NORTHEAST ENERGY EFFICIENCY PARTNERSHIPS

Regional O & M Guide for High Performance Schools and Public Buildings

Strategies for creating green, healthy & energy efficient existing buildings in your state or local government

Presented by

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NORTHEAST ENERGY EFFICIENCY PARTNERSHIPS

"Accelerating Energy Efficiency"

MISSION

Accelerate the efficient use of energy in the Northeast and Mid-Atlantic Regions

APPROACH

Overcome barriers to efficiency through

Collaboration, Education & Advocacy

VISION

Transform the way we think about and use energy in the world around us.

COMMON COMPLAINTS

The boilers not working … again!

We don't have the money

It's been leaking since Monday

@8!!@!

I'm hot…. I'm cold

The air in here is awful

This buildings is making me sick

That's not my problem!

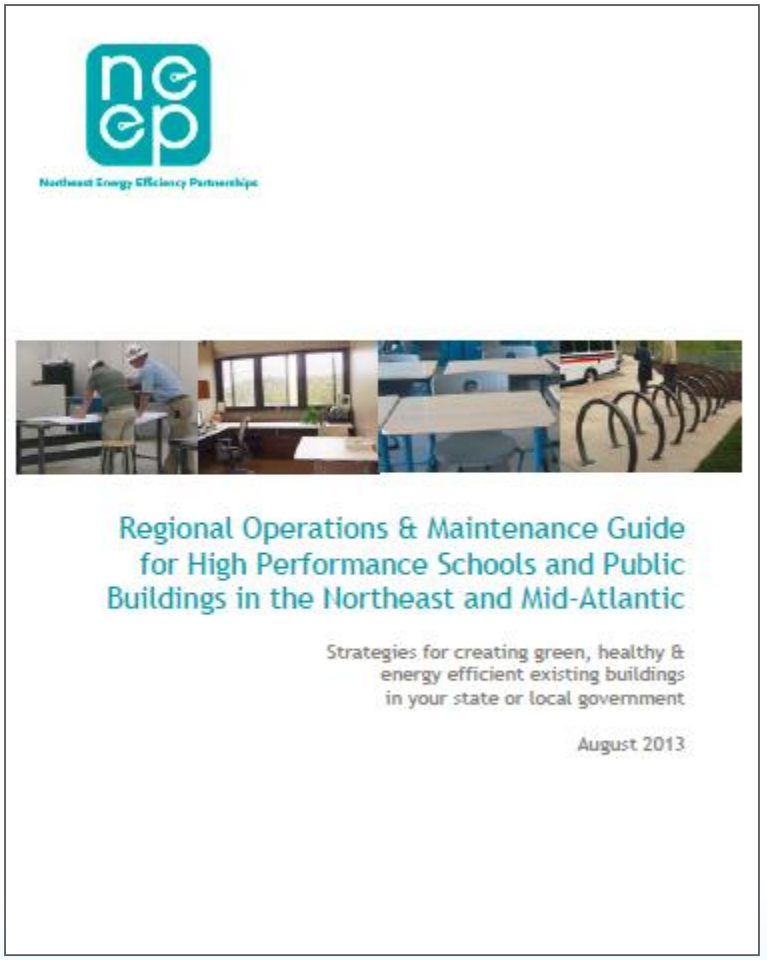
21 CENTURY SCHOOL SUPERHERO

REGIONAL OPERATIONS & MAINTENANCE GUIDE

Strategies for creating green, healthy & energy efficient existing buildings in your state or local government

WHAT IS IT?

