



Massachusetts Water Resources Authority

*Presentation to the*  
**MWRA Board of Directors**

***Update on Renewable and  
Sustainable Energy Initiatives***

**November 12, 2008**



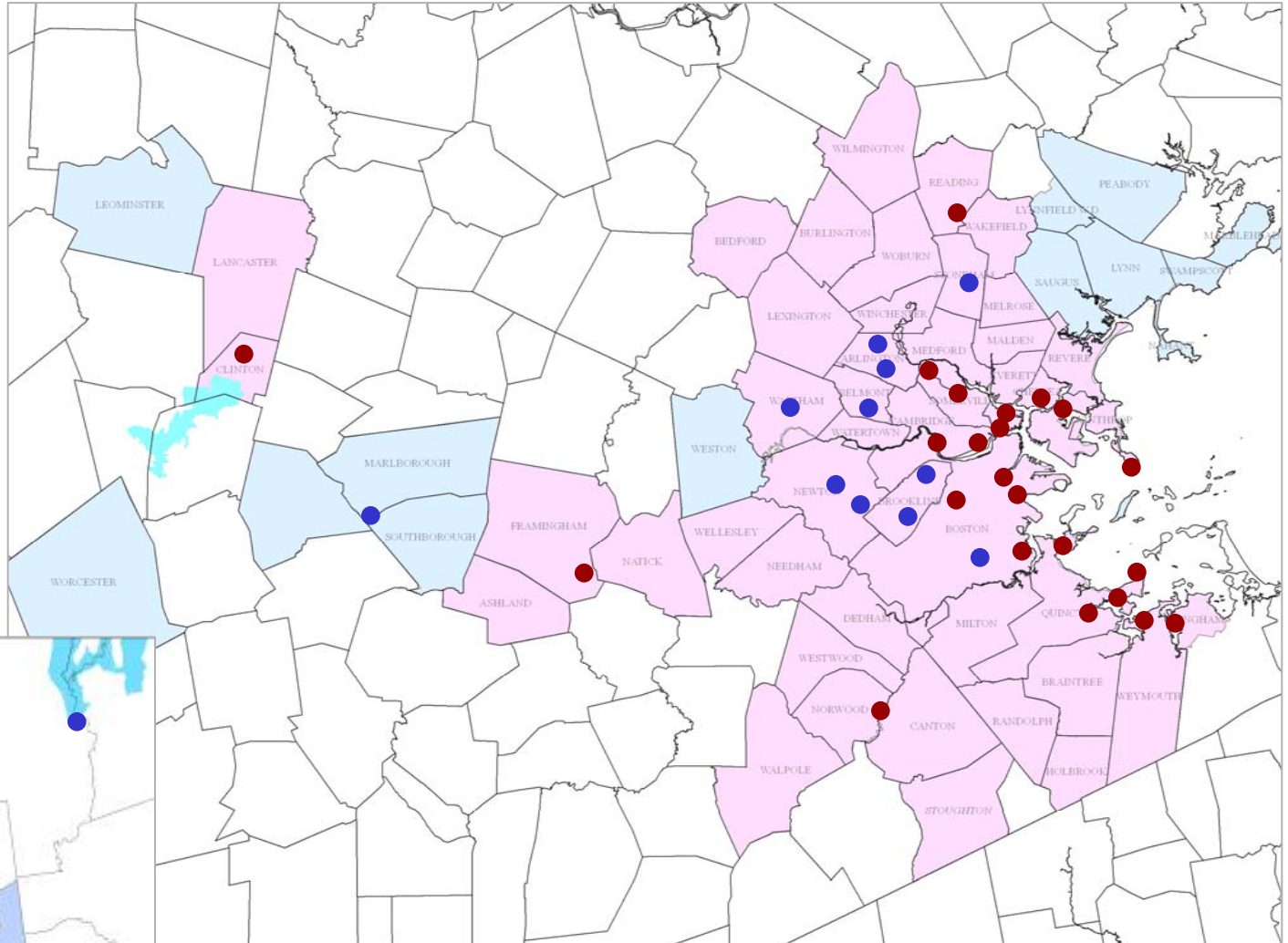
# MWRA Facilities

## Wastewater

- 2 Treatment Plants
- 12 Pump Stations
- 4 Headworks
