CLEANENERGYRESULTS

Advancing Renewable Energy and Energy Efficiency in the Commonwealth

An Innovative Partnership:

The Massachusetts Department of Environmental Protection

The Massachusetts Department of Energy Resources

Catherine Finneran and Mike DiBara, MassDEP

Massachusetts Water Resources Commission March 8, 2012

Massachusetts & Clean Energy

- Top Priority for Patrick Administration
- Global Warming Solutions Act
  - Comprehensive Program -> Climate Change
  - Goal 10 -25 % Below 1990 GHG levels by 2020
- Green Communities Act
  - Supports Development of Clean Energy Resources
  - Expands Efforts to Promote Energy Efficiency

MA Clean Energy Goals

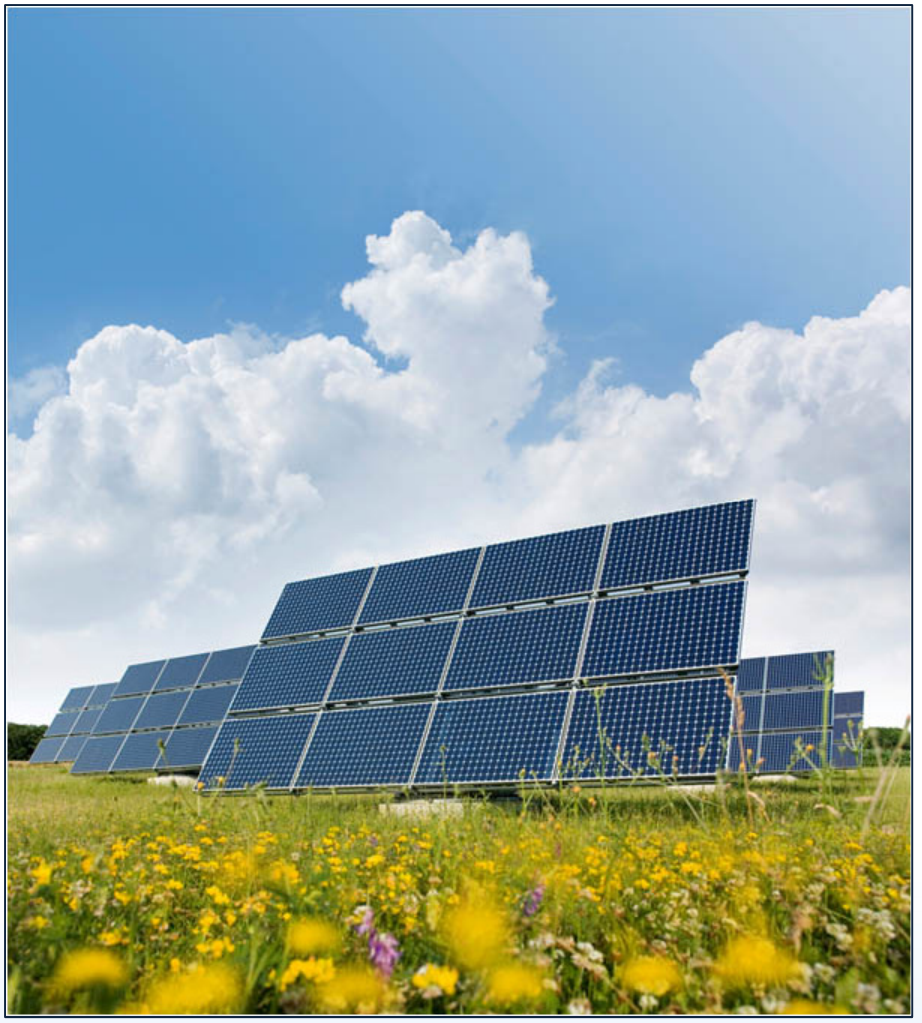
- 15% MA Electricity Supply from Renewable Sources by 2020
  - Solar: 400 MW
  - Wind: 2,000 MW

- DOER Year In Review (as of 12/31/11)
  - Solar: 72 MW (10x increase since 2007)
  - Wind 44 MW (from 3.5 MW in 2007)

MA Ranked #1 in Energy Efficiency
(American Council for an Energy Efficient Economy)

Clean Energy Results Program

- MassDEP/DOER Partnership
- Launched November 16, 2011
- Eliminates Barriers to Siting Clean Energy Projects
- Ensures Highest Protective Standards: Public Health and Environment



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Why is the Program Needed?

