

THE SURPRISING STORY BEHIND FLORIDA'S FIRST NET-ZERO HIGH SCHOOL

NeoCity Academy breaks the mold with a 20 energy use intensity, six-year payback, and affordable tilt-up concrete envelope.



If God is in the details, then NeoCity Academy, Florida's first net-zero public high school, may be blessed with a touch of the Divine.

The \$13.2 million, 44,820-square-foot magnet school opened in the fall of 2019 to greet Osceola County's top STEM students. The 500-student facility is also a masterclass in the power of construction detailing.

Just ask the lead architect, Philip Donovan, AIA, LEED AP BD+C, and studio principal of Little Diversified Architectural Consulting's Community Practice. Working closely with the project's general contractor, Gilbane Building Company, Mr. Donovan and the project team achieved a remarkable set of energy distinctions:

- **20 energy use intensity** (versus a national average of 68 EUI)

- **\$115,000 in annual energy savings**
- **76% less energy used** than a typical Florida school
- **Generates 365 kWh and consumes only 346 kWh**, a net energy surplus

The good news for school leadership and county taxpayers: The cost came in *below* the state's tightly prescribed budget system.

HIGH PERFORMANCE, LOW COST

Mr. Donovan credits extreme detailing of the tilt-up concrete envelope for much of the school's stingy energy use. Tilt-up concrete construction is popular with Florida school officials for its economy, durability, and installation speed. The mass of the concrete panels is also an effective barrier to central Florida's notorious heat and humidity.



"Concrete is the best air and water barrier money can buy. It's the most durable for the cost, time, and schedule," says Mr. Donovan. But could a comparatively low-cost, tilt-up solution offer the kind of envelope performance expected of a net-zero energy structure?

PROVEN MEANS AND METHODS

"We couldn't come in with a bunch of new systems. We had to work with proven means and methods everyone understood," Mr. Donovan explains. The architect had seen the effect of careful detailing on a couple of net-zero school projects in Virginia. Maybe an even more rigorous approach to NeoCity Academy could yield similar or even better results.

To put his ideas to the test, Gilbane constructed a three-sided building mockup with

a roof representing every material connection spec'd for the project, each joint redundantly sealed up to five times with common, inexpensive materials. "We're 40 miles from the Space Coast. We didn't send a man to the moon with just one system, right? We had redundant systems. If one failed the others ensured success. We took a similar redundancy approach to each joint," Mr. Donovan says.

BREAKTHROUGH RESULTS

Expectations were high that this extra measure of TLC around the doors, windows, roof, and panel joints could be productive. The results startled everyone. "Building code requires that air leakage must not exceed 0.4 CFM. We specified 0.15 CFM. The testing equipment registered just 0.027 CFM. The testing guys thought their equipment was broken. They had never seen such a low CFM," Mr. Donovan says.

The architect is quick to point out many other factors that contributed to the building's miserly energy use, from the distributed arrangement of 38 heat pumps to the photovoltaic rooftop array that minimizes thermal bridging. Today, the students, faculty, and staff of the academy are delighted with a building that not only supports an immersive, hands-on learning experience but also demonstrates surprisingly affordable net-zero building performance.

SIX-YEAR PAYBACK

Marc Clinch, chief facilities officer for the Osceola School District, the building's owner, is delighted. "NeoCity Academy proves there is a more cost- and energy-efficient way to build schools. This represents a less than six-year payback on our investment. That's phenomenal for a building that will serve the community for many decades."

The possibilities with tilt-up concrete construction has made a believer out of Mr. Donovan. NeoCity Academy is his first tilt-up

concrete project. "The school expects to save \$115,000 a year in energy expense. That's equivalent to two or three teachers' salaries." For school officials, the lessons of NeoCity Academy are like an answer to a prayer.

To learn more about designing with tilt-up concrete, visit BuildWithStrength.com.

Project: NeoCity Academy High School, Kissimmee, Fla.
Owner: School District of Osceola County
Architect: Little Diversified Architectural Consulting
General Contractor: Gilbane Building Company
MEP/Fire Alarm Engineer: CMTA
Landscape Architect: Redmon Design
Civil Engineer: Hanson Walters
Photos: Mark Herboth

