



# Leadership Steering Committee Meeting Q2 2012

The Commonwealth of Massachusetts  
Accelerated Energy Program  
2012-2014  
[www.mass.gov/dcam/aep](http://www.mass.gov/dcam/aep)



Governor Deval Patrick  
Lt. Governor Timothy P. Murray

Secretary Jay Gonzalez  
Commissioner Carole Cornelison



Secretary Richard K. Sullivan  
Commissioner Mark Sylvia



Welcome and Introductions

AEP Overview

Quarterly Report Review

DOER Updates – ARRA

Feedback and Discussion

Next Meetings

DCAM and DOER recognize **Stephen Brown** and **Yvonne Jones** from DCR. In Q2, DCR provided innovative thoughts, attended numerous planning meetings and aided DCAM and DOER in advancing the goals of the AEP.

Contributions include:

- Site coordination
- Test run audit feedback
- Innovative approaches to implementation
- Green Team initiative at Waquoit Bay National Estuarine Research Reserve

Thank you Stephen and Yvonne for your dedicated efforts!

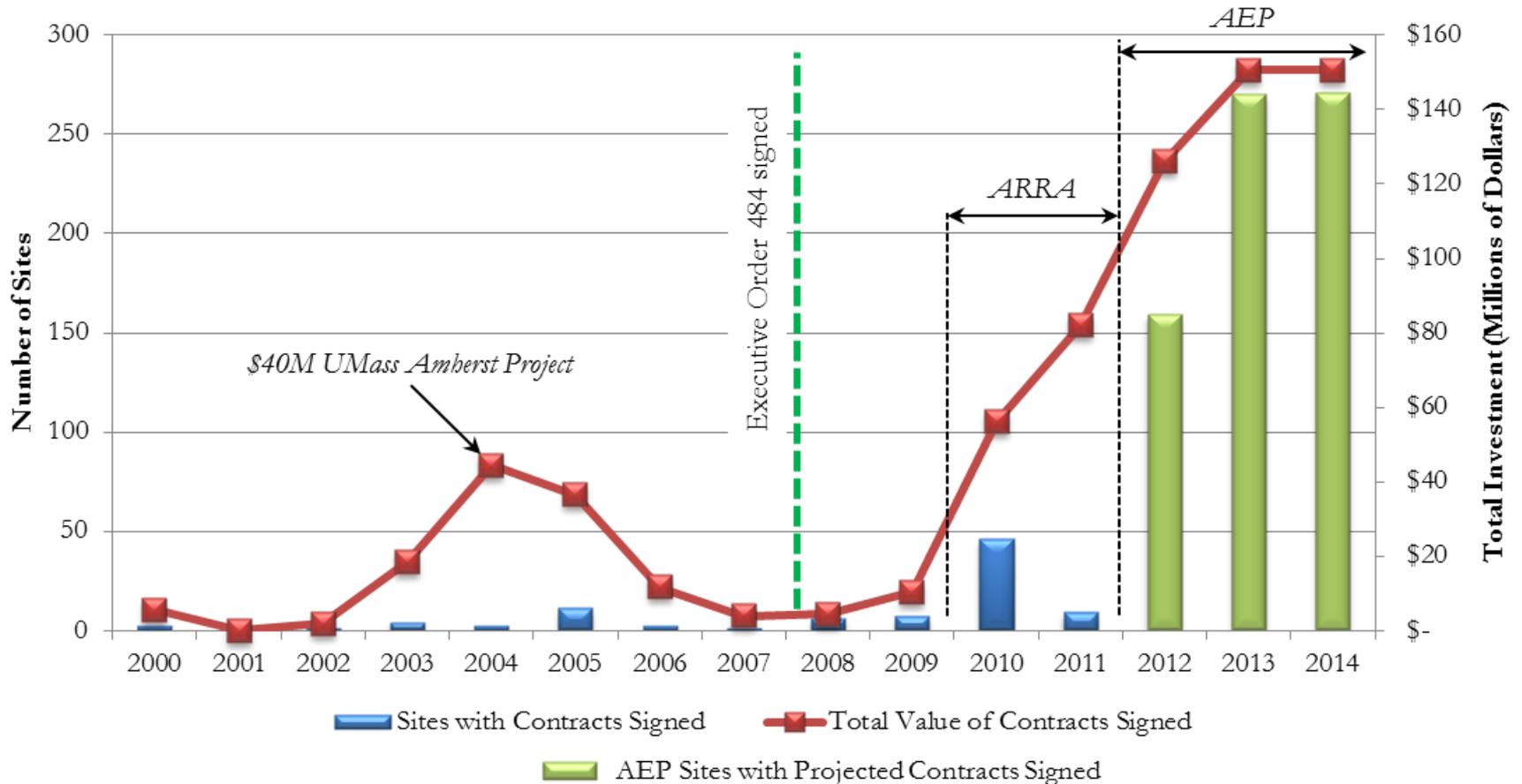


- The AEP was established in December 2011 to accelerate the implementation of energy and water projects across the Commonwealth.
- DCAM is working with DOER and numerous partners to retrofit 700 sites throughout the Commonwealth.
- In Q2 2012, the AEP team accomplished the following:
  - Finalized Planning and Implementation Strategy
  - Developed Financial Projections
  - Initiated Energy Studies at 99 Sites
  - Completed Energy Projects at 6 Sites
  - Established an initial Energy Baseline
  - Lean process improvement



