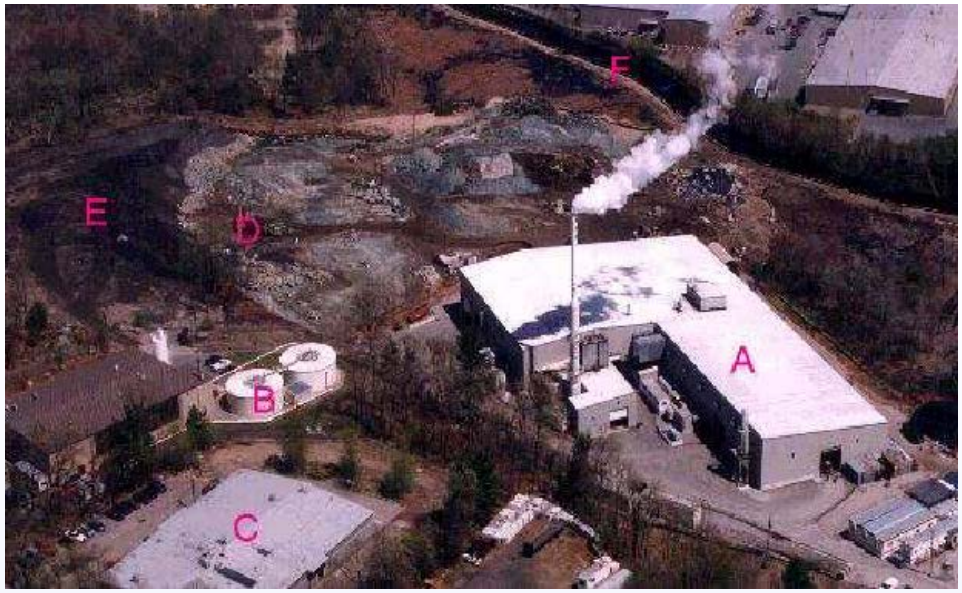
The State of Greener Cleanups in Massachusetts

Air & Waste Management Association – New England Section
FALL 2016 CONFERENCE

Thursday, October 27, 2016
Sheraton Framingham Hotel & Conference Center, Framingham

Thomas M. Potter, Clean Energy Development Coordinator

Cleanups have an Environmental Footprint



Remediation – 1996 to 2016

A) Incinerator & Restored Wetland

B) Groundwater Treatment Plant

C) Bauer, Inc.

D) Excavation

E) Backfilled Incinerated Ash

F) Cochato River

Challenge: To Lower the Environmental Footprint of Cleanup Projects

Greener Cleanups*

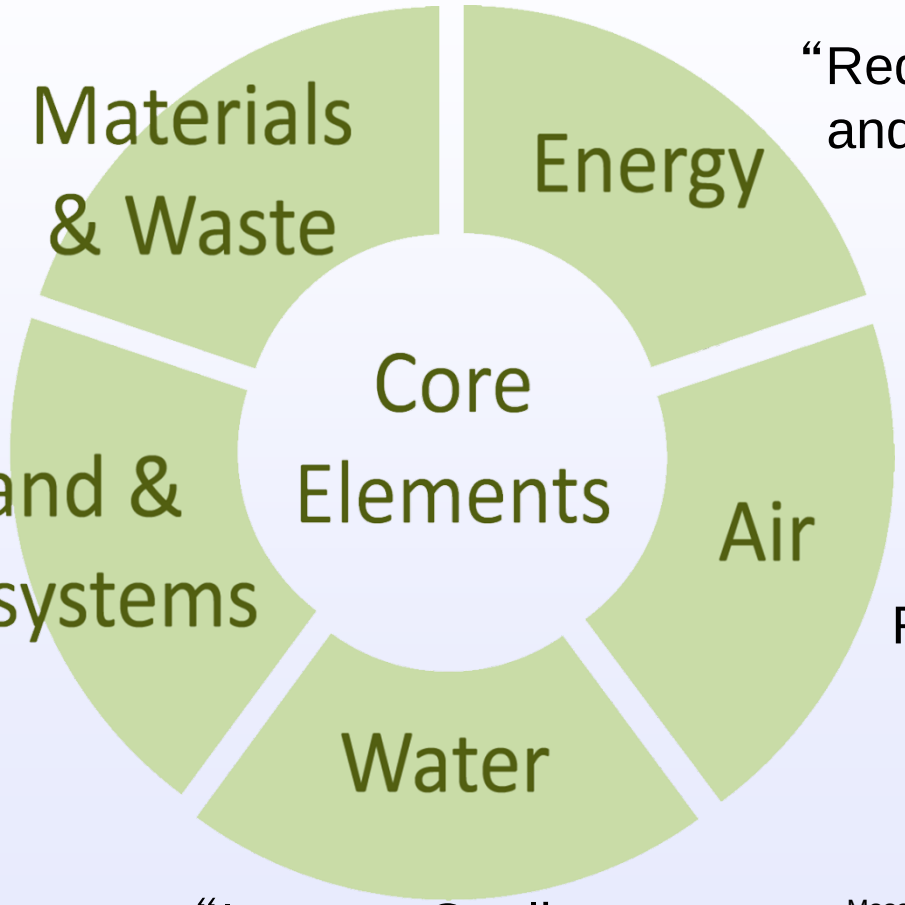
The practice of considering all environmental effects of remedy implementation and incorporating options to minimize the environmental footprints of cleanup actions.

