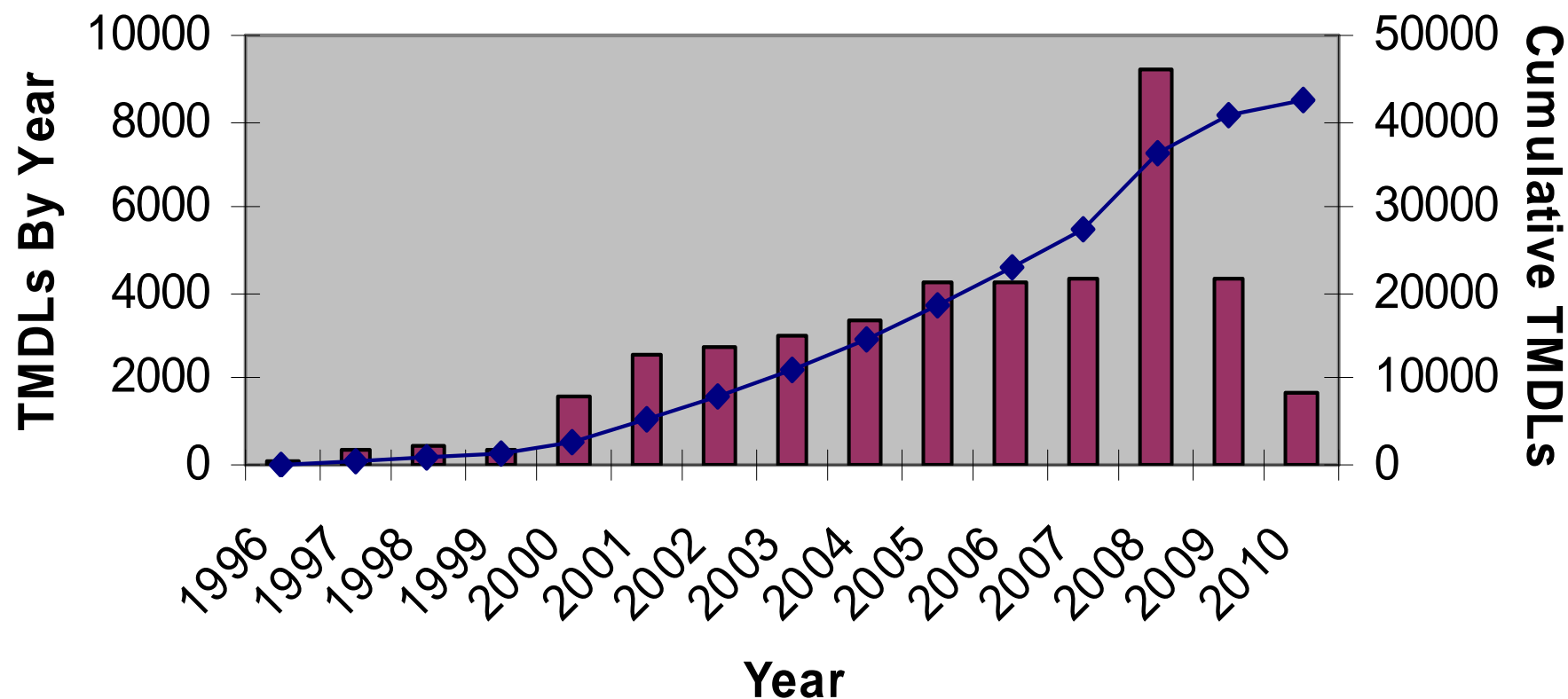
First, Look at the Mission: Significant WQ Impairment Remains, But WWTPs Not the Main Cause¹



¹Except in bays and estuaries

Is the TMDL Era Coming to An End?

