



Massachusetts Water Resources Authority

Presentation to

MWRA BOARD OF DIRECTORS

*Memorandum Of Understanding Between MWRA and
Northeast Utilities Companies*

January 2014

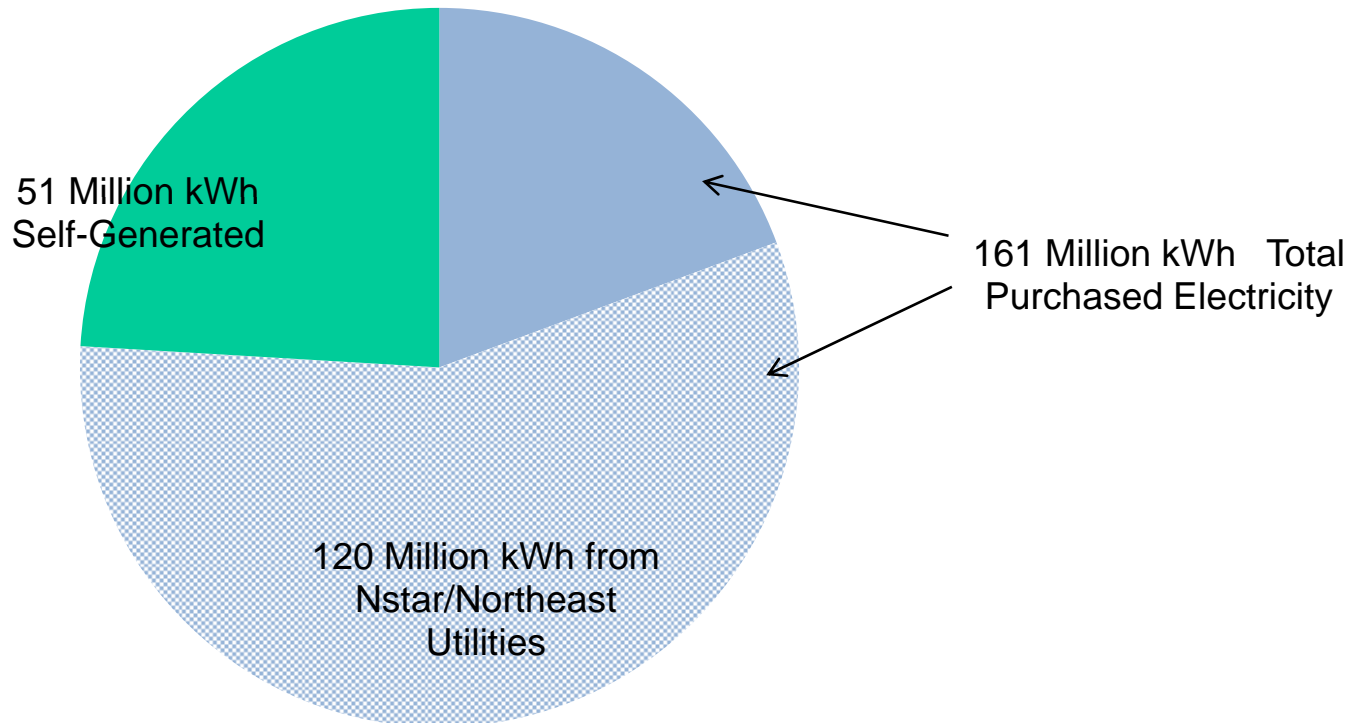


MOU Overview

- MWRA is leading by example, with a host of renewable energy projects and energy efficiency projects
- The MOU offers MWRA an opportunity to partner with NSTAR/Northeast Utilities to further our efforts
 - increased financial support
 - Increased technical assistance
 - builds on our relationship
 - catalyst for further innovation



Context for MOU



- MWRA is among Northeast Utilities' largest customers
- Green Communities Act of 2008 requires utilities to provide for energy efficiency



