



Massachusetts Water Resources Authority

Presentation to

MWRA Board of Directors

***MWRA Energy Efforts & Savings
FY02 to FY11 Ten Year Summary Report***

January 18, 2012



MWRA Energy Program - Summary of Accomplishments

- Energy Savings and revenue total approximately \$177M during FY02 – FY11
- Increase annual energy savings and revenue from \$6M in FY02 to \$24M in FY11
- Aggressive pursuit of rebates and grants – over \$12M awarded to date
- About 45% of MWRA's total energy cost profile derived from renewable sources
- Process optimization and implementation of energy audit recommendations projected to save almost \$2M annually
- Recognition for energy program leadership and projection completion – MWRA awarded 8 regional and national awards (2005 – 2011)



MWRA Drivers for Energy Efficiency Focus

- Cost Savings
- Operations
 - Equipment replacement
- Environmental agency
 - MWRA has been successfully meeting the goals established in Governor Patrick's Executive Order 484 (April 2007)
 - Goals include:
 - Overall Reduction of Energy Consumption
 - Increase Renewable On-site Energy Production
 - Purchase of Renewable Energy

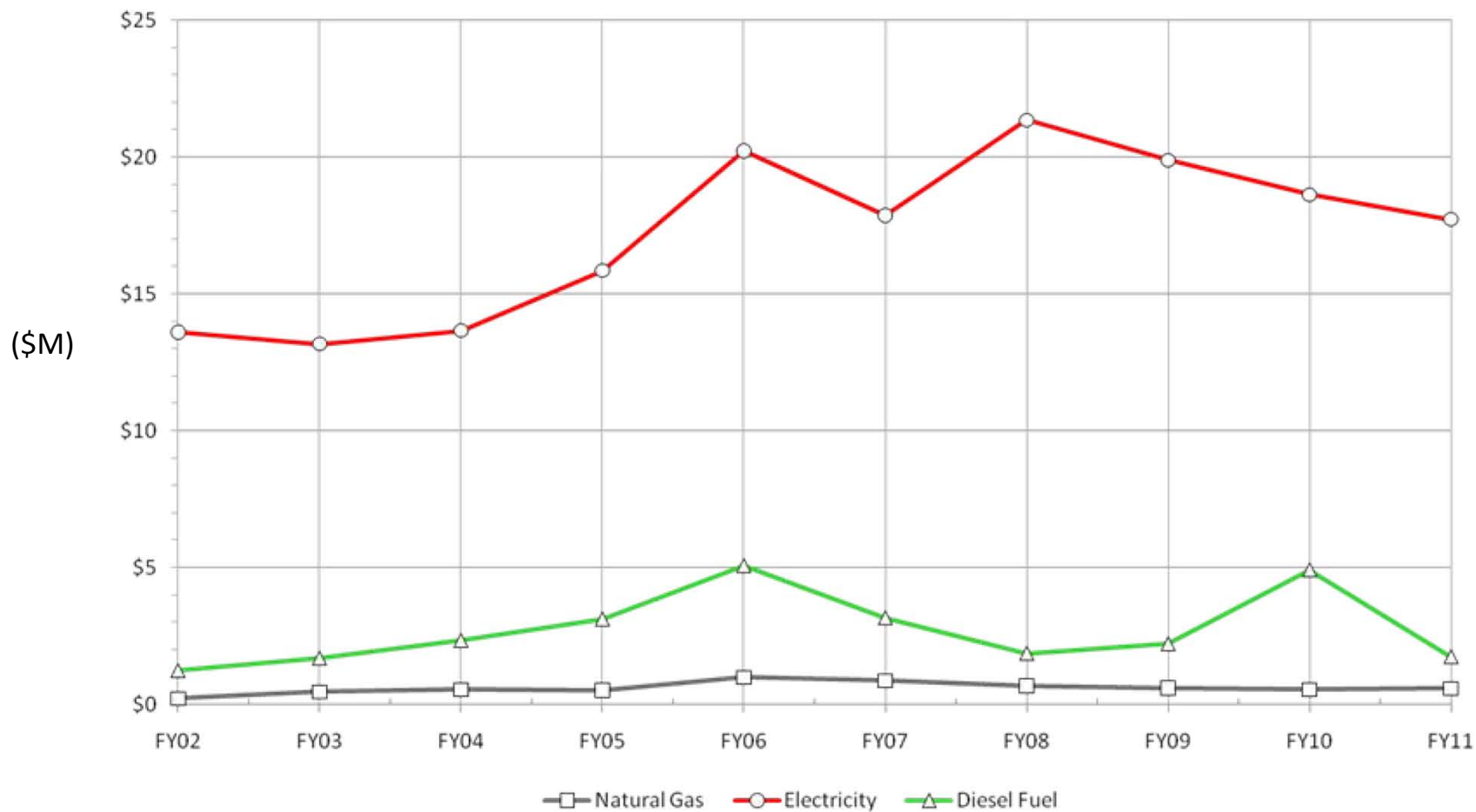