*as defined by US EPA, aka Green Remediation
(no definition in Massachusetts)

Core Elements for Greener Cleanups

"Minimize, Reuse, and Recycle…"

"Reduction, Efficiency, and Renewables…"



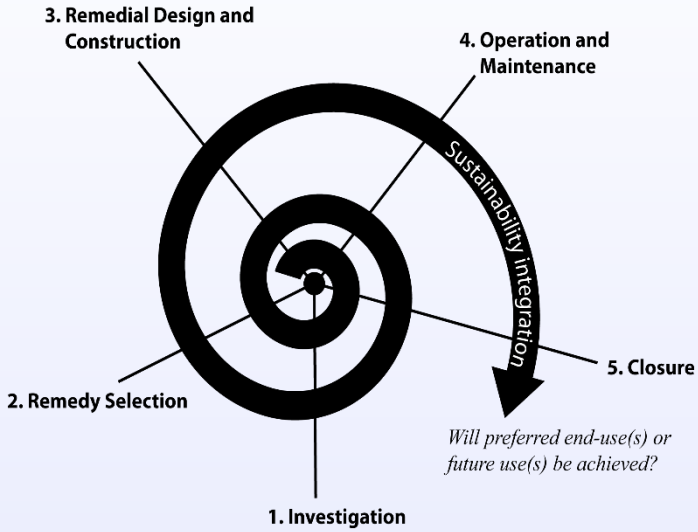
"Conserve, Protect, and Restore…"

"Protect Air Quality, Reduce Greenhouse Gases…"

"Improve Quality, Decrease Quantity of Use…"

Framework for Greener Cleanups

- Greener Cleanup is a Process, not a Technology
  - Greener cleanup principles should be integrated into cleanup projects
  - Applied on a phase-by-phase basis
  - Is not just about remedy selection and "green technologies"
- Two tracks in Greener Cleanups
  - Qualitative - Focus on how to incorporate BMPs (Best Management Practices) into projects
  - Quantitative Evaluation to help identify BMPs



Best Management Practices **(BMPs)**

Activities that, if applicable to the situation, typically will reduce the environmental footprint of a cleanup activity.

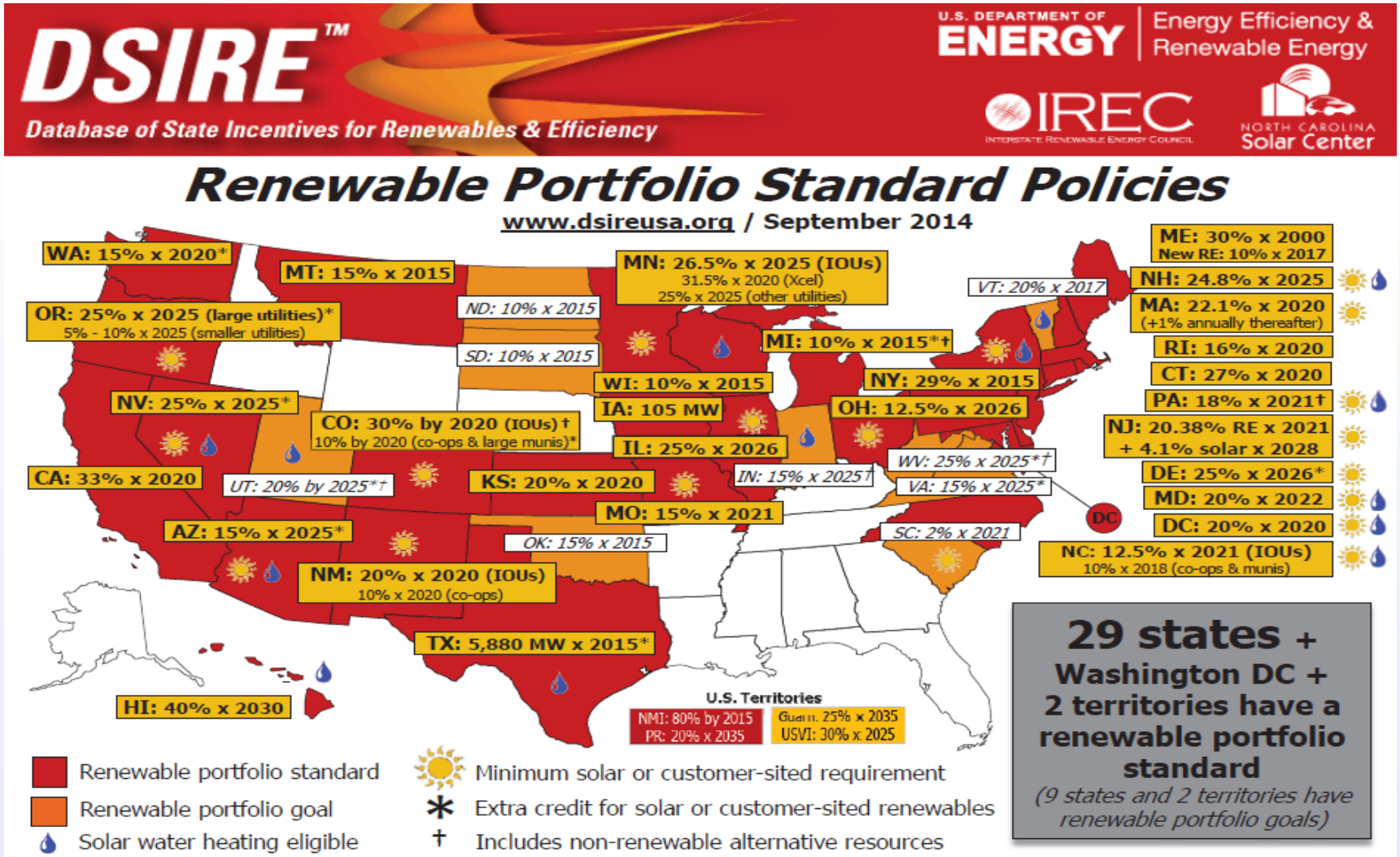
Examples:

