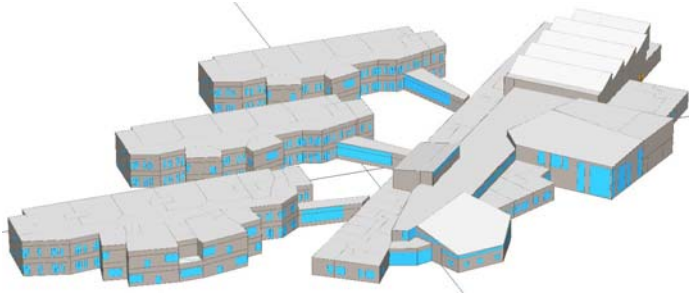


# BINGHAMTON CITY SCHOOL DISTRICT

## MacARTHUR ELEMENTARY SCHOOL



### ROLE

Energy modeling and NYSERDA  
Technical Assistance for New  
Construction

### PROJECT ACHIEVEMENTS

- Goal to achieve Net Zero
- ECMs estimated to save 703,000 kwh and 257 therms annually
- \$242,000 in available NYSERDA incentives

### CONTACT

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Pathfinder provided enhanced energy modeling and NYSERDA Technical Assistance for New Construction for a new 120,000 sq. ft. school building, serving grades pre-K - 5. The District set a goal to achieve Net Zero for the building, which includes classrooms, administrative offices, cafeteria, kitchen and gymnasium.

The modeled site EUI was 22 kBtu/ft<sup>2</sup>-yr without PV and 10 kBtu/ft<sup>2</sup>-yr including the 419 kW PV system. LEED modeling showed 82% energy savings (including a PV system) and 83% energy cost savings. The project should receive the maximum 19 points for EAc1 Optimized Energy Performance and 7 points for EAc2 On-Site Renewable Energy.

The Performance Rating Method of ASHRAE Standard 90.1 2007 and the New Construction Program Simulation Guidelines were used to analyze energy performance. A whole building energy simulation was performed to determine improvement of the proposed design relative to a baseline building. The computer simulation program requires input of key characteristics for the building shell, mechanical and electrical systems, along with operating strategies and schedules provided by the owner and design team to estimate potential energy savings for a wide range of design alternatives and energy efficiency strategies. The analysis captured interactions between different building systems, and included simulating projected annual energy consumption at hourly time intervals using average weather data for the location. Additional simulations were performed for each energy conservation measure (ECM) to evaluate its contribution toward energy and demand savings.

ECMs used in the analysis included: variable speed pumping, energy recovery ventilation, advanced lighting and controls, daylighting controls, exterior lighting, improved building envelope (glazing), high efficiency service hot water. The ECMs were estimated to save 703,000 kwh in electricity and 257 therms natural gas annually.

The project incentives were calculated using a whole building energy simulation and shows \$242,000 in financial incentives available from NYSERDA, to be provided after the completion of construction.



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