



Northeast Energy Efficiency Partnerships

# Using CHPS to Produce Desired Outcomes in School Buildings

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Northern New England Facilities Masters Conference

February 24, 2016

# Agenda

1. Background
2. NE-CHPS Overview
3. Operations and Metrics
4. Indoor Environmental Quality
5. Relevant Statistics
6. The Operations Report Card
7. Case Studies and Exemplars
8. Resources & Events
9. Questions?



# About ME

- High Performance Buildings Associate at NEEP
- Prior to NEEP, Southern NH Planning Commission in Manchester, NH
- UNH Graduate



**My Vision:** All students have access to healthy, high performance school facilities and schools become centers of the community again

# About NEEP

## Mission

Accelerate energy efficiency as an essential part of demand-side solutions that enable a sustainable regional energy system

## Approach

Overcome barriers and transform markets via  
***Collaboration, Education and Enterprise***

## Vision

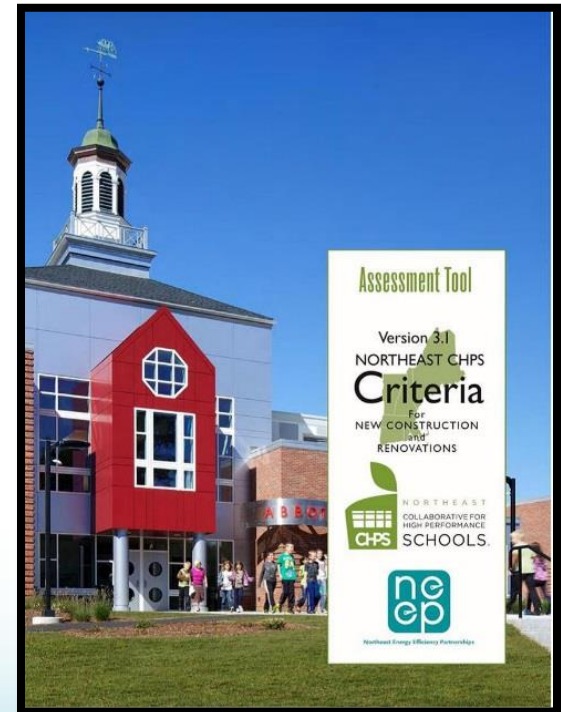
Region embraces **next generation energy efficiency** as a core strategy to meet energy needs in a carbon-constrained world



*One of six regional energy efficiency organizations (REEOs) funded by the US Department of Energy (US DOE) to link regions to US DOE guidance, products and programs*

# Overview of NE – CHPS 3.1

- What is NE – CHPS?
  - A **complete building criteria** that provides students with **premium educational environments**
  - Considerations for:
    - Indoor environmental quality
    - Efficient use of energy
    - Occupant comfort – thermal, acoustical and visual
    - Ease of O & M



# NE – CHPS Overview

- How does it work?
  - Point based system
  - New construction projects, renovations, or phased approach
  - 41 prerequisites
  - For all schools from pre-K to community colleges
  - Upfront costs are quickly offset by energy efficiency operational savings



Freeman Kennedy School – Norfolk, MA

# What's in the Criteria?

Seven Basic Metrics	Related Example
1. Integrated Design Process	Engineers consult with teachers & students
2. Indoor Environmental Quality	Walk-off mats keep pollutants outside
3. Energy Usage	Motion sensor activated lighting
4. Water Usage	Low-flow toilets & waterless urinals
5. Site Selection/Development	Facility located near public transportation
6. Materials & Waste Management	Locally produced materials
7. Operations & Metrics	Occupant behavior seminars

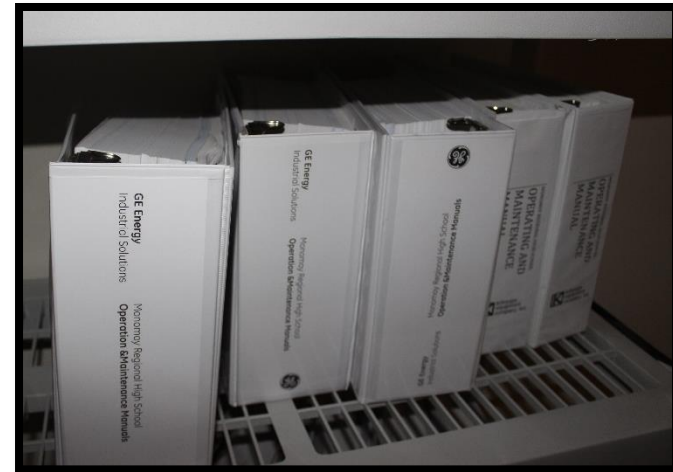




# Let's Take a Closer Look at...

## Operations and Metrics

- Points awarded for:
  - Facility staff and occupant training
  - Performance benchmarking
  - Development of a systems maintenance plan
  - Use of green cleaning products
  - Development of Integrated Pest management plan
- Proper facilities maintenance:
  - Decreases need to replace equipment
  - Decreases overhead costs







# Let's Take a Closer Look at...



## Indoor Environmental Quality (IEQ)

- NE-CHPS offers a comprehensive set of guidelines to improve indoor environmental quality
  - **Air** quality, **thermal** quality, **lighting** quality, **sound** quality,
- Points awarded for:
  - Properly designed and commissioned HVAC systems that provide outdoor air
  - Walk off mats to reduce contaminants from entering the school
  - Availability of natural daylighting
  - Optimal acoustical performance in classrooms
  - And much more!