- A pathway for existing Public Building to adopt high performance strategies
- Many low cost ideas
- Regionally developed
- Available online as a free resource



COVERING

- **Establishing Operations and Maintenance Policies**
- **Indoor Environmental Quality**
- Integrated Pest Management
- **Energy Efficiency**
- Alternative and Renewable Energy Systems
- Commissioning and Retro-Commissioning
- Water Efficiency
- Materials Selection and Specification
- Recycling
- Landscaping to Reduce "Heat Island Effect”
- Transportation
- **Innovative Financing Options**
- Cafeteria Practices
- Zero Net Energy Buildings
- Specialized Building Types

THE CHALLENGE
Energy

- Average school building is 42 yrs. old
- Not designed to meet demands of today's energy loads (technology)
- Space heating, cooling, and lighting together account 70% of school energy use.
- Per pupil energy expenditure have risen 19% while inflation was only 4%.

The cost of energy is one of the few things that can be reduced without negatively affecting classroom instruction.

Source NREL

THE CHALLENGE

IEQ

- 1 in 10 asthma
- Controlling exposure to IE factors could **prevent** more than 65 percent of asthma cases among elementary school-age children
- Indoor air can produce verbal, motor and behavioral disabilities. Can also cause hearing impairments, irritability and developmental delays

Source: NE Lung Assoc. & American Journal of Respiratory and Critical Care Medicine

CONNECTIONS

Green Ribbon Schools
MSBA
Green Communities
DOE Better Buildings Challenge

PILLAR ONE – ENVIRONMENTAL IMPACT

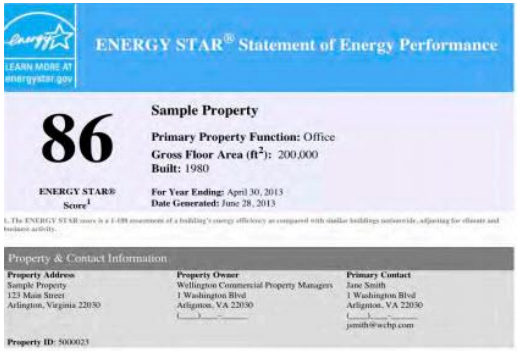
FOUR ELEMENTS MAKE UP THIS PILLAR

1. GREENHOUSE GAS EMISSIONS
2. WATER
3. WASTE
4. ALTERNATIVE TRANSPORTATION

ENERGY EFFICIENCY ISSUES COVERED:

Operate with minimal energy usage while providing superior performance

- Benchmarking
- Energy Management Systems
- Boilers
- Building Envelope Improvements
- Renewables


ENERGY STAR® Statement of Energy Performance

86

Sample Property

Primary Property Function: Office

Gross Floor Area (ft²): 200,000

Built: 1980

ENERGY STAR® Score[1]

For Year Ending: April 30, 2013

Date Generated: June 28, 2013

Property & Contact Information

Property Address
Sample Property
123 Main Street
Arlington, Virginia 22030

Property Owner
Wellington Commercial Property Managers
1 Washington Blvd
Arlington, VA 22030

Primary Contact
Jane Smith
1 Washington Blvd
Arlington, VA 22030
jsmith@wcbp.com

Property ID: 5000023

(EUI)

National Median Comparison

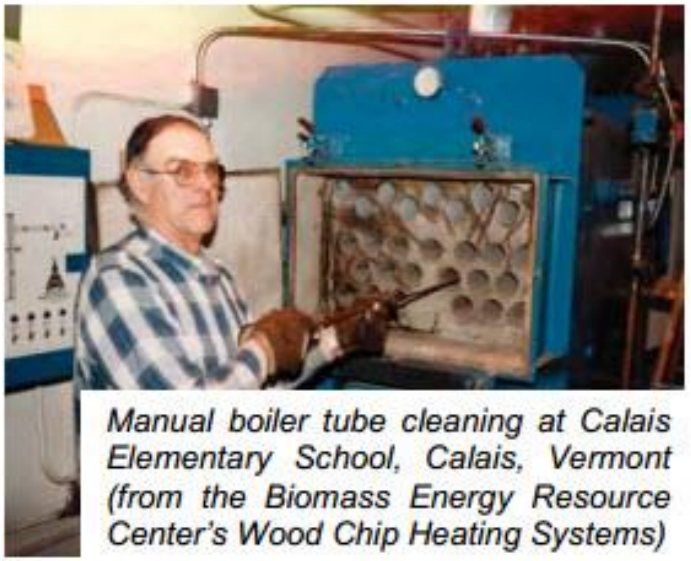
National Median Site EUI (kBtu/ft²)	122
National Median Source EUI (kBtu/ft²)	352
% Diff from National Median Source EUI	-38%

Annual Emissions

Greenhouse Gas Emissions (MtCO2e/year)	1,927

is true and correct to the best of my knowledge.