# Accelerated Energy Program

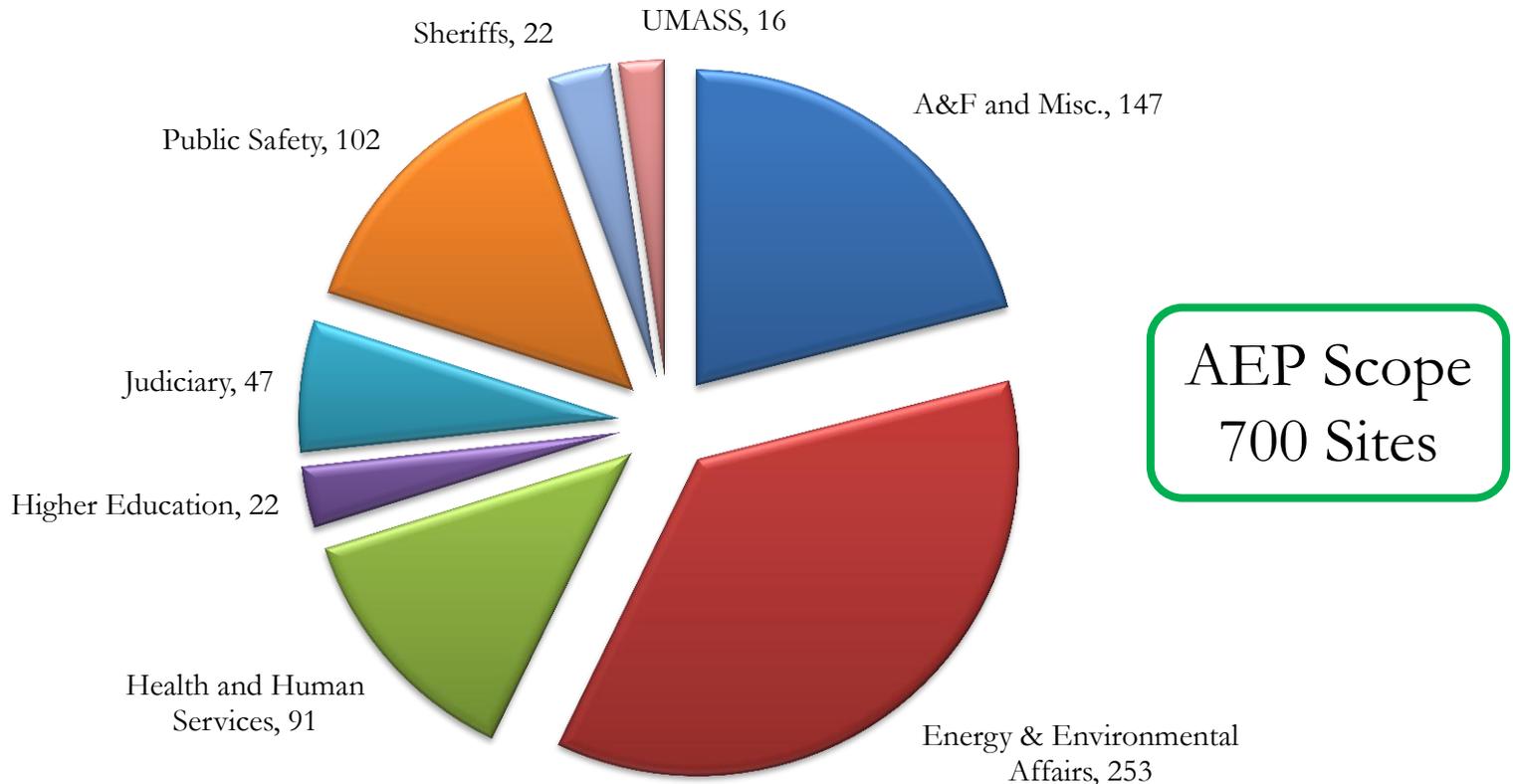
In December 2011, the Patrick-Murray Administration established the Accelerated Energy Program (AEP) to accelerate and expand energy and water conservation projects.