- 5 CSO Facilities

## Water

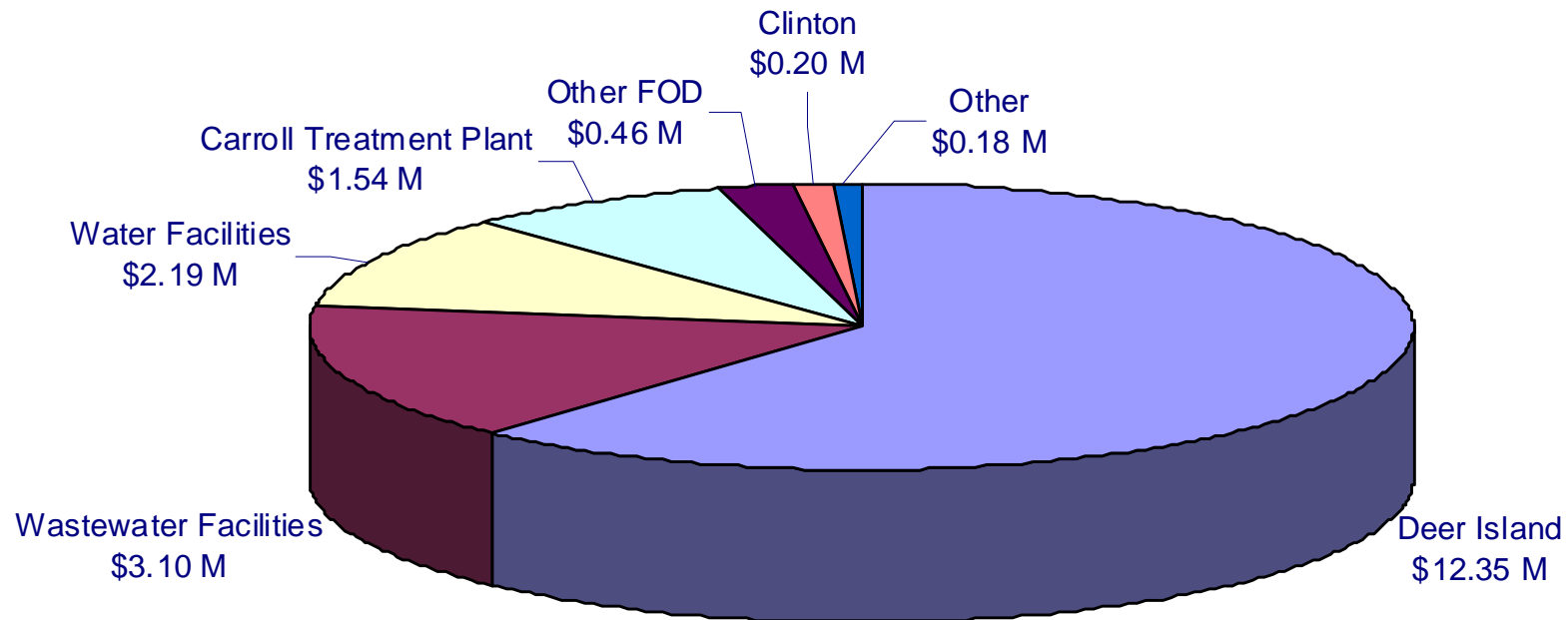
- 2 Treatment Plants
- 10 Pump Stations





## MWRA Energy Usage – FY2008

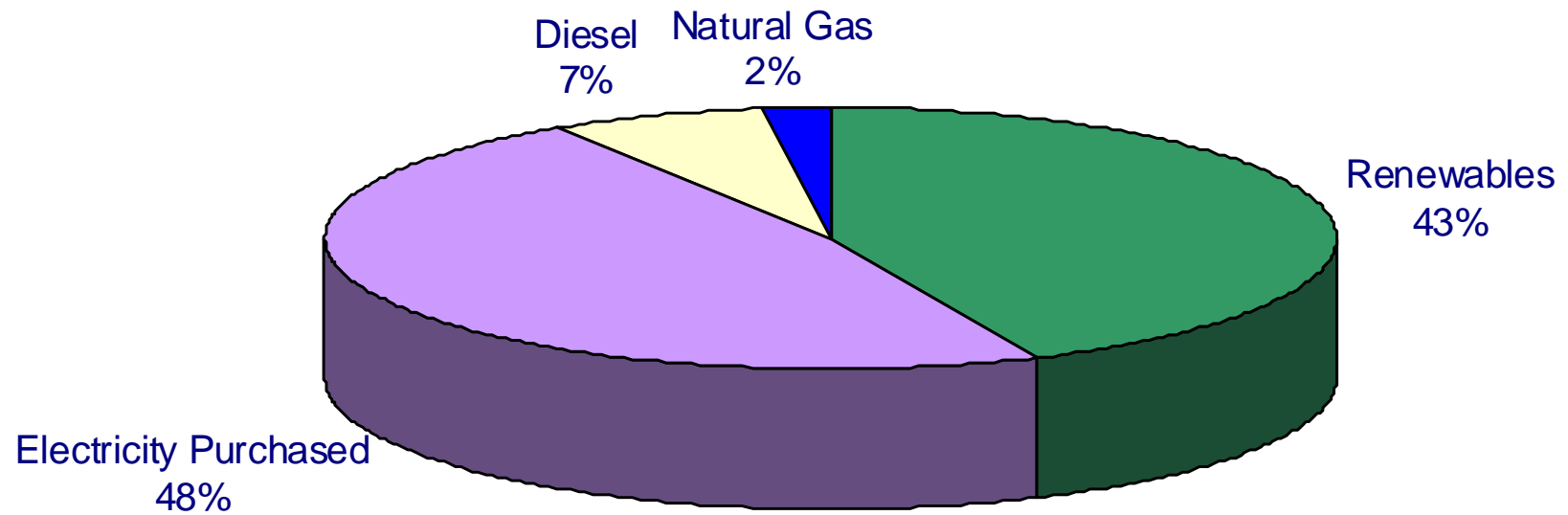
- MWRA's total energy cost for FY2008 was \$20.1 million
- Deer Island accounts for 62% of MWRA's energy budget