- Support Meeting Commonwealth Clean Energy Goals
- Promote Clean and Efficient Sources of Energy at MassDEP Regulated Sites
- Maximize MassDEP's Unique Expertise to Overcome Permitting & Siting Obstacles
- Address Public Health Concerns and Misconceptions Using Sound Science

What Projects are Targeted?

* RPS/APS, including:
  - Solar Photovoltaic
  - Wind
  - AD/CHP
  - Sustainable Biomass
  - Landfill Gas
* Energy Efficiency
* Energy Conservation

Program Elements

1. **Project-Specific Support and Coordination**
   - Permitting/Compliance Assistance
   - Regulatory and Financial Assistance

2. **Regulatory Review and Streamlining**
   - Remove Regulatory Barriers
   - Financial Incentives

3. **Broad Public Education and Engagement**
   - Coordinated Outreach (DOER, MassCEC)
   - Communicate Project Benefits/Address Misconceptions

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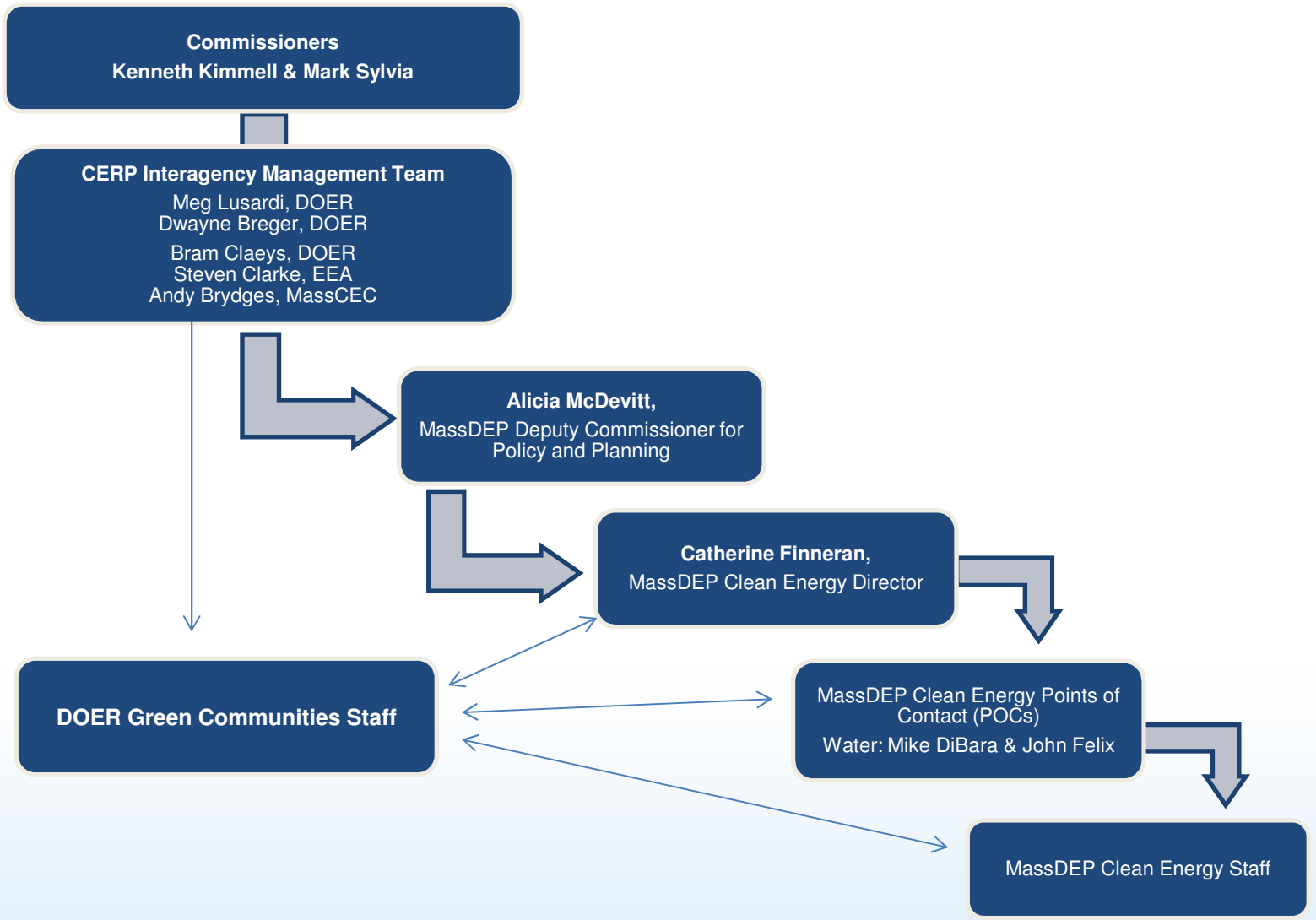
Program Management Structure