*“Asthma accounts for a total of 14 million lost school days each year.”*

-American Lung Association

# NE – CHPS Outcomes

- Improved student and staff health
- Increased operational savings
  - Lower energy and water consumption
- Reduced environmental degradation
- Enhanced resiliency



*Profile School, Bethlehem, NH.*

*High Performance Design Concepts can save schools 20-40% annually on utility costs (EPA)*

Students exposed to **natural daylight in classrooms** progress as much as **20 percent** faster on math tests and as much as **26 percent** faster on reading tests than students with no daylight exposure ([\*EPA, K-12 Guide\*](#))



**Green building** measures in school designs **improves indoor air quality** and can **reduce absenteeism** rates by as much as **15 percent** ([\*EPA, K-12 Guide\*](#))

# The Operations Report Card

- Tool that helps make data-driven solutions for school improvement plans
- Evaluates seven metrics:
  1. Indoor air quality
  2. Energy efficiency
  3. Visual quality
  4. Acoustics
  5. Thermal comfort
  6. Water conservation
  7. Waste reduction



# Existing NE-CHPS Schools in NH

School Name	Location	Status
Keene Middle School	Keene	Completed
Merrimack Valley High School	Penacook	Completed
Profile School	Bethlehem	Completed
Mason Elementary School	Mason	Completed
TNT Alternative School	Keene	Completed
Idelhurst Elementary School	Somersworth	Completed
Lebanon Middle School	Lebanon	Completed
Portsmouth Middle School	Portsmouth	Completed
Kingswood High School	Wolfeboro	Completed
Abbot-Downing Elementary School	Concord	Completed
Christa McAuliffe Elementary School	Concord	Completed
Mill Brook Primary School	Concord	Completed
Laconia Middle School	Laconia	Completed

# CHPS Schools in New England





# Three NH Case Studies

1. Abbot – Downing Elementary School  
Concord, NH (2012)
2. Keene Middle School  
Keene, NH (2011)
3. Merrimack Valley High School  
Penacook, NH (2008)





# Abbot – Downing Elementary School

NE – CHPS Verified (New Construction)



Abbot – Downing Elementary School  
Concord, NH (2012)