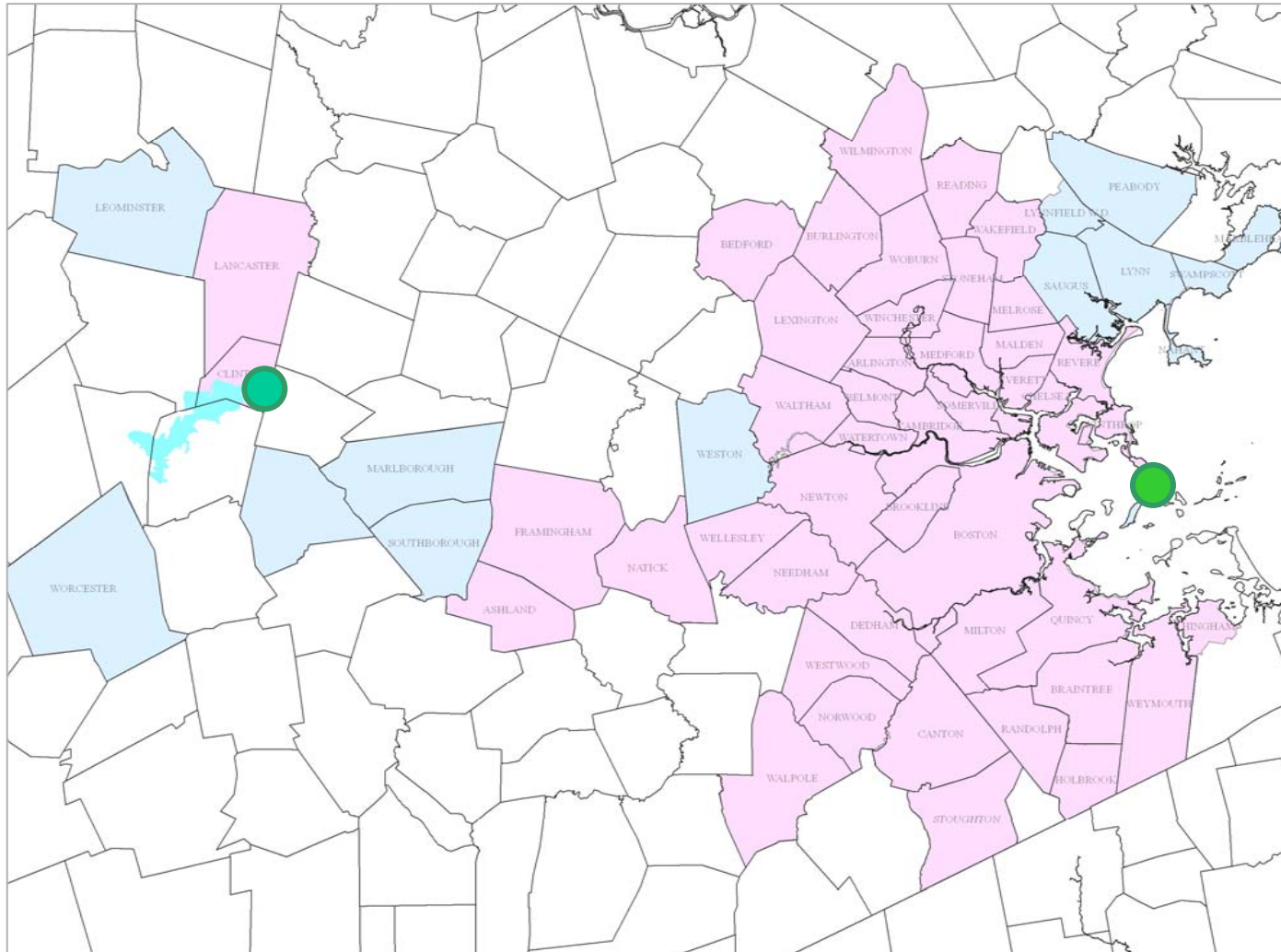
## Self-Generated Renewable Energy

- MWRA self-generated 43% of its energy needs in FY08





# Methane Utilization





## Methane Utilization: Deer Island Treatment Plant

- Deer Island utilizes 97% of the methane generated to power a steam turbine generator for Plant heat and hot water
- Avoid purchase of about \$15 million in fuel oil





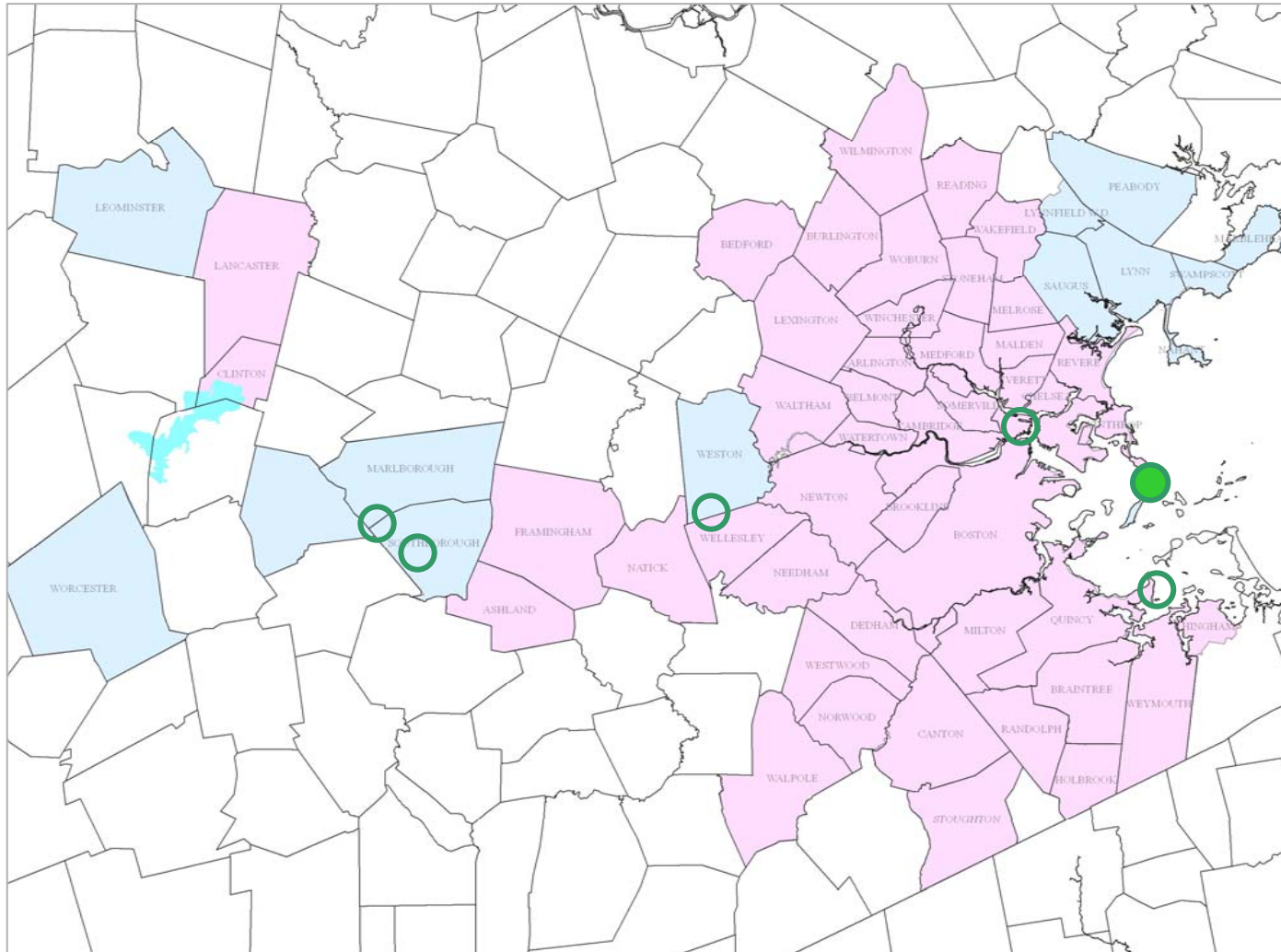
## Methane Utilization: Clinton Wastewater Treatment Plant