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CERP Activities and Goals

- Organics to Renewable Energy
- Environmentally Challenged Land
- Wind
- Clean Energy Support Teams
- Wastewater and Drinking Water Utilities

Organics to Renewable Energy

CERP 2020 Goals:

- Divert an additional 350,000 tons per year of organic material from landfills and incinerators
- Increase energy production from aerobic and anaerobic digestion to 50 megawatts (375gh/year)

Steps to Reach Goals

- Regulatory Amendments
  - Solid Waste Assignment and Wastewater Treatment
- Infrastructure for Organics Diversion
  - Address Collection Barriers
  - Establish Waste Ban (Commercial/Institutional Food Waste)
- Project Siting
  - Identify Appropriate Locations

Environmentally Challenged Property

- Achieve 50+ MW of Clean Energy on Closed Landfills, Brownfields, and Superfund Sites (by 2020)

- Promote the Use of Green Remediation

WMECO Pittsfield

Clean Energy on Closed Landfills

- Total 46+ MW permitted since 7/10

➢ Progress: 30+ MW Permitted Under CERP since 7/11

  ➢ 9 Projects permitted in December alone!

Easthampton Landfill 2.3MW- Photo Courtesy of Borrego Solar Systems, Inc.

Brownfields

Brockton Brightfields Site

Progress:

- 14+ MW Sited on Brownfields
- 5+ Superfund Sites Evaluated for Green Remediation
- Liability Guidance Developed

CERP Goals: Wind

- Wind Turbine Health Impact Study: Report of the Independent Panel

- Review MassDEP Noise Policy Guidance Relating to Wind Turbines

Goals of Report

- Goals of Report:
  - Proactively address health concerns raised by the public about wind turbine exposures
  - Convene independent panel of experts to review existing information of documented/potential health effects associated with proximity to wind turbines
- Process:
  - Panel of physicians and scientists: acoustical noise, public health, sleep disturbance, mechanical engineering, epidemiology, neuroscience
  - Panelists worked independently

Key Health Findings

- No evidence for set of health effects from exposure to wind turbines that could be characterized as “Wind Turbine Syndrome”
- Weight of evidence suggests no association between noise from wind turbines and measures of mental health problems
- There is a possibility that noise from some wind turbines can cause sleep disruptions
- Falling ice is physically harmful and measures should be taken to ensure that the public will not encounter such ice.

Clean Energy / Energy Efficiency at Water Utilities

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Water / Wastewater Treatment in MA

- 370 Water Utilities
  - Including MWRA
- Approx. $150 Million / Year in Energy Costs

<u>Impacts</u>

- 1 Billion kWhs Used
- 1 million of CO_2

Massachusetts Energy Management Pilot for Wastewater and Drinking Water Facilities

A Targeted Approach to Advance Municipal Energy Savings and Greenhouse Gas Reductions

Pilot Facilities

These projects are being made possible by the collaborative efforts of the following organizations:

Executive Office of Energy & Environmental Affairs
MassDEP
Massachusetts Division of Energy Resources
University of Massachusetts Amherst
Center for Energy Efficiency and Renewable Energy
EPA New England
Massachusetts Technology Collaborative
Renewable Energy Trust
Utility / Energy Efficiency Providers: NSTAR, Nantucket Grid/NeoSpan, Cape Light Compact, Western Massachusetts Electric, Unitil, Bay State Gas, and Berkshire Gas
Consortium on Energy Efficiency

A New Public / Private Partnership

Public

- (7) Water & (7) Wastewater Facilities
- MA Dept. of Environmental Protection
- MA Executive Office of Energy / Environmental Affairs
- MA Dept of Energy Resources
- EPA New England
- MA Renewable Energy Trust
- University of MA – Northeast CHP Center

