

# This presentation premiered at WaterSmart Innovations

[watersmartinnovations.com](http://watersmartinnovations.com)



# Reaching our Potential: Water Conservation Opportunities in the Great Lakes

Jeffrey Ripp, Assistant Administrator for Water  
Public Service Commission of Wisconsin  
WaterSmart Innovations, Las Vegas, October 5, 2011



Water Accountability,  
LLC



# Public Service Commission's Mission

- Financial regulation of utilities (natural monopolies) in the absence of competition
- Set rates and service standards for water, electric, gas, and some telephone and wastewater utilities
- Promote energy efficiency and water conservation to reduce costs for utilities and customers

# Water Supply Challenges

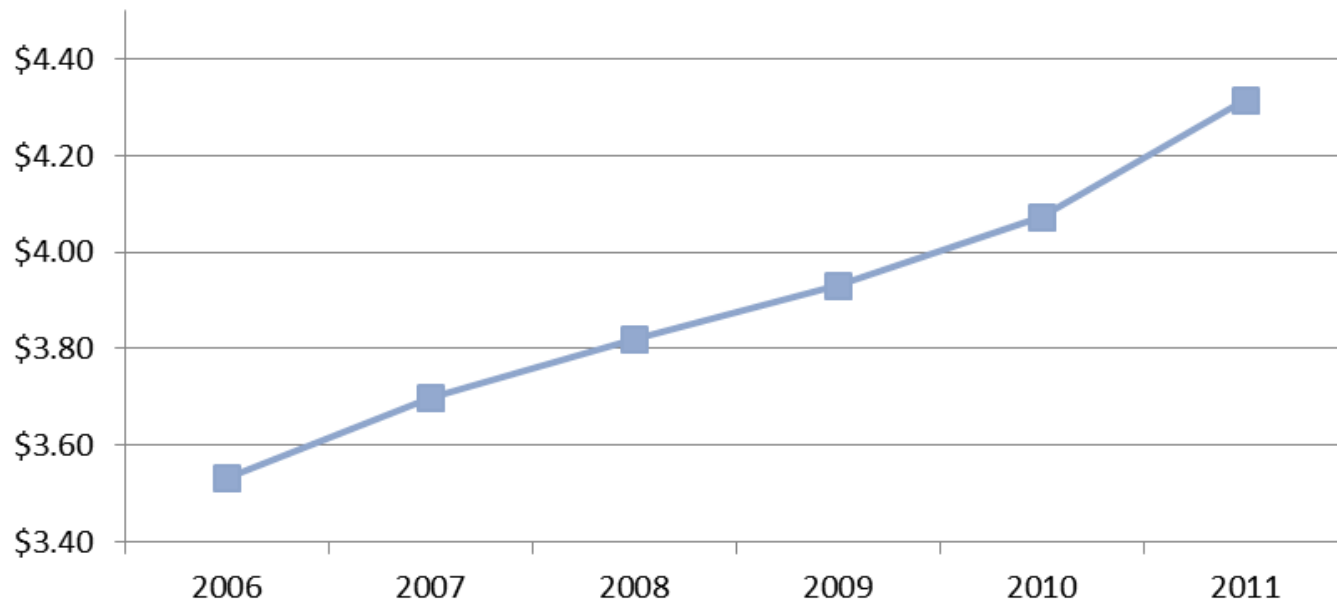
- Local/regional scarcity
- Aging infrastructure
- Rising operating costs
- Declining water sales
- Increasing public interest
- New Regulations - Great Lakes Compact



# Rising Costs of Water

## Equivalent Cost per 1000 Gallons

(Service charge + Volume charge for 18,750 gallons)