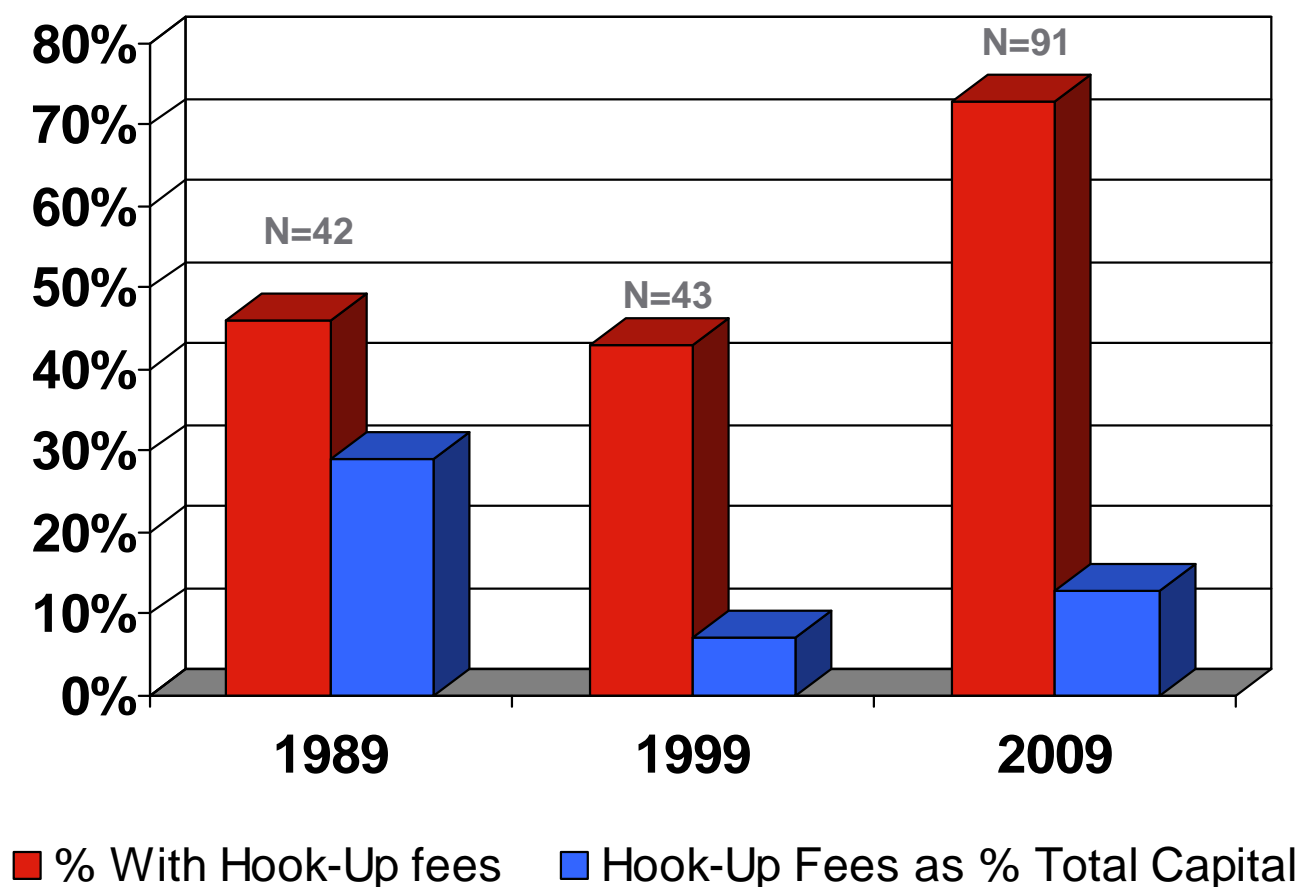
Annual and Cumulative TMDLs



Source: US Environmental Protection Agency

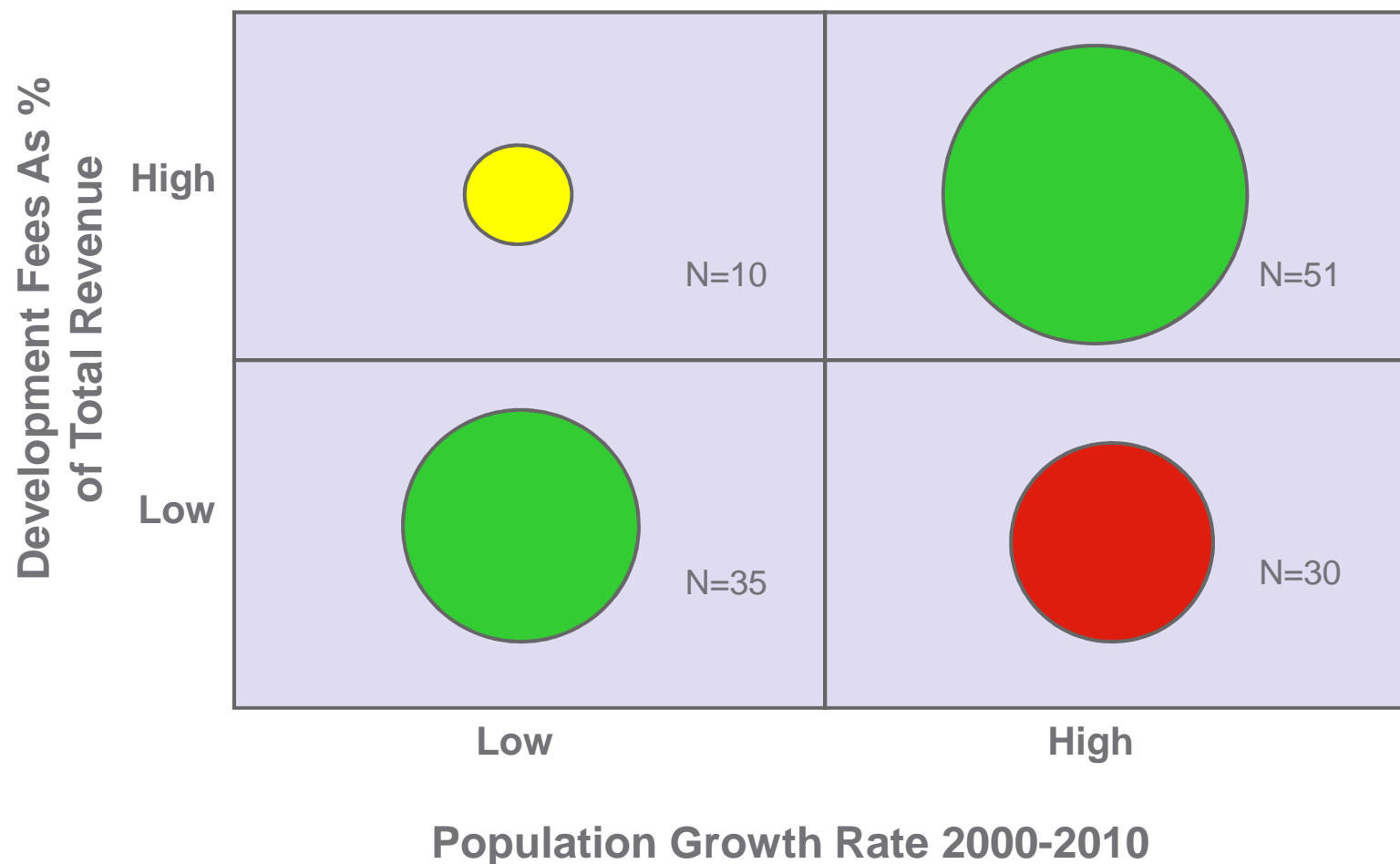
Is Development Paying the Cost of Growth?

In 1989, 42 of 92 NACWA members (46%) collected hook-up fees, collecting on average 29% of annual capital expenditures. In 2009, 91 of 125 members (73%) collected development fees, in total equal to only 4% of capital outlays.



Looking More Closely at 2009....

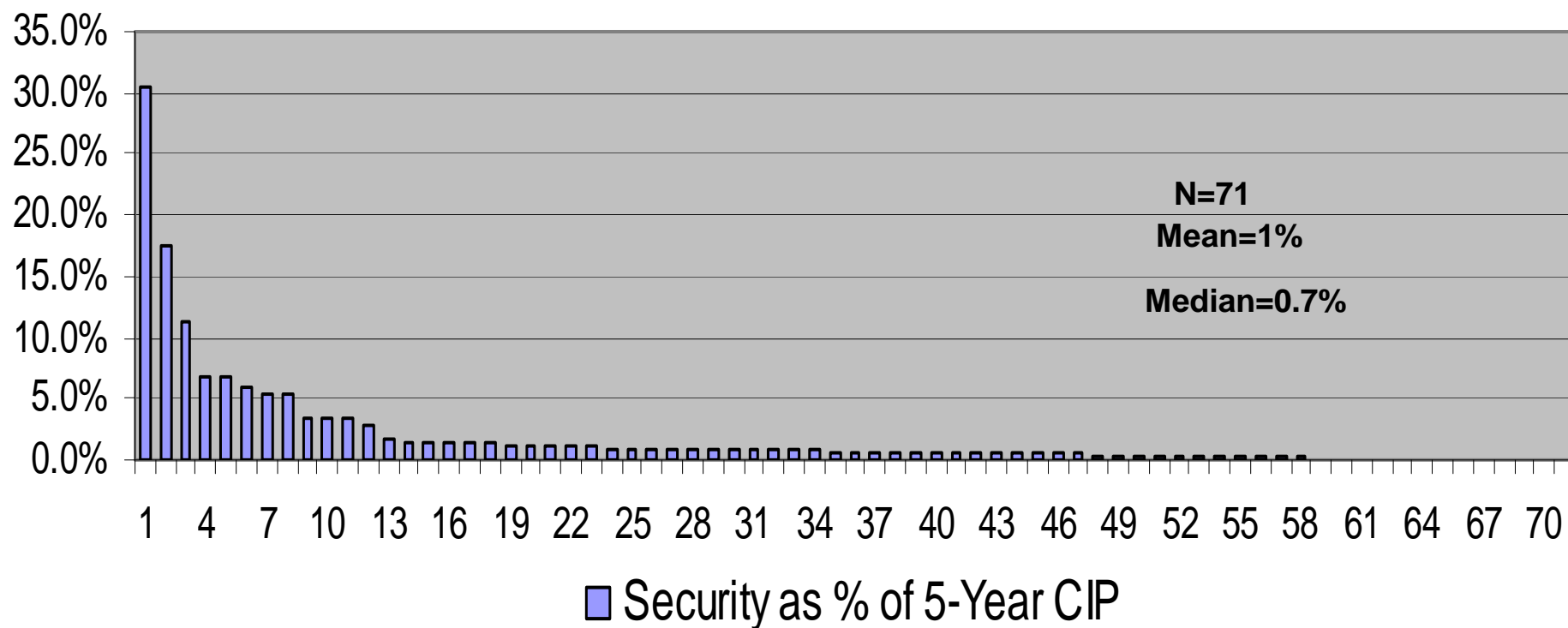
Looking more closely at 2009 and considering hook-up fees plus special assessments, development fees deliver a significantly greater share of revenue in high-growth states than anywhere else. About 25% of members could do better though.



Are POTWs Adequately Addressing Security?

As of 2004, perhaps the height of the security initiative, POTWs added on average 1% to their capital improvement plans through 2009 to beef up deterrence, detection, response, and recovery capabilities. This compares to capital cost increases of about 1.5% for security in the water sector, 1% for highways, and 0.8% for electric utilities. Yet, only 2 out of 3 have completed VAs and security costs have tripled since 2005.

