Hollis Montessori School

NY Passive House Conference - 2017
Jordan Goldman, CPHC
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Hollis Montessori School

- 11,000 ft²
- Located in Hollis, NH
  - 7,500 HDD
  - 750 CDD
- Age 3 – Grade 9

PHOTO COURTESY OF ZEROENERGY DESIGN
PROJECT TEAM SUMMARY

• Client: Hollis Montessori School
• Architect: David Ely, Windy Hill Associates
• Construction Manager: TJ Dang, TMJ Construction
• PH Consultant / Mechanical Designer: Jordan Goldman, ZeroEnergy Design
SPECIFIC OPPORTUNITIES

• Energy Use as an Educational Tool
  – the Montessori curriculum

• Passive House Benefits
  – Comfort
  – Indoor air quality
  – Daylighting

• Open Site

• Use Certification as a Fundraising and Enrollment Advantage
SPECIFIC CHALLENGES

• High occupancy
• High code required ventilation
  – 1.3 ACH total capacity
• ADA requirements
• Construction timeline
INSULATION STRATEGIES

• Wall
  – 12” double-stud w/DPC
  – R-41

• Roof
  – 20” truss w/DPC + 6” nailbase polyiso
  – R-111

• Slab
  – 12” Type IX EPS
  – R-54
FENSTRATION STRATEGIES

• Windows
  – uPVC Tilt and Turn frames
  – U-0.149 \( \frac{BTU}{hr \cdot ft^2 \cdot ^\circ F} \)
  – SHGC – 0.33

• Doors
  – Aluminum frames
  – U-0.175 \( \frac{BTU}{hr \cdot ft^2 \cdot ^\circ F} \)
  – SHGC – 0.35
MODELED RESULTS

• $13 \frac{kWh}{m^2 \cdot yr}$ (4.1 $\frac{kBTU}{ft^2 \cdot yr}$) annual heating demand
• $0.26 \text{ACH}_{50}$ (actual)

• $101 \frac{kWh}{m^2 \cdot yr}$ (32.1 $\frac{kBTU}{ft^2 \cdot yr}$) primary energy demand
  – 10.2 heating (10%)
  – 58.6 domestic hot water (58%)
  – 32.5 miscellaneous electric (32%)

→ 35,000 kWh/year usage (site)
ACTUAL RESULTS

• 30,892 kWh usage (site) in 2016
  – $34 \frac{kWh}{m^2 \cdot yr}$ site energy ($11 \frac{kBTU}{ft^2 \cdot yr}$)
  – $92 \frac{kWh}{m^2 \cdot yr}$ source energy ($29 \frac{kBTU}{ft^2 \cdot yr}$)

• From CBECs data
  – $229 \frac{kWh}{m^2 \cdot yr}$ site energy ($72.6 \frac{kBTU}{ft^2 \cdot yr}$)
  – $646 \frac{kWh}{m^2 \cdot yr}$ source energy ($205 \frac{kBTU}{ft^2 \cdot yr}$)

~85% REDUCTION
QUESTIONS?

Thank You!

Contact Info:

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