Water And Sewer Is An Energy Intensive Business

- MWRA's total demand - 210,800,000 kWh and 493,250 therms (electricity and natural gas only). Equivalent to 18,500 homes, similar to MWRA service area town the size of Arlington.
- MWRA's costs for natural gas, electricity and diesel fuel
 - \$15 M (8.4% of total direct expenses) in FY02
 - \$20 million (9.9% of budget) in FY11



MWRA Energy Cost by Source FY02-FY11



- Price impacts in diesel fuel and electricity prices during FY06 due to Hurricane Katrina and CWTP start-up
- Increases in electricity prices in FY08-FY10 due to market
- Diesel fuel purchases increased in FY10 due to CTG use during spring storms



MWRA's Energy Initiatives – 10 Year CEB Impact

Source (\$'s in Millions)

FY02-FY11

Savings and Avoided Costs:

Avoided Fuel (DI Digas)	\$ 82 million
Competitive Bidding vs Basic Service	\$ 34
DI Steam Turbine Generator	\$ 24
Audits/Efficiency	\$ 6.5
Hydropower	\$ 4.4
Wind	\$ 0.4
Solar	\$ 0.1
Avoided Capacity Charges	\$ 2.5

Total Savings/Avoided Costs

\$ 154 million

Revenue:

RPS Credits	\$ 8.0 million
Load Reduction	\$ 6.8
Generation Sales to Grid	\$ 7.8
Utility Rebates/Other	\$ 0.7