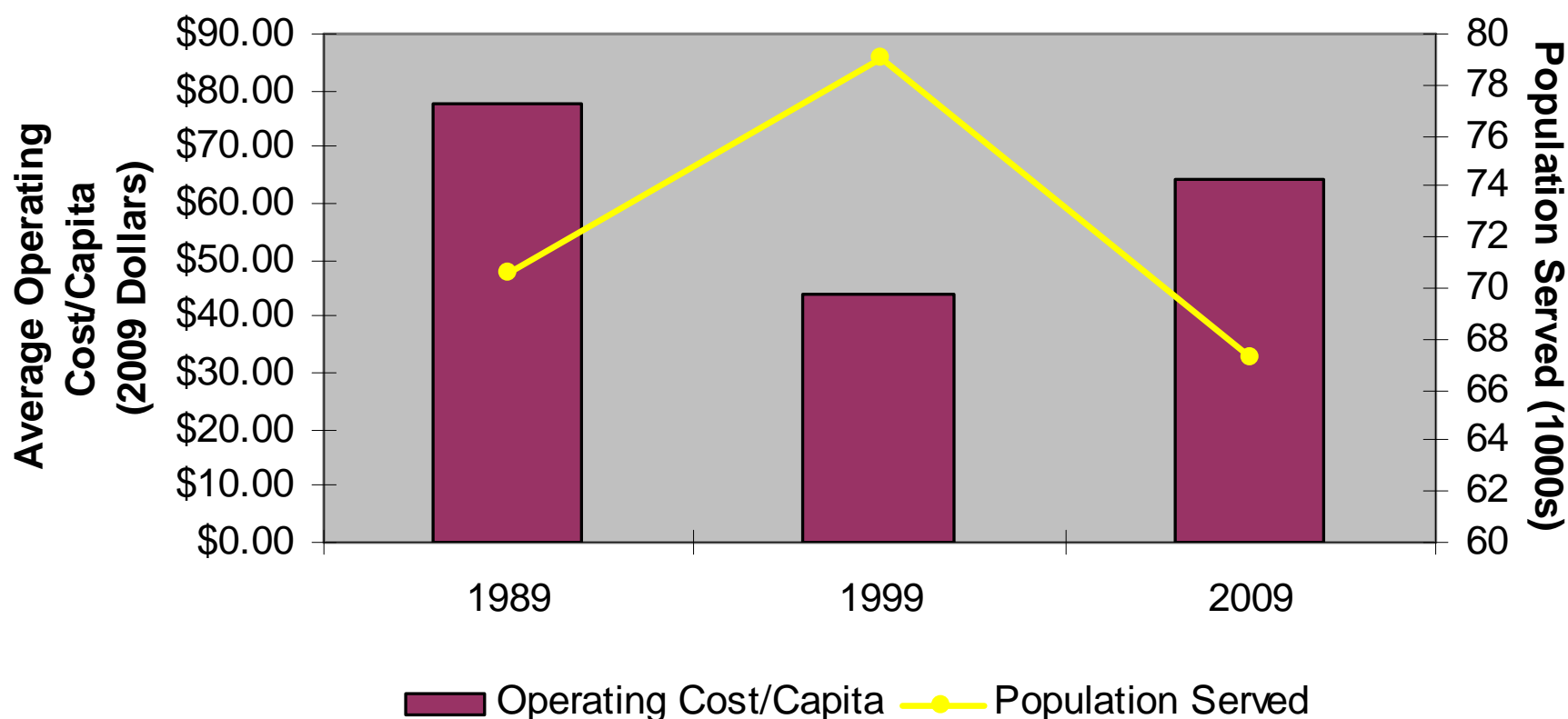
Security as % of 5-Year CIP (as of 2004)



Are US POTWs Efficient (modern operations)?

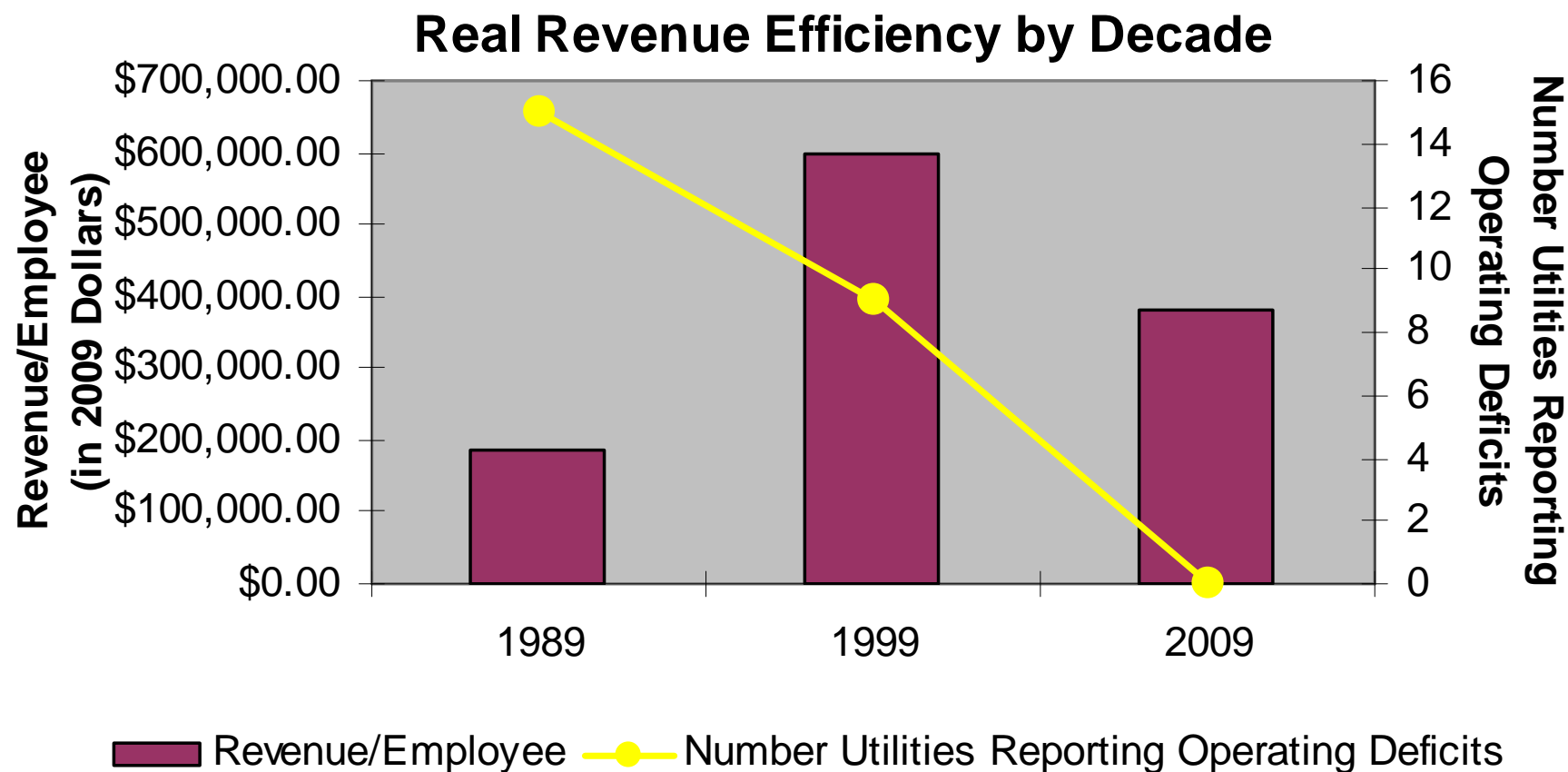
In the 1990s, NACWA utilities increased efficiency of operations by about 45 percent, but rising costs of increasing requirements have eroded about half of those gains this decade.