- 70% of the plant's heat needs are currently met by burning methane





# Wind Power







## Wind Feasibility Study

- MWRA identified 16 possible facilities where wind power could be feasible
- The most cost-effective locations have:
  - significant electrical demand
  - infrastructure to consume the power on site





## Wind Power: Deer Island

- FAA has approved 2, 190-foot turbine, estimated generation 2 million kWh
- \$400,000 MTC grant for design and construction
- Design/Build contract awarded at October Board meeting





## Wind Power: Nut Island Headworks, Quincy

- Proposed 328-foot turbine, estimated generation 3.7 million kWh
- \$500,000 MTC grant for design and construction





## Wind Power: Carroll Water Treatment Plant, Marlborough

- Potential for 350-400 foot turbine generating 2.4 million kWh
- Wind monitoring tower installed in August 2007





## Wind Power: Southborough Maintenance Facility

- Potential for 350-400 foot turbine generating 2.5 million kWh
- Wind monitoring tower installed in August 2007





## Wind Power: Norumbega Covered Storage, Weston

- Currently exploring potential for wind turbine





## Wind Power: DeLauri Pump Station, Charlestown

- Currently exploring potential for wind turbine









## Solar Power: Deer Island

- 100 kW photovoltaic system completed in May 2008
- Generates 105,000 kWh





## Solar Power: Carroll Water Treatment Plant, Marlborough

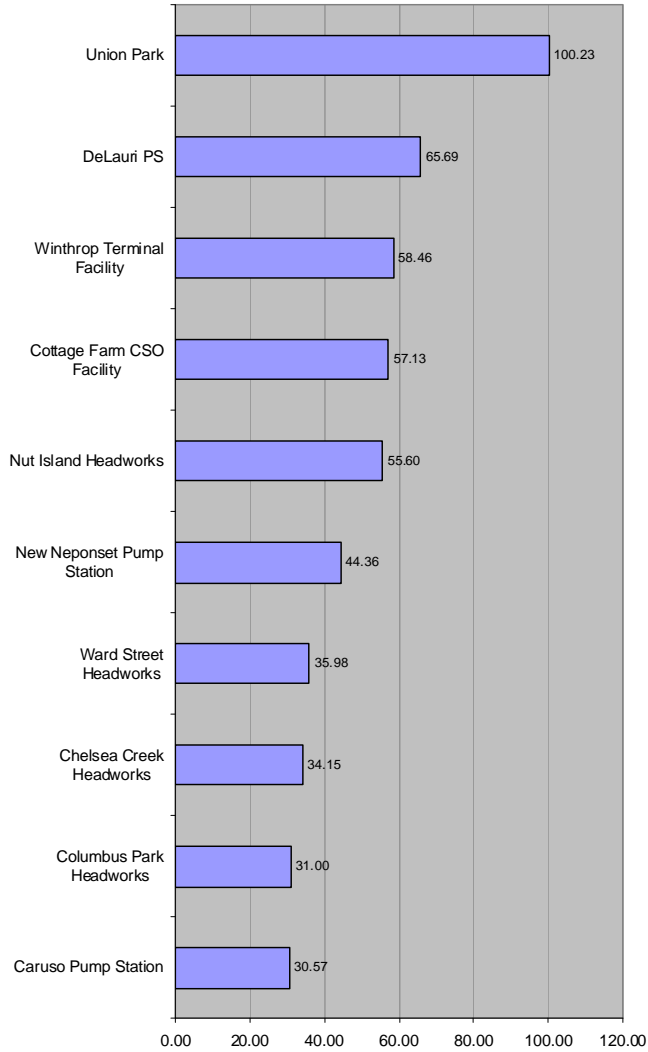
- Study underway for 60,000 kWh solar installation