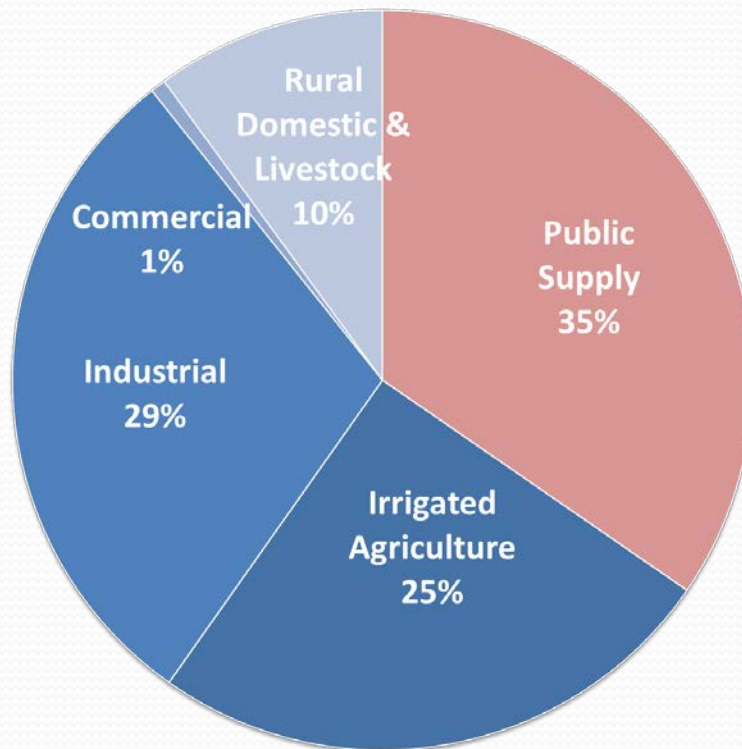


**2011 Statewide Average Residential Bill = \$80.90/Quarter**

# Water Conservation Potential Study

- **Purpose:** Identify cost-effective water efficiency and conservation potential in Wisconsin communities
- **Project Team:** Camp Dresser & McKee, Water Accountability, LLC., WI Department of Natural Resources, Public Service Commission of Wisconsin
- **Funding:** WI Department of Natural Resources and Public Service Commission of Wisconsin

# Water Use in Wisconsin



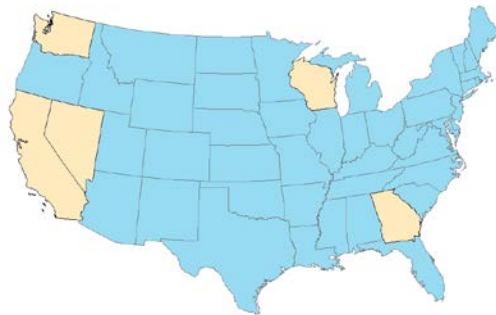
(Millions of Gallons per Day)

- Public Supply 552.4
- Industrial 470.9
- Irrigated Ag. 401.8
- Rural Supply 160.2
- Commercial 10.7

Source: Buchwald, C.A, *Water Use in Wisconsin, 2005*, US Geological Survey Open-File Report 2009-1076, 74 p.

# Similar Projects

- Energy Efficiency and Customer-Sited Renewable Resource Potential in Wisconsin for the Years 2012 and 2018 (2009)
- A Review of Water Conservation Planning in the Atlanta Region (2007)
- Hidden Oasis: Water Conservation and Efficiency in Las Vegas (2007)
- Water Conservation Potential Assessment, Seattle Public Utilities (1998)
- Waste Not, Want Not: The Potential for Urban Water Conservation in California (2003)