Operating Cost Per Capita By Decade



The Revenue Perspective: A Story of Two Decades

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

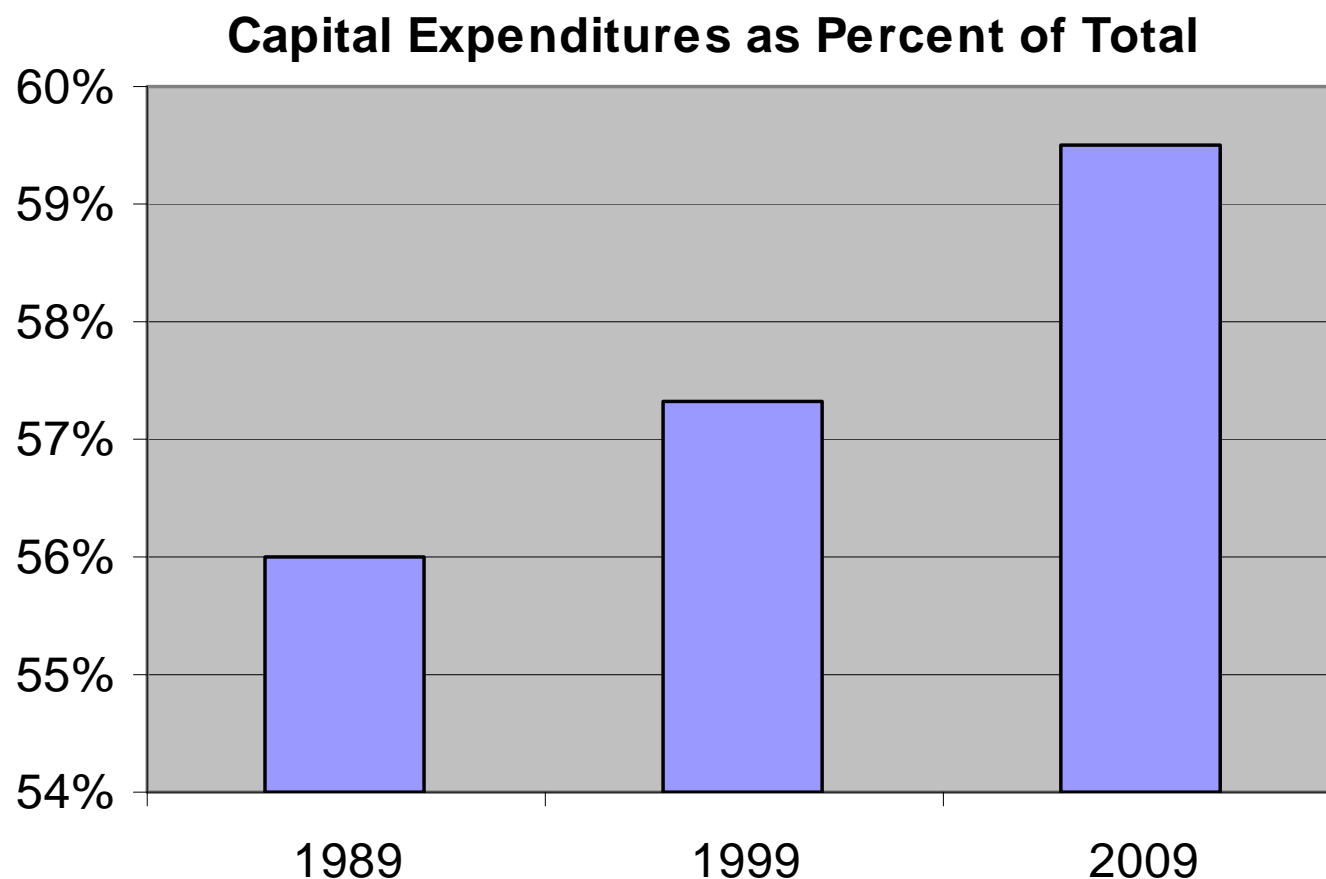


Note: Revenue is total revenue from own sources (excludes intergovernmental loans and grants)

Source: NACWA Financial Surveys

US POTWs are firmly in the “infrastructure age”

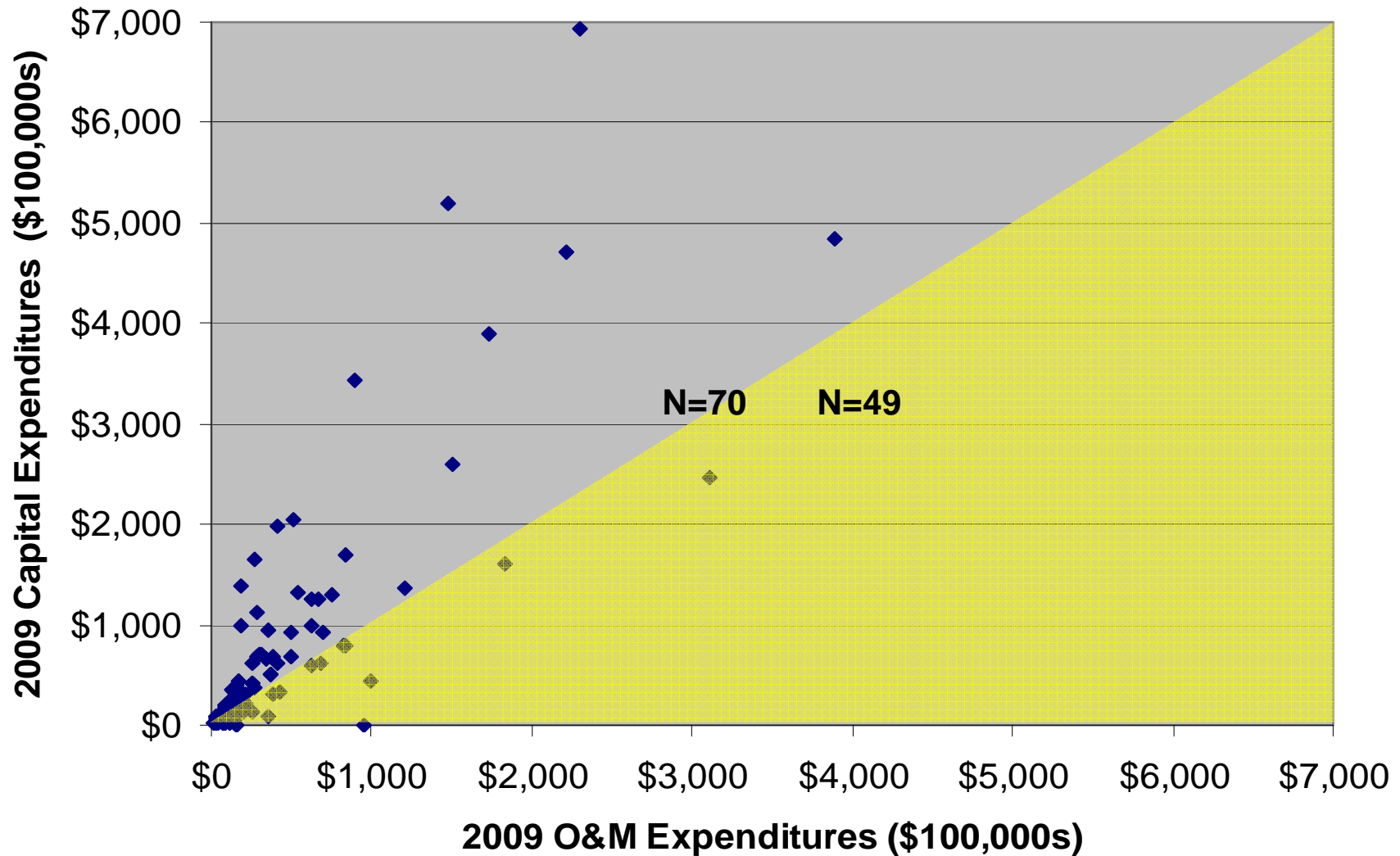
Like many other infrastructure “modes” wastewater utilities devote an increasing proportion of expenditures to capital plant, a result of increasing environmental and service level requirements and an aging infrastructure, in turn, creating new demands for capital efficiencies.



Source: NACWA Financial Surveys

Looking More Closely at 2009 NACWA Data...