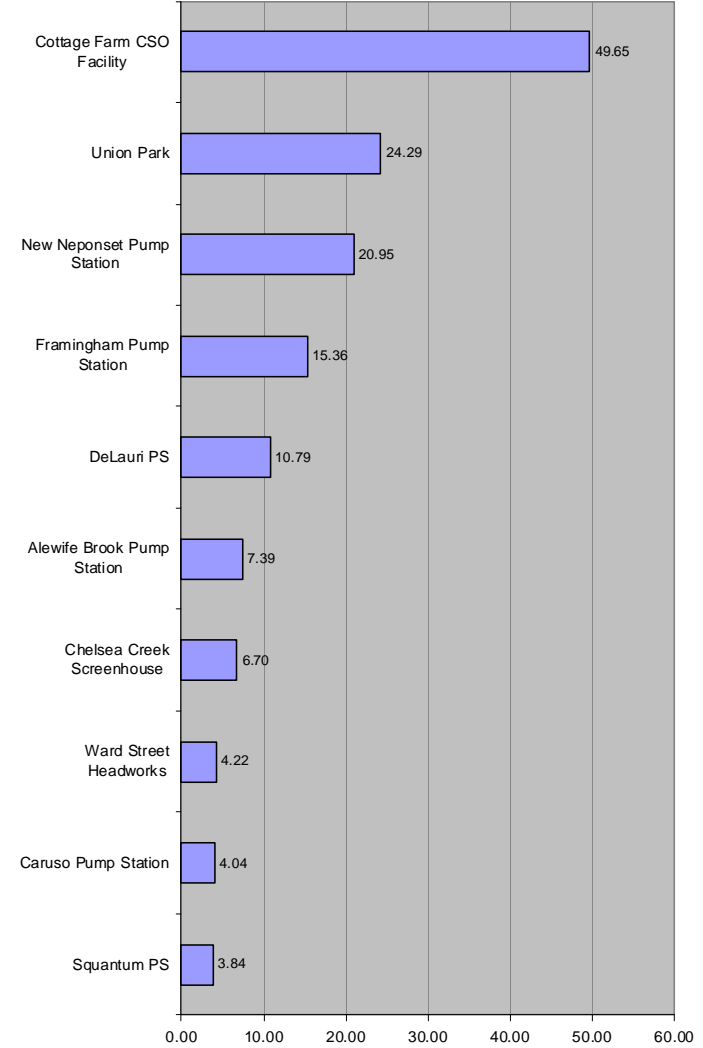


# Solar Power: Potential at Other Sewer Facilities

**Top Ten Potential for Roof-Top PV Generation**



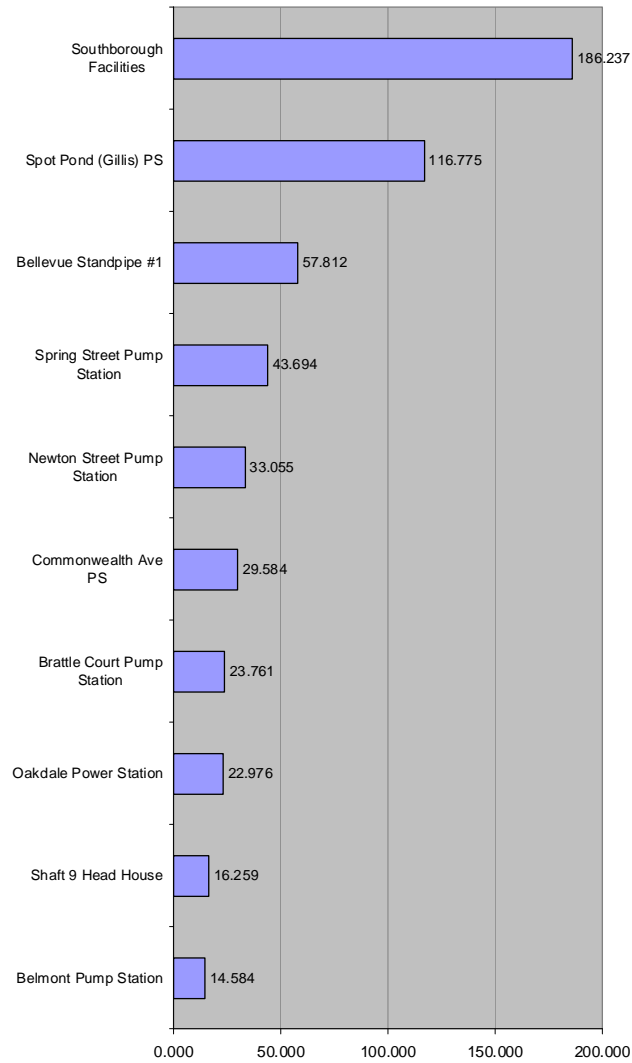
**Percentage of Demand Met by Roof-Top PV**