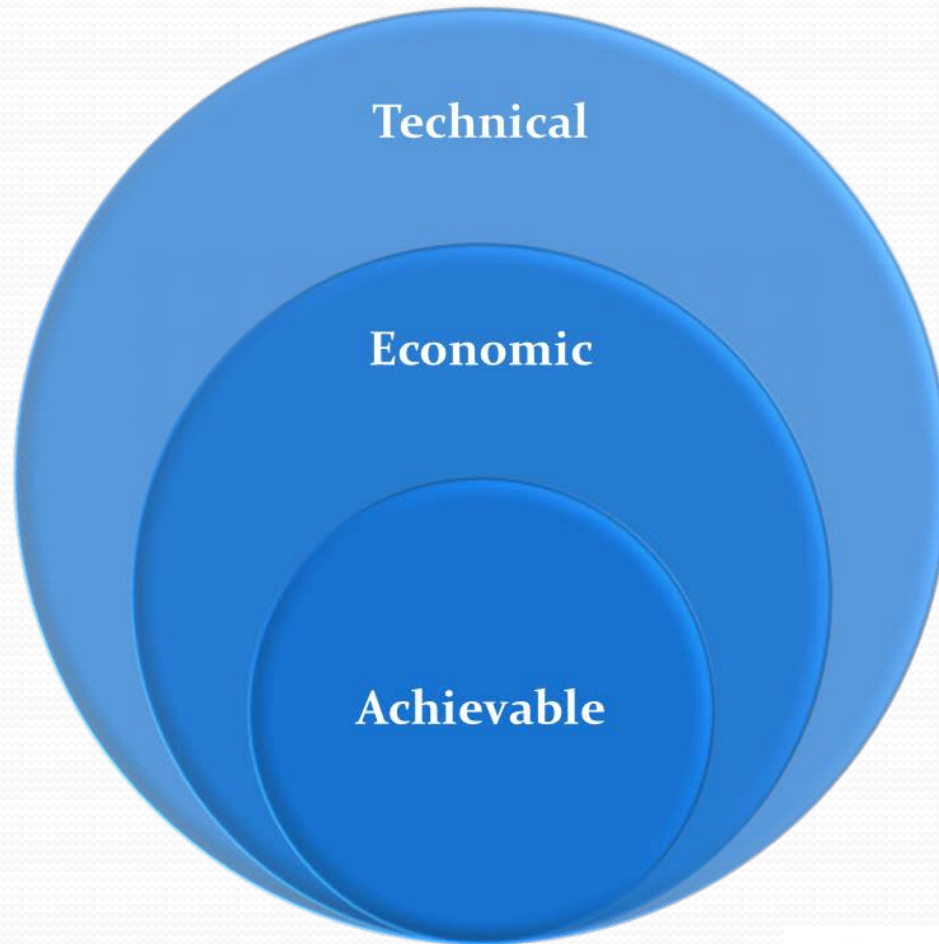




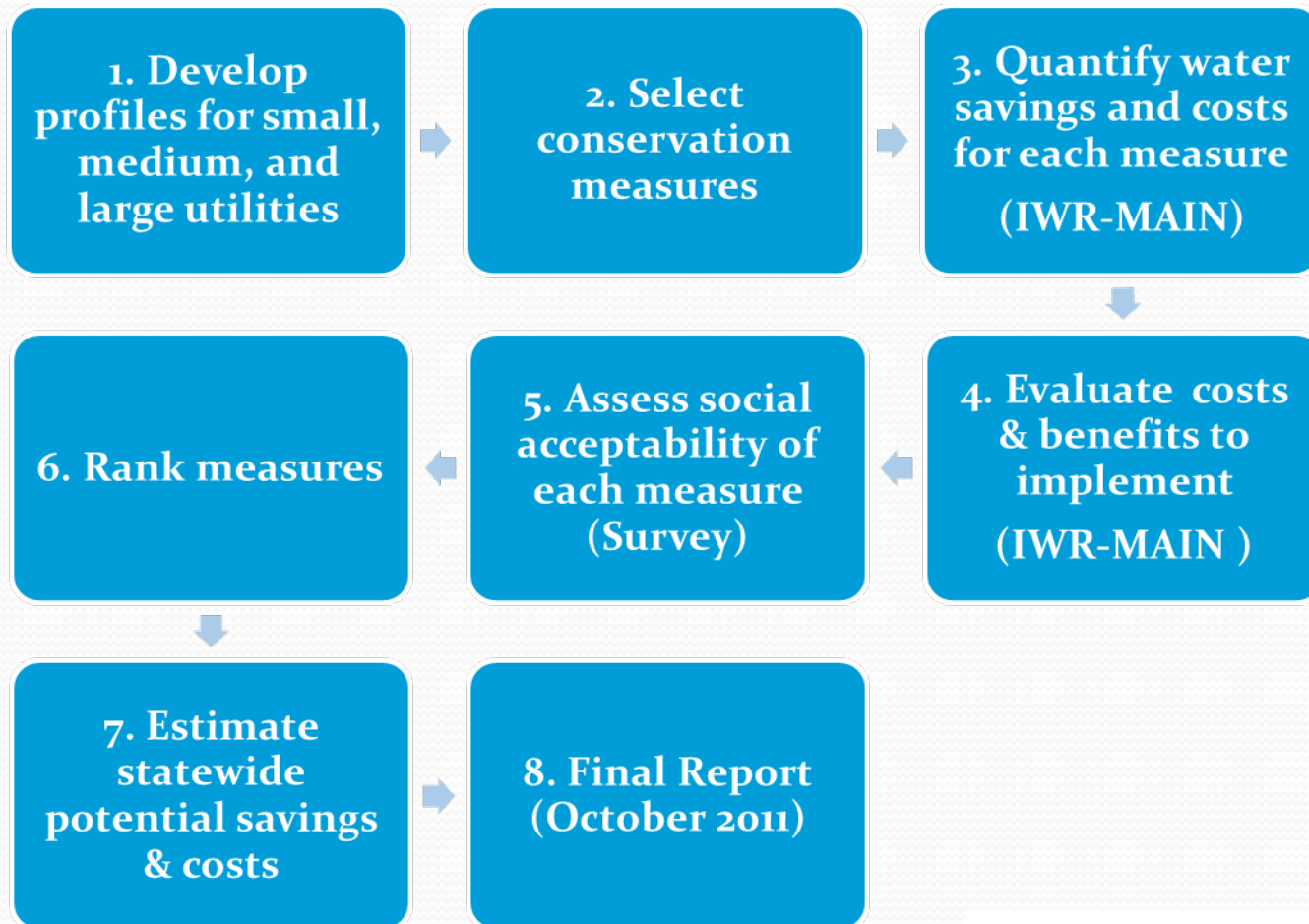
# Wisconsin Project Objectives

- Statewide, independent analysis of urban water users (i.e., public utilities)
- Quantify technical, economic, and achievable water savings potential in Wisconsin
- Evaluate short-term (5 year) and longer term (20 year) water savings and costs
- Include both demand reduction measures and water loss control
- Evaluate customer satisfaction & acceptability of measures

# Definitions - Water Savings Potential



# Overview of Study Method



# “Generic” Utility Profiles

System Size	N	Average Production (MGD)	Average Number of Accounts		Average GPD per Account	
			Residential	Non-residential	Residential	Non-residential
Large	72	5.7	11,158	1,473	161	1,614
Medium	130	0.6	1,827	268	131	1,001
Small	318	0.1	371	64	116	741

# Demand Reduction Measures Evaluated

1. Dual flush & 1.28 gpf toilets
2. Low-flow or non-water urinals
3. LF showerheads & faucets
4. Residential dishwashers
5. Nonres. dishwashers
6. Pre-rinse spray valves
7. Clothes washer rebates
8. Irrigation controllers
9. Cooling tower controllers
10. Irrigation ordinances
11. Water waste ordinances
12. Stricter building codes
13. Submetering
14. Residential and CII audits
15. Property manager workshops
16. Landscape Workshops
17. Increasing block rates
18. Seasonal rates

# Estimating Costs & Water Savings

## Water Saving Assumptions

- Sector/end use affected
- Water savings per participant
- Start/end years
- Participation rate
- Customer energy savings