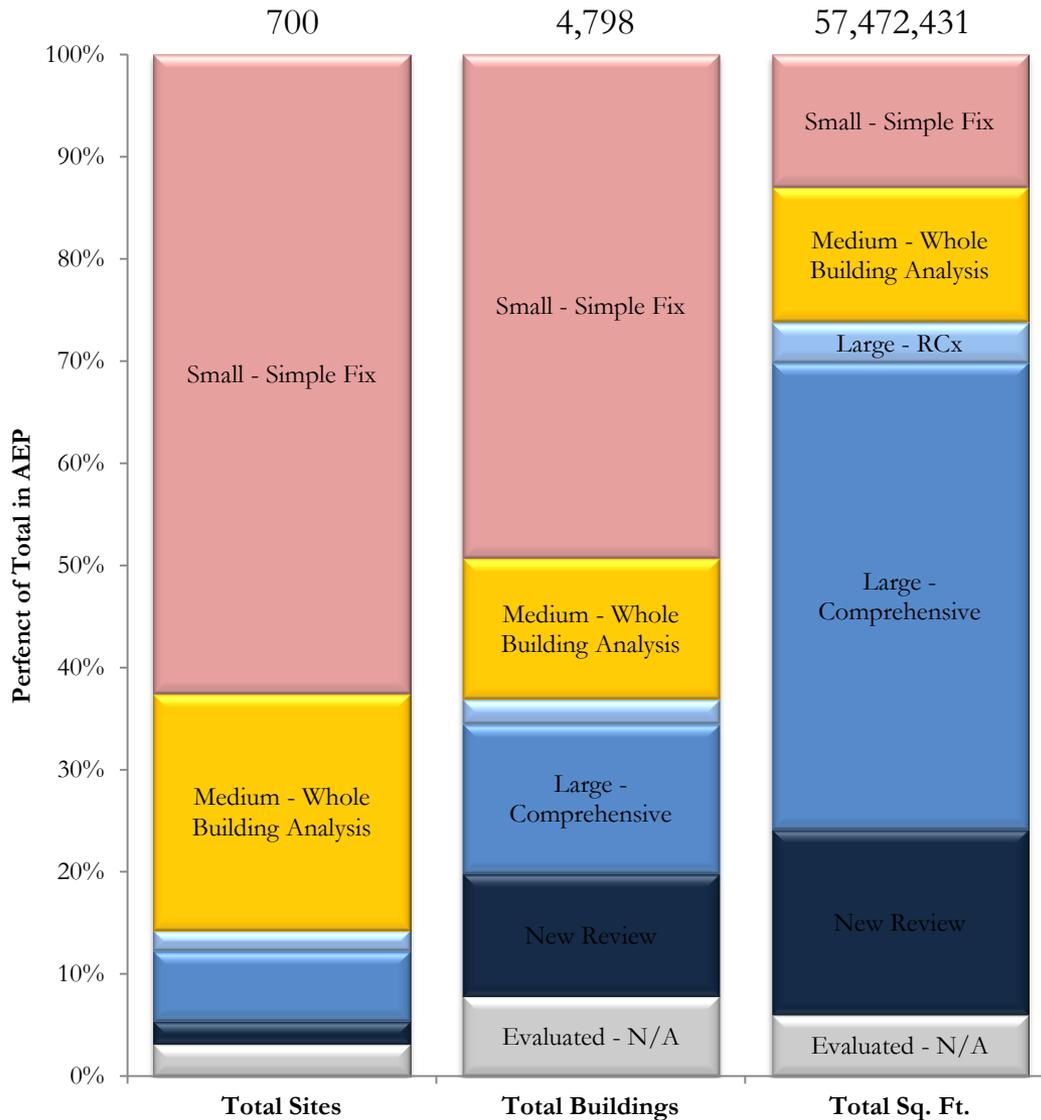


# Program Definition

There are 818 sites in the Commonwealth's capital asset inventory. A total of 118 were excluded from the AEP because they are not currently in use, are considered retrofitted through recent prior projects, or do not consume energy. The remaining 700 sites will be retrofitted through the AEP.



# Implementation Plan



Implementation Group	3/16	8/3
Simple Fix	444	<b>438</b>
Whole Building Analysis	152	<b>162</b>
Retro-Commissioning	20	<b>14</b>
Comprehensive	27	<b>48</b>
New Review	11	<b>16</b>
Evaluated – N/A	57	<b>22</b>

# Sample ECMs by Implementation Group

ECM	Implementation Group			
	Simple Fix	Whole Building Analysis	Retro-Commissioning	Comprehensive

## Group 1 (Short payback, mini-audit, ready to build)

Lighting Upgrades (lamps, LED's), Controls	✓	✓	✓	✓
Low Resistance Air Filters	✓	✓	✓	✓
Programmable Thermostats	✓	✓	✓	✓
Weather Stripping	✓	✓	✓	✓
Water Conservation	✓	✓	✓	✓
Steam Trap Replacement		✓	✓	✓
Retro-Commissioning		✓	✓	✓
Variable Frequency Drives (Pumps, Fans, Cooling Towers)		✓	✓	✓

## Group 2 (Medium payback - Study and detailed design)

High Efficiency Boilers, Pumps, Fans		✓	✓	✓
Insulating piping & equipment		✓	✓	✓
Increased building insulation		✓	✓	✓
Metering			✓	✓
Energy Dashboard			✓	✓
New windows or storm windows			✓	✓
Energy Recovery			✓	✓
Solar Thermal			✓	✓

## Group 3 (Long payback - Feasibility study, design)

Photovoltaics			✓	✓
Solar Thermal			✓	✓
Rainwater harvesting			✓	✓
Wind Turbines				✓
CHP and/or cogeneration				✓
Geothermal				✓
Chilled Water Storage				✓
Recovery Cooling Coil Condensate				✓

We plan to “green” **700** Sites

In a total of **700** Working days

We have initiated work at **105** Sites in the AEP

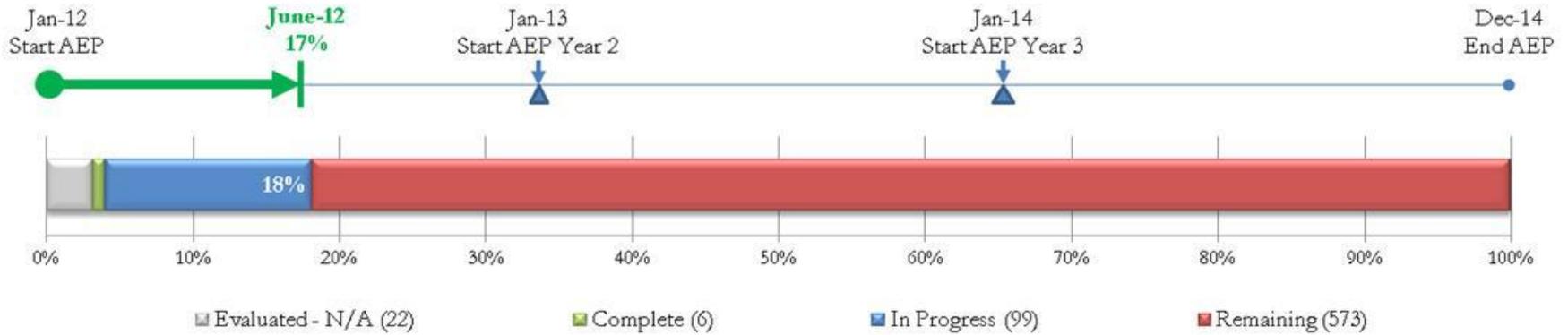
And now have **99** Sites **In Progress**

