This new educational center, located in DeKorte Park, is representative of the core mission of the New Jersey Meadowlands Commission, as it is environmentally sustainable, energy efficient, and beautiful. The total building area of 10,000 square feet packs in enough solar panels to generate up to 40% of the building's power needs. In addition, it includes the use of Forest Stewardship Council (FSC) certified wood, recycled materials, regionally extracted, processed and manufactured materials, automated light and water controls, and many other sustainable features.

New Jersey Meadowlands Commission Center for Environmental & Science Education

"The most rewarding aspect of the project was the design process and the development of the project as a team, owner, architect, landscape architect and engineers, to reach our goal of being LEED Certified. Being the first Public Agency in New Jersey to receive a Platinum rating was truly a reflection of the team's effort."
- Fredric Rosen, Architect

Location of Project: Lyndhurst, NJ

Owner: New Jersey Meadowlands Commission (NJMC) Center for Environmental & Science Education (CESE)

Project Team

Engineer: *Robert Hatch, P.E. | Linwood Engineering Associates*

Architect: *Frederic Rosen, R.A.*

General Contractor: *Benard Associates*

Construction Manager: *Ralph Venturini*

Commissioning Agent: *Dometech*

Green Consultant: *Bill Reed | Integrated Design*

LEED AP: *Brad Miller | NJMC*

Overview

The NJMC Center for Environmental & Science Education is owned by the New Jersey Meadowlands Commission. It is a 10,000 square foot educational building and observatory and includes the following sustainable features:

- 165 rooftop solar panels to generate 33kW of electricity - up to 40 percent of the building's power needs
- Solar tubes in the ceiling to allow natural light to come into the Center and reduce reliance on traditional power sources
- Use of Forest Stewardship Council (FSC) certified wood
- Use of building products that incorporate recycled content materials
- Use of materials extracted, processed, and manufactured regionally
- Use of low-emitting building materials
- Motion-sensitive lighting controls that automatically shut off lights when rooms are not in use
- Energy-efficient heating, ventilation and air-conditioning systems
- Infrared sensors on bathroom sinks
- Use of low-flow toilets and fixtures, and waterless urinal for water use reduction
- A green housekeeping program - utilizing only environmentally friendly cleaning supplies

Process

Design

By supporting and promoting the environmentally responsible building practices defined by LEED, the NJMC could go beyond its mandate to promote orderly development that is sensitive to the Meadowlands environment. The agency had the opportunity to encourage innovative building practices throughout its development community that would further enhance the Meadowlands District. Through Executive Order #24, Governor James E. McGreevey required the incorporation of LEED standards in the design of new schools "to achieve maximum energy efficiency and environmental sustainability." By supporting LEED, the NJMC could follow the Governor's example to create a more sustainable environment within the state.

Sustainable building practices were utilized in the design to meet the NJMC's goal of achieving at least LEED Gold Certification for the CESE building. Minimum standards were developed for the project's specifications to ensure the LEED guidelines would be followed for construction activity and building material use.

Both an in-house staff and an outside architect and engineer were utilized in the design process. A LEED consultant was hired to guide the process, and an NJMC LEED Accredited Professional was involved in the design process to streamline the green building application and certification process.

Build

Construction activity was monitored by NJMC staff and the Construction Manager to ensure sustainable practices were maintained throughout the process. Source-separated dumpsters were utilized to divide recyclable and non-recyclable construction waste. This is meant to divert construction, demolition and land-clearing debris from landfills and incinerators. Resources that are recyclable were recovered and redirected back to the manufacturing process. Labels from building materials, paints and adhesives were collected, as were chain-of-custody information where appropriate.

Operate

A measurement and verification system has been installed to track water use and electricity consumption as well as electrical generation from the solar panels. A Green Housekeeping program is in place, practiced regularly by the maintenance staff, which involves the purchase of resource-efficient, bio-degradable, and non-toxic cleaning products and supplies. Furthermore, the building went through the Commissioning process to ensure the optimal operation of the facility.

Evaluate

Commissioning was done to verify that the building's energy-related systems were installed, calibrated and performing according to the project requirements, basis of design, and construction documents.

Finance

The project cost more than a typical construction project of the same size. FSC lumber is more expensive than non-FSC lumber and results in no financial benefit to the building. However, other sustainable features such as occupancy sensors for lighting control and energy-efficient heating, ventilation and air-conditioning systems result in energy use reductions and significant financial savings. Additionally, high-efficiency equipment and the photovoltaic system also yield energy costs savings. The NJMC contracted Rutgers University to conduct a Life Cycle Cost Analysis for the building.

Performance

Energy

The NJMC has just completed the installation of electric and gas pulse meters to make the energy monitoring system operational. Once the system has been active for a long enough time period, the NJMC can report and record energy usage. The CESE building is on the same electric meter as the NJMC administration building, which makes actual electrical consumption calculations difficult. However, due to a replacement of existing light fixtures with energy efficiency fixtures and occupancy sensors in the administration building, there was a 16.96% electrical consumption savings from 2008-2009. This means that even after the construction and operation of the new CESE building, the NJMC used nearly 17% less electricity than the before the building was constructed.

Water

Water use was calculated to be 60% less than a typical building.

Ratings and Awards

LEED Platinum

Lessons and Trade-offs

The waterless urinals presented a problem at first for the maintenance staff, but it was eventually overcome through better education. The FSC lumber delayed the project a few months because it was in high demand, but ultimately the project was completed on-schedule.

List of Green Strategies

Design

- Brownfield and Infill Development
- Integrated Design Process
- Energy Modeling
- Building Information Modeling
- Life Cycle Cost Analysis
- Native and Adapted Plants
- Cool Roof
- Energy Effiicient Landscape
- Building Orientation to Maximize Solar Access
- Daylighting
- High-Efficiency HVAC System
- Properly Sized HVAC Equipment
- Demand Control Ventilation
- Variable Frequency Drives
- ENERGY STAR Equipment
- Low-flow Fixtures
- On-Demand Hot Water Heating System
- Waterless Urinals
- Photovoltaic Systems (PV)
- Life Cycle Assessment
- Recycling Center
- Construction and Demolition Waste Management Plan
- Individual Comfort Controls
- Sound Absorbing Materials
- Indoor Air Quality Management Plan
- Entryway System
- Moisture Control
- Interior and Lighting Design
- Biophilia
- Views and Operable Windows
- Sense of Place
- Certified Wood
- Post-Consumer Recycled Content
- Regional Materials
- Low-Emitting Materials
- Rapidly Renewable Resources

Build

- Site Protection Plan
- Construction and Demolition Waste Recycling Plan
- Building Flush
- Indoor Air Quality Management Plan

Operate

- Operator and Occupant Training
- Alternative Transportation
- Plug Load
- Day Cleaning
- Integrated Pest Management
- Green Cleaning
- Sensor Controls
- Smart Controls
- Source Reduction and Recycling
- Composting
- Preventative Maintenance
- Flexible Work Spaces
- Building Commissioning Plan

Evaluate

- Building Performance Evaluation
- Track Building Performance