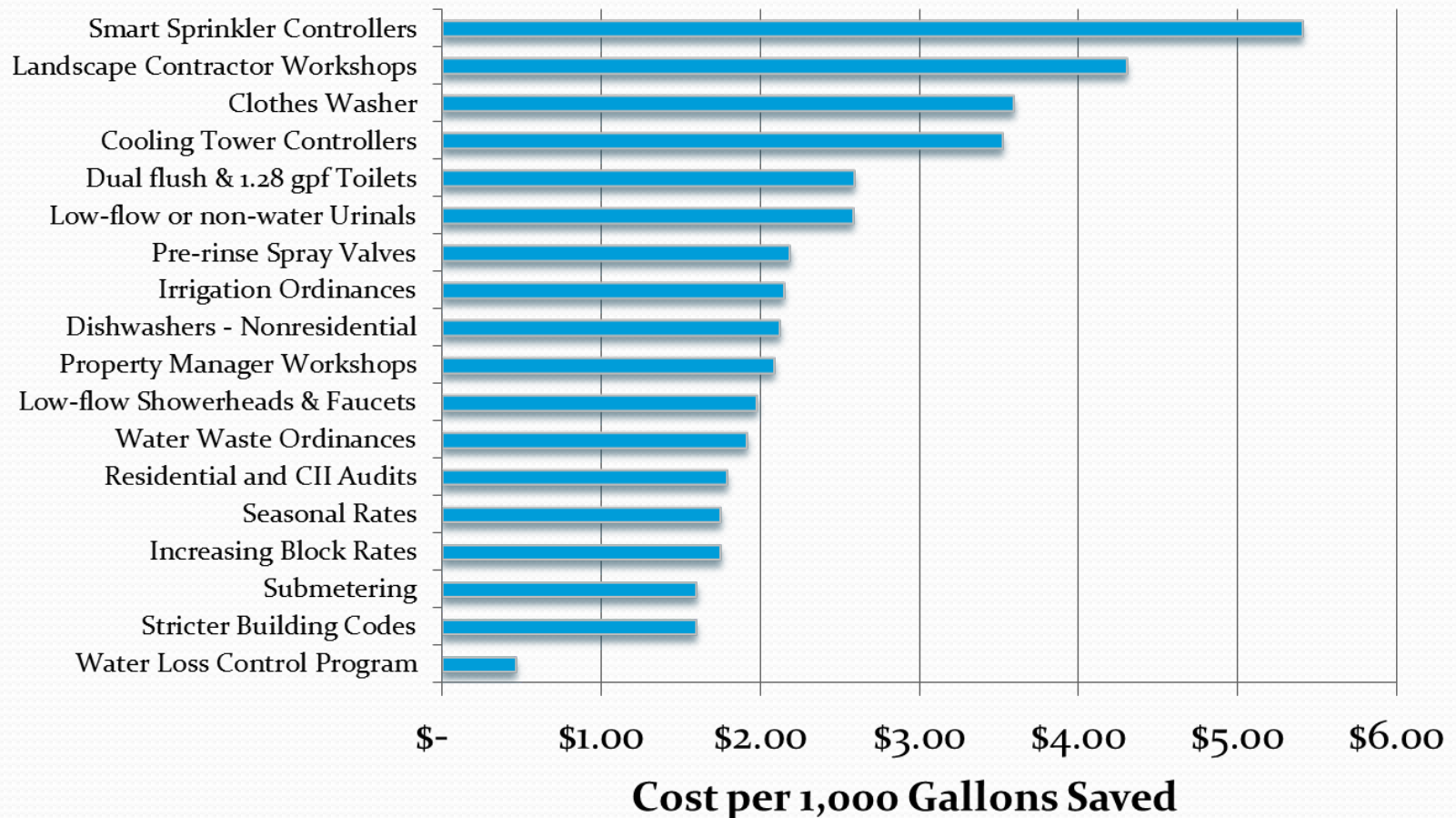
## Economic Assumptions

- Costs to customers
- Costs to utility
- Deferred cost of water supply
- Deferred capital acquisition or expansion costs
- Avoided operating costs
- Discount rates

# Economic Metrics Used

Metric	Positive	Marginal	Negative
<b>Benefit-Cost Ratio</b>	Greater than 1.1	0.9 to 1.1	Less than 0.9
<b>Net Present Value</b>	Greater than 0		Less than 0
<b>Unit Cost of Water Saved (per, 1,000 gallons)</b>	Less than \$1.65	\$1.65 to \$2.00	Greater than \$2.00

# Example – Statewide Average Unit Cost





# Water Loss Control Analysis

Standard	Water Savings in Year 2030 (MGD)	Net Present Value (Millions)	Benefit-Cost Ratio
Technical (UARL)	42.9	\$136.0	2.57
Economic (<10%)	30.2	\$109.8	2.80
Achievable (15/25%)	15.5	\$54.9	2.76

- Savings based on reducing water loss to identified levels
- Costs based on estimates of leak detection and repair activities
- Utility avoided costs included in benefits calculation

# Evaluation of Measure Acceptability

- Web survey of all Wisconsin water utilities
  - *50% response rate (286/569)*
- Ranked likely impact of each measure on customer satisfaction
  - *Mostly positive (+2) to Mostly negative (-2)*
- Asked whether measure already implemented in service area