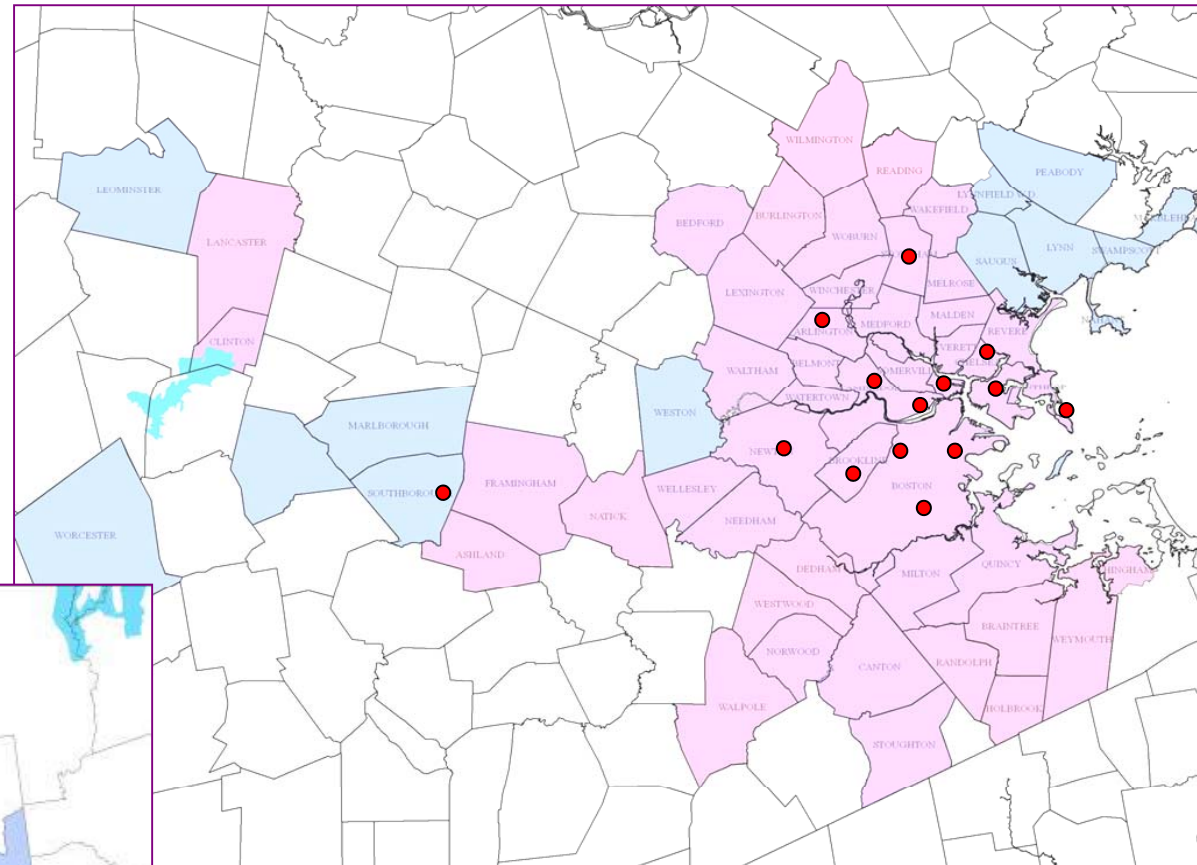
MOU Highlights

- MOU includes preliminary list of energy efficiency projects for implementation CY14-16. List will be updated periodically.
- Goal is to reduce electrical demand from NSTAR by 15% - almost 18,000,000 kWh
- NSTAR/NU to pay MWRA a minimum of \$0.30 per kWh saved
- Predominantly, stand-alone energy efficiency projects include:
 - Lighting improvements
 - Pump/Motor efficiency improvements
 - HVAC
- MOU also help funds projects that MWRA would implement anyway (e.g. asset protection and replacement needs, other incentives and directives)