And **6** Sites with **Completed** projects

# Key Metrics

<b>Accelerate delivery of energy projects to 3 years and "green" every facility where feasible</b>	<b>Target</b>	<b>Q2 Actual</b>
Sites Retrofitted ("touched") (Total # & Sq. Ft.)	700	6
Energy Projects Completed (Total #) by Agency, Utility & DCAM		
Annual Energy & Water Savings (Estimated Total \$)	>\$43M	
Investment in Energy Projects (Estimated Total \$)	\$427M	
Average Payback on Total Investment	≤ 10 Years	
<b>Communicate progress.</b>	<b>Target</b>	<b>Q2 Actual</b>
Public Website with Quarterly Updates	Quarterly	Launched
Total # of Unique Visitors per Month (Public Website)		
Total # of Buildings "Tagged" with AEP Label		
<b>Implement innovative, sustainable, and economical energy solutions.</b>	<b>Target</b>	<b>Q2 Actual</b>
Total # of Projects Using Innovative Approaches or Methods		
Energy Consumption Reduction by Program Area (% kBtu per sf. Ft)		
Renewable Energy by Program Area (% of Total Consumption)		
Greenhouse Gas Emissions by Program Area (% MTCO2 Reduction)		
Potable Water/Sewer by Program Area (% of Reduction of Total potable water usage)		
<b>Improve energy and water efficiency and sustainability.</b>	<b>Target</b>	<b>Q2 Actual</b>
Energy Conservation Classes Offered (Total #)		
Energy Training Sessions Provided (Total #)		
Buildings with Utility Metering or Energy Dashboards		
<b>Continuously improve processes.</b>	<b>Target</b>	<b>Q2 Actual</b>
On-Time Project Completion	100%	
On-Budget Project Completion	100%	
<b>Create sustainable job opportunities across the Commonwealth.</b>	<b>Target</b>	<b>Q2 Actual</b>
Workforce / Jobs Created (Total #)		
<i>Minorities</i>	15.3%	TBD
<i>Women</i>	6.9%	TBD
M/WBE Participation (Project Commitment / Awards)		
<i>Design Contracts</i>	17.9%	TBD
<i>Construction Contracts</i>	10.4%	TBD

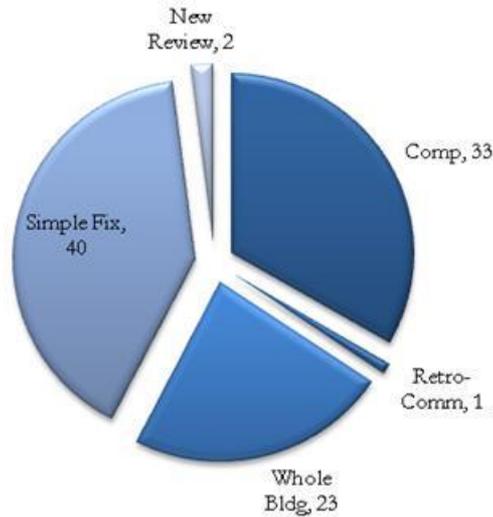
# Program Status



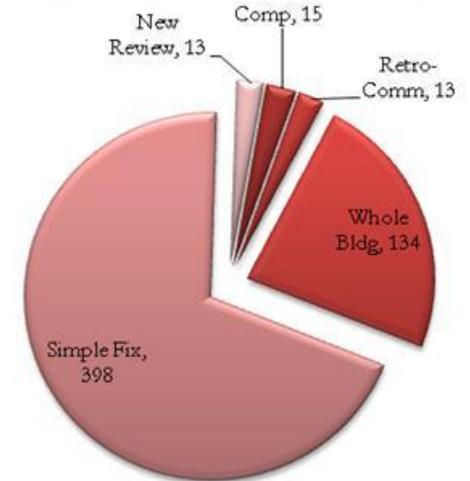
## Number Complete (6)



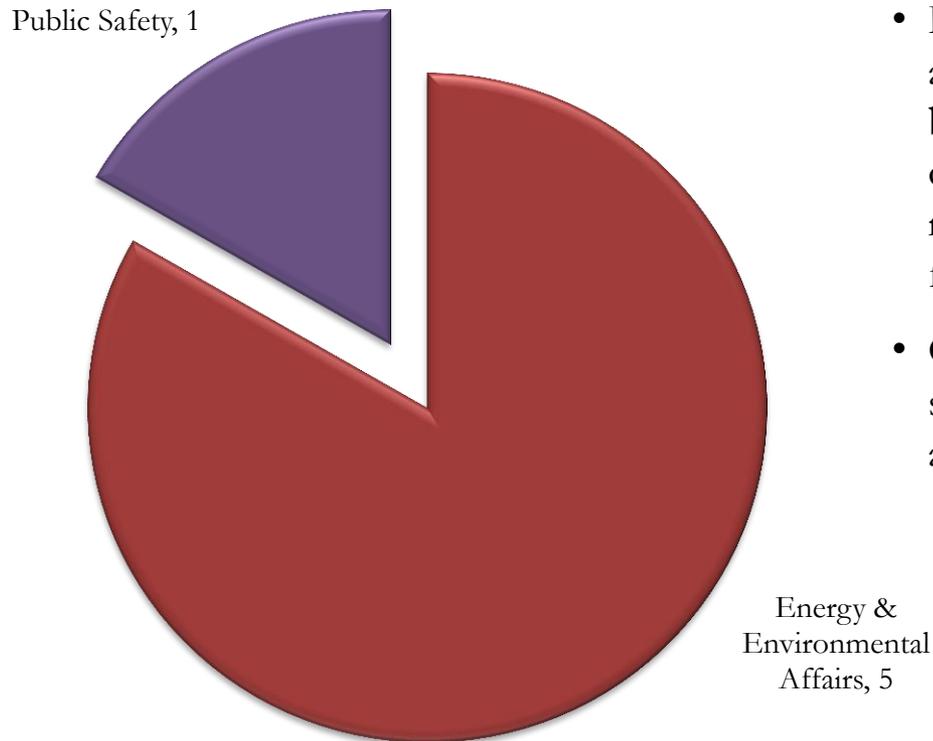
## Number In Progress (99)



