

CASE STUDY: THE SOLAIRE

New York, NY

SUMMARY INFORMATION	
Occupancy	27-story residential tower with 293 units
Size	357,000 sq. feet
Completed	August 2003
Owner	River Terrace Associates, LLC
Developer	Albanese Development Corporation
Architect	Schuman, Lichtenstein, Claman, Efron Architects
Awards and Ratings	LEED Gold certification; AIA/COTE Green Project Award (2004)

Situated on the banks of the Hudson River in lower Manhattan, the Solaire offers its residents convenient access to public transportation, on-demand hybrid rental cars, bicycle parking and electric vehicle charging. Gardens of native shrubs, perennials and bamboo cover 75 percent of the roof, helping to lower heating and cooling loads and increase tenant satisfaction. To help reduce potable water demand by 50 percent overall, the building uses recycled wastewater for its cooling tower, low-flow toilets and for irrigating landscaping.

The Solaire cut its energy demand by 35 percent using automatic dimming fluorescent lights, high-performance windows, daylighting and other strategies; west-facing photovoltaic panels supply 5 percent of the building's energy needs. Ninety-three percent of the construction waste for the project was recycled and about 60 percent of the building materials were made from recycled content. To maintain superior air quality, the building features filtered fresh air, operable windows and controlled humidity.

COSTS AND SAVINGS

Construction Costs

Total: \$114,489,750 (without land)

Per square foot: \$321

Greening Costs

Total: \$17,250,000

Per square foot: \$44.57

Photovoltaic system: \$375,000 4-year payback period.

Low-e windows: \$1,500,000 7-year payback.

Lighting control system: \$125,000 4-year payback.

Projected Utility Use and Costs

Electricity use: 2,930,000 kWh/yr.

Natural gas use: 35,100,000 MJ/yr.

Potable water use: 4,440,000 gal/yr.

Energy cost: \$.072/square foot; \$258,000 total/yr.

Pollution Reductions

CO₂: 1,662 tons/yr.

NO_x: 1.9 tons/yr.

SO_x: 1.9 tons/yr.

STRATEGIES**Site**

- Seventy-five percent of the open roof area is planted to create a cooling effect around the building and site.
- Plantings include drought-tolerant, wind-resistant, self-sustaining shrubs, perennials and bamboo that are adaptable to shallow soil depths between 6" and 18".
- A water retention layer reduces stormwater velocity and volume.
- Subsurface infiltration basins remove pollutants from stormwater.
- Stormwater runoff is collected in a 10,000-gallon basement storage tank with a sediment basin and treatment system and used for irrigating landscaping and operating the cooling tower.

Water

- On-site blackwater treatment system that recycles 100 percent of the building's wastewater for use in cooling towers, toilets and landscape irrigation.
- Plumbing is designed to accommodate graywater separation.
- Apartments feature water-efficient fixtures and toilets.
- Residents are encouraged to conserve water.

Energy

- Large exterior windows and high ceilings optimize daylighting.
- Lamp ballasts dim automatically.
- Electronic fluorescent lamp ballasts are used in conjunction with daylighting.
- Occupancy and daylight sensors control electric lighting.
- All apartments include fluorescent lighting and master shut-off switches.
- Cooling equipment was sized correctly with the help of energy consumption simulation tools.
- Cooling towers and gas-fired absorption chiller/heater reduce electricity demand and save peak power costs.
- HVAC fans and motors use variable frequency drives.
- Seven-day programmable thermostats are used to program HVAC system.
- HVAC system was fully commissioned.
- Computerized building management system controls and monitors HVAC.
- Continuous air barriers help control air leakage.
- All penetrations through the building envelope were sealed.
- Windows have infiltration rates no greater than 0.06 cfm/ft.
- Other energy-efficiency strategies include high-performance operable windows, doors and glazing; water-efficient clothes washers and water heaters that are Energy Star-rated with energy efficiency ratings in the top 20 percent.

Renewable Energy

- Photovoltaic panels on the west facade take advantage of the strong westerly sun.
- Photovoltaic system operates at peak production on hot, sunny days when demand on the local power grid is highest.
- Space was set aside and fuel connection provided for future installation of fuel-cell technology.

Materials and Resources

- Sixty-seven percent of materials were manufactured within a 500-mile radius of the site.
- Photovoltaic cells were made from 100 percent recycled materials.
- Building materials include recycled-content gypsum board, mineral wool insulation, mineral-fiber ceiling panels and tiles, and slate roofing shingles.
- Brick, cast stone, slate, granite and ceramic tile were produced locally.
- Low- or no-emitting materials that are free of formaldehyde were used throughout.
- Wood was sourced from Forest Stewardship Council-certified, sustainable forests.
- Site-generated construction waste was sorted and sold for re-use.
- Ninety-three percent (by weight) of the construction waste was recycled.
- The design provides for adaptability to future uses.
- Energy Star Refrigerators are among the top 25 percent most energy efficient.
- Ozone-depletion potential of refrigerants in cooling systems was minimized.
- Thirty percent of the cement used in concrete was replaced with fly ash.

Indoor Environmental Quality

- Building materials contain no formaldehyde and low or zero levels of volatile organic compounds.
- Indoor air quality is monitored and tested.
- Indoor air is fully filtered, humidified and centrally conditioned.
- Thermostats and operable windows are digitally programmable.
- Humidity levels are maintained between 30 and 60 percent.
- Occupants can choose between fresh and conditioned air.
- Parking garage features carbon-monoxide monitors.
- Outdoor-air intakes are located away from pollution sources.
- Positive air pressure is maintained within the building.