Total Revenue

\$ 23 million

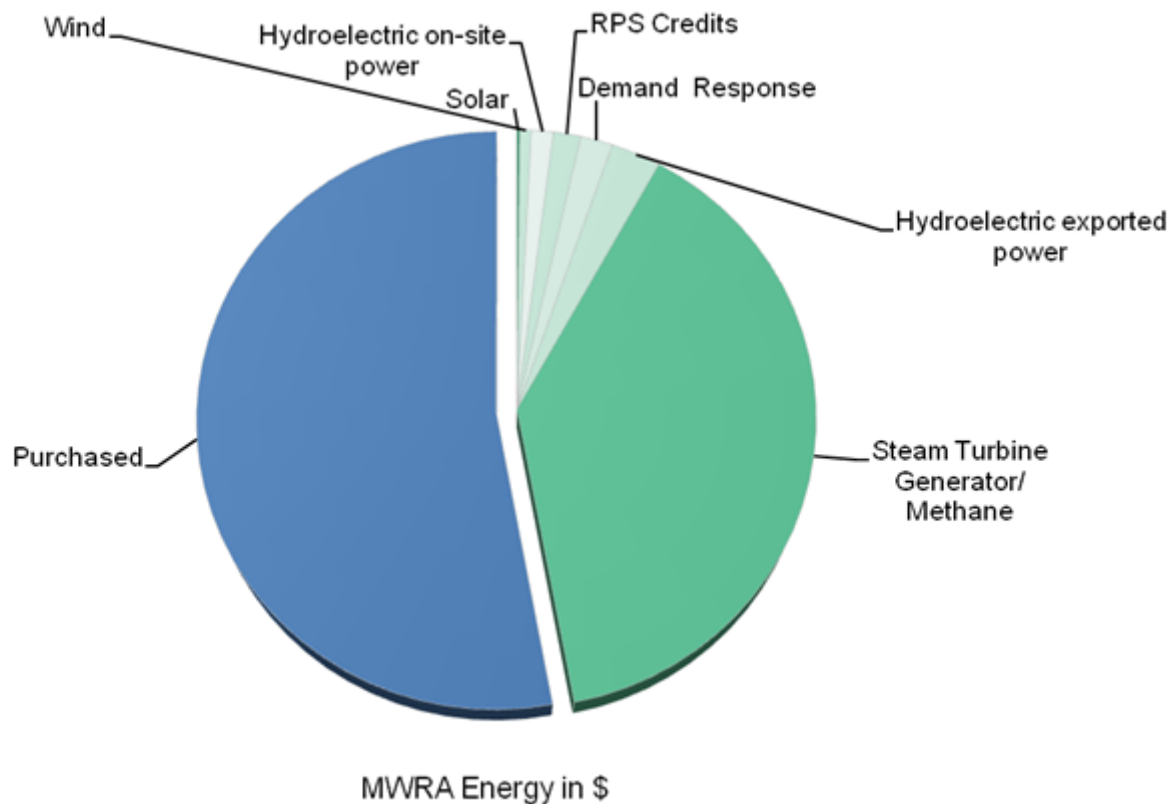
TOTAL CEB IMPACT

\$ 177 million



Energy From Renewables

- Of MWRA's total energy profile (in \$), over 45% is derived from renewable sources





Renewable Energy at MWRA



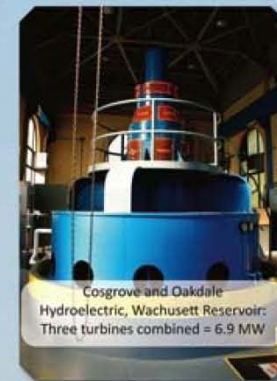
Deer Island Methane: Provides all heat and hot water for plant; used to generate electricity



Deer Island Solar 2: 180 kW roof-mounted solar array - November 2009



Carroll Water Treatment Plant, Marlborough: 496 kW solar array - February 2011



Cosgrove and Oakdale Hydroelectric, Wachusett Reservoir: Three turbines combined = 6.9 MW



Deer Island Wind: Two 600 kW turbines - November 2009



Deer Island Wind: 100 kW FloDesign experimental turbine - May 2011



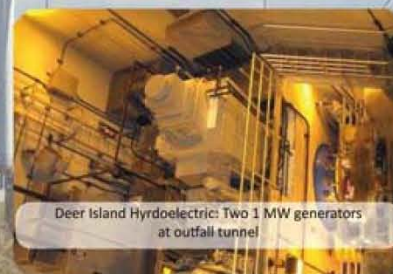
Charlestown Wind: 1.5 MW turbine - September 2011



Deer Island Solar 1: 100 kW roof-mounted solar array - April 2008



Deer Island Solar 3: 450 kW roof-mounted and ground solar array - April 2011



Deer Island Hydroelectric: Two 1 MW generators at outfall tunnel



Loring Road, Weston: 200 kW hydroelectric turbine - November 2010



Methane Utilization At Deer Island

- Deer Island utilizes 98% of the methane generated to power a steam turbine generator and backpressure turbine for plant heat and hot water
- Avoid purchase of about 5MG in fuel oil annually
- Approximately 33 MkWh/yr electricity production (projected FY13)
- Over \$3.6M/yr electricity savings and revenue (projected FY13)





Hydroelectric Power

- Cosgrove, Oakdale, Loring Rd, Deer Island
- Over 8MW Capacity
- Approximately 23 MkWh/yr electricity production
- Over \$1.8M/yr savings and revenue





Wind Power

- Deer Island, Charlestown (DeLauri Pump Station)
- 2.8 MW Capacity
- Over 5 MWh/yr electricity production
- Approximately \$575,000/yr savings and revenue