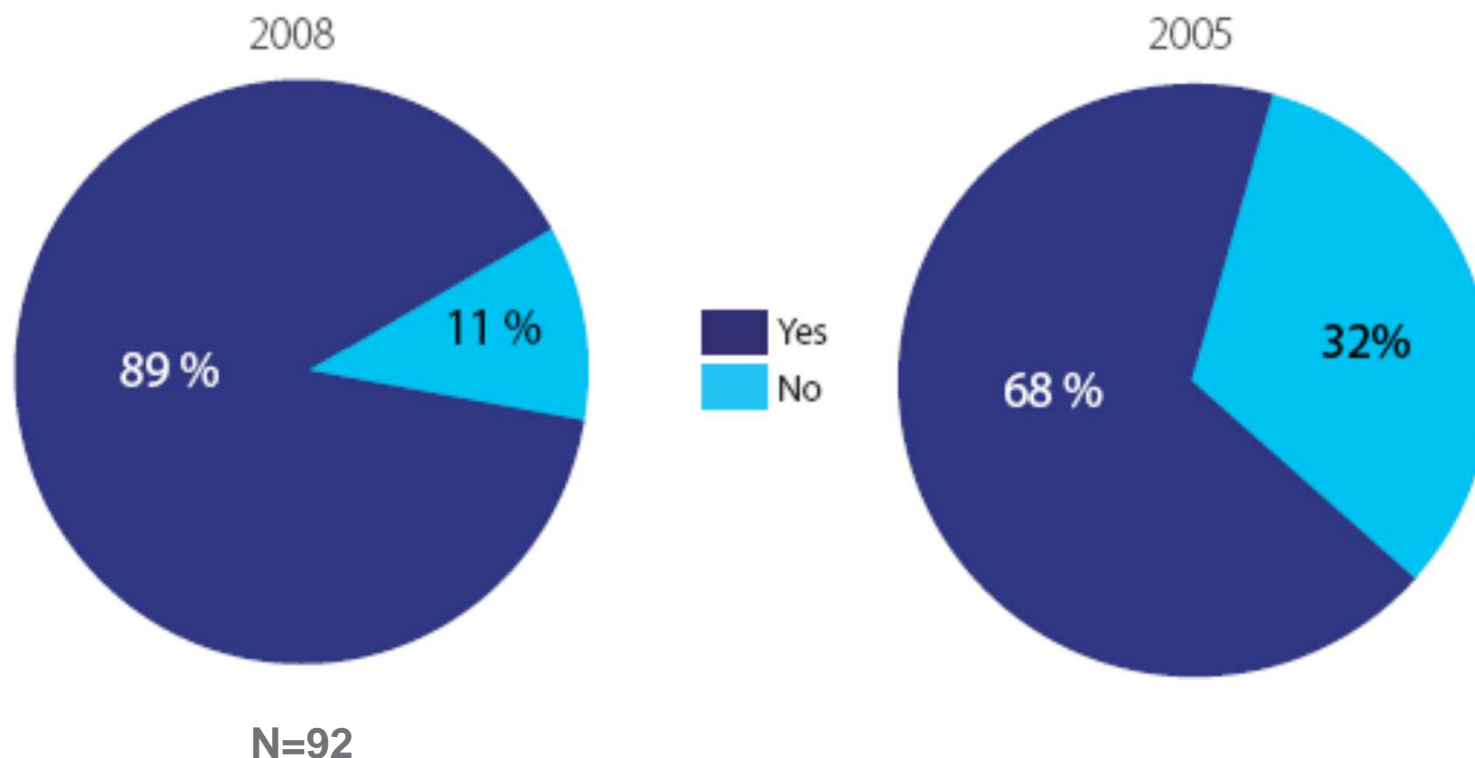
2009 Capital Vs Operating Expenditures



Source: NACWA Financial Surveys

US POTWs are Rising to the Capital Efficiency Challenge

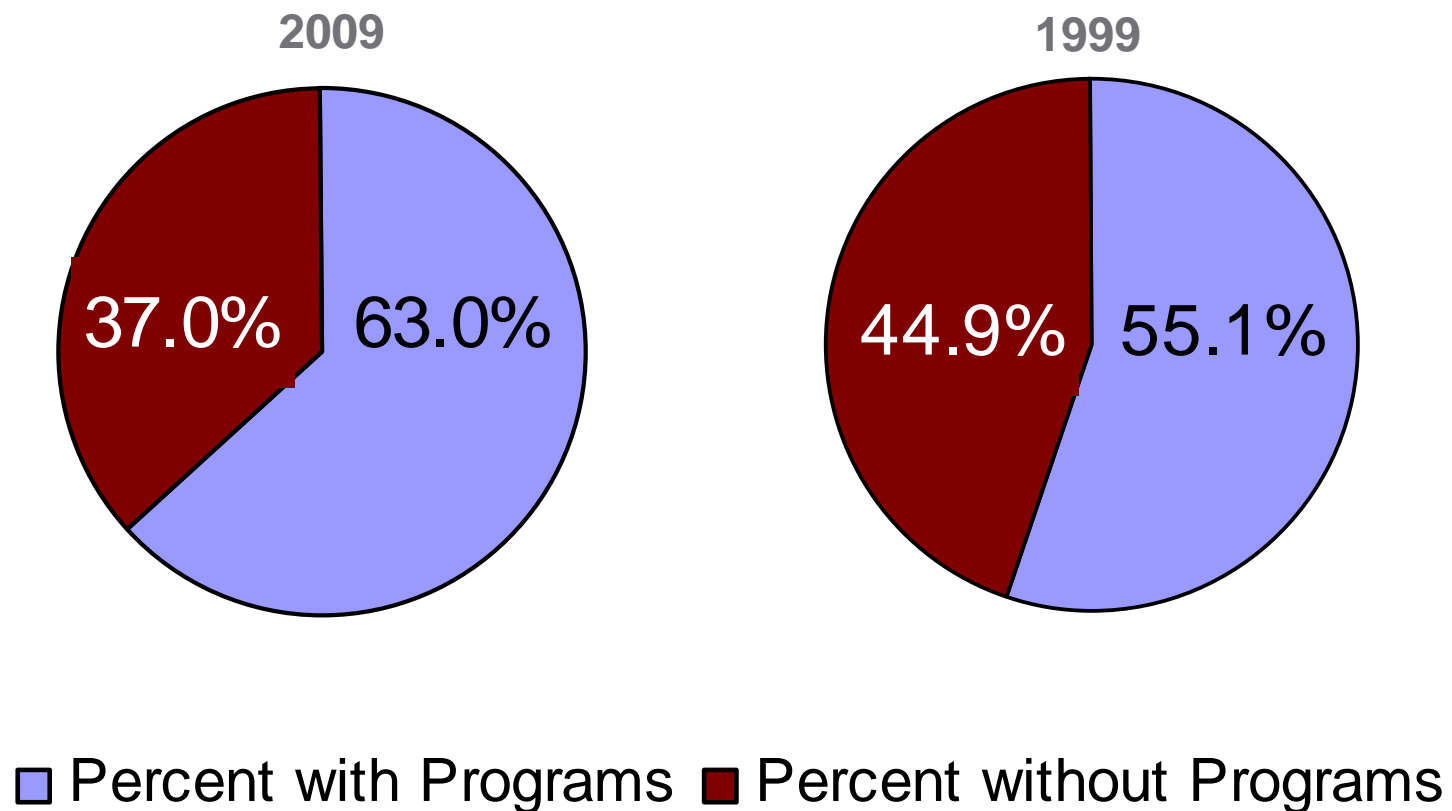
Percent of NACWA members that have implemented an “asset management system,” defined as an integrative process that enables a utility to determine how to minimize life cycle costs of owning and operating infrastructure assets while meeting customer service demands