Private

- Every Major Investor-Owned Electric & Gas Utility

Non Profit

- Consortium for Energy Efficiency

2007 Energy Pilots

14 Pilot Facilities: Recommendations



Efficiency: **Save $2M / Year**



Green Power: **Save $1.7M / Year**

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ARRA – Green Infrastructure

Recovery & Reinvestment:
Clean Energy & the Environment

Jump-start "Green" projects: 20% of SRF ARRA

Fully Implement Energy Pilot & Other "Green" projects

(7) Wastewater Plants:	$ 34.8 M
(7) Water Plants:	$ 8.2M
	$ 43.0M
(7) Others	$ 23.1M
Total	$ 66.1M

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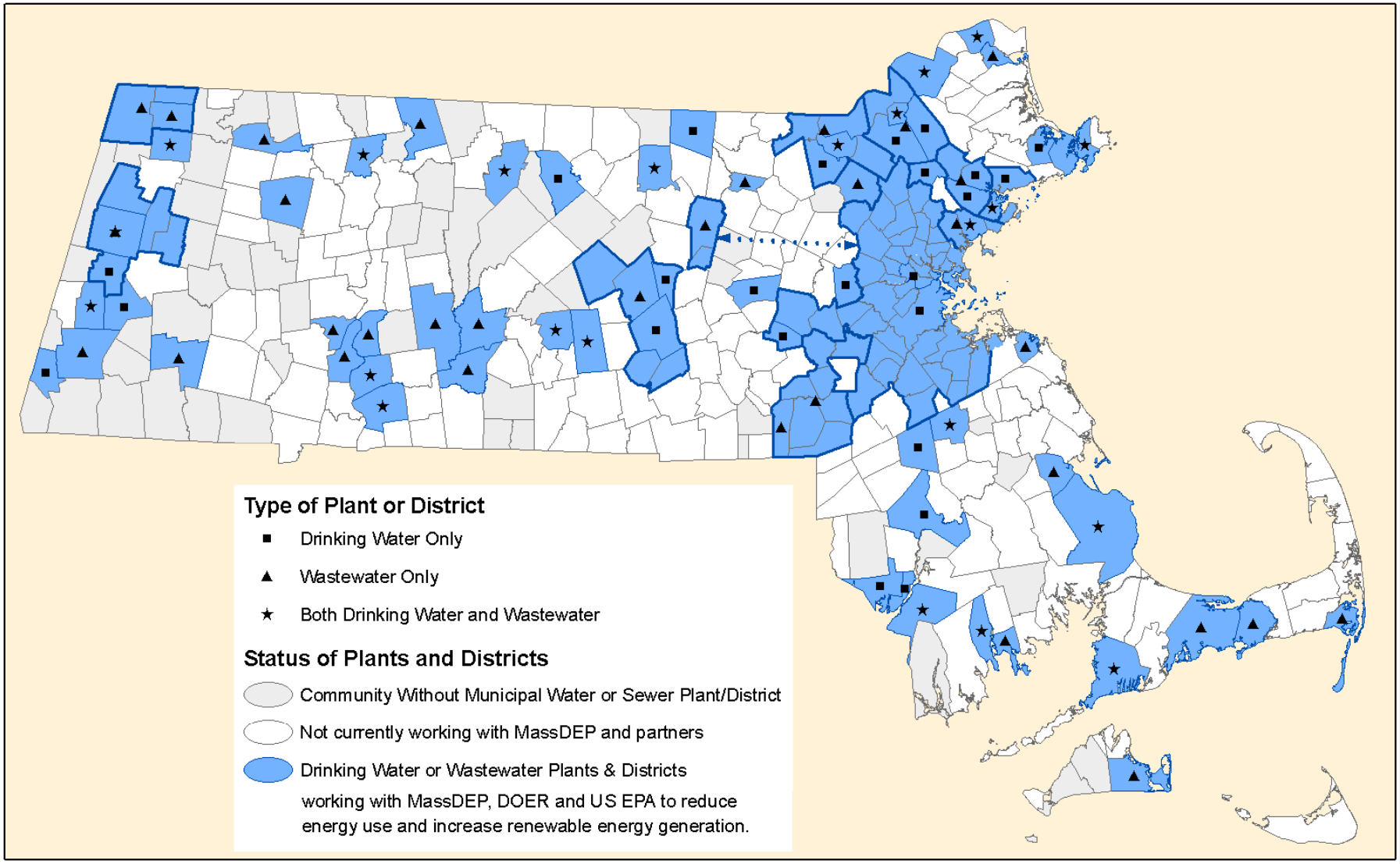
Anticipated Results