## Number Remaining (573)



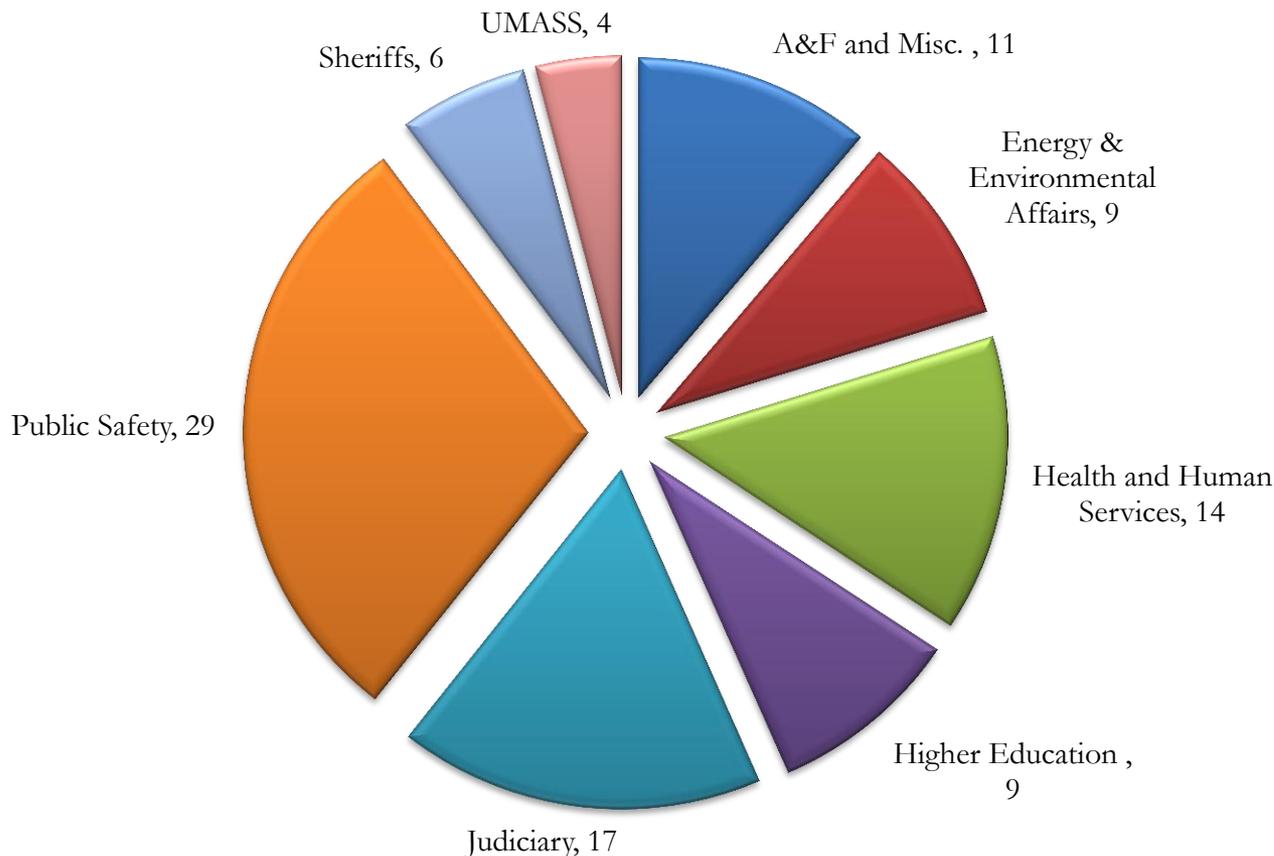
Complete:  
6 Sites



**The following major milestones have been achieved through Q2 2012:**

- Five Department of Conservation and Recreation skating rinks have been retrofitted with reflective ceilings. These projects were managed by DOER using ARRA funding.
- One Department of Correction site, MCI Norfolk, has completed a water conservation project.

In Progress:  
99 Sites



**The following major milestones have been achieved through Q2 2012:**

- Department of State Police – Audits initiated at 27 sites
- DCR and MassDOT – Audits initiated at 14 sites. 11 of the audits were completed this quarter
- Department of Mental Health – Audits initiated at 8 sites
- State House – Construction started on lighting project
- Government Center Complex – Finalizing audits at 5 sites
- Middlesex Community College – Construction started on ground source heat pump project

## Executive Office of Labor & Workforce Development

### Career Center Taunton, MA

Status: **Audit Complete**

#### Project Overview:

- Heating and cooling systems currently operate simultaneously and independently.
- Retro-commissioning at the Career Center will reduce overall utility costs by an estimated \$12,000 per year.
- Implementation of retro-commissioning has a 1.4 year payback.
- AEP sites may move from one implementation group to another after study; this site is an example as it will probably move from Simple Fix to Retro-Commissioning.

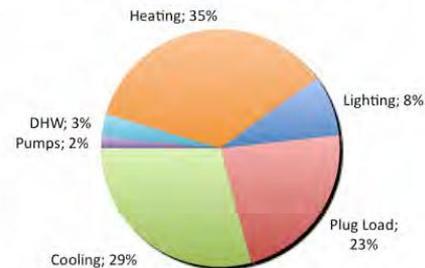
#### Other EOLWD Sites:

- Career Centers in Brockton, Fall River, and New Bedford will be retrofit through the Simple Fix or WBA programs.