Professional Engineer Stamp
(if applicable)


Manual boiler tube cleaning at Calais Elementary School, Calais, Vermont (from the Biomass Energy Resource Center's Wood Chip Heating Systems)

Strategies to achieve 20% baseline reduction goals!

PILLAR ONE – ENVIRONMENTAL IMPACT
ELEMENT 1 - GREENHOUSE GAS EMISSIONS

WHAT KINDS OF ACTIVITIES?

- Did your school have an energy audit?
- Did your school come up with a plan to reduce energy in the coming years?
- Did your school make energy efficiency improvements? Lighting? Vending machine controls?
- Do you have solar panels or other renewable energy at your school?

Occupant Engagement

- Green Teams
- Shutting lights off
- Open / closing windows

See it in Action:

Energy Behavior Program in the Workplace: An Energy and Cost Savings Initiative from New Hampshire State Government

According to ACEEE 2012 report, "*Greening Work Styles: An Analysis of Energy Behavior Programs in the Workplaces*," government and institutional buildings are the best candidates to take the lead in promoting and set an example for energy behavior programs. An analysis of the reviewed case studies reports energy savings between 4% and 75% from standalone behavior program to comprehensive project with behavior component. Notable shared strategy among successful behavior programs is the use of community-based social marketing techniques and effective communication tools to engage building occupants.

As part of the interagency effort to encourage energy-savings behavior among state employees both at work and at home, New Hampshire recently launched an initiative that uses personal pledge forms asking employees to commit to various energy-saving actions, such as shutting off lights or unplugging appliances when not in use. The initiative accompanied with the use of prompt signs as action cue throughout state agency further increases the visibility of the program. The ACEEE 2012 study notes that personal pledge forms made in public often lead to a higher rate of actual action.

PLUG LOADS

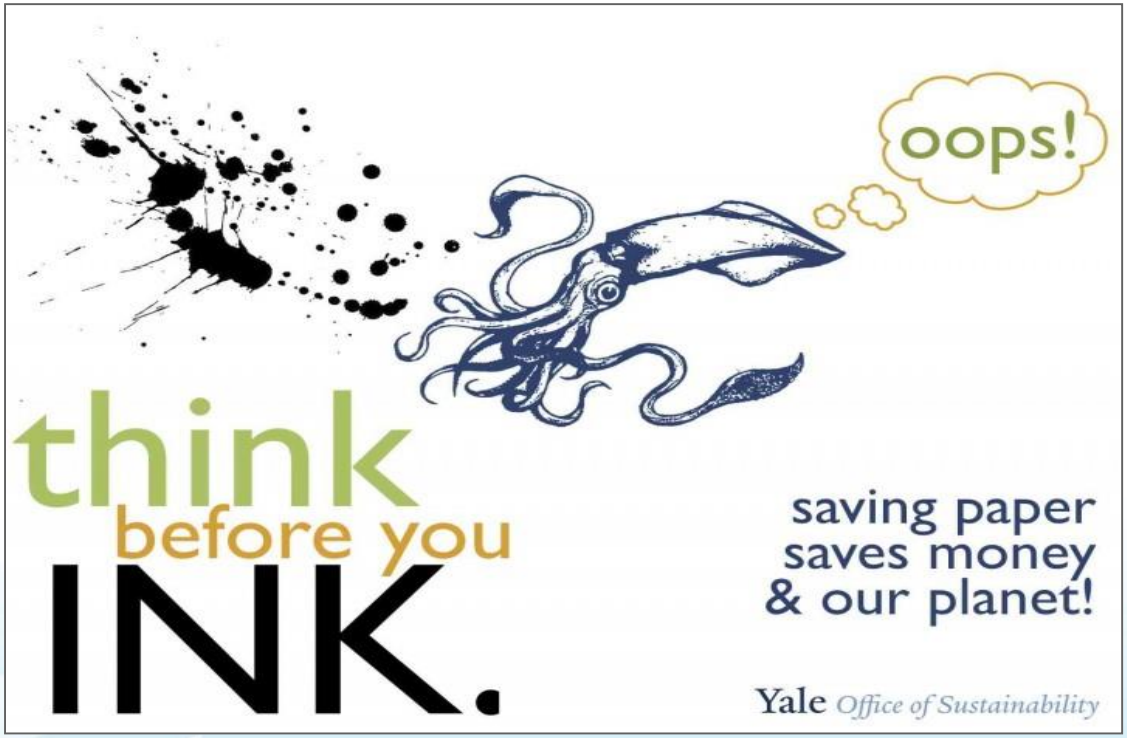
Data collection & feedback for behavior change