Energy Efficiency Projects Completed Through December 2013 in NSTAR/NU Territory

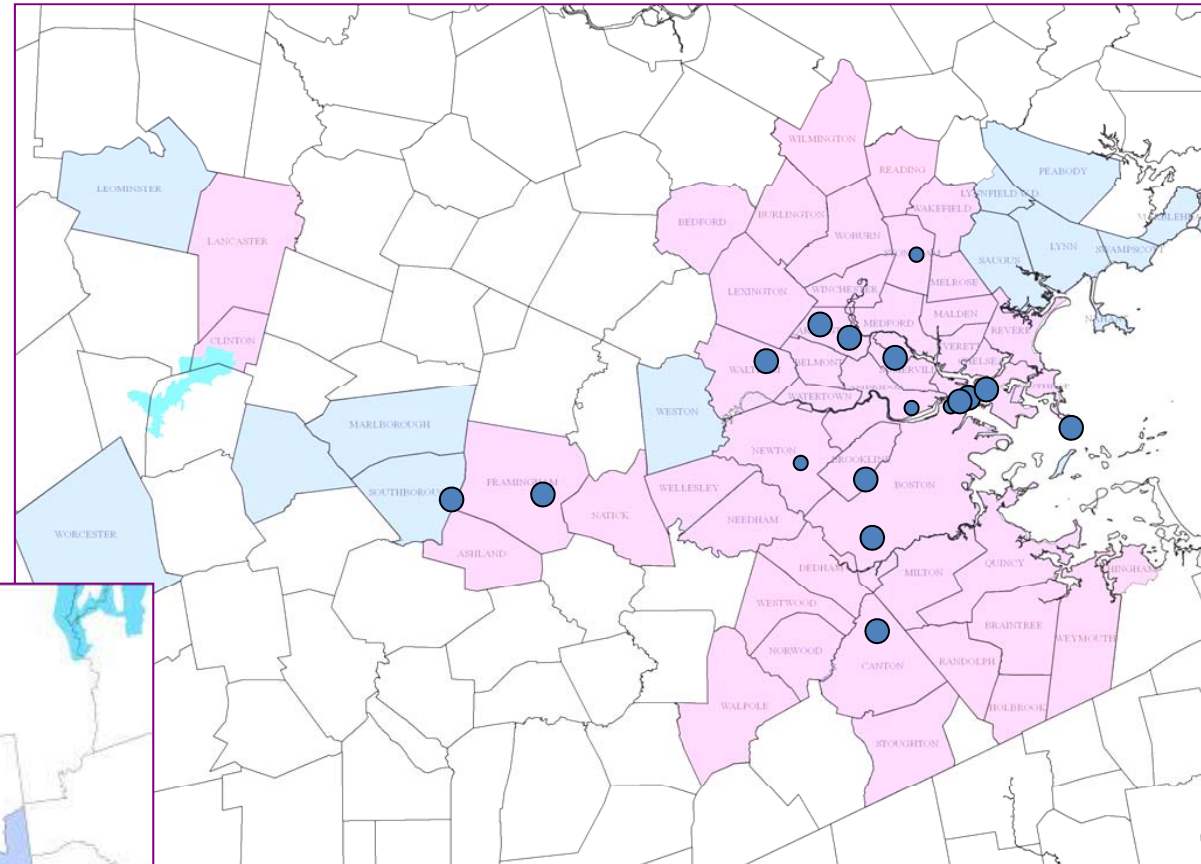
Completed Projects ●





Energy Efficiency Projects Included in the NSTAR/NU MOU

Projects In the MOU ●



Multiple projects at one facility ●

Single project at one facility ●



Energy Efficient Audits – Envisioned with MOU



Energy Efficiency Proposal MWRA – Brattle Court Pump Station 18 Brattle Court, Arlington, MA 02476



Executive Summary

Horizon Energy Solutions (HES) conducted engineering assessments of the mechanical processes and electrical systems at 18 Brattle Court, Arlington, MA 02476.

HES utilized technical studies performed by UTS Energy Engineering, LLC (2011 Reports) as supporting information for building systems. Energy saving calculations were performed by UTS Energy Engineering, LLC.

As a result of our findings, we are recommending (4) Energy Conservation Measures (ECMs), which would result in energy savings for the facility. We expect that this ECM will reduce annual energy consumption from **127,146 kWh**, amounting to approximately **\$16,956** in electric energy savings annually. The information that follows depicts the proposed ECMs that can be employed, and a depiction of the expected energy savings, project implementation costs, and the long term financial savings.