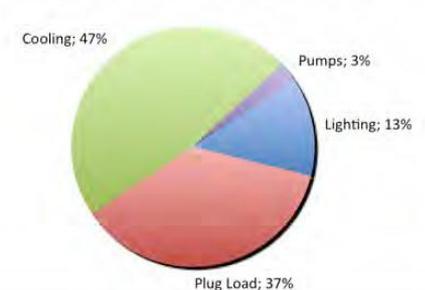


*Taunton Career Center*

Taunton Career Center Utility Cost



Taunton Career Center Electric End Use



*\*Utility Costs and Electric End Use from EE&D Audit*

## Department of Conservation and Recreation

### Energy Efficient Skating Rinks

Murphy Memorial – South Boston, MA

Reilly Memorial – Brighton, MA

Daly Memorial – Brighton, MA

Devine Memorial – Dorchester, MA

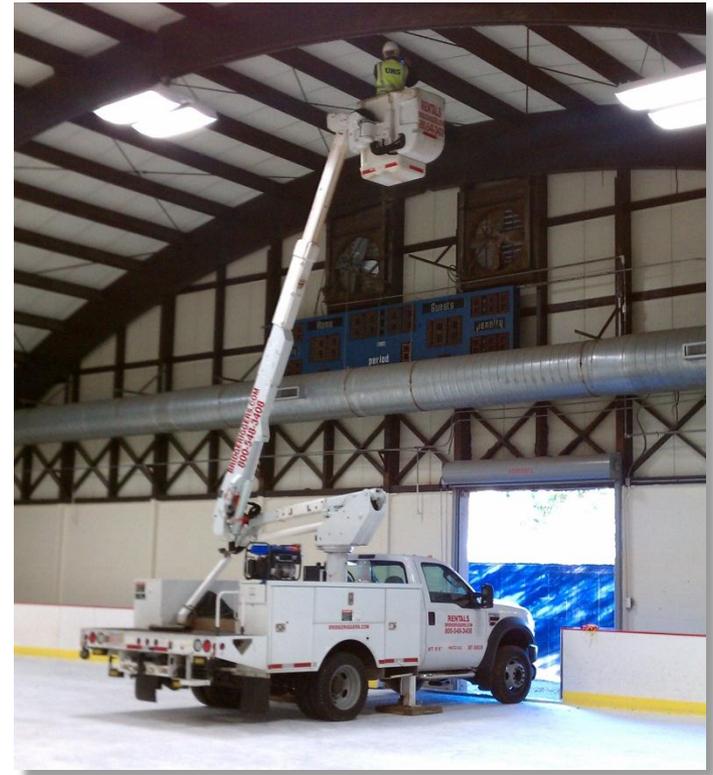
Bajko Memorial – Hyde Park, MA

Connell Memorial – Weymouth, MA

Status: **In Construction / Complete**

### Project Overview:

- DOER led project utilizing ARRA funds.
- Low-Emissivity ceilings at five ice rinks will reduce energy use and improve ice quality.
- After installation of new low-e material, rink managers measured a 20 degree temperature drop at ice level.
- New ceilings will reduce rink refrigeration loads by 25-40%.
- The project will yield an estimated 30%+ in total energy savings.



*Murphy Memorial Rink*



## Judiciary

---

### Worcester Trial Court Worcester, MA

---

Status: **Audit Initiated**

#### Project Overview:

- 420,000 square foot building was built in 2007.
- Audit will investigate function of HVAC, Energy Management System, and lighting systems.
- Depending on retro-commissioning results, operational upgrades and quick payback ECMs may be recommended for implementation.

#### Other Judiciary Sites:

- 26 other sites are bundled into larger projects that are currently in construction or study.



*Worcester Trial Courthouse*

## Sheriff's Department Berkshire

---

### Berkshire County Jail and House of Corrections Pittsfield, MA

---

Status: **Study Initiated**

#### Project Overview:

- 160,000 square foot facility dedicated in 2001
- Comprehensive energy and water retrofit may include:
  - Lighting improvements
  - Occupancy sensors
  - Metered timer controls for showers – will save an estimated 45,625 gallons/year
  - Condensing boilers
  - Solar photovoltaic array for on-site power generation
  - Solar thermal heating system for domestic hot water
- Total investment of \$2.7M has a 5.4 year simple payback



*Berkshire County Jail and House of Corrections*

## University of Massachusetts

### UMass Amherst Amherst, MA

Status: **In Construction / Study Initiated**

#### Project Overview:

- A significant amount of energy efficiency measures have been invested in UMass Amherst since 2000, including:
  - 2004 – \$43M Comprehensive energy contract signed.
  - 2009 - \$3M Cogeneration contract signed.
- UMass qualifies for a New Review of potential upgrades:
  - Small energy retrofit project – ESA signed 6/27. Will invest \$1.7M in lighting upgrades and controls, fume hood controls, and optimization of chillers and the Central Heating Plant.
  - New Biomass Plant – Study currently In Progress.
  - Due to size of the site, more projects and measures may be determined during the AEP.



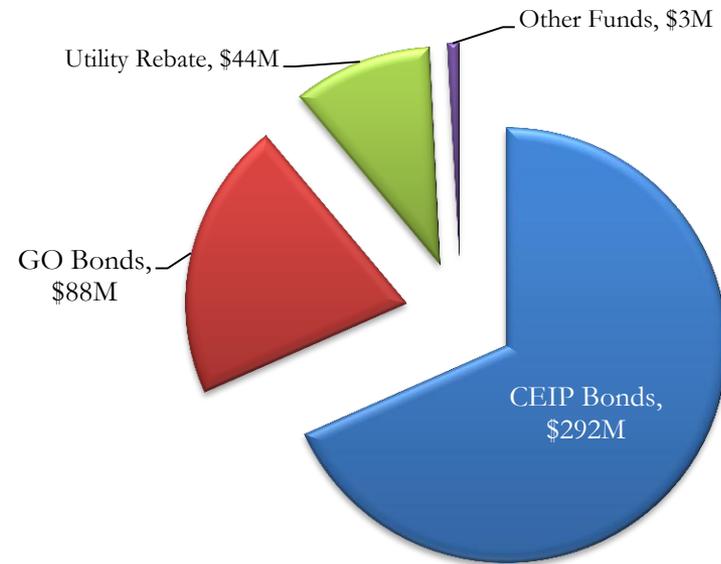
*University of Massachusetts - Amherst*



*UMass Amherst Central Heating Plant*

## Projected Investment by Funding Source

- 68% of total AEP investment (\$292M) is funded by CEIP Commonwealth bonds.
- Utility rebates estimated based on a review of past DCAM, DOER, and utility projects.