Source: NACWA 2009 Financial Survey

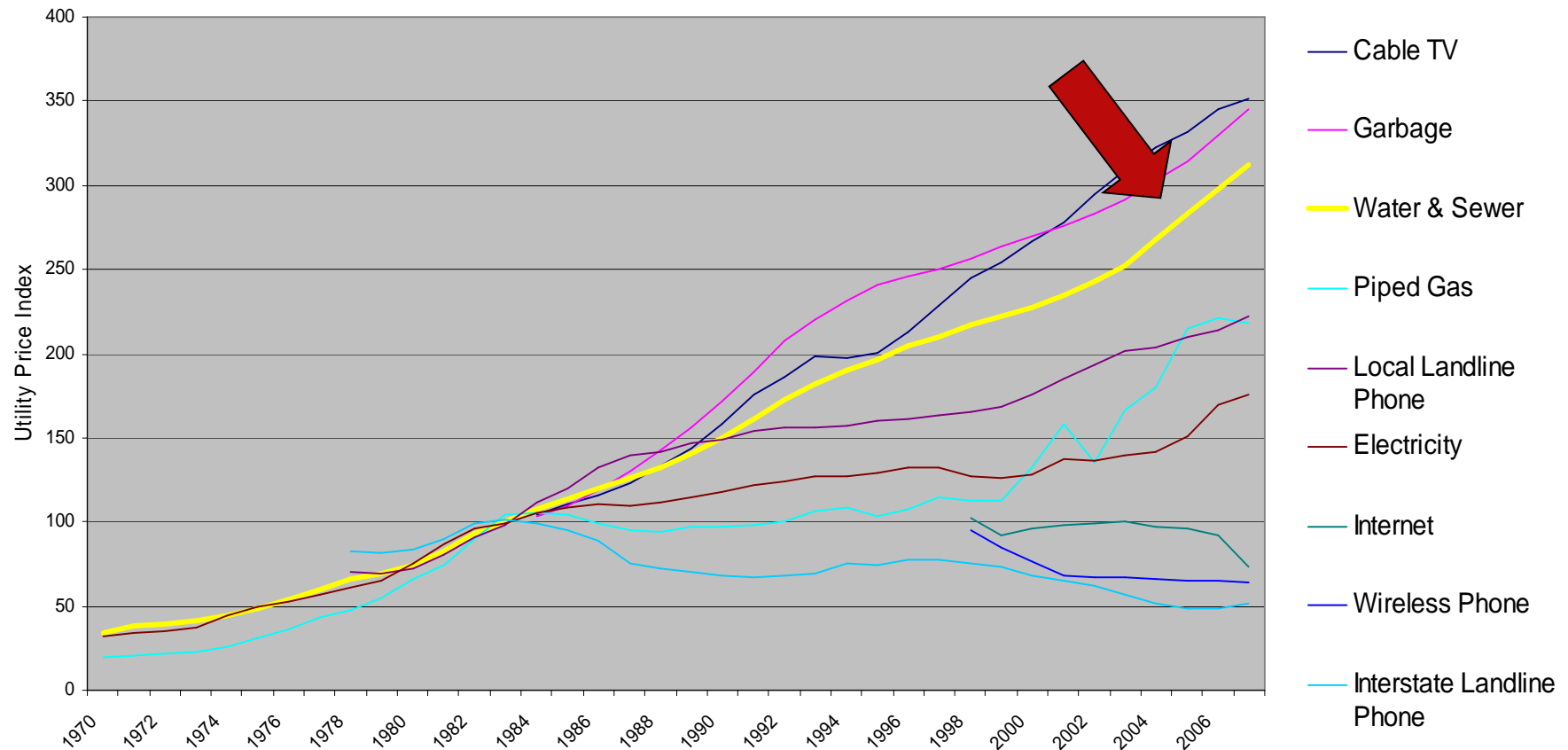
Do US POTWs Pay Attention to Affordability?

More than half do. But while statistics give the appearance of an increase in community assistance programs, the sample size in 1999 was significantly larger than in 2009, so no real gains in terms of number of programs.



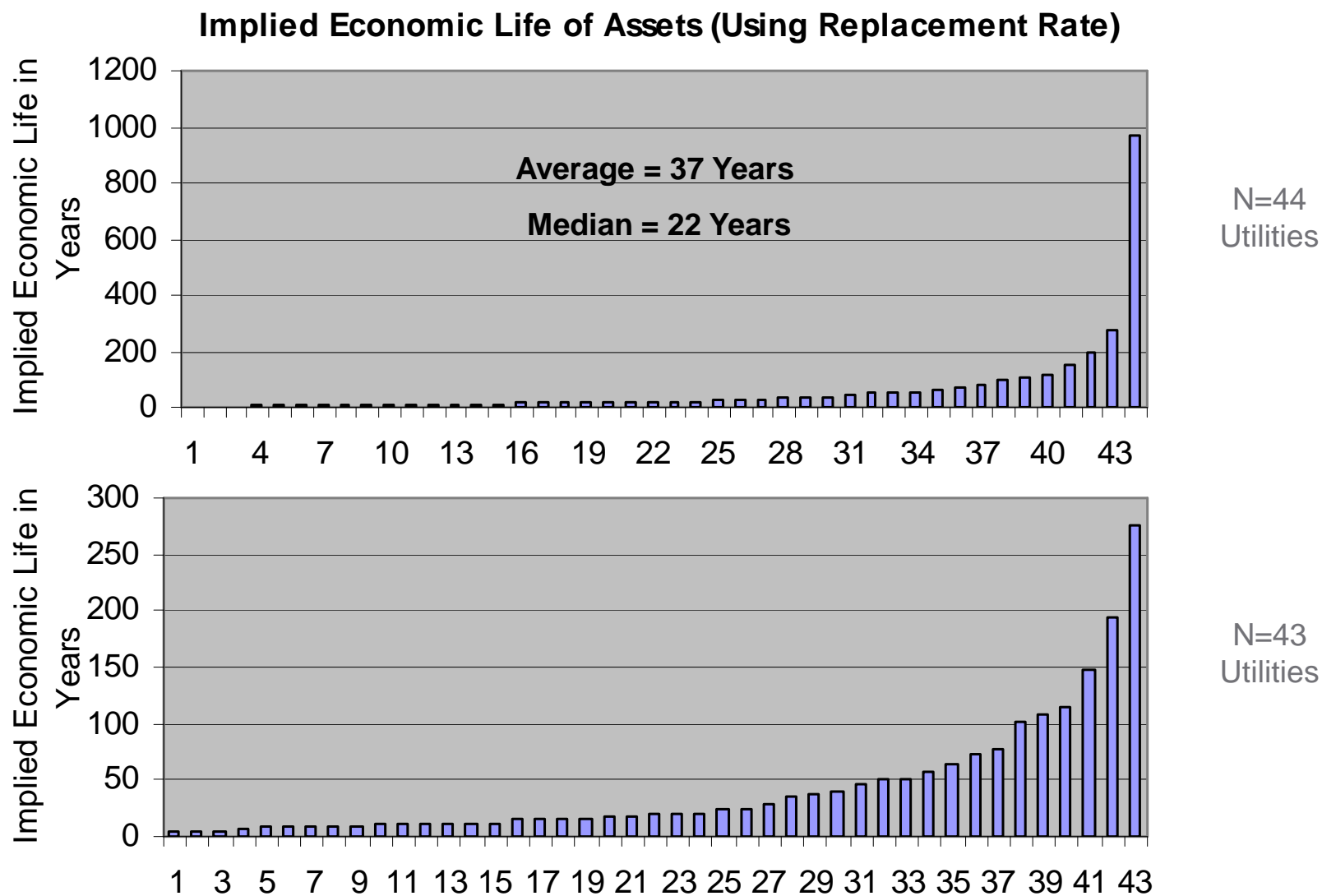
Full Cost Pricing

Local water and sewer rates are increasing 3% above inflation, on average, faster than rates in nearly any other network service.