EEM	Location / EEM Description	Summary								
		Total	Potential NSTAR Rebate	Potential NGRID Rebate	Total Less Rebate	kWh Savings	Therm Savings	Electrical Savings	Natural Gas Savings	Simple Payback
1	Insulation of Ceiling*	\$ 17,766	\$ 7,745		\$ 10,021	30,980		\$ 4,647	\$ -	2.16
2	Insulation of piping	\$ 90,580	\$ 13,140		\$ 77,440	52,560		\$ 7,884	\$ -	9.82
3	Heat Pump Block Heater	\$ 29,137	\$ 7,375		\$ 21,762	29,500		\$ 4,425		4.92
4	Lighting Upgrades	\$ 8,801	\$ 3,526		\$ 5,275	14,106		\$ 2,116		2.49
	Totals	\$ 146,284	\$ 31,786		\$ 114,498	127,146	\$ -	\$ 16,956		6.75

*= assumes MWRA will provide necessary scaffolding to install insulation.

The expected energy savings were determined based on the customer's reporting of operational characteristics and that mechanical equipment was operating without significant faults.



Energy Efficiency Projects Add Up at Chelsea Admin. Bldg.

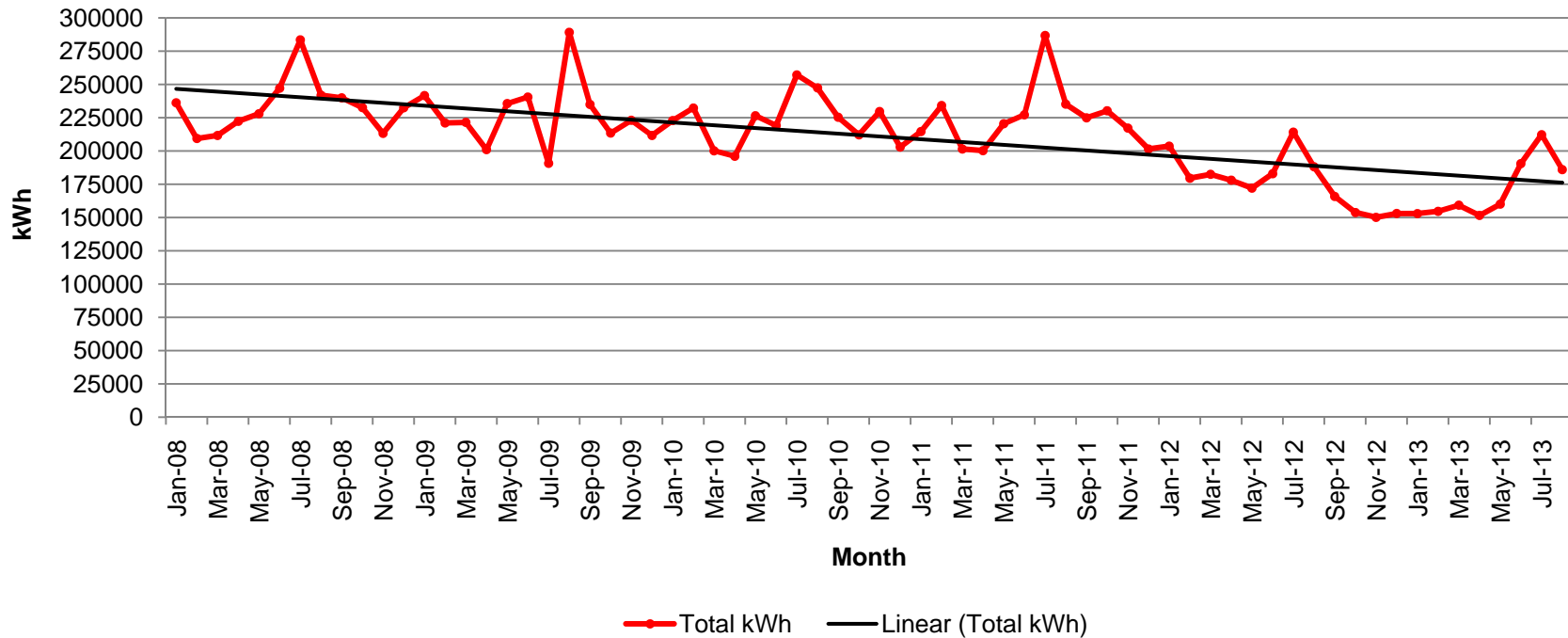
- Chelsea Admin. Bldg. energy efficiency upgrades included installation of:
 - Energy efficient indoor lighting and lighting controls (January 2009/2011)
 - LED outdoor lighting (June 2011)
 - Energy Management System to control HVAC (August 2012)