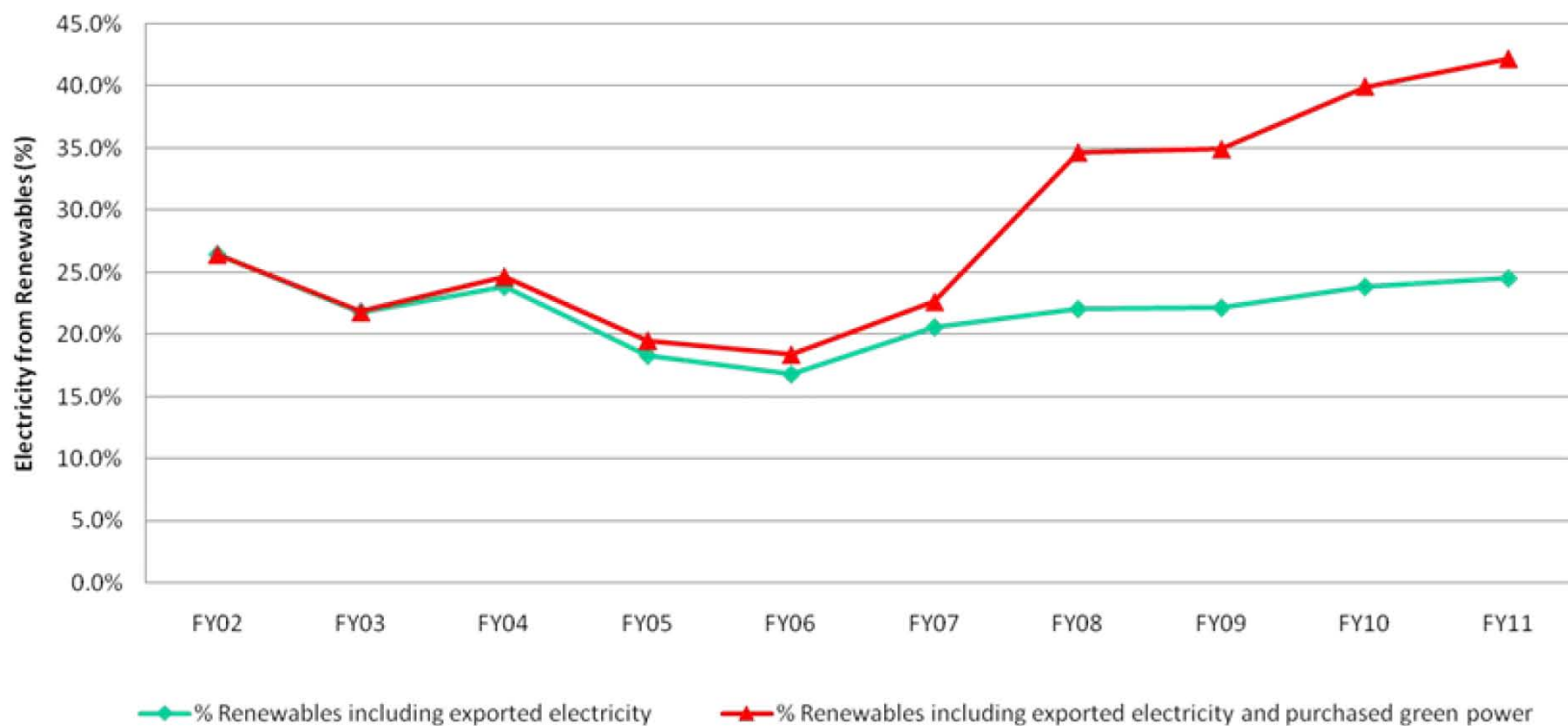
Solar Power

- Deer Island, CWTP
- Over 1200 kW Capacity
- Over 1.4 MWh/yr electricity production
- Approximately \$242,000/yr savings and revenue