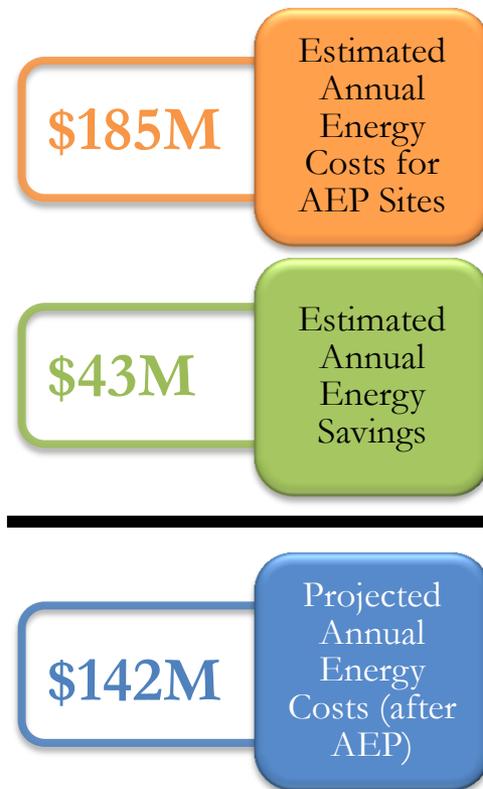
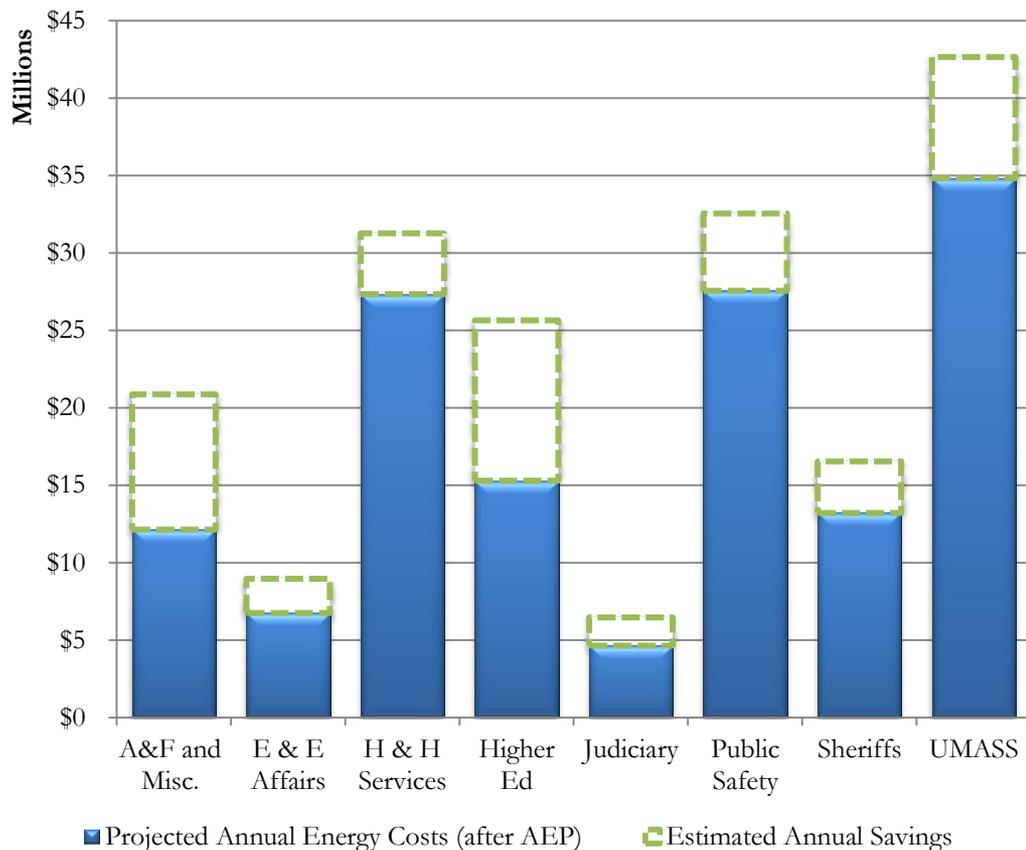


**Total Investment:  
\$427 Million**

Implementation Group	Est. Total Investment	CEIP Bonds	GO Bonds	Percentage Utility Rebate	Utility Rebate	Other Funds
Simple Fix	\$ 16,054,061	\$ -	\$ 10,350,869	36%	\$ 5,703,192	\$ -
Whole Building Analysis	\$ 57,650,059	\$ 9,820,000	\$ 33,589,211	25%	\$ 14,240,848	\$ -
Retro-Commission	\$ 24,028,771	\$ 16,540,689	\$ 3,619,898	16%	\$ 3,868,185	\$ -
Comprehensive	\$ 304,493,949	\$ 243,363,866	\$ 40,147,051	6%	\$ 19,498,032	\$ 1,485,000
New Review	\$ 24,855,699	\$ 22,000,000	\$ 789,847	1%	\$ 246,851	\$ 1,819,000
<b>TOTAL</b>	<b>\$ 427,082,539</b>	<b>\$ 291,724,555</b>	<b>\$ 88,496,876</b>	<b>10%</b>	<b>\$ 43,557,108</b>	<b>\$ 3,304,000</b>