- Benchmark current equipment with an audit and possible metering
  - Designate a "Champion"
- Eliminate unneeded equipment and select efficient equipment
  - Identify occupant's true needs
- Turn it off - during non-business hours equipment should be powered down
- Institutionalize plug load reduction measures
- Address unique plug loads such as vending machines
- Promote building occupant awareness

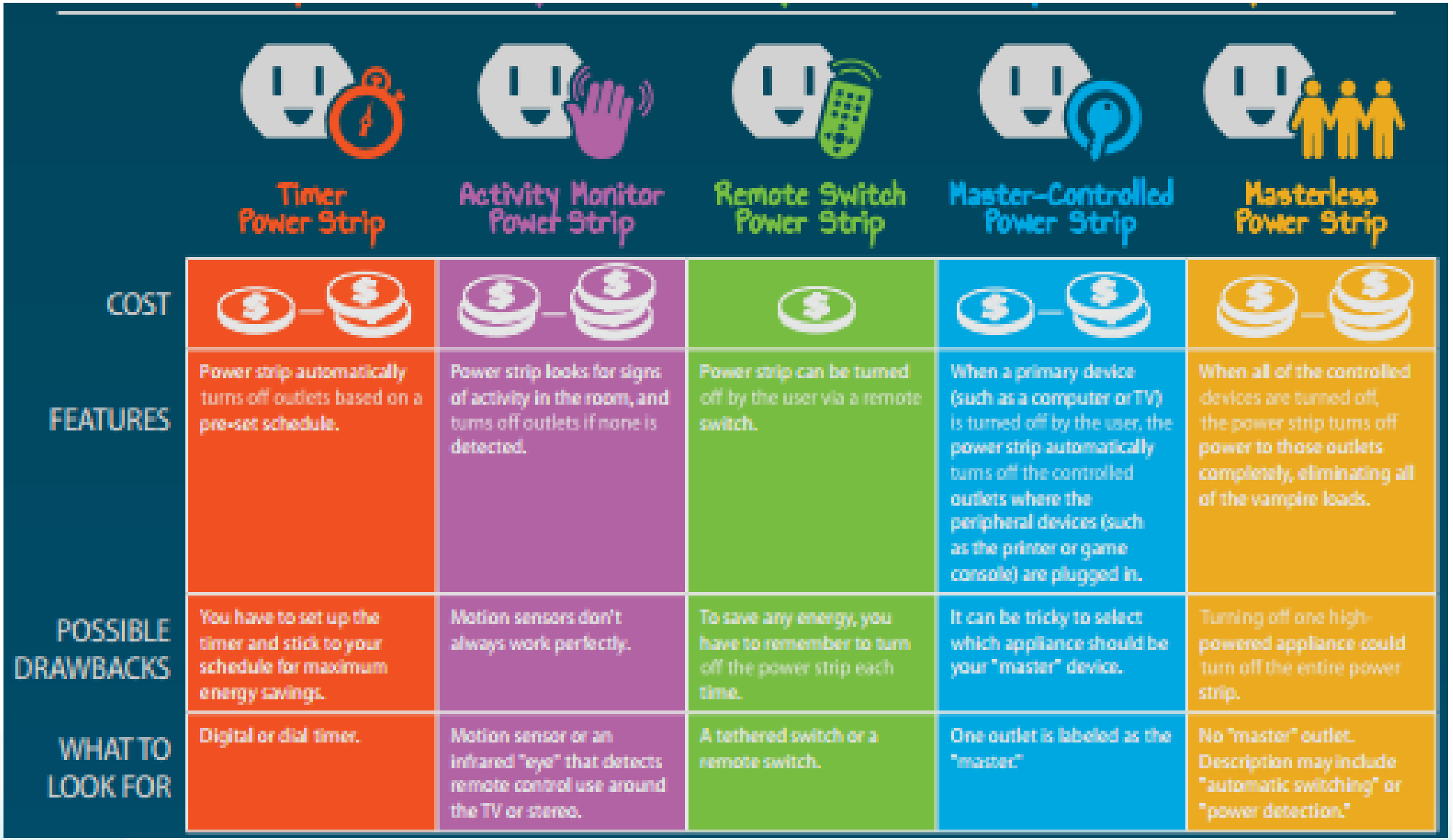
OCCUPANT ENGAGEMENT

Reminders

Eco



ADVANCED POWER STRIPS



Infographic Credit:
Lawrence Berkley
National Labs

ANACOSTIA HIGH SCHOOL
Green Team

- Energy audit walkthrough
- Carbon footprint assessment
- Poster campaign
- Energy Patrol
- “Random Acts of Green-ness Day”

11% energy savings !

There's no need to fear —Facilities is here!

US Department of Energy Initiatives

US Department of Energy Better Buildings Challenge

The US Department of Energy's Better Buildings Challenge supports building owners by providing technical assistance and strategic partnerships (including financial institutions) to accelerate energy efficiency. Partners agree to **reduce portfolio energy usage by 20% over the next 10 years.**

Regional Participants include: Delaware; Maryland; Massachusetts; Rhode Island; Pittsburgh, PA; Medford, MA; Rochester, NY; Worcester, MA; District of Columbia; Boston, MA; Huntington, NY; Indian River School District, NY; Delaware State University; Anne Arundel Public Schools; Allegheny College; Housing Authority of the City of Bristol, CT; Village of Hempstead Housing Authority; Philadelphia Housing Authority.