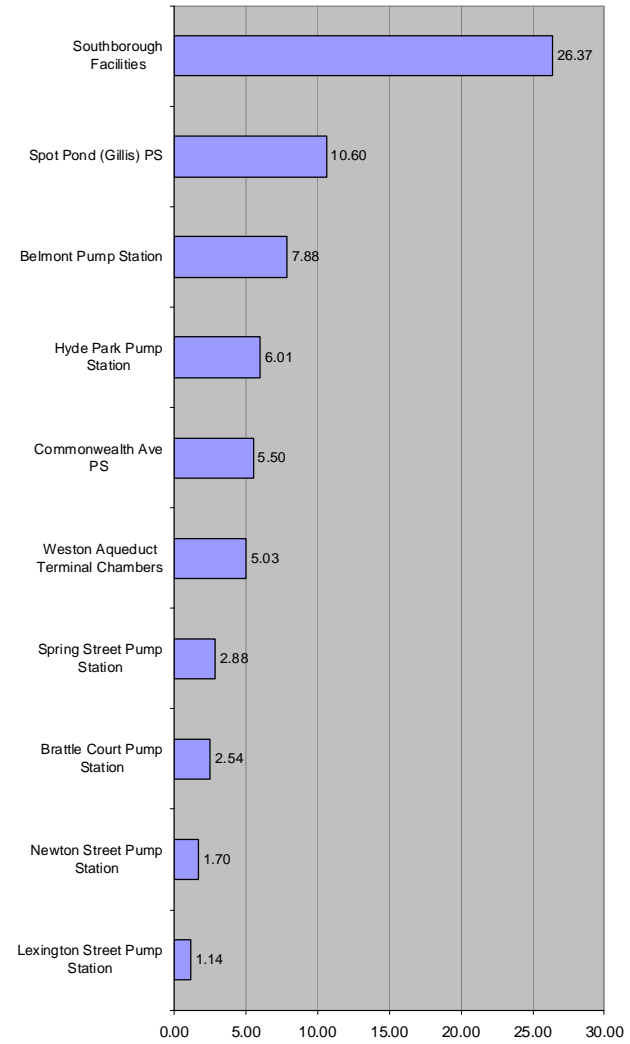


# Solar Power: Potential at Other Water Facilities

**Top Ten Potential for Roof-Top PV Generation**

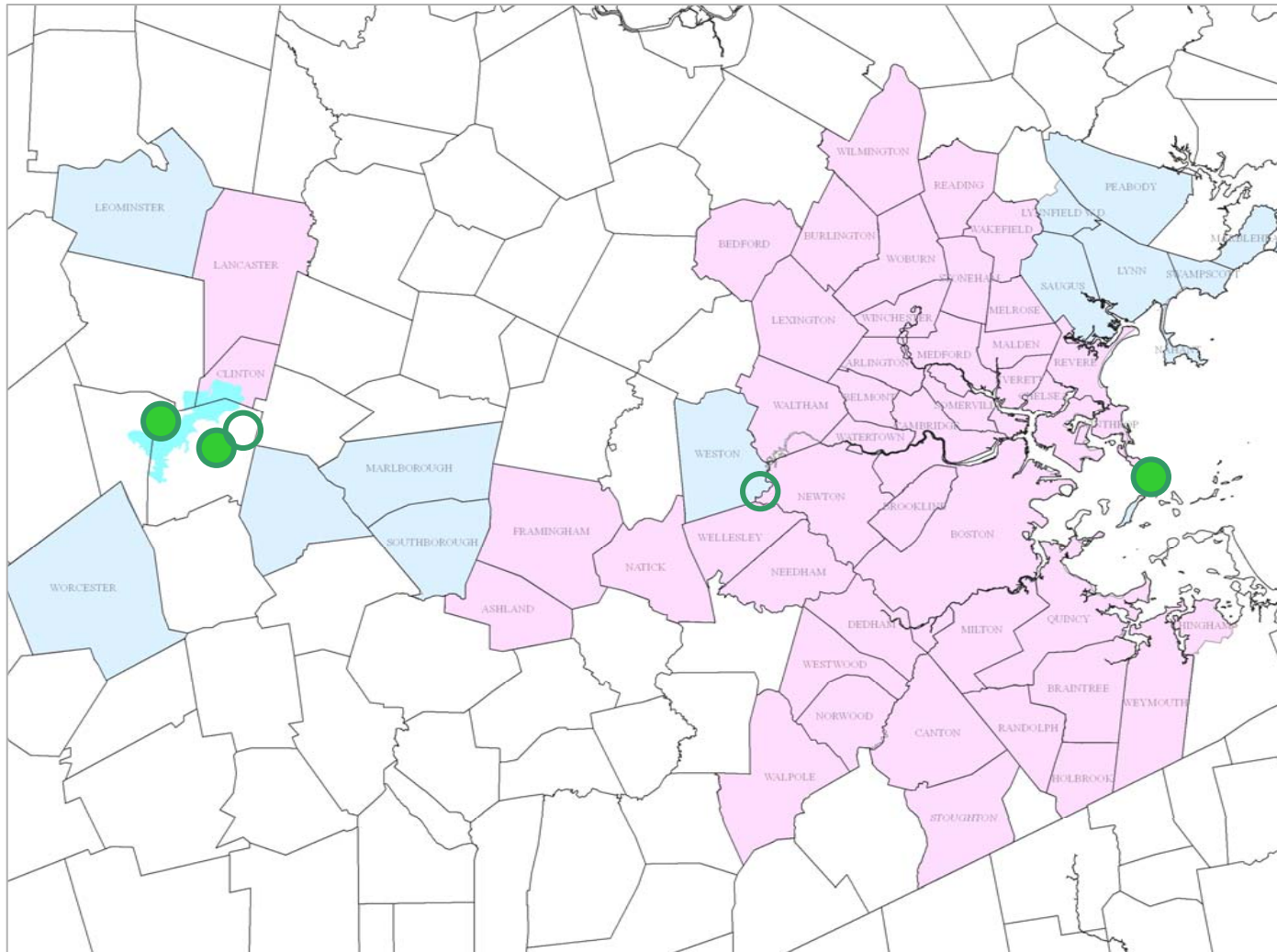


**Percentage of Demand Met by Roof-Top PV**





# Hydroelectric Power





## Hydroelectric Power: Deer Island

- 2 hydroelectric generators at Outfall shaft
- Generate 5.8 million kWh





## Hydroelectric Power: Oakdale Power Station

- Hydroelectric generator produces 13 million kWh
- Revenue for FY08 was \$1.09 million





## Hydroelectric Power: Cosgrove Intake

- Hydroelectric generator produces 3.4 million kWh
- Revenue for FY08 was \$148,000







## Hydroelectric Power: Loring Road Covered Storage, Weston

- 1.2 million kWh hydropower turbine-generator currently in design
- \$377,000 grant from MTC for design and construction





## Hydroelectric Power: Wachusett Dam

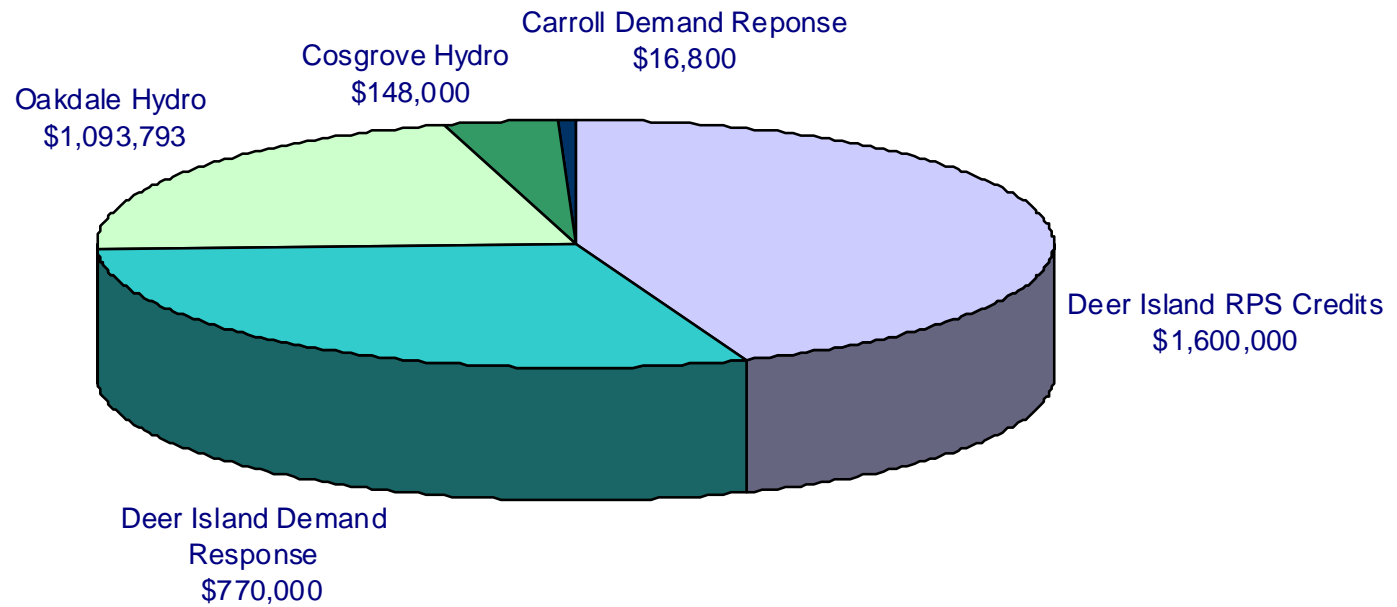
- Completing feasibility study for 750,000 kWh hydropower turbine
- Applied for grant from MTC in late September