- Use on-site generated renewable energy
- Recycle non-usable/spent materials & Equip.
- Implement idle reduction plans
- Minimize clearing of trees
- Establish green requirements (for example, SMPs and BMPs) as evaluation criteria in the selection of contractors and include language in RFPs,

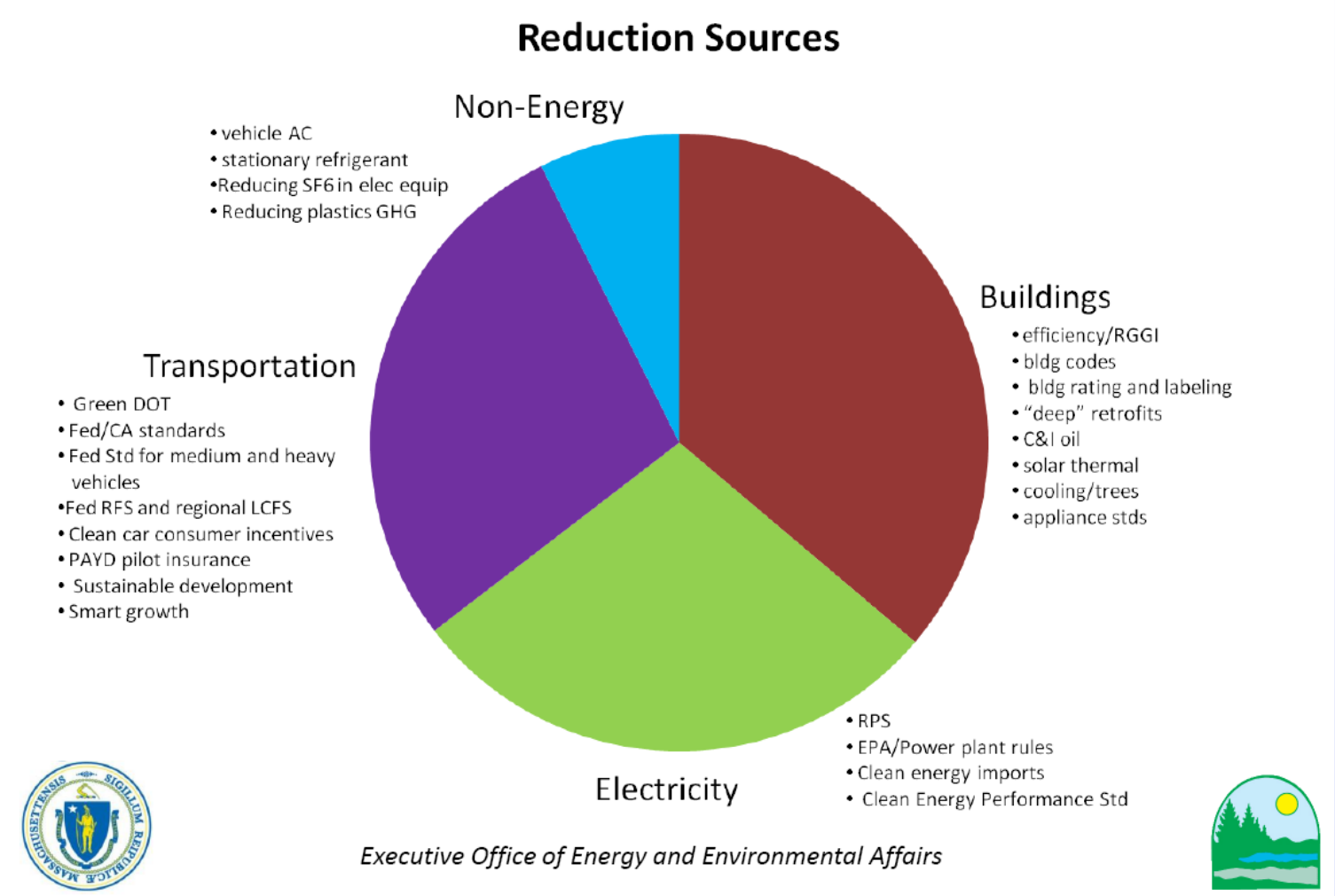
Massachusetts Clean Energy

- 2007 established **Executive Office of Energy & Environmental Affairs**
- 2008 **Green Communities Act (GCA)**
  - Supports Development of Clean Energy Resources
  - Expands Efforts to Promote Energy Efficiency
  - **Increased the Renewable Energy Portfolio Standard (RPS) to 1% per year.**
  - **Goal of 15% "New Sources" by 2020 (currently 9%)**
- 2008 **Global Warming Solutions Act**
  - Comprehensive Program -> Climate Change
  - **Goal 25 % Below 1990 GHG levels by 2020**

ENERGY: RPS Programs Nationally



EMISSIONS: GHG Emission Reduction Opportunities



CLEANENERGYRESULTS

- Launched 2011
- **Promotes Clean and Efficient Sources of Energy at MassDEP Regulated Sites (where we have authority or control)**
- Maximizes MassDEP's Unique Expertise to Overcome Permitting & Siting Obstacles
- **Create economic growth and employment opportunities**

