

case study

LEED® Platinum Hacienda Ja Ja Has Last Laugh on Energy Bills

New Cooling System Helps Cut Energy Usage by 58.7%

Alamo Heights, Texas, has always had an independent streak. The town is surrounded by the City of San Antonio, but this mostly residential enclave chose to incorporate in 1922 to avoid being annexed by the larger surrounding city. The center of Alamo Heights is located five miles north of downtown San Antonio. The San Antonio Zoo, the Witte Museum, the San Antonio Botanical Gardens and McNay Art Museum can all be found in or around this community. The town's current population is about 7,500, with 3,200 households.

Plans for a Texas Dream House

A couple relocating to Alamo Heights wanted a future retirement home in the San Antonio area, where they had friends and loved the climate and culture. She is a specialist in Japanese art, a former deputy director of the Dallas Art Museum and the Asian Art Museum of San Francisco, and now a personal art curator. He is an attorney and architect. They discovered a perfect half-acre lot in Alamo Heights, with five small rental properties scattered beneath a grove of 30 mature live oak trees. One of these dwellings (later removed from the property to make way for the home) had six hand-painted tiles that hung in a frame on its front door, proclaiming it "Hacienda Ja Ja" (pronounced "HAHA" in Spanish). The architect saved the tiles in the trunk of her car and eventually displayed them in a low wall along the path to the front door. The homeowners liked the happy idea of calling their dream house "Hacienda Ja Ja."

It would house their collection of Asian sculptures, paintings, artifacts and ceramics. They had a clear vision that this home should one day achieve LEED® Platinum — the highest certification awarded by the U.S. Green Building Council. Hacienda Ja Ja would be sustainable and energy efficient, with simple, clean lines and ample windows that would bring the tree canopy into every room.

To make this dream come true, the couple turned to the San Antonio firm of Lake | Flato Architects, known for design that responds to the natural environment and merges with the landscape. "Lake | Flato has green building in its DNA," said the architect husband, who had previously worked in San Antonio for 11 years, where he had gotten to know many of the firm's principals. "This firm always strives for energy efficiency as integral to the design from the beginning. They understood that we wanted the energy-efficiency aspects never to dominate the feeling of the house, which is all about light and utilizing the best of the natural setting."

VRF Zoning Makes Energy Efficiency a Reality

The homeowner noted that Lake | Flato was familiar with the many benefits of the Variable Refrigerant Flow (VRF) zoning systems from Mitsubishi Electric Cooling & Heating (Mitsubishi Electric), Suwanee, Ga. "Our Lake | Flato team suggested the system from the earliest concept stage," he



Project Name

Hacienda Ja Ja

Project Location

Alamo Heights, Texas

Completion Date

May 2010

The Team

Architect

**Lake | Flato Architects,
San Antonio**

LEED Consultant

**Contacts LLC.,
San Antonio**

Mech. Consultant/
Contractor

**Southwest Mechanical
Services,
San Antonio**

General Contractor

**Truax Construction,
Inc., San Antonio**

HVAC Distributor

**Paschal-Harper,
San Antonio**

Annual Energy Use and Savings

Total Energy Use Per Square Foot:	11.9 kBtu
Total Energy Reduction*:	58.7%
Total Energy Savings*:	\$1,150

*Compared to an average Texas home of the same size
*Compared to the national average

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said. “They explained the advantages for our dream house would be individual zone control, minimal ductwork, simplicity of installation, ability to fit into small spaces and one of the industry’s quietest operating systems.”

Ray Butler is founder of Southwest Mechanical Services in San Antonio. A 35-year industry veteran, he handles many of Lake | Flato’s residential installations. Introduced to Mitsubishi Electric VRF zoning systems in 2004, he thinks so highly of this technology that he now works primarily with Mitsubishi Electric equipment and systems in most installations.

“I have a high regard for this technology and equipment because it is state-of-the-art, has high-end equipment, is incredibly reliable and easy to install. The technology offers the most energy-efficient performance in the industry, and Mitsubishi Electric provides impressive customer service.” Butler said.

Getting Rid of the Boiler-tower Mentality

“Someday mechanical engineers are going to get their heads out of the sand and recognize that VRF zoning is the future for our industry,” Butler continued. “They need to get rid of their ‘boiler-tower’ mentality. Mitsubishi Electric engineering is a pioneer ahead of its time. It has the industry’s only two-pipe simultaneous cooling and heating ability. That’s revolutionary, eliminating the inefficiencies of four- and two-pipe chiller systems.

“Here in Texas, VRF zoning systems do away with the need for costly, backup electric heat strips. These systems severely cut the huge costs of electrical installations. For example, a typical Mitsubishi Electric indoor fan coil requires a mere 1.5 amps of electricity versus 40 amps from a conventional DX [unitary] system; that’s because the DX system requires 10 kW alone for heat strips in the cooling mode.”



Casey Dunn Photography

A Mitsubishi Electric concealed indoor unit in the living room was ducted through a custom bookcase, providing optimum air flow and a discreet profile. The VRF zoning system has the capability to run efficiently at low load conditions, helping to contribute valuable LEED points for the home.

Reducing the Carbon Footprint for LEED Platinum Credits

Regarding overall LEED scoring, Hacienda Ja Ja earned 100 out of a possible 136 points. The Mitsubishi Electric system had a large impact on the “Energy & Atmosphere” section, scoring 35 out of a possible 38 points.

Mitsubishi Electric’s VRF zoning system made specific contributions to Hacienda Ja Ja’s LEED Platinum recognition. VRF zoning systems help projects meet the prerequisite “Optimize Energy Performance,” by providing a means to exceed ENERGY STAR® for Homes.

Other LