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Author: Dan Kaplan, Senior Principal, FXFOWLE

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Sustainable design in high-rise residential...

Major cities and metropolitan areas across the United States have been witnessing a renaissance in urban development. According to the report, *Emerging Trends in Real Estate 2006*, issued by the Urban Land Institute and PricewaterhouseCoopers LLP last November, one of the current development patterns is a steady demand for urban projects due to continuous downtown migration by empty nesters and young professionals. The report also predicts that concerns over sprawl, traffic congestion and higher energy prices will accentuate the desirability of urban living environments. This reflects a global trend taking place in major international cities due to demographic changes and rediscovery of center city living creating a need for more urban residential housing.

High-rise residential emerging trends

But what is driving this boom in high-rise living? Analysts agree that major demographic shifts, investments in real estate and smart growth principles are contributing factors to the rise in a demand for more high-rise residential living. But the issues that are in the forefront of these trends are primarily focused on life-style and health choices, and significantly environmental awareness and sustainability. These issues are not only changing the way we live, but they are impacting and reinventing how we build high-rise residential buildings.

Although residential buildings form a key component in any sustainable urban network, they typically become “background” buildings, in that they do not receive the same attention and inventiveness as high-rise commercial buildings. However, there are many high-rise residential design opportunities emerging as consumers are beginning to mandate a more advanced quality of life.

Despite the drive to meet a growing demand for housing by building faster and cheaper, a movement has begun to “raise the bar” on the quality of high-rise residential architecture from both performance and design aesthetic viewpoints. FXFOWLE is currently designing over a dozen residential buildings in New York City representing over 4,000 units combined, each contributing to and advancing this positive trend. One project in particular offers residents high performance green technologies not available in typical residential buildings; and its success is due in large part by the leadership of the builder/owner to “do the right thing,” and its innovative architectural design that synthesizes aesthetics, functionality, and environmental responsibility.

The Helena

The Helena is an award-winning, LEED® Gold-rated building, and the first voluntarily sustainable high-rise residential building in New York. The 38-story, 600,000 gross square foot building on Manhattan’s West Side was designed to have a minimal impact on the environment, while incorporating sustainable design elements in practical yet unexpected ways. The Helena has set an exemplary standard for high-rise, high-performance buildings, bringing the benefits of sustainable living to both market-rate and subsidized rental units (20% of the units are set aside for low/moderate income households). Targeting urban professionals, The Helena features over 580 studios, one- and two-bedroom apartments, most with river views, with a host of amenities, green roofs with panoramic views of Manhattan, and a 24-hour New York City lifestyle. The building’s integrated green design represents a reinvention of New York City housing by rejecting the vernacular, low-expectation formulation of this building type and creates not only a new standard, but a significant contribution to the new green high-rise residential market.

The Helena’s form is derived from the interlocking and varied composition of key elements – building mass, fenestration, balconies – to create a series of volumes seen as individual, slender structures. The building also features 11,906 square feet of green roofs



Rooftop access at The Helena.

which contribute to energy use reduction, minimize stormwater runoff by 75%, and mitigate the urban heat island effect – while creating a year-round amenity.

The Helena’s building envelope is sealed and insulated for energy efficiency and moisture management. The building’s ventilation strategy includes high filtration of the air supply; trickle vents in each operable window for cold weather ventilation, a pressurized treatment of hallways to prevent the migration of contaminated air between apartments, and walk-off mats placed at all exterior doors to minimize dust and particulate matter from entering the building. A green housekeeping plan contributes to a healthy indoor environment and provides superior indoor air quality to the residents and building personnel with the use of only non-toxic cleaning agents.

Other sustainable contributing factors include maximized daylighting, low-emitting materials, a blackwater treatment plant that reconditions 76% of the building’s waste water on site, electricity that’s produced on site by micro-turbine co-generation, a 13.1 kW array of building integrated photovoltaic panels that promote resource conservation, and dedicated recycling chutes on each floor. The building’s design reduces energy use by 65% with high-efficiency water source heat pumps, microturbines, occupancy sensors in stairwells and corridors, master switches in every ↗



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A 13.1kW array of building integrated photovoltaic panels complements other energy-saving features such as high-efficiency water source heat pumps, microturbines and occupancy sensors.



... no longer an emerging trend



An upper-floor terrace doubles as a green roofscape.

apartment, as well as Energy Star Appliances, corresponding to 33% in cost savings per year. The Helena is also involved in a 2-year green power contract for 50% of its purchased energy.

The Helena's green building materials were selected for their recycled, rapidly renewable content and their proximity to the construction site. They include:

- Wheat board cabinets & bi-fold doors
- 80% recycled content steel
- Cementitious material which contains 45% blast furnace slag
- 100% recycled gypsum wall board
- Wool and 100% recycled nylon carpeting
- Forest Stewardship Council-certified wood flooring

Additionally, The Helena team was able to modify the LEED prerequisite, "Environmental Tobacco Smoke (ETS) Control" to allow residential projects to meet it. The project used super sealed construction to prevent ETS leakage, all doors off the hallway needed weather stripping, and a blower door test was conducted to demonstrate a minimum amount of leakage from the units. Gasketed switches and receptacles were used on all demising walls. The materials are urea-formaldehyde-free, and all carpets, paints, sealants, and adhesives have very low or no VOC content

Investigation of the patterns displayed in the LEED credits achieved by The Helena aided in the understanding of the value and achievability of various sustainable design strategies. Although the rating system is a good tool for comparing and contrasting results, it falls short in the service of urban residential projects, as well as ways the market is moving beyond the rating system.

Conclusion

FXFOWLE's advancement of sustainable design has spanned a wide variety of project typologies with industry impact beyond simply greening the firm's individual projects like The Helena. This includes many benchmarks for project types considered difficult to design in a sustainable manner. The firm's most widely recognized environmental leadership project, the Condé Nast Building @ 4 Times Square (1999), a speculative commercial project, set high standards for indoor environmental quality, energy efficiency and was the first commercial project in the United States to integrate photovoltaic panels and fuel cells when it was designed in 1995.

With the environmental consciousness of the building industry continuously increasing; it is essential to disseminate information gained from previous sustainable efforts to enhance our global efforts for the future. Advances in technology, materials and research, along with government financial incentives and benefits, have already rapidly transformed the green building landscape and contributing to define a new generation of high performance architecture.

Author

Dan Kaplan, AIA
Senior Principal
FXFOWLE ARCHITECTS, PC
New York, NY, USA

dkaplan@xfowle.com
f: +1 212 463 8716
t: +1 212 627 1700 x304

Dan Kaplan has more than 20 years experience in the design of complex commercial and residential urban buildings; serving in a design and leadership capacity for many of the firm's largest projects.

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