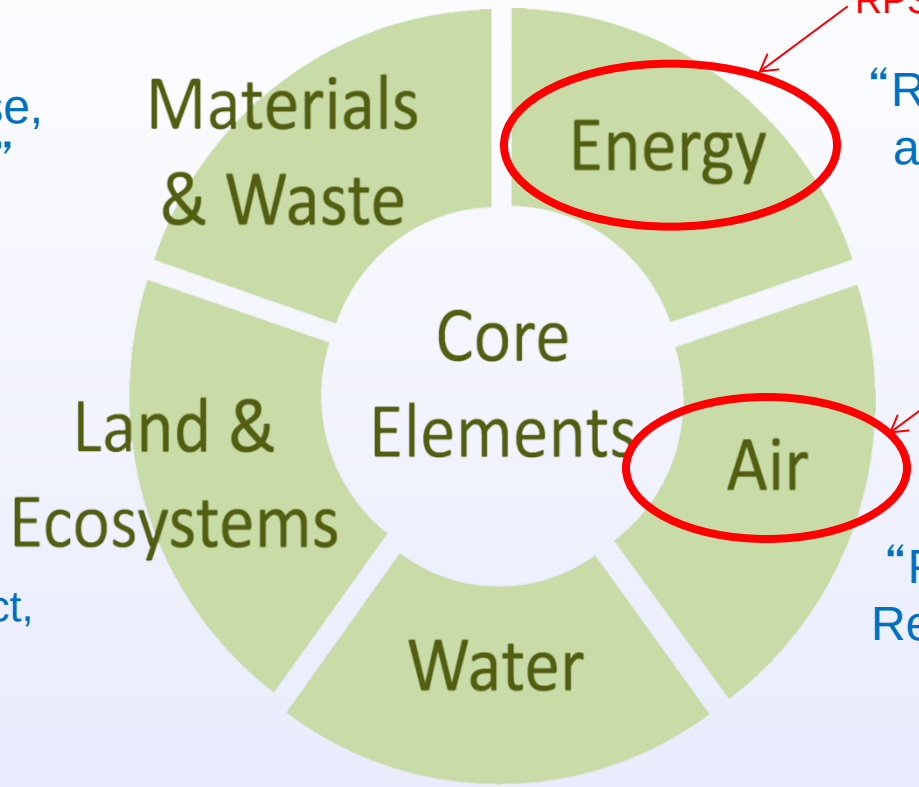
Massachusetts Department of ENVIRONMENTAL PROTECTION

COMMISSIONER'S CERP GOAL

"Promote the use of Green Remediation/ Greener Cleanups at state and federally regulated contaminated sites"

Brockton Brightfields, 425 kW solar PV

Core Elements of Greener Cleanups



"Minimize, Reuse, and Recycle…"

RPS Compliance

"Reduction, Efficiency, and Renewables…"

GHG Reduction /Climate Change Mitigation

"Protect Air Quality, Reduce Greenhouse Gases…"

"Conserve, Protect, and Restore…"

"Improve Quality, Decrease Quantity of Use…"

WASTE: “Landfills Last” - Materials Management Framework

- **2008 Goal -** Significantly reduce the waste deposited in landfills

- **Waste Bans**
  - Asphalt Pavement, Brick & Concrete
  - Clean Gypsum Wallboard
  - Commercial Food Waste (Effective October 1, 2014)
  - Ferrous & Non-Ferrous Metals
  - Leaves & Yard Waste
  - Recyclable Paper, Cardboard & Paperboard
  - Treated & Untreated Wood & Wood Waste (Banned from Landfills Only)

WATER: Management of Water Resources

- **2008 Goal** - Work to bolster water quality and quantity by promoting best practices for better conservation, management and protection

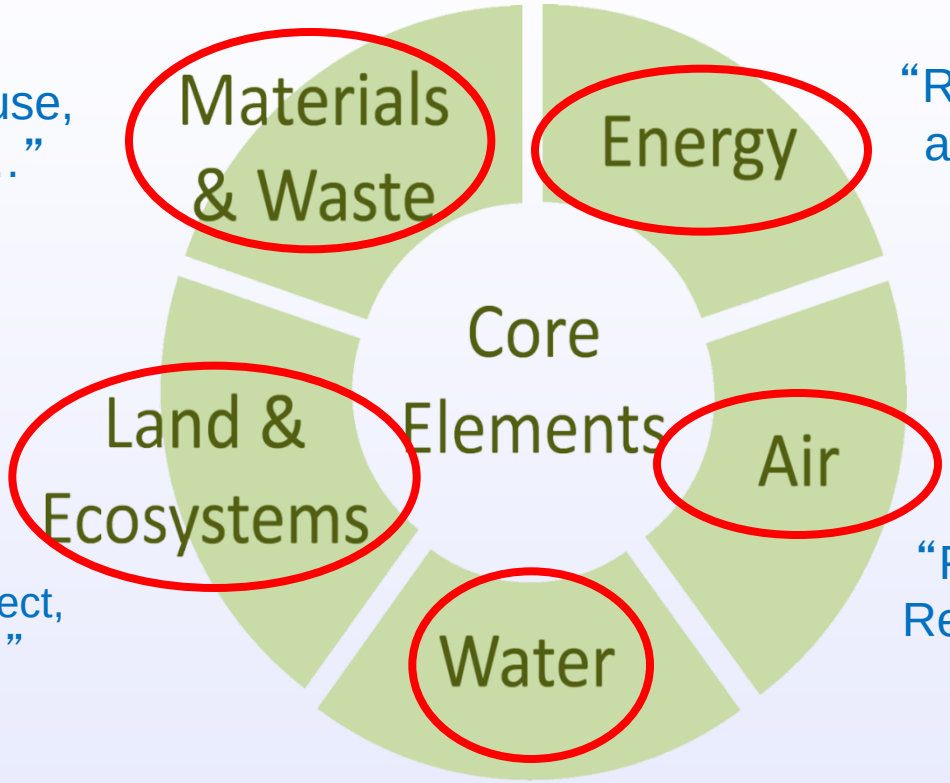
- **Major Activities:**
  - Water Management Act
  - *SWMI – Sustainable Water Management Initiative*