## Projected Annual Energy Cost Reductions

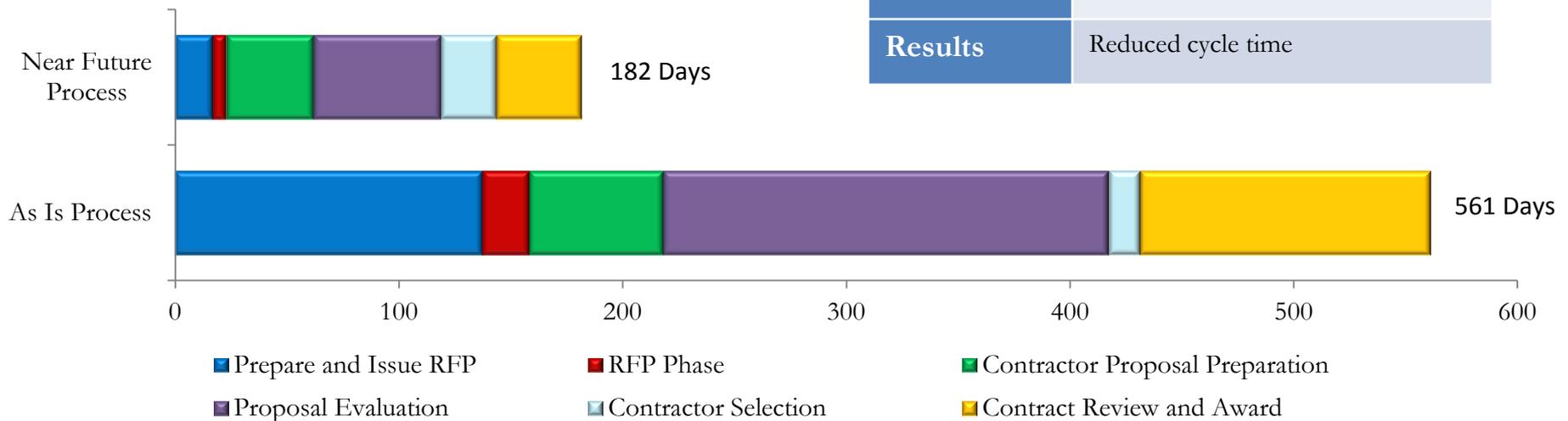
- Shown below are energy costs for AEP sites, with anticipated reductions from current levels represented by green dashed areas.
- Savings estimates generated using historical data.



DCAM and the AEP team are working to incorporate Lean principles in an attempt to make procurement, data processes and workflow more efficient.

Applying Lean thinking to Energy Design-Build Procurement enabled the AEP team to drastically shorten its existing process:

**67% Reduction**



Principles of Lean	
Theory	Waste is deadly
Application	1. Define value
	2. Identify Value Stream
	3. Make it flow
	4. Let customer pull
	5. Pursue perfection
Focus	Flow focused
Assumption	Non-value added steps exist
Results	Reduced cycle time

The AEP is a complex program with a variety of stakeholders and contributors. Given the complexity of the program, the identification and mitigation of risks becomes an important factor in successful program management.

The table below highlights some important risks from the Program Exposures section of the Q2 2012 report.

Risk Identifier	Risk	Impact Description	Risk Score (1=Low 6=High)	Timeline	Risk Response	Risk Owner (Working Group)
<b>Communications</b>						
CO-R1	Communication plan is not in place	Lack of broad support for AEP	1	Mid-term	Engage stakeholders and the public through targeted events.	Communications
<b>Implementation Planning</b>						
IP-R2	Lack of consensus in definition of "Green" and set benchmark for completion	Cannot accurately track progress of AEP	2	Near term	Collaboratively develop a definition for completion.	Data & Performance Management / Communications
IP-R4	All requested funding not in place (bond bills, utility rebates, etc.)	Not enough funds to complete program	6	Near term	Develop a project prioritization list based on highest return on investment or critical needs.	Procurement
<b>Standards &amp; Process Creation</b>						
SP-R2	Inadequate procurement/contracting resources to handle increased volume of projects	Program implementation is delayed beyond 3 years	6	Near term	Augment existing procurement/contracting staff by outsourcing or bring in additional long term hires within DCAM.	Procurement / Labor & Workforce Development
SP-R3	Building codes change during implementation	Construction change orders	2	Long term	Coordinate with MAFMA to identify and monitor state regulations and building codes to identify changes prior to construction. Quarterly updates.	Site Upgrades

# Working Group Accomplishments

	Q2 2012	Q3 2012
Communications	Hired firm to promote the AEP, launched public website	Develop Strategic Public Relations and Stakeholder Engagement Campaign
Simple Fix	Developed implementation strategies and engaged with utilities	Secure contracts with utilities
Audits & RCx	Developed standardized audit template and Retro-Commissioning approach	Initiate Retro-Commissioning audits
Outreach & Tech Support	Finalized Site Survey	Distribute Survey to facility managers and analyze results
Sites Upgrades	Developed building code matrix	Develop roadmap for building codes
Data & Performance	Refined program definition, energy baseline, and initial financial plans	Prioritize all AEP projects using baseline data
Procurement	Explored innovative contract options with utilities, comptroller, and DCAM business units	Develop approach for achieving M/WBE goals
Leasing	Identified all leased spaces in privately owned sites	Develop approach for leased spaces
Labor & Workforce	Established new working group, defined goals and objectives	Establish AEP Certification Program

What is “green”?

Program Goals and Financing

Q3 Outlook

Other



Thank you!

We greatly appreciate your  
time and guidance.

The next Leadership Steering  
Committee meeting is scheduled  
for November 2, 2012.



*Drill Rig at Middlesex CC*