

## AGENDA

Introductions

BHS Design Summary

Presentations & Discussion

Public Comments

Closing Comments

### Moderator

Bill Lovallo

*Chair* - Belmont High School Building Committee

### Expert Panel

Steve Dorrance

*Director* - Belmont Facility Department

Roger Colton

*Chair* - Belmont Energy Committee

Rob Diemer

*Sustainability Consultant* - In Posse

Patrick Cunningham

*Architect* - Perkins + Will

Mark Haley

*Geotechnical Engineer* - Haley & Aldrich

Beth Heider

*Chief Sustainability Officer* - Skanska

Chris Roy

*General Manager* - Belmont Light

Jacob Knowles

*Energy Consultant* - BR+A

Jonathan Abe

*Energy Consultant* - Sunwealth



Belmont High School

# ENERGY SUMMIT

October 4th, 2018

# NEW BELMONT HIGH SCHOOL

Students: 2,215 (grades 7-12)

Size: 445,100 gross sf

## Energy Sustainability Measures

### Photovoltaic Panels

3,394 panels generate estimated 1,190,650 kWh and offsets 25%-32% of building's annual energy.

### Geothermal Heat Exchange

High efficiency cooling and heating.

### Radiant Heating Cooling & Induction Units

Highest cooling & heating efficiency, reduces ductwork & maintenance while providing quiet comfort to occupants

### High efficiency 100% outside air energy recovery unit

Reduces ductwork and fan energy

### High Performance Envelope

Critical to both energy reduction and occupant comfort.

### Maximize Daylight

Building orientation, and expansive glazing inside and out maximize daylight to reduce the use of artificial light.

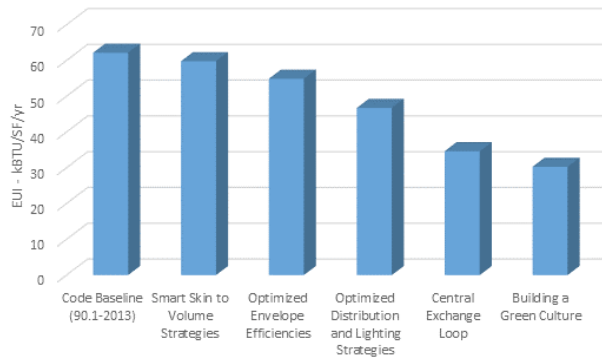
### Solar Shading

Fixed exterior shades protect from high summer sun while allowing passive heating in the colder months.

### Low Power Lighting w/ Daylight Control

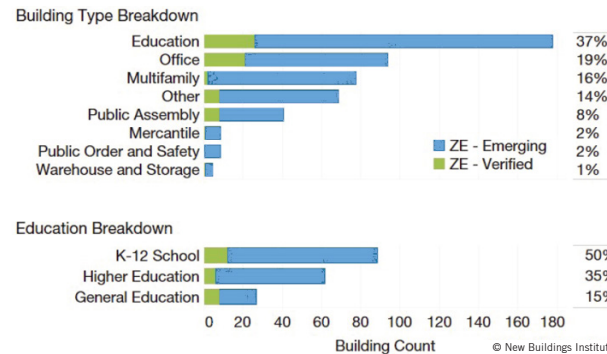
High-efficiency LEED lighting reduces electricity consumption and cooling load.

## 51% SAVINGS FROM CODE BASELINE BUILDING



|  | EUI | % Savings |
|--|-----|-----------|
| Code Baseline (90.1-2013)                      | 62  |           |
| Smart Skin to Volume Strategies                | 60  | 4%        |
| Optimized Envelope Efficiencies                | 55  | 12%       |
| Optimized Distribution and Lighting Strategies | 47  | 25%       |
| Central Exchange Loop                          | 35  | 44%       |
| Building a Green Culture                       | 30  | 51%       |

## 2018 Getting to Zero Status



# ENERGY RELATED ACRONYMS

## AEC - Alternative Energy Certificate

Under the Massachusetts Alternative Portfolio Standard (APS) promulgated by DOER, certain clean energy technologies including geothermal heat-pumps are eligible to generate AECs while operating. Retail energy suppliers (not including Municipal Light Plants) are required to purchase and retire AECs each year at an amount relative to the load they serve, and this gives an AEC its value. Clean energy systems installed at qualified ZNE buildings are eligible for AEC multipliers.

## DOER - Department of Energy Resources (MA)

DOER is the state agency tasked by the legislature with developing and implementing the RPS, APS, and other energy related programs.

## REC - Renewable Energy Certificate

A REC represents proof that one megawatt-hour (MWh) of electricity was generated from an eligible renewable energy resource. There are two REC markets relevant to the BHS ZNE discussion:

- National Voluntary Market:** RECs generated from renewable energy resources across the U.S. can be purchased to meet green energy goals including helping to qualify for status as a ZNE facility.
- Massachusetts Compliance Market:** The Massachusetts Renewable Energy Portfolio Standard (RPS) requires retail electricity suppliers (e.g Eversource) obtain a percentage of the electricity they serve to their customers from qualifying renewable energy facilities. Compliance is demonstrated by obtaining and retiring RECs that meet certain DOER requirements. The proposed solar PV system at the new BHS will generate Massachusetts RPS Class 1 RECs.

## ZNE Zero Net Energy

**ZNE Building:** An optimally energy-efficient building which maximizes on-site renewable energy, where on a source energy basis, the building energy consumption is less than or equal to the renewable energy allocated to the building.

**Class D ZNE Building:** An optimally energy-efficient building which maximizes on-site renewable energy, where on a source energy basis, the actual annual delivered energy is less than or equal to the on-site renewable exported energy plus acquired Renewable Energy Certificates (RECs).