Ipswich River:

LAND: Protecting Land And Ecosystems

- Minimize areas that need use limitations
- Minimize soil and habitat disturbance or destruction
- Use native species to support habitat

Core Elements of Greener Cleanups



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MassDEP Efforts (2012 – 2016)

- **GREENER CLEANUPS WORKGROUP (2012 – Present)**
- **REGULATORY AMENDMANTS (June 2014)**
  - Consider eliminating/reducing impacts (Core Elements)
- **GREENER CLEANUPS "GUIDANCE" (October 2014)**
  - Policy advocates use of ASTM Standard Guide for Greener Cleanups (E2893-13, November 2013)
- **LSP TRAINING**
  - December 2014
  - AEHS Conference 2014, 2015, 2016
- **Greener Cleanups Leadership Recognition *Incentive* Program**

310 CMR 40.0191
Response Action Performance Standard (RAPs)

- (3) The application of RAPS shall be protective of health, safety, public welfare and the environment and shall include, without limitation, in the context of meeting the requirements of this Contingency Plan, consideration of the following:
  - *(e) eliminating or reducing, to the extent practicable and consistent with response action requirements and objectives, total energy use, air pollutant emissions, greenhouse gases, water use, materials consumption, and ecosystem and water resources impacts resulting from the performance of response actions through energy efficiency, renewable energy use, materials management, waste reduction, land management, and ecosystem protection.*

Greener Cleanups Guidance (WSC #14 – 150)

- **DRAFT**
  - May 2014
- **COMMENTS**
  - July 2014
- **FINAL EFFECTIVE**
  - October 2014

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection
One Winter Street Boston, MA 02108 • 617-292-5500

DEVAL L. PATRICK
Governor

RICHARD K. SULLIVAN JR.
Secretary

DAVID W. CASH
Commissioner

GREENER CLEANUPS GUIDANCE
WSC #14 – 150

This document provides guidance in support of 310 CMR 40.0191 and 310 CMR 40.0858 on recommended approaches that maximize the net environmental benefit when conducting response actions at disposal sites regulated under the Massachusetts Contingency Plan (MCP), 310 CMR 40.0000. Recommended approaches include adherence to available industry standards and guidance as described further in this document.

This document is intended solely as guidance. It is not a regulation, rule or requirement, and should not be construed as mandatory. It does not create any substantive or procedural rights, and is not enforceable by any party in any administrative proceeding with the Commonwealth. This document provides guidance on approaches MassDEP considers acceptable for meeting the general requirements set forth in the MCP. Parties using this guidance should be aware that other acceptable alternatives may be available for achieving and documenting compliance with the applicable regulatory requirements and performance standards of the MCP.

Benjamin J. Ericson
Assistant Commissioner
Bureau of Waste Site Cleanup

October 20, 2014

This information is available in alternate format. Call Michelle Waters-Ekanem, Diversity Director, at 617-292-5751. TDD# 1-866-539-7622 or 1-617-574-6868
MassDEP Website: www.mass.gov/dep
Printed on Recycled Paper

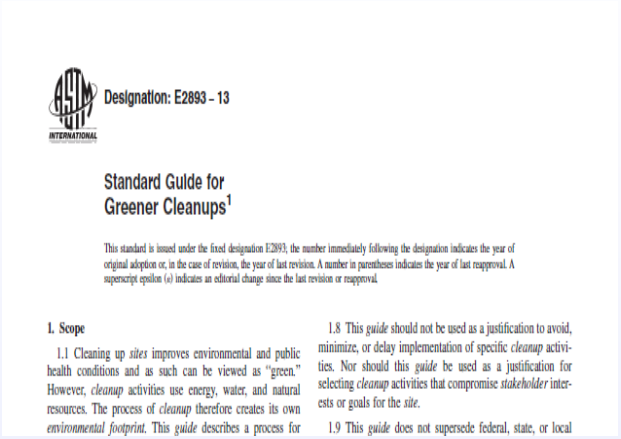
Compliance Through Available Industry Standards & Guidance

- **USEPA, CLU-IN**, Green Remediation Focus (http://cluin.org/greenremediation/)
- **ASTM** International, November 2013, *Standard Guide for Greener Cleanups*, E2893-13
- **ITRC**, November 2011, *Technical/Regulatory Guidance, Green and Sustainable Remediation: A Practical Framework* (GSR-2).

MassDEP Recommendation

- MassDEP strongly recommends use of the *ASTM Standard Guide for Greener Cleanups* ("the ASTM Guide") (Designation: ASTM E2893-13, November 2013 or May 2016)

- List of up to 160 BMPs'



Designation: E2893 – 13

Standard Guide for Greener Cleanups[1]

This standard is issued under the fixed designation E2893; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 Cleaning up *sites* improves environmental and public health conditions and as such can be viewed as "green." However, *cleanup* activities use energy, water, and natural resources. The process of *cleanup* therefore creates its own *environmental footprint*. This *guide* describes a process for

1.8 This *guide* should not be used as a justification to avoid, minimize, or delay implementation of specific *cleanup* activities. Nor should this *guide* be used as a justification for selecting *cleanup* activities that compromise *stakeholder* interests or goals for the *site*.

1.9 This *guide* does not supersede federal, state, or local

Best Management Practices (BMPs)

Activities that, if applicable to the situation, typically will reduce the environmental footprint of a cleanup activity.