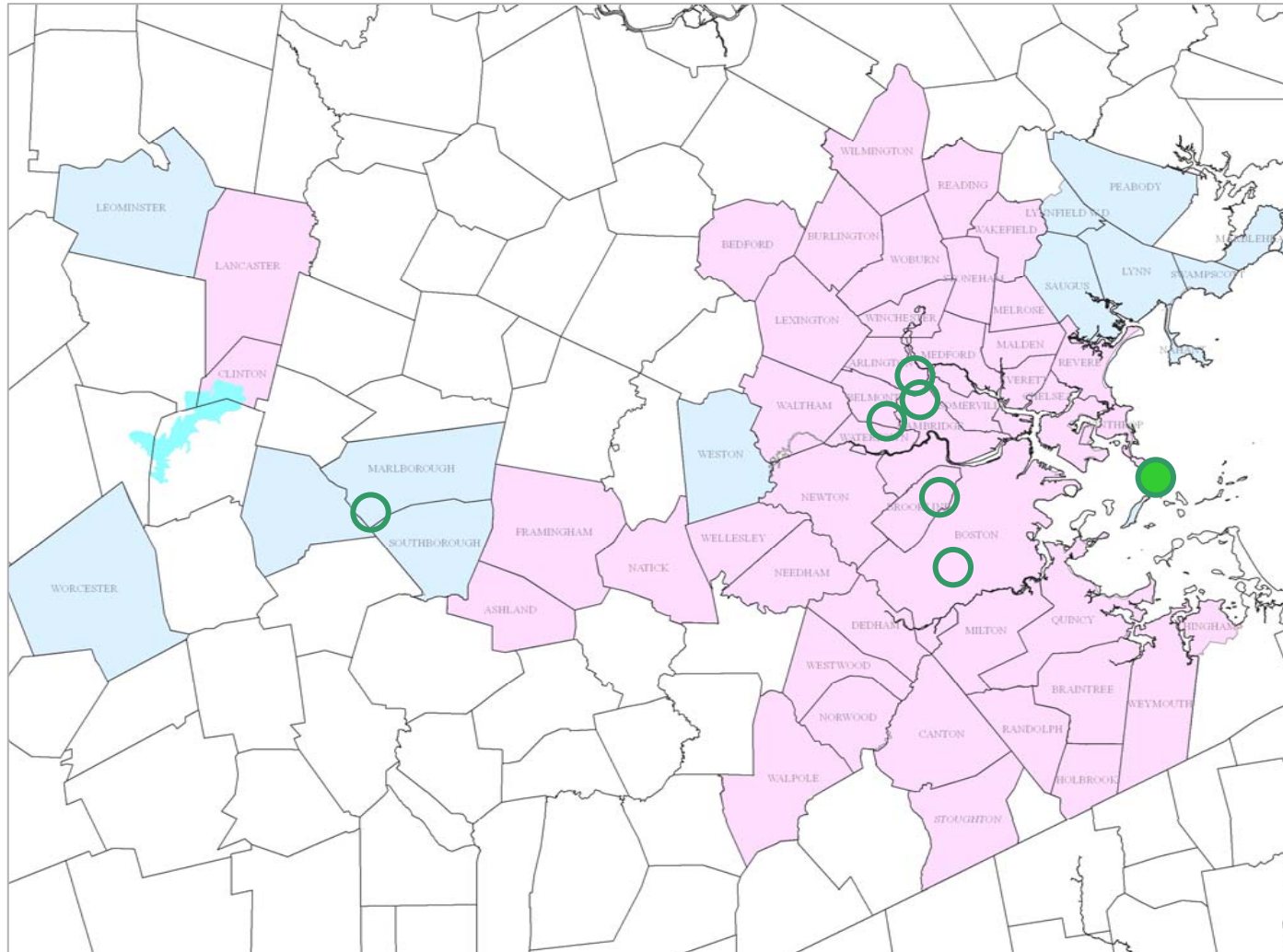
## Revenues From Renewable Sources

- MWRA generated \$3.6 million from renewable sources in FY08





# Equipment Upgrades





## Equipment Upgrades: Deer Island Electrical

- Replacing VFDs that power 18 pumps at 2 stations with energy efficient units
  - South System Pump Station completed
  - North System Pump Station to begin Fall 2009





## Equipment Upgrades: Deer Island Steam Turbine Generator

- Installation of back-pressure turbine at thermal/power plant
- Will increase renewable energy production from methane
- Design/build contract to be advertised in early 2009





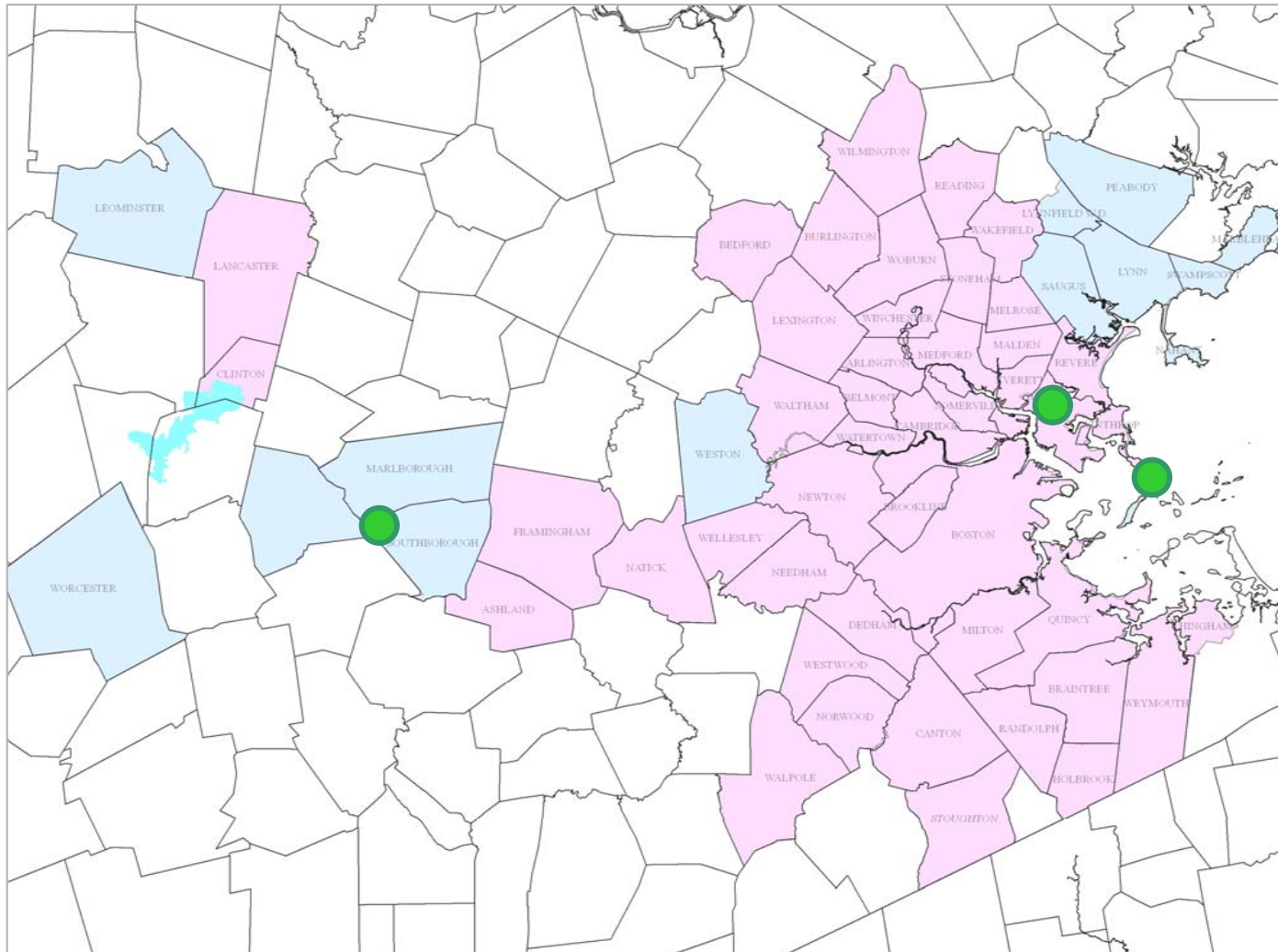
## Equipment Upgrades: Rehab of Water Pump Stations