Energy Efficiency Projects Add Up at Chelsea Admin. Bldg.

Total Monthly kWh Usage at the Chelsea Admin. Building Over 6-Year Period





Insulation of Incoming Water Pipes in 3 Water Pump Stations

- Installation of insulation on incoming water pipes at 3 water pump stations will decrease dehumidification needs and decrease maintenance costs
 - \$200,000 total cost
 - 165,000 kWh/year savings
 - \$56,400 incentive payment
 - Payback 6 years





Installation of VFDs and Energy Efficient Motors on HVAC Equipment

- Install energy efficient motors and VFDs on exhaust and supply fans at Chelsea Screen House
 - 122,400 kWh/yr savings
 - \$30,600 NSTAR incentive





Capital Projects

- VFDs are being installed on the pumps at Gillis Pump Station in 2014, as part of larger rehabilitation
 - 927,000 kWh/year savings
 - \$178,000 incentive payment





Lighting

- Deer Island Interior Lighting
 - Phases 1, 2, 4 - complete
 - Total savings ~ 3M kWh/year
 - MWRA Paybacks approx 2-3 years
 - Phase 5 - ongoing
 - Savings ~ 100,000 kWh/yr
 - MWRA Payback approx 7 years
 - Phase 3 Lighting controls - future
 - Savings ~ 300,00 kWh/year
- Deer Island Exterior Lighting
 - Phases 1,2 – complete
 - Total savings ~ 174,000 kWh/year
 - Paybacks approx 3-6 years





Variable Frequency Drive (VFD)

- Variable Frequency Drive (VFD) - type of motor controller that drives an electric motor by varying frequency and voltage supplied to electric motor.
- Secondary Optimization - Installation VFDs Stages 5 & 6
 - \$2.24M total cost
 - 3.1M kWh/year savings
 - \$930,000 incentive payment
 - Payback 5 years
- Deer Island NMPS VFD/motor (project for asset protection)
 - 730,000 kWh/year savings
 - \$219,000 incentive payment





Capital Projects – EE Efforts

- Sludge Pump Replacement
 - Replace positive displacement pumps with centrifugal pumps
 - 200 hp overall reduction
 - 790,000 kWh/yr savings







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North System Hydraulic Study

January 2014



Project Description

- Optimize MWRA-owned interceptor performance
- Modeling existing conditions with wet weather events
- Evaluate Alternatives
- Recommend Potential Improvements