Source: US Bureau of Labor Statistics

NACWA Data Suggest a 2% Annual Capital Replacement Rate



Source: 2009 NACWA Financial Survey

US Replacement Rates Competitive with Best in World

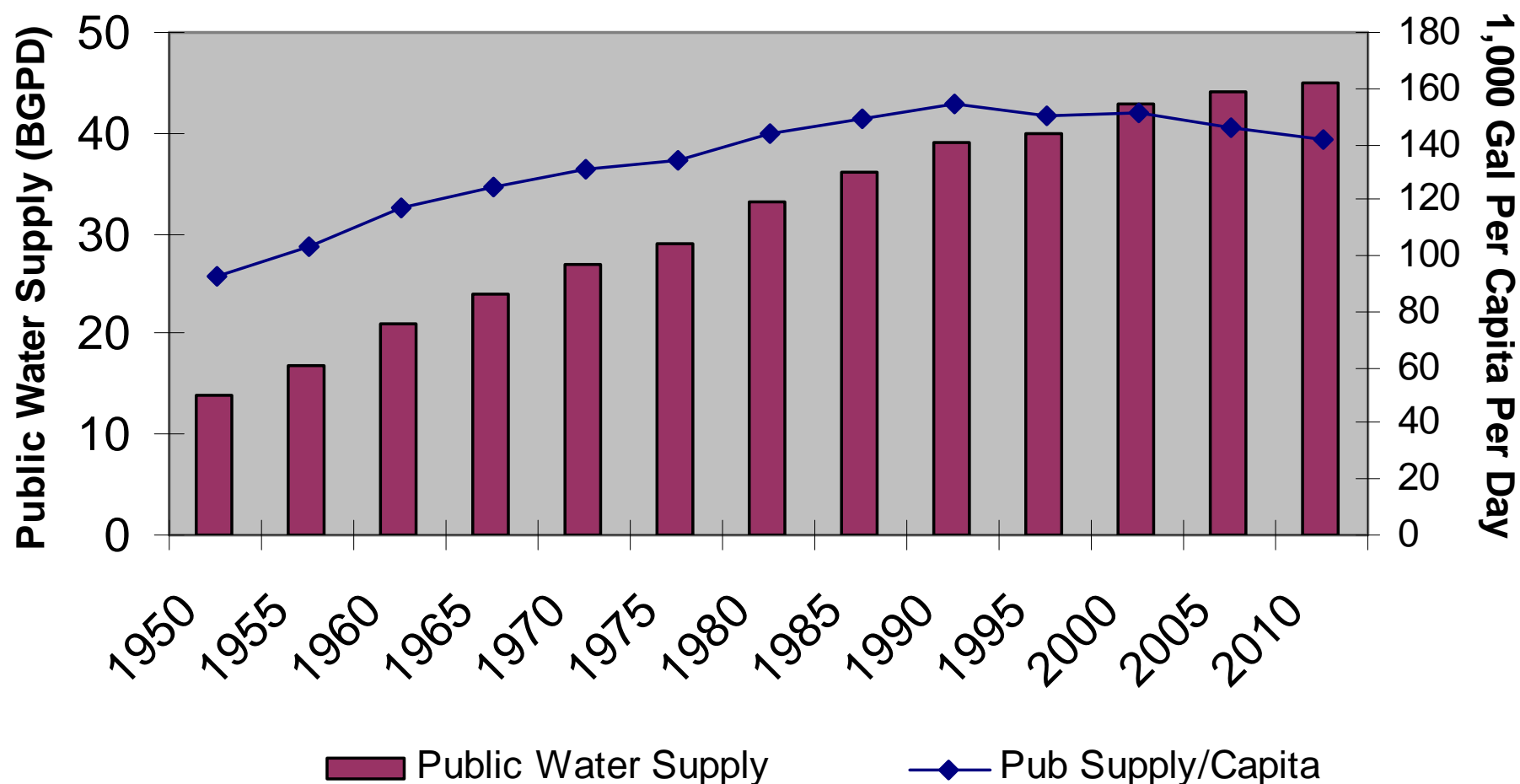
Even if only half of US water and wastewater investments are for renewal, replacement, and renovation and not expansion, US investment rate suggests we are competitive with the best in the world

Country	Percent Water Mains Renewed (Average)	Percent Sewers Replaced or Renovated (Average)
England and Wales	0.92	0.14
Scotland	0.45	0.03
Australia	0.68	0.45
Canada	0.48	--
Portugal	1.34	0.18
United States	3.30 ^a	3.80 ^a

^a Renewal rates shown for the USA are the percentage of expenditure on the asset divided by the asset value, so include both replacement and new investment. Renewal rates for other countries are replacements and rehabilitations.

Are US Utilities Efficient in Water and Energy Use?

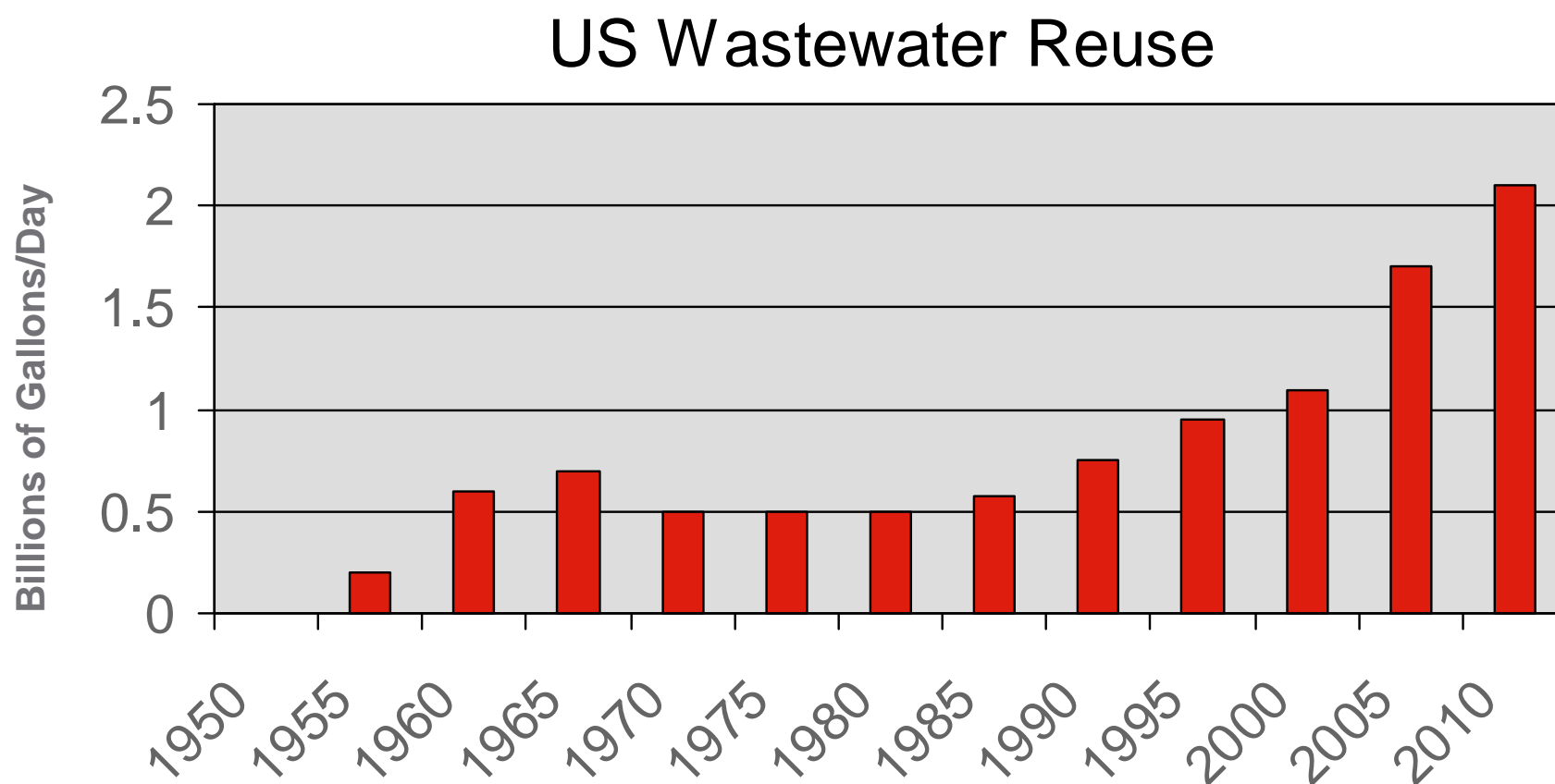
Total and Per Capita US Public Water Supply