- **Save $5+M / year for ratepayers**
- **34% annual reduction in energy costs and CO_2 emissions**
- **10+ megawatts of "green" power**
  - **5.2 MW (solar), 4.8 MW (wind)**
  - **.34 MW (CHP), .20 MW (hydro)**
- **Zero-net energy pathway**

Drinking Water and Wastewater Plants and Districts Working with MassDEP, DOER, and U.S. EPA to Address Energy Use



CERP Water Utility Goals

By 2020, Achieve Zero-Net Energy Use at 20% of Water Treatment Facilities

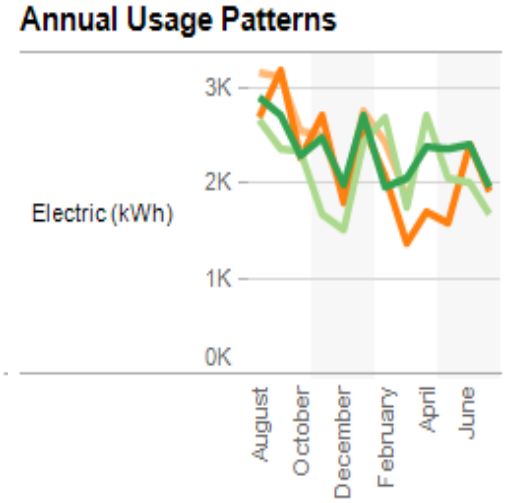
Barnstable Wastewater Treatment 819 kW

- Benchmark Energy Use
- Assess Zero-Net Energy Potential
- Increase Use of Renewable Energy and Energy Efficiency

MassEnergyInsight

POWERING EFFICIENCY

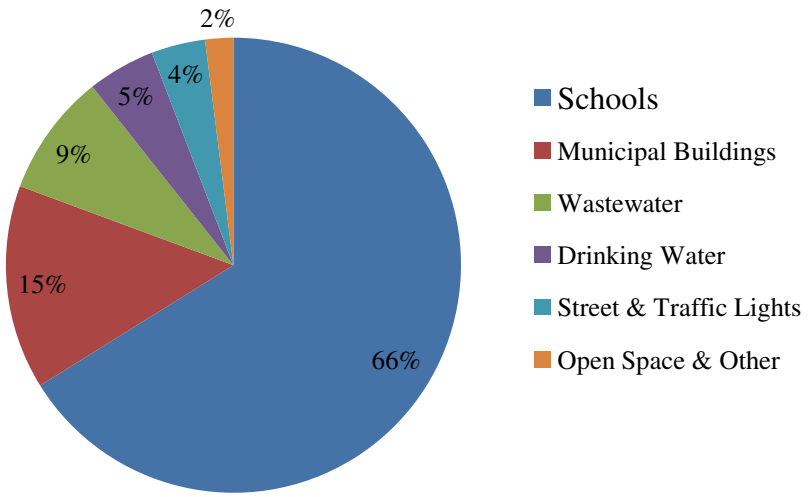
- **FREE** online tool for MA cities, towns
- Sponsored by Mass Dept of Energy Resources
- MassEnergyInsight provides:
  - Automated electronic download of utility data
  - All energy costs and accounts in one place
  - Standard and custom reporting



- MassDEP and DOER are collaborating to gather sector-wide drinking water and wastewater energy use data in MassEnergyInsight

•Currently, approximately 50% of the water flow associated with drinking water treatment and pumping is represented in MassEnergyInsight

Municipal Energy Use in (MEI)



- 72 Drinking Water Plants

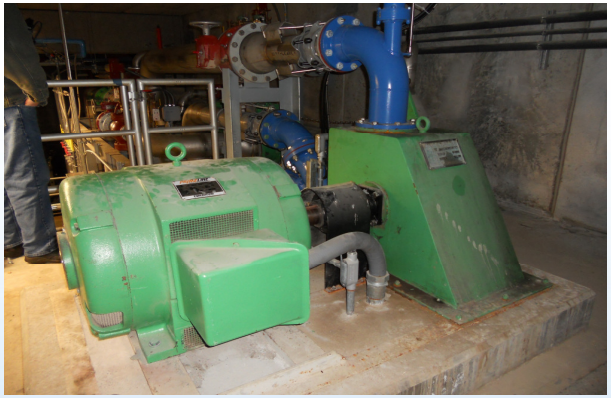
- Drinking Water treatment and pumping accounted for 5% of total municipal energy use in FY11