MWRA Renewable Electricity Portfolio



* FY08 – Additional purchase of National Green-e Power

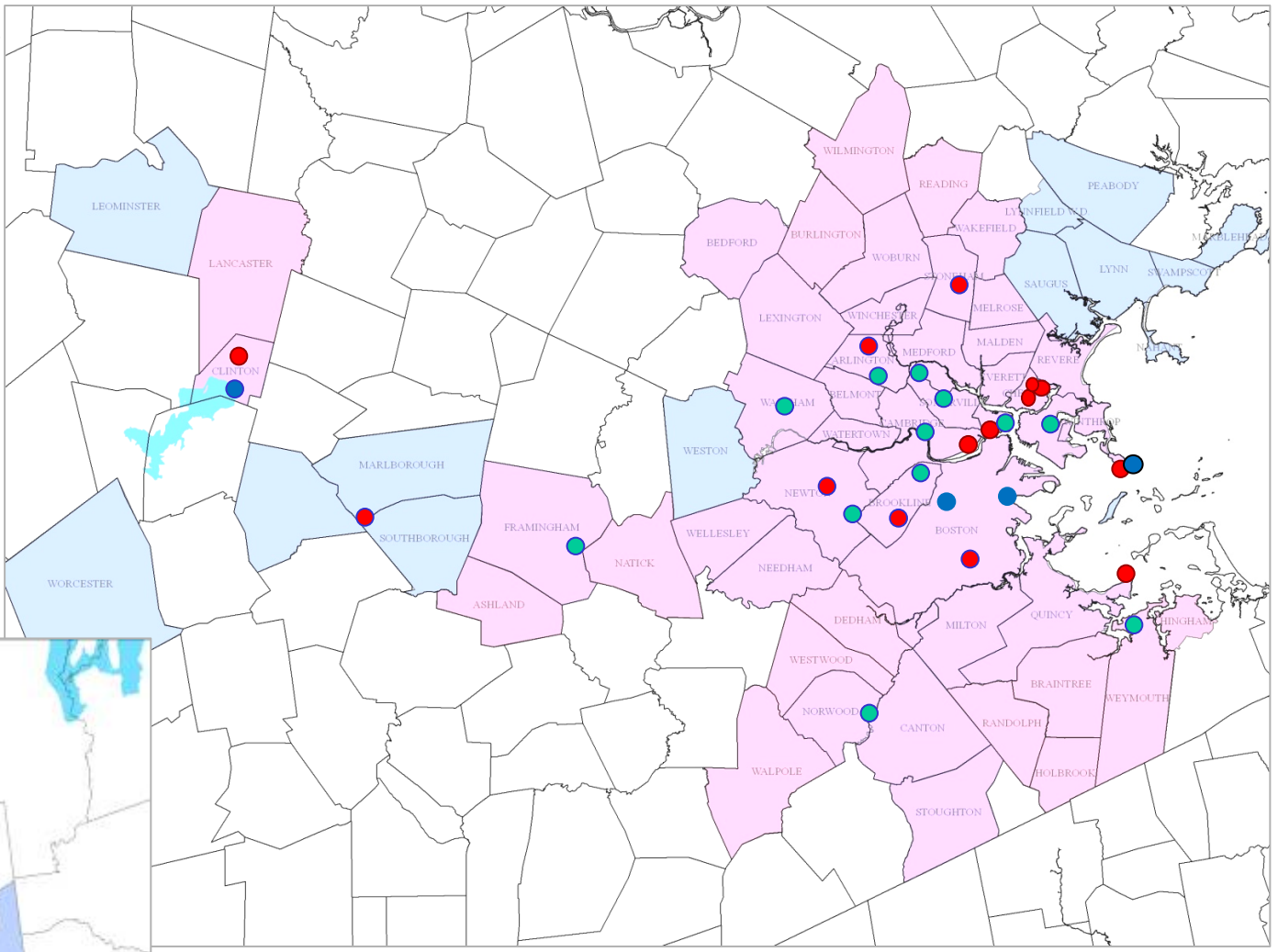


Facility Energy Efficiency Audits

Completed Projects ●

Project Currently Underway ●

Facilities Audited, Project Being Evaluated ●





Maximizing Grants and Rebates

- When the American Reinvestment and Recovery Act was announced, MWRA had a number projects “shovel ready”
- MWRA received \$33M in ARRA funds for water and sewer projects of which nearly \$10M for renewable energy projects
- Over \$2.5M various state grants
- Approximately \$680,000 energy efficiency project rebates to date



MWRA Future Energy Initiatives

- Hydro – Continue to explore hydropower development potential
- Wind – Conducting feasibility study for 4th wind turbine at Deer Island
- Solar – Comprehensive solar assessment ongoing
- Demand Side Management – Continue energy audits, process control optimization, demand response, EMS installation
- Grants/Rebates – Seek funding assistance opportunities
- Other Sustainable Efforts – alternative fuel vehicles, green power purchase, energy efficient computing, recycling