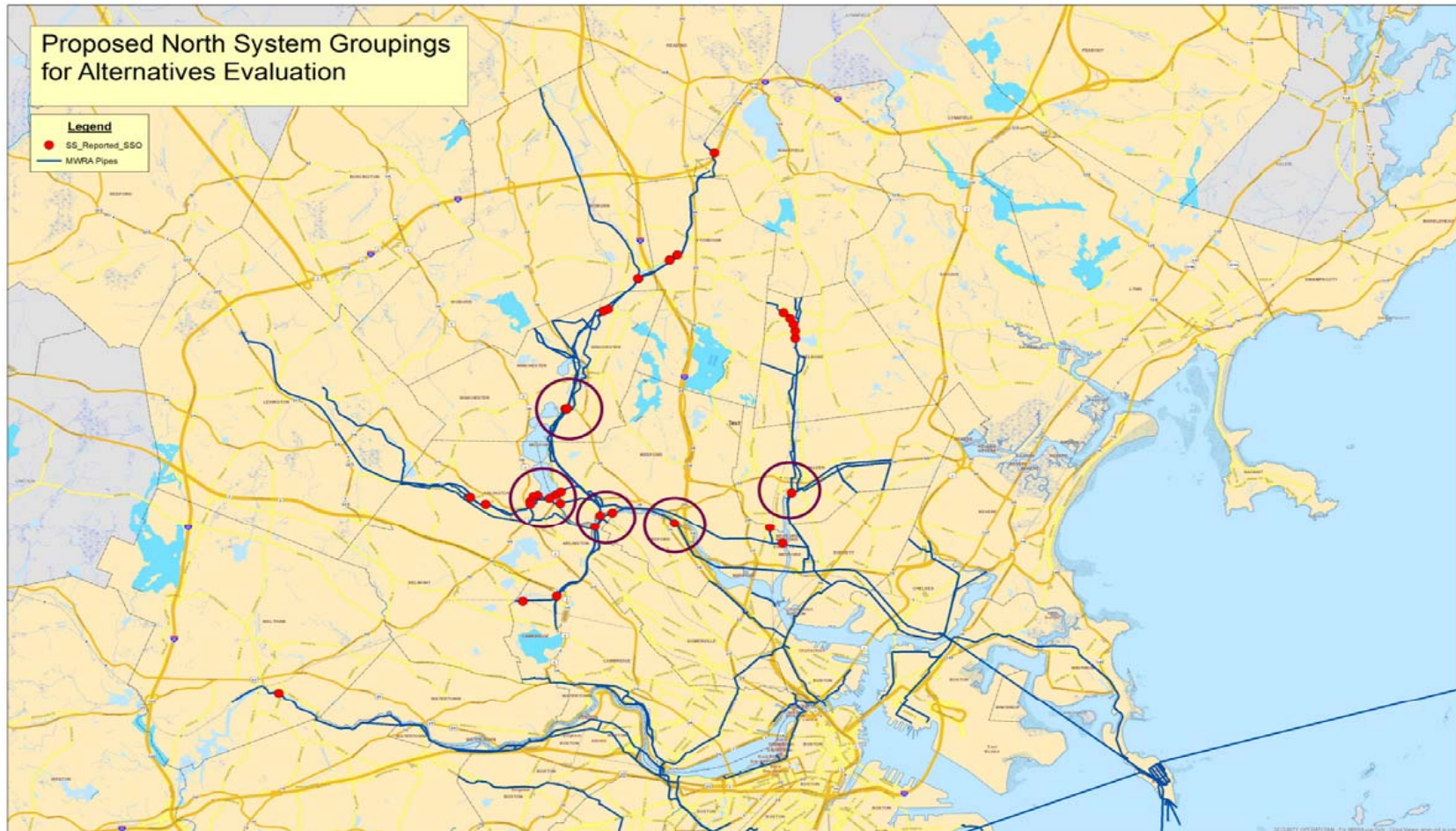


Historical North System Extreme Wet Weather SSO Locations





Proposed North System Groupings for Alternative Evaluation





Alternatives Evaluation

- Siphon Evaluation
- Manhole Modifications
- Underflow Baffles
- Additional Gates
- Pipeline reconfiguration/interconnection
- SSO Consolidation



Project Schedule

- Draft recommendations to Board November 2014





MWRA Advisory Board's Economic Development Report

January 15, 2014

Presentation to the MWRA Board of Directors



Confirming the Link

**Study on Investment in
Water and Wastewater
Infrastructure and Economic
Development**

January 2014

Edward J. Collins, Jr. Center for Public Management

McCORMACK GRADUATE SCHOOL OF POLICY AND GLOBAL STUDIES



- Infrastructure Investment
 - State/Local Revenues
 - Job Growth
 - Private Economy
- “Forgotten Infrastructure”
- Confirm Correlation



Academic Research

- \$1 → \$2 – \$14 in new taxes
- \$1 → \$2.62 – \$6.77 in private economy
- “...in general, states get greater returns from investing in water and sewer systems than from investing in highways.”