- ## Outdoor Lighting Accelerator

  The US Department of Energy's Outdoor Lighting Accelerator program provides municipalities with the tools and guidance necessary to complete a goal of replacing all lights system-wide within two years.

- ## Energy Data Accelerator

  The US Department of Energy's Energy Data Accelerator program identifies best-practices for streamlined access to building energy usage data. The icon to the left is the Green Button, an initiative of the department of energy that focuses on a universal format for building energy usage data.

US Department of Energy Initiatives

Municipal Solid State Street Lighting Consortium (MSSSLC)

Shares technical information and experiences related to LED street and area lighting demonstrations, standing as an objective resource for evaluating new products on the market intended for those applications.

MODEL TOOLS AND SPECIFICATIONS

- Streetlight retrofit financial analysis tool to help municipalities determine cost-savings of a potential conversion

- Model Specification for LED Roadway Luminaires, V2.0

- Model Specification for Networked Outdoor Lighting Control Systems V2.0

Better Buildings Summit May 2015! Washington DC

DOE Technical Information for Solid State Lighting (TINSSL)

Why LED lighting?

Since 2003, the U.S. Department of Energy has invested with industry partners in research and development of solid-state lighting (SSL)—including both light-emitting diode (LED) and organic light emitting diode (OLED) technologies.