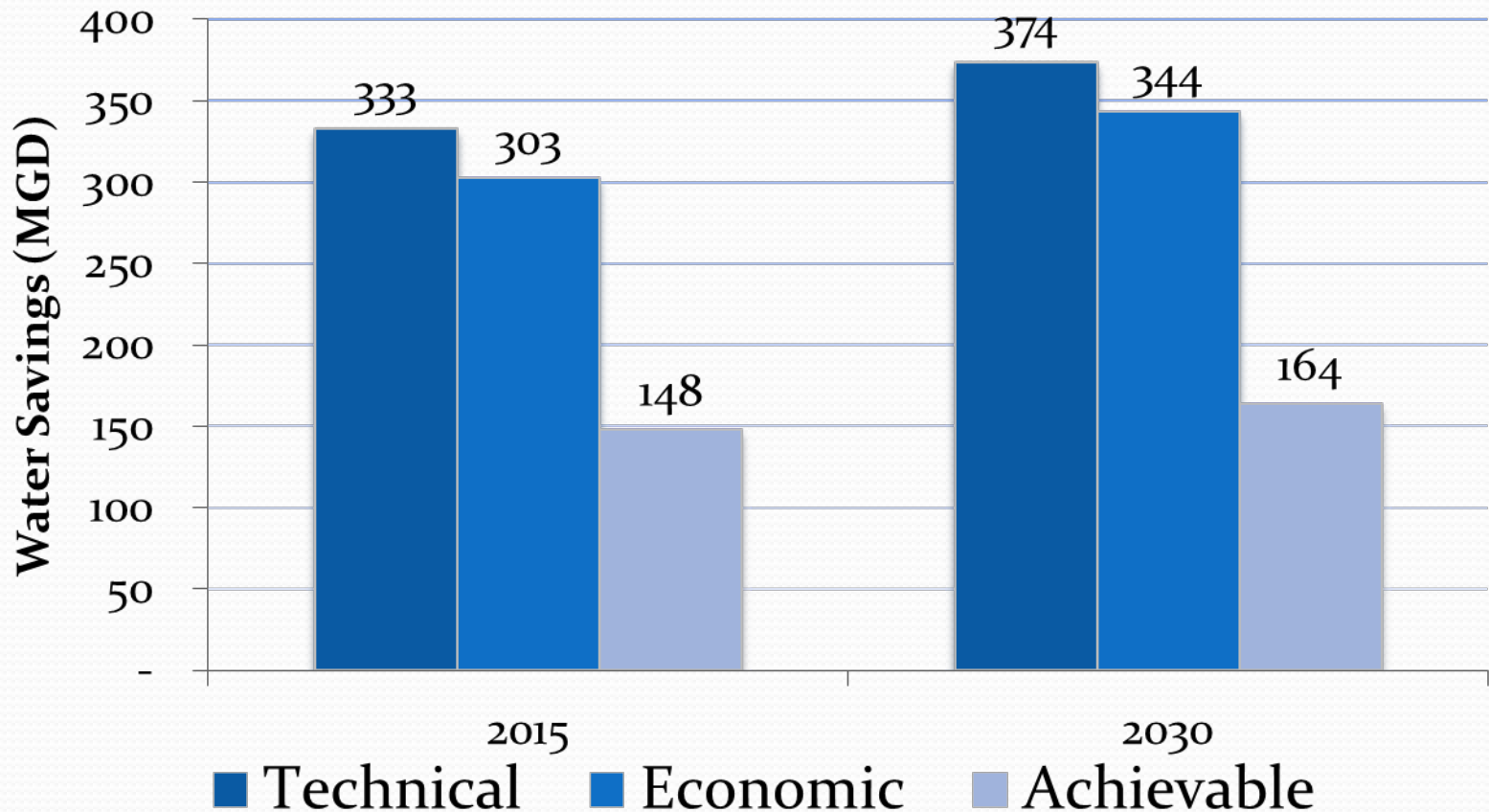
# Survey Results – Customer Satisfaction

Positive	Neutral	Negative
AMR and automatic customer notification	Pre-rinse spray valve retrofit and replacement	Inclining block rates for residential customers
Education and information	Dishwasher replacement	Water waste ordinance
Clothes washer rebate	Low-flow or waterless urinal	Lawn watering/outdoor water use ordinance
Toilet Repair and Rebate	Water audits	Seasonal rates
Low-flow showerhead and faucet replacement	Recirculating cooling tower with conductivity controller incentive	More stringent building codes
	Property manager workshops	
	Submetering multifamily accounts	
	Rain sensor/weather based irrigation controller incentive	
	Landscape contractor workshops	