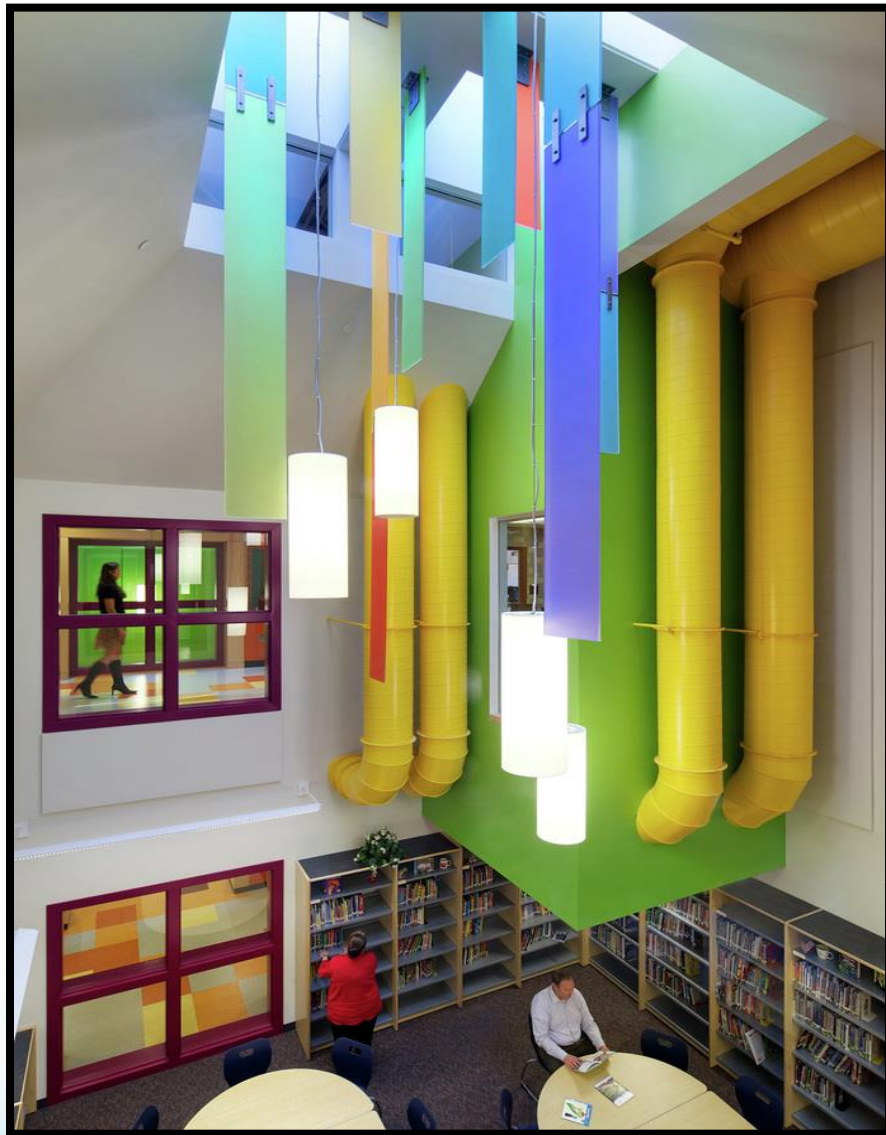
**\$50,032**

*Estimated energy cost savings per year*

## High Performance Features:

- HVAC, lighting and structural components are visible
- Mechanical systems surpass ASHRAE 90.1 standards
- Constructed with locally sourced materials that contain little to no VOCs
- Low flow fixtures reduce potable water usage by 52%

# Inside Look at Abbot – Downing Elementary



# Keene Middle School

NE – CHPS Verified (New Construction)



Keene Middle School  
Keene, NH (2011)

## High Performance Features:

- Wood-Chip heating plant
- **Extensive daylighting features**
- **Low-flow fixtures**
- **Rainwater harvesting system**
- Reflective roof surface
- High efficiency heat recovery system
- Energy Efficient Lighting

★ **34.5% Energy Costs Savings**

# Merrimack Valley High School

NE – CHPS Verified (Major Renovation)



Merrimack Valley High School  
Penacook, NH (2008)

## High Performance Features:

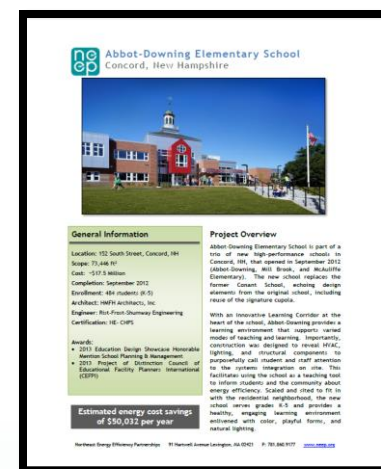
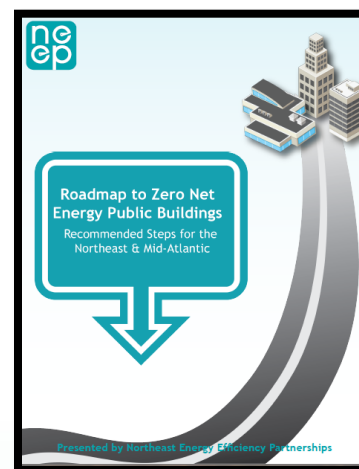
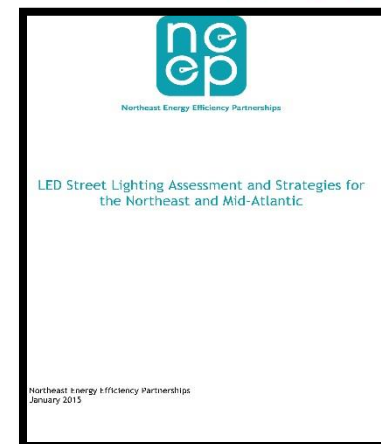
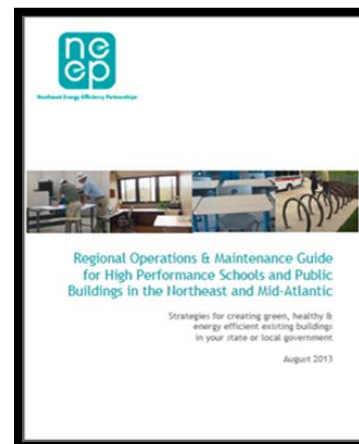
- Wood chip-fired boiler
- New air exchange / ventilation system
- Electrical improvements (lighting, pumps, motors, occupant controls, remote sensing, etc.)
- Building envelope sealing

★ 61% Energy Cost Savings



# Resources

- Regional Operations & Maintenance Guide
- LED Street Lighting Report
- Roadmap to Zero Energy Public Buildings
- School Exemplars
- NE-CHPS V3.1



Additional Resources: <http://neep.org/resources>

# High Performance Schools Training

Free Training April 21, 2016

Maynard High School in Massachusetts

Register on the [NEEP Website](#) Today!



TRAINING CO-HOSTS





# 2016 NEEP Summit



**June 13-14, 2016**

**Omni Mt. Washington Resort**

**Next Generation Energy Efficiency**

**Information on registration, sponsorship opportunities, and program:**  
**<http://neep.org/events/2016-summit> or contact Lucie Carriou at**  
**[lcarriou@neep.org](mailto:lcarriou@neep.org)**



# Thank you!

- Questions?
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