Source: US Geological Survey

A Clear History (and Future) of Wastewater Reuse

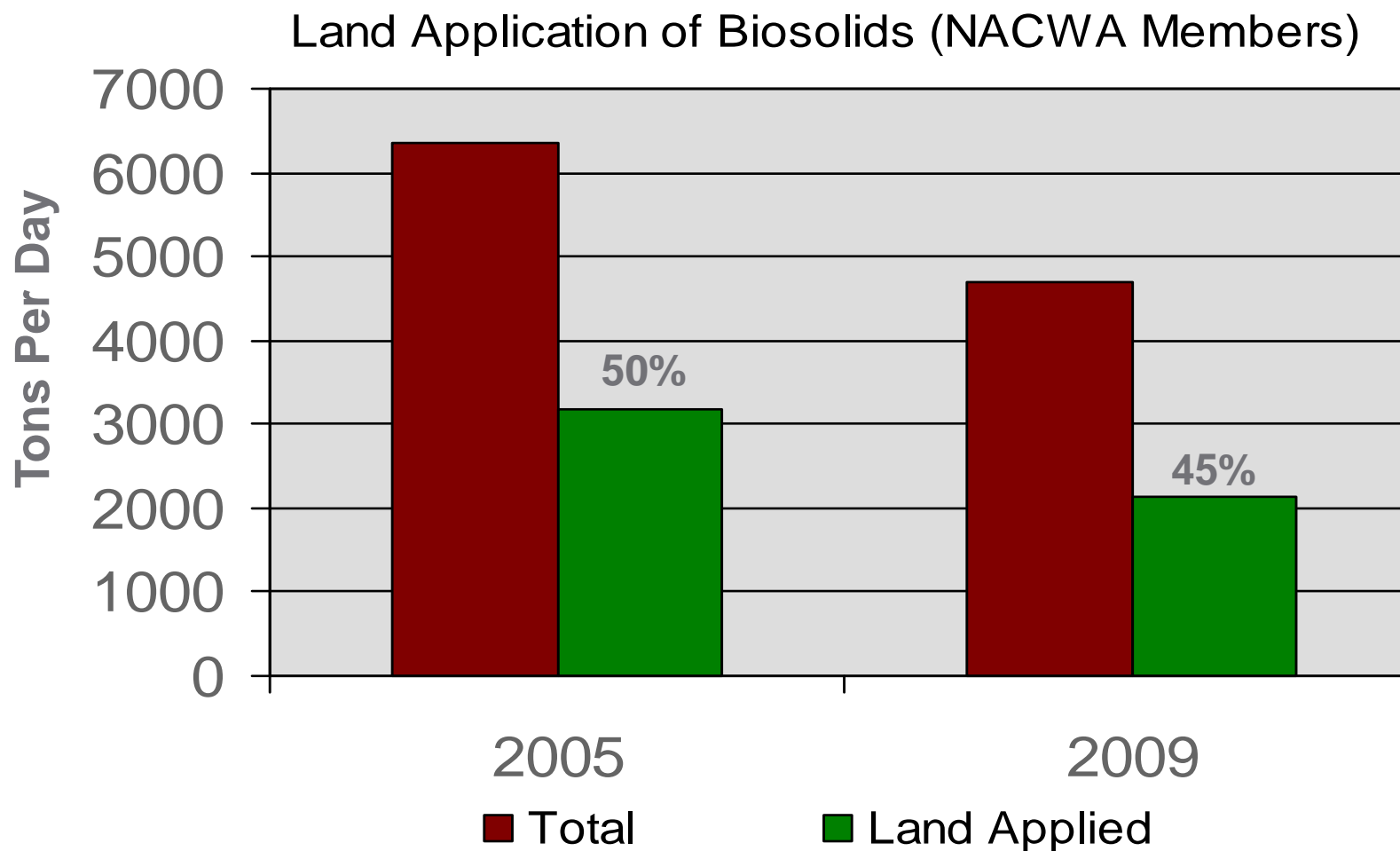
About 6% of total municipal wastewater effluent in the US is reclaimed for landscape irrigation and recharge. Four states -- CA, AZ, TX, and FL -- account for 90% of reclaimed wastewaters.



Source: USGS and other sources

Beneficial Use of Biosolids at Steady State

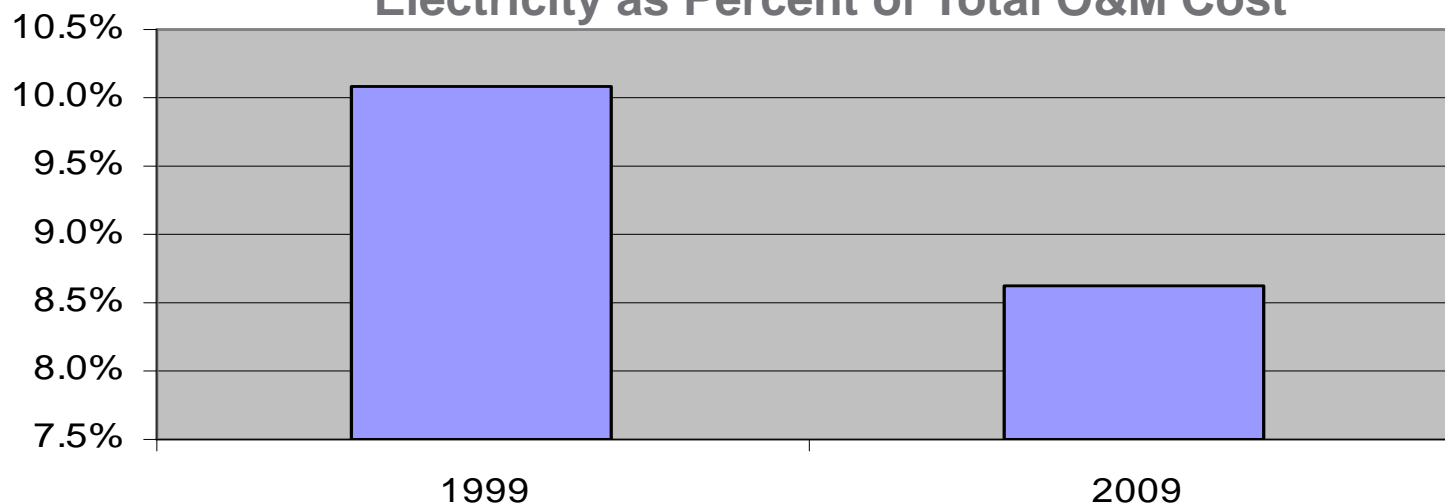
Data unavailable from the 1970s-1990s, but in the 2000s, beneficial reuse (land application plus composting) is down slightly as a percent of total biosolids generated.



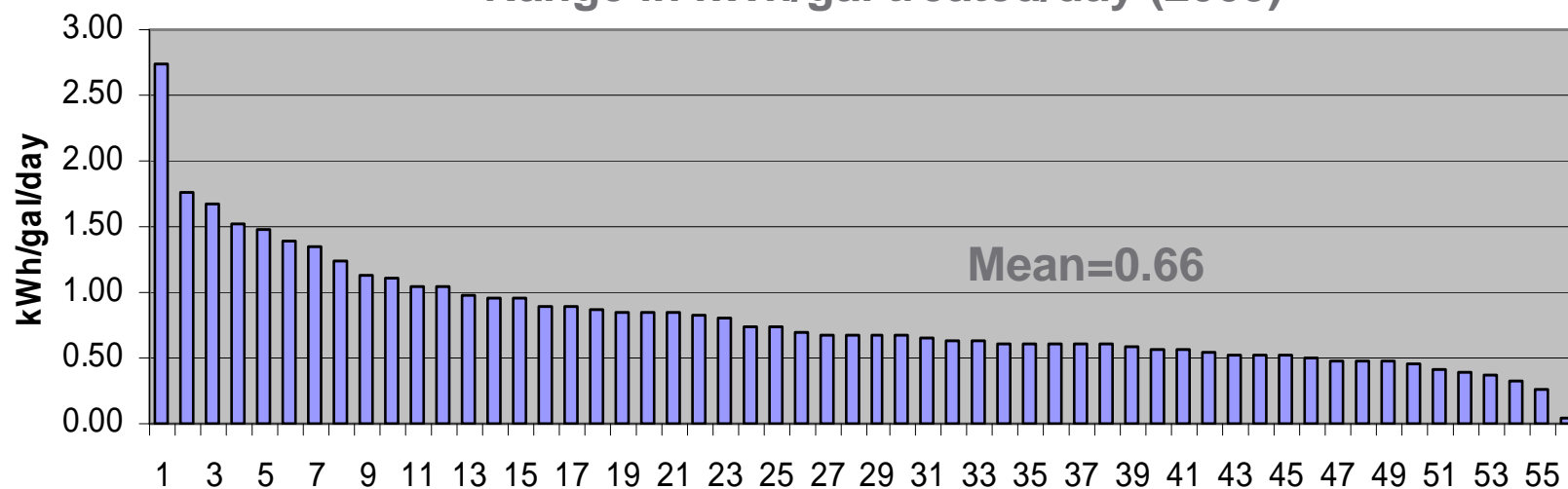
Source: NACWA Financial Surveys

Energy Use Declining as % of O&M

Electricity as Percent of Total O&M Cost



Range in kWh/gal treated/day (2009)



Source: NACWA Financial Surveys

So, How Sustainable Are We?

- Cost of Development
- Security and Emergency Preparedness
- Modern Plant Operations
- Affordability
- Full Cost Pricing
- Asset Management
- Conservation/Water Efficiency
- Energy Management

B

A-

B

B

B+

B+

A-

C+

B