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
• 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 Included in the NSTAR/ NU MOU

Projects In the MOU

Multiple projects at one facility  
Single project at one facility
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.

<table>
<thead>
<tr>
<th>ECM</th>
<th>Initial NERT/ SF Savings</th>
<th>Potential NERT/ SF Savings</th>
<th>Total Cost Savings</th>
<th>HTU Savings</th>
<th>Therm Savings</th>
<th>Electrical Savings</th>
<th>Natural Gas Savings</th>
<th>Simple Payback</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation of ceiling</td>
<td>$17,706</td>
<td>$7,780</td>
<td>$10,201</td>
<td>$6,453</td>
<td>$3,087</td>
<td>$4,967</td>
<td>$740</td>
<td>2.19</td>
</tr>
<tr>
<td>Insulation of piping</td>
<td>$41,093</td>
<td>$12,144</td>
<td>$28,950</td>
<td>$15,000</td>
<td>$6,900</td>
<td>$9,000</td>
<td>$2,600</td>
<td>4.95</td>
</tr>
<tr>
<td>Heat Pump Block Heater</td>
<td>$29,127</td>
<td>$7,370</td>
<td>$21,750</td>
<td>$12,000</td>
<td>$4,900</td>
<td>$7,100</td>
<td>$1,700</td>
<td>2.47</td>
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<tr>
<td>Lighting Upgrades</td>
<td>$8,805</td>
<td>$3,520</td>
<td>$5,275</td>
<td>$2,150</td>
<td>$1,350</td>
<td>$1,800</td>
<td>$1,740</td>
<td>2.12</td>
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<tr>
<td>Total</td>
<td>$105,104</td>
<td>$34,870</td>
<td>$70,250</td>
<td>$45,000</td>
<td>$14,200</td>
<td>$17,600</td>
<td>$9,940</td>
<td>2.76</td>
</tr>
</tbody>
</table>

* 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.

- 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)

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
• 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
• Deer Island Interior Lighting
  – Phases 1, 2, 4 - complete
    • Total savings ~ 3M kWh/yr
    • 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
• Sludge Pump Replacement
  – Replace positive displacement pumps with centrifugal pumps
  – 200 hp overall reduction
  – 790,000 kWh/yr savings
Presentation to

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North System Hydraulic Study

January 2014
• Optimize MWRA-owned interceptor performance

• Modeling existing conditions with wet weather events

• Evaluate Alternatives

• Recommend Potential Improvements
Alternatives Evaluation

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

- Infrastructure Investment
  - State/Local Revenues
  - Job Growth
  - Private Economy

- “Forgotten Infrastructure”

- Confirm Correlation
• $1 \rightarrow $2 – $14 in new taxes

• $1 \rightarrow $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
• SWMI Designations
  – “Potentially constrained”

• MAPC’s MetroFuture Plan
  o 19% of projected job growth in jeopardy
  o ≈ 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 ≈ 90,000 gallons per year)
Fund Types

Water
- Enterprise 82%
- General 10%
- Special Revenue 7%
- Other 1%

Sewer
- Enterprise 86%
- General 9%
- Special Revenue 5%
Coming Up

• Senate Bills 1880 and 1947
  – Local funding
  – Enterprise Fund Contingent

• Advisory Board Forum
  – Spring 2014