- An estimated $22,262,614 was spent on energy to treat and pump drinking water in FY11

- 67,353 tons of greenhouse gas emissions (CO2e), equivalent to 11,981 vehicles

Town of Lee - Drinking Water Plant

Efficiency & Renewables	Estimated Project Cost	Estimated Annual Savings ($)	Estimated Annual Savings (kWhs)
VSDs, Motor & Lighting upgrades	$21,000	$7,900 (25%)	27,940
34 kW Solar (PV) system	$380,000	$4,100 (12%)	30,000
Hydro turbine optimization	$320,466	$20,000 (57%)	200,000
Totals	**$721,466**	**$32,000 (94%)**	**257,940**



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Town of Chelmsford
Crooked Spring Water Treatment Plant

485 kW solar PV

- Feasibility Study: UMass – Lowell
- Producing 500,000 kWh / year (41%)
- Saving $ 73,000 / yr (Electricity/ REC)
- Real Time power monitoring
  (plant / public)

http://www.powerdash.com/systems/1000277/

Greater Lawrence Sanitary District Wastewater Treatment Plant

Efficiency First!

- Install VFDs / Premium Efficiency Motors
- Operational, Aeration, Water System, Lighting Improvements

Save ~$637,000 / yr in Electric Costs

- Sludge digester &HVAC improvements

Save ~$350,000 / yr in Natural Gas Costs

Est. Annual CO_2 Emission Reductions:
2,035 tons

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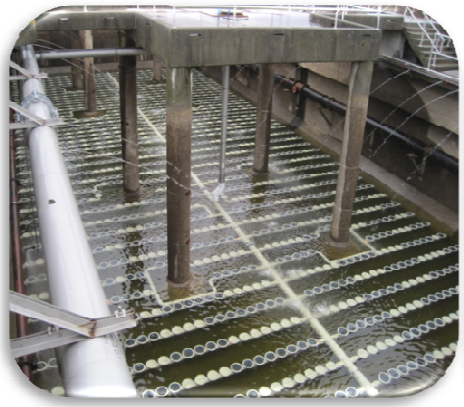
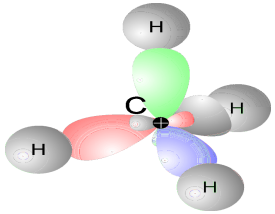
City of Pittsfield
Wastewater Treatment Plant



Aeration Upgrade - Diffused Air w / Turbo Blowers

1,584 kW solar PV

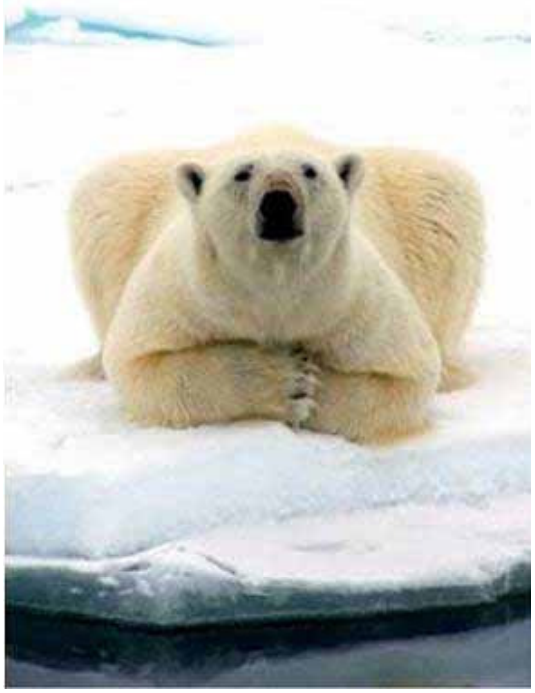


CHP Upgrade

Overall 90% reduction in electrical costs, saving $660,000 / yr

Clean Energy Results:
Public Water / Wastewater Facilities

	CHP (kW)	Solar (kW)	Wind (kW)	Hydro (kW)	Anaerobic Digestion / CHP (kW)	Total (kW)
Installed (before 2007)	-	15	-	9,960	6,000	**15,975**
Installed (between 2007 – 2011)	-	5,475	6,200	262	195	**12,132**
In-Process (to be built)	1,500	592	5,325	59	110	**7,586**
Totals (kW)	**1,500**	**6,082**	**11,525**	**10,281**	**6,305**	**35,693**



Thank You!

Questions?

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