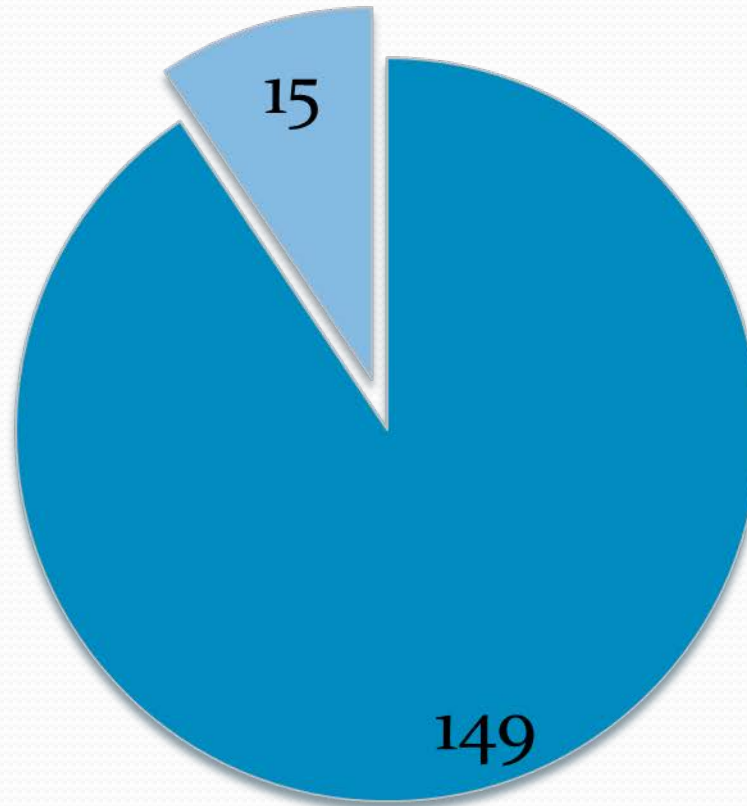
# Summary of Results (Statewide)

Measure	Technical	Economic	Achievable
Dual flush & 1.28 gpf Toilets	√		
Low-flow or non-water Urinals	√	√	√
Low-flow Showerheads & Faucets	√	√	√
Dishwashers - Residential	√		
Dishwashers - Nonresidential	√	√	√
Pre-rinse Spray Valves	√	√	√
Clothes Washers	√		
Smart Sprinkler Controllers	√		
Cooling Tower Controllers	√		
Irrigation Ordinances	√	√	
Water Waste Ordinances	√	√	
Stricter Building Codes	√	√	
Submetering	√	√	√
Residential and CII Audits	√	√	√
Property Manager Workshops	√	√	√
Landscape Contractor Workshops	√		
Increasing Block Rates	√	√	
Seasonal Rates	√	√	
Water Loss Control	√	√	√

# Statewide Conservation Potential



# 2030 Achievable Savings (MGD)



■ Demand Reduction    ■ Water Loss Control

# 2030 Achievable Savings– NPV

Measure	Cost-Benefit Ratio	NPV (\$ millions)
Low-flow or non-water urinals	0.95	0.4
Low-flow Showerheads & Faucets	1.23	17.4
Dishwashers - Nonresidential	1.15	25.9
Pre-rinse Spray Valves	1.12	4.4
Submetering	1.41	81.3
Residential and CII Audits	1.36	249.5
Property Manager Workshops	1.17	55.4
Water Loss Control	2.76	54.9
<b>Total</b>		<b>\$489.2</b>

# Conclusions

- Achievable water savings of 164 MGD by 2030 have a NPV of \$489 million.
- Measures that are popular with customers are not always cost-effective (e.g., clothes washer rebates)
- Measures that are cost-effective may not be popular (e.g., inclining block rates)
- Water loss control is generally more cost-effective than demand management
- State policies or incentives can enhance achievable savings by favoring demand management



# Next Steps

- Report will be presented to Wisconsin state agencies
- Individual utilities can fine-tune analysis to assess water conservation potential in their communities
- Final report will be available at:

<http://psc.wi.gov/conservation/water/wc-reports.htm>

# Questions?

## Jeffrey J. Ripp

Assistant Administrator,  
Division of Water, Compliance and  
Consumer Affairs  
Public Service Commission  
(608) 267-9813  
Jeffrey.Ripp@Wisconsin.Gov



## William Davis

Senior Economist – Principal  
Camp, Dresser, & McKee  
(618) 351-4650  
daviswy@cdm.com