- New VFDs, motors and pumps at 5 largest water pump stations
- Will decrease energy use
- Eligible for \$190,000 in rebates





# Energy Audits







## Energy Audits: Deer Island

- Phase 1 of lighting improvements completed in piping galleries and warehouse
- Phase 2 to begin in October 2008 will focus on operational facilities
- Phase 3 will include occupancy controls and timers





## Energy Audits: Carroll Water Treatment Plant

- Recommendation to turn off soda ash mixers resulted in \$200,000 annual savings
- Lighting improvement audit underway; recommendations from HVAC audit expected early 2009





## Energy Audits: Chelsea Facility

- NSTAR energy audit completed; recommendations to be implemented in 2 phases:
  - Lighting underway
  - HVAC to follow





## Energy Audits: Southborough Facility

- Energy audit to being in mid-2009





## Fleet Optimization

- Of the 378 vehicles, 249 are powered by alternative fuel:
  - 195 Biodiesel
  - 33 Hybrid
  - 12 Flex Fuel
  - 2 Propane
- 15 larger vehicles have been retrofitted to remove 50% of emissions
- Electric Vehicles are used on Deer Island and at Carroll Plant





## Green Computing

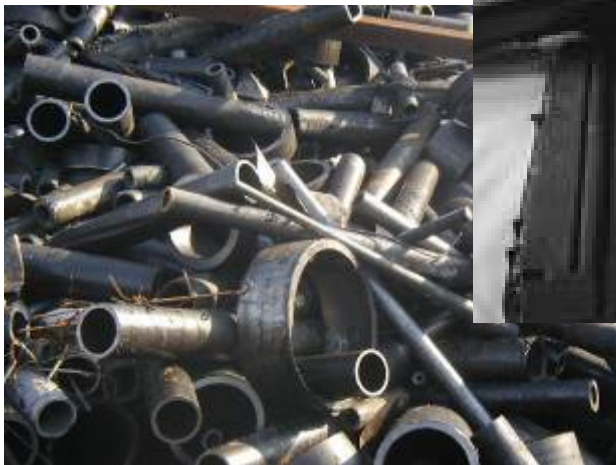
- All new PCs and laptops are Energy Star compliant
- 500 monitors replaced with energy-efficient flat panels
- Energy monitoring software installed to automatically put PCs to sleep when inactive





# Recycling

- MWRA recycles:
  - Paper and cardboard
  - Waste oil
  - Scrap metal
  - Toner cartridges



**MWRA Recycles**  
CNY Facility  
Recycling Locations & Tips

**Mixed Paper**

- White and colored paper
- Fax, photocopy or printer paper
- Laser printer paper

**Cardboard**

- Corrugated boxes
- Cardboard or paper packing materials
- Chipboard boxes (cereal boxes)

**Chelsea Facility**  
Recycling Locations & Tips

**Mixed Paper**

- White and colored paper
- Fax, photocopy or printer paper
- Office and plotter paper
- Composition paper
- Computer paper
- Brown craft paper
- Manila & colored folders
- Brown paper bags (not food use)
- Newspapers (including inserts)
- Catalogs and brochures
- Pamphlets and manuals
- Soft cover books, workbooks
- Hardcover books (cover removed)
- Telephone books
- Real estate books
- Junk mail and envelopes
- Magazines

**Batteries**

Recycle your old **Alkaline** and **Lead Acid** batteries with Fast Services and other batteries with the Warehouse

**Cardboard**

Corrugated boxes  
Cardboard or paper packing materials  
Chipboard boxes (cereal boxes, etc.)

**How?**

Break down and flatten boxes, bring to the mixed paper recycle container or drop off at the warehouse.

**Other Warehouse Items**

- Light Bulbs
- Thermometer Lamps
- Urinals
- Gas Cylinders (if empty only)
- Toner Cartridges
- Printers, fax and copier cartridges

**Waste Oil**

**How?**

- Use Fast Services
- Bring to the Warehouse
- Label containers
- Complete Tracking Form
- Call 800-456-7890 or 617-251-1234
- 1 Drum/Kit at a Time

Information contact: 617-251-1234 or 800-456-7890



## Leading By Example

- Members of the Leading By Example Program held their July meeting at Deer Island
- MWRA received the “Leading By Example Innovation Award” last fall