Realized Economic Development

- 5 projects included in report*
 - Over 20,000 jobs created
 - \$106 million annual state/local revenue
 - \$173 million increased local buying power

*Includes 2 case studies provided by the Advisory Board in Appendix F



Unrealized Economic Development

- 2 projects included in report
 - Potential for over 6,800 new jobs
 - Potential \$62 million annual state/local revenue
 - \$118 million increased local buying power



Safe Water Management Initiative

- SWMI Designations
 - “Potentially constrained”
- MAPC’s MetroFuture Plan
 - 19% of projected job growth in jeopardy
 - \approx 44,200 jobs



Conclusions

- Report independently validates the relationship between water/wastewater investment and economic growth
- Next Steps
 - Release report to public and media tomorrow
 - Utilize contents before State Bonding Committee on January 30
 - Use as part of testimony during legislative process



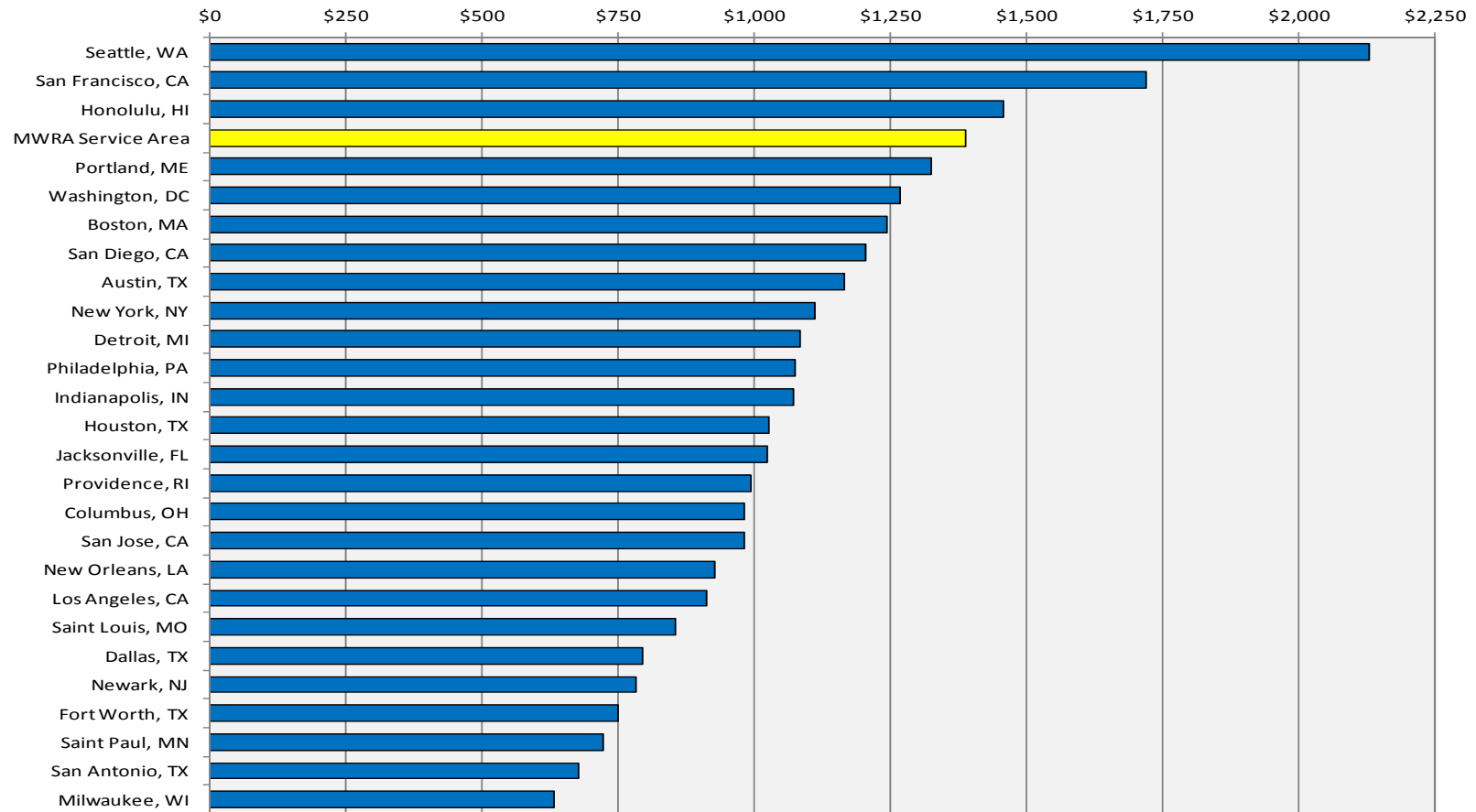
2013 Water & Sewer Retail Rate Survey

- Annual cost: \$926 - \$1,389
- 3.1% average increase
 - Lowest in 12 years



2013 Comparison to Other U.S. Cities

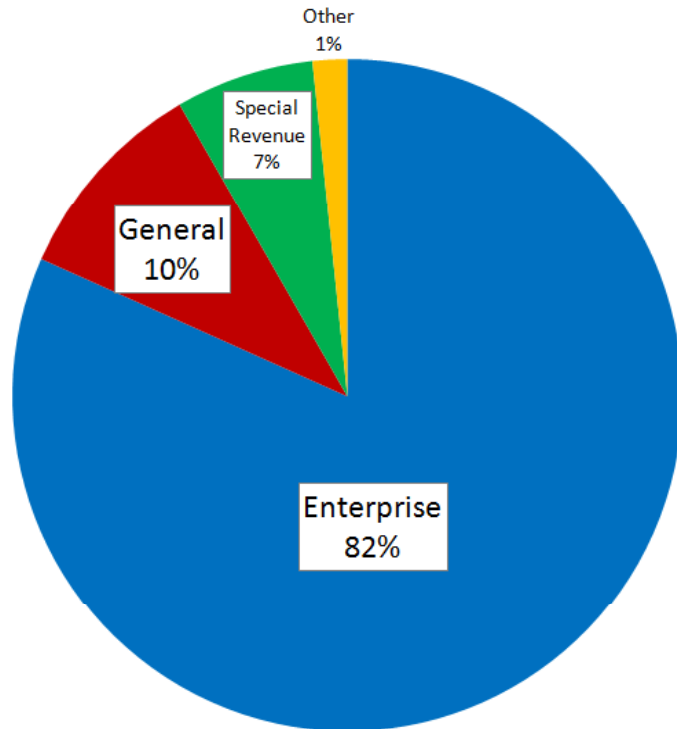
(120 HCF \approx 90,000 gallons per year)



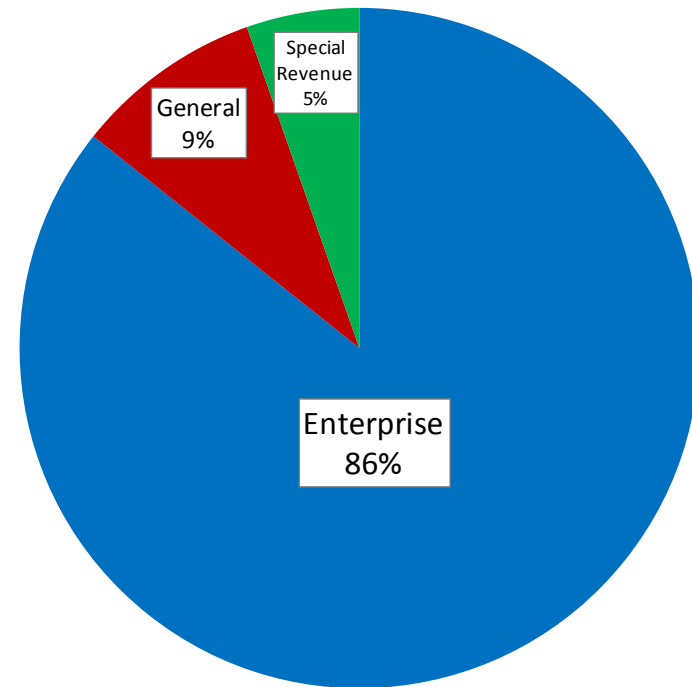


Fund Types

Water



Sewer





Coming Up

- Senate Bills 1880 and 1947
 - Local funding
 - Enterprise Fund Contingent
- Advisory Board Forum
 - Spring 2014



Questions

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