- *"Best Engineering Practices"*
- BMPs are organized on a technology or activity basis, but are applied based on the phase of the project
- BMPs assigned to EPA's five core elements
- Also established 10 Categories

Green BMP Categories

1. Buildings
2. Materials
3. Power & Fuel
4. Project Planning & Team Management
5. Residual Solid & Liquid Waste
6. Sampling & Analysis
7. Site Preparation/Land Restoration
8. Surface/Storm Water Management
9. Vehicle & Equipment Management
10. Wastewater Management

ASTM Standard Guide for Greener Cleanups BMP Table

		Core Element Addressed (at Site Level)					Remediation Technology										
Category	Best Management Practice	Energy	Air	Water	Materials and Waste	Land and Ecosystems	Soil Vapor Extraction	Air Sparging	Pump and Treat	In-situ Chemical Oxidation	Bioremediation/MNA	In-situ Thermal Treatment	Phytotechnology	Subsurface containment & Treatment Barriers	Excavation and Surface Restoration	ex-Situ Bio/chemical oxidation	Vapor Intrusion Mitigation
Buildings	Minimize the size of the housing for above-ground treatment system and equipment	X			X	X	X	X	X	X	X	X	X	X	X	X	X
Buildings	Install energy recovery ventilators in buildings to allow incoming fresh air while capturing energy from outgoing, conditioned air	X					X	X	X	X	X	X	X	X	X	X	X
Buildings	Reuse existing structures for treatment system, storage, sample management, etc.				X		X	X	X	X	X	X	X	X	X	X	X
Buildings	Build energy efficent heating and cooling into new buildings by using natural conditions such as prevailing wind directions for cooling/heating, passive solar building design, and/or existing	X					X	X	X	X	X	X	X	X	X	X	X
Buildings	Design energy efficient HVAC systems (e.g., programmable heating and cooling systems)	X					X	X	X	X	X	X	X	X	X	X	X
Buildings	Properly insulate buildings	X					X	X	X	X	X	X	X	X	X	X	X
Buildings	Build energy efficiency lighting into new buildings by using natural conditions such as passive lighting and by using designed systems such as energy star lighting.	X					X	X	X	X	X	X	X	X	X	X	X
Materials	Use dedicated materials when performing multiple rounds of sampling of all matrices				X		X	X	X	X	X	X	X	X	X	X	X
Materials	Purchase materials in bulk quantities and packed in reusable/recyclable containers and drums to reduce packaging waste				X		X	X	X	X	X	X	X	X	X	X	X
Materials	Use products, packing material, and equipment that can be reused or recycled				X		X	X	X	X	X	X	X	X	X	X	X
Materials	Prepare, store, and distribute documents electronically using an environmental management				X		X	X	X	X	X	X	X	X	X	X	X
Materials	Recycle all non-usable/spent equipment/materials following completion of project				X		X	X	X	X	X	X	X	X	X	X	X
Materials	Use materials that are made from recycled materials (e.g., steel, concrete, plastics and asphalt; tarps made with recycled or biobased contents instead of virgin petroleum-based contents)				X		X	X	X	X	X	X	X	X	X	X	X
Materials	Link a deconstruction project with an on-site or local current construction or renovation project to facilitate reuse of clean salvaged materials.				X		X	X	X	X	X	X	X	X	X	X	X
Materials	Use on-site/local materials, when possible.	X	X		X							X			X		
Materials	Steam-clean or use phosphate-free detergents or biodegradable cleaning products instead of organic solvents or acids to decontaminate sampling equipment			X	X		X	X	X	X	X	X	X	X	X	X	X
Materials	Use wood based materials and products that are certified in accordance with the Forest Stewardship Council (FSC) Principles and Criteria for wood building components				X		X	X	X	X	X	X	X	X	X	X	X
Materials	Use regenerated GAC for use in carbon beds				X		X		X			X					X
Materials	Consider preheating vapors to reduce relative humidity prior to treatment with vapor-phase GAC to improve adsorption efficiency when additional analysis supports approach				X		X					X					X

of
ENVIRONMENTAL PROTECTION

BMP Examples

AIR

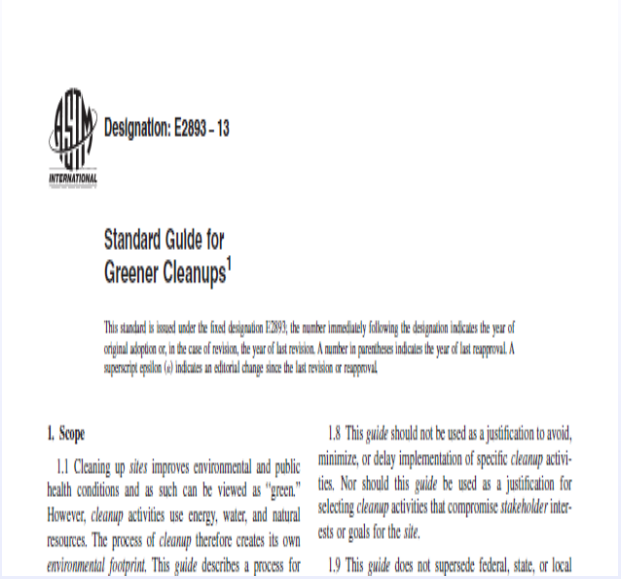
- Use local laboratory to minimize impacts from transportation
- Implement an idle reduction plan
- Replace conventional vehicles with electric, hybrid, ethanol, or compressed natural gas vehicles

Waste Management

- Link a deconstruction project with a replacement construction project (for example, the same site of the deconstruction project or a local current construction or renovation project) to facilitate reuse of clean salvaged materials
- Salvage uncontaminated objects/infrastructure with potential recycle, resale, donation, or reuse
- Use products, packing material, and equipment that can be reused or recycled

FREE Access to View ASTM's Standard Guide for Greener Cleanups

- In partnership with USEPA, ASTM is offering a complimentary, 2-month viewing period **(September 28 – November 30)** for this standard. For complementary viewing of the Standard, go to www.astm.org/E2893-16.