Using LEDs

While LEDs are well suited to a variety of lighting applications, in the rapidly changing LED marketplace, "do your homework" remains the watchword.

Technology Factsheets

Fact sheets describing solid-state lighting, its characteristics, applications, and issues relating to its successful introduction into the marketplace.

NEEP partners with U.S. DOE to promote Solid State Lighting Information and Resources

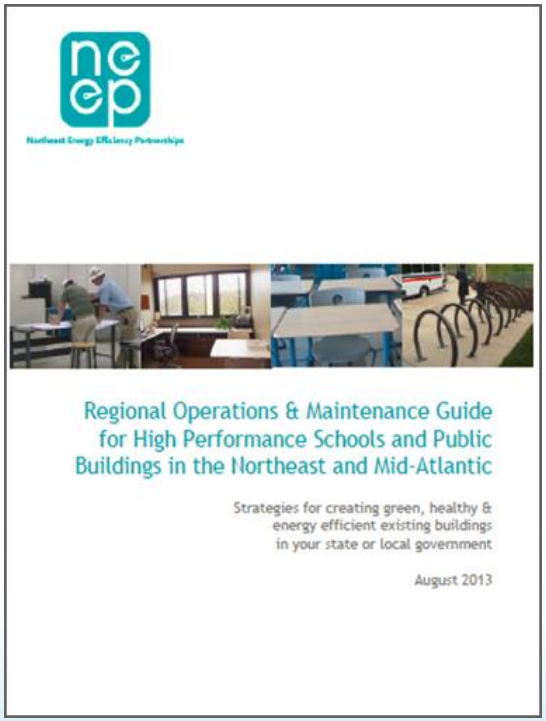
Resources on Standards including Design Guidance

Performance of T12 and T8 Fluorescent Lamps and Troffers and LED Linear Replacement Lamps Study

RESOURCES

Available at www.neep.org

http://www.neep.org/public-policy/energy-efficient-buildings/high-performance-public-buildings/Regional-O&M-Guide



PILLAR ONE – ENVIRONMENTAL IMPACT
ELEMENT 1 – GREENHOUSE GAS EMISSIONS

FEDERAL RESOURCES:

- Green Ribbon Schools' Resource Page
  - http://www2.ed.gov/programs/green-ribbon-schools/resources.doc

RESOURCES IN MASSACHUSETTS:

- MA Dept. of Energy Resources Green Communities Division
  - http://www.mass.gov/eea/energy-utilities-clean-tech/green-communities/
- The Green Team, MassDEP
  - www.thegreenteam.org
- NEEP
  - O&M Guide – www.neep.org
- Green Schools Committee Mass Chapter USGBC:
  - http://www.usgbcma.org/greenschools
- Mass Save
  - http://www.masssave.com/

PILLAR ONE – ENVIRONMENTAL IMPACT
ELEMENT 2 - WATER

MASSACHUSETTS RESOURCES:

- EPA: Soak up the Rain
  - http://www.epa.gov/region1/soakuptherain/
- MA Drinking Water Education Partnership
  - http://www.madwep.org/education_kids_stuff.htm
- Mass Water Resources Authority
  - http://www.mwra.state.ma.us/02org/html/sti.htm
- Boston Water & Sewer Commission
  - http://www.bwsc.org/COMMUNITY/education/kids_corner.asp

Prevent pollution of local waterways
Reduce flooding
Protect water resources
Beautify neighborhoods

EPA Region 1: http://www.epa.gov/region1/soakuptherain/

PILLAR ONE – ENVIRONMENTAL IMPACT
ELEMENT 3 - SOLID WASTE

MASSACHUSETTS RESOURCES:

- The Green Team, MassDEP
  - www.thegreenteam.org

- MassDEP Waste and Recycling Resources
  - http://www.mass.gov/dep/recycle/reduce/kidsteac.htm

THANK YOU!

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