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Cleanups Required!

- Actions and remedies must eliminate, mitigate or prevent certain conditions, including an **Imminent Hazard**, a **Condition of Substantial Release Migration**, a **Substantial Hazard** and a **Critical Exposure Pathway**

- Greener cleanup considerations **MAY NOT** be used to override these or any other MCP requirements.

Time-Critical Situations

- Time-critical situations (e.g., “2-hour” and “72-hour” reportable conditions under the MCP)are likely are not suitable for initial consideration of greener cleanup practices.

- However, once immediate risks and their causes have been addressed, greener cleanup practices should be considered.

Example A: Excavation and Surface Restoration

- **Asphalt Pavement:** from roads, parking lots, and similar sources
- **Brick and Concrete:** from construction activities and demolition of buildings, roads, bridges, and similar sources

Example A = CONSIDER WHEN APPLICABLE

[Reuse in road construction (reclaimed asphalt pavement)/ Reuse as structural fill]

		Category	BMP	Energy	Air	Water	Materials and Waste	Land and Ecosystems	Excavation and Surface Restoration
YES	6	Materials	Use recycled content (for example, steel made from recycled metals, concrete and/or asphalt from recycled crushed concrete and/or asphalt, respectively, and plastic made from recycled plastic; tarps made with recycled or biobased contents instead of virgin petroleum-based contents)				X		X
YES	9	Materials	Link a deconstruction project with a replacement construction project (for example, the same site of the deconstruction project or a local current construction or renovation project) to facilitate reuse of clean salvaged materials				X		X

INCENTIVES

- Cleanup Cost Reductions/Savings
  - Implement BMPs that reduce or have no effect on the project cost, unless reason not to do so
  - If during implementation, new information or changed circumstances causes implementation of BMP to be cost-prohibitive, may elect not to implement
- Contracting requirements
  - MassDEP SARRS
- Leadership Recognition

2016 Massachusetts DEP
Greener Cleanups Leadership Recognition
Incentive Program

"MassDEP will recognize *the* person(s), entity, or project that demonstrates professional performance in applying Greener Cleanup principles and practices to reduce the overall net environmental footprint of response actions implemented under the Massachusetts Contingency Plan. Greener Cleanups aim to eliminate or reduce *total energy use, air pollutant emissions, greenhouse gases, water use, materials consumption, and ecosystem and water resources impacts related to the assessment and cleanup of a disposal site.*"

Eligibility & Consideration

- FY2016 Recognition: Response action submittals filed between June 30, 2014 and June 30, 2016.
- Any response action submittal completed in accordance with applicable requirements of the MCP in consideration of the "Greener Cleanup" core elements prescribed at 310 CMR 40.0191 and, as applicable, at 310 CMR 40.0858.
- Primary focus will be on:
  - MCP regulatory compliance and "Greener Cleanups Guidance"
  - Identification, prioritization, selection, implementation and documentation of feasible ASTM's Best Management Practices (BMPs), and/or other technical equivalent.
- Internal BWSC Review Team - screened and scored universe.

ROBERTS CONSULTING, INC.

SOVEREIGN CONSULTING INC.

Leadership Recognition - PROJECT

- **RA:** Modified Phase III Remedial Action Plan
- **RELEASE:** No source established. Soil, groundwater, and indoor air at the Site have been impacted by chlorinated volatile organic compounds (VOCs), primarily tetrachloroethylene (PCE).
- **REMEDY:** Surfactant enhanced ISCO treatment for unsaturated and saturated soil, and ISCO for groundwater
- **GC:** Qualitative BMP application (identification, selection, prioritization)
  - 88 BMPs Identified, 30 retained for remedial design

    (5 CE: EN/A/MW/EC/W, 4 with High Priority)
  - BMP tables completed

Table 1 – Greener Cleanups BMPs (applicable to ISCO)

Category	Best Management Practice	Core Element Addressed					Priority	Retained?	Comments
		Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Materials	Use dedicated materials when sampling				X		Medium	Yes	
Materials	Purchase materials in bulk quantities and reusable containers to reduce packaging waste				X		Medium	Yes	
Materials	Use products that can be reused or recycled				X		Low	Yes	
Materials	Prepare, store and distribute documents electronically				X		Low	Yes	
Materials	Recycle as much non-usable/spent equipment/materials as possible				X		Low	Yes	
Power and Fuel	Conduct hydraulic tracer tests to optimize hydraulic delivery of reagents	X				X	Low	Yes	
Power and Fuel	Operate remediation system during off-peak hours of electrical demand	X				X	Not applicable	No	ISCO injections will not require power from the electrical grid
Power and Fuel	Install amp meters to evaluate consumption rates on a real time basis to evaluate options for off-peak energy usage	X					Not applicable	No	ISCO injections will not require power from the electrical grid
Power and Fuel	Use on-site renewable energy	X	X				Not applicable	No	ISCO injections will not require power from the electrical grid
Power and Fuel	Insulate all applicable pipes and equipment to improve energy efficiency	X					Low	Yes	
Power and Fuel	Use solar power pack system for low-power system demands	X					Not applicable	No	ISCO injections will not require power from the electrical grid
Power and Fuel	Purchase renewable energy via local utility to power cleanup activities	X	X				Not applicable	No	ISCO injections will not require power from the electrical grid
Power and Fuel	Employ auxiliary power units to power cab heating and air conditioning when machines not operating	X	X				Low	No	Not applicable to proposed project
Power and Fuel	Use gravity flow to introduce amendments or chemical oxidants to the subsurface	X			X		Low	No	Require high pressure injection
Power and Fuel	Operate pumping equipment in pulsed mode when nearing asymptotic conditions	X					Not applicable	No	Critical to reduce timeframe for injections to minimize impact on parking lot

Page 2

- **Sample BMPs:**
  - **Select oxidants/reagents** with lower environmental burden
  - **Insulate** all applicable pipes and equipment to improve energy efficiency
  - **Establish green requirements** as evaluation criteria in the selection of contractors and include language in RFPs
  - **Use alternate drilling methods** including DPT (Direct Push Technology) or sonic drilling to minimize drill cuttings that require disposal

448 High Street Site, Medford
RTN 3-0028477

(View file at: http://public.dep.state.ma.us/SearchableSites2/Search.aspx)

Thank You!

Thomas M. Potter

Clean Energy Development Coordinator

MassDEP Bureau of Waste Site Cleanup

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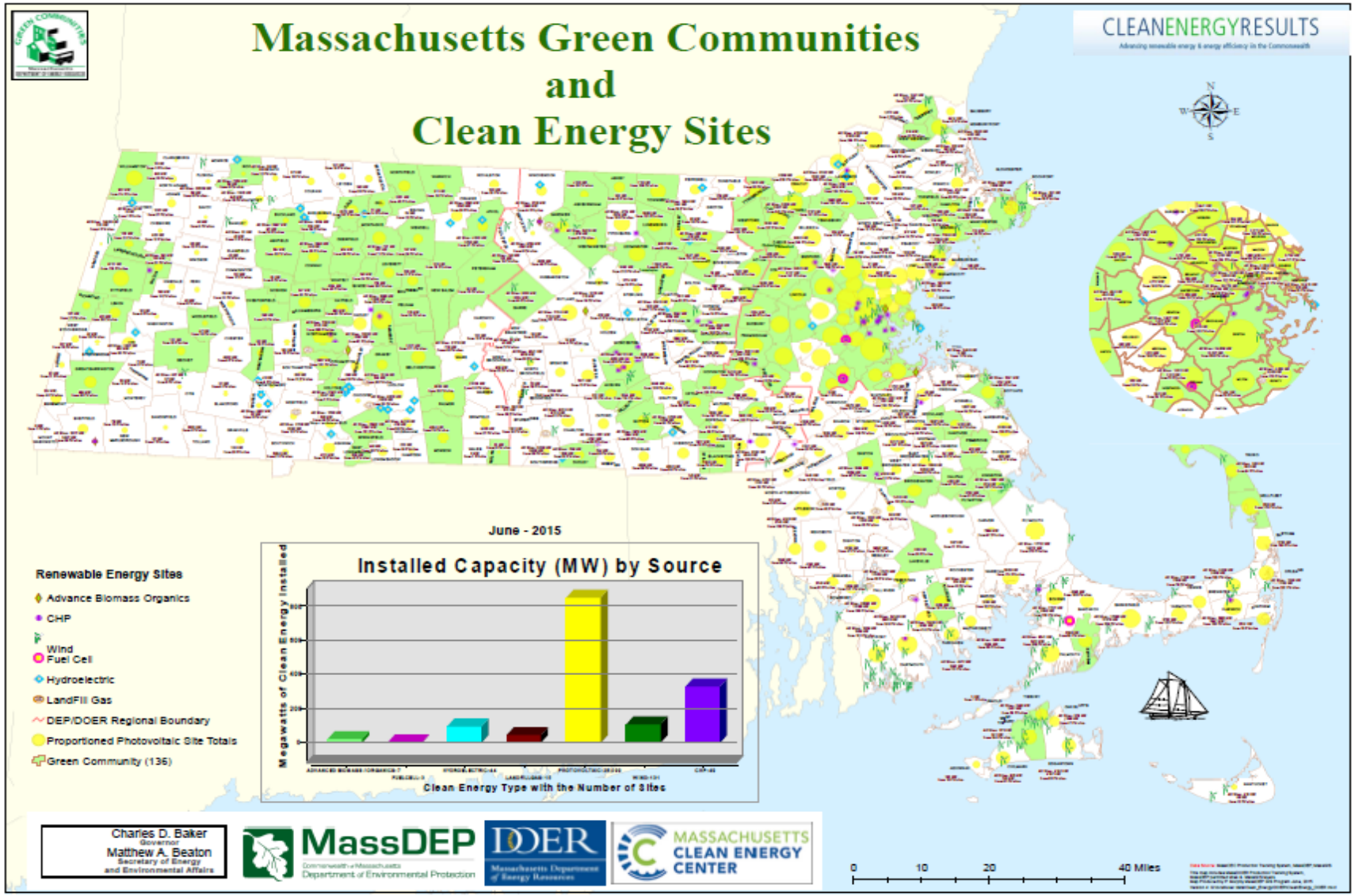
Boston, MA 02108

617-292-5628

Thomas.Potter@state.ma.us

Clean Energy Results Program Website:

http://www.mass.gov/eea/agencies/massdep/climate-energy/energy/


Massachusetts Green Communities
and
Clean Energy Sites
CLEANENERGYRESULTS
June - 2015
Renewable Energy Sites
Advance Biomass Organics
CHP
Wind
Fuel Cell
Hydroelectric
LandFill Gas
DEP/DOER Regional Boundary
Proportioned Photovoltaic Site Totals
Green Community (136)
Installed Capacity (MW) by Source
Megawatts of Clean Energy Installed
Clean Energy Type with the Number of Sites
Charles D. Baker
Governor
Matthew A. Beaton
Secretary of Energy and Environmental Affairs
MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection
DOER
Massachusetts Department of Energy Resources
MASSACHUSETTS CLEAN ENERGY CENTER
0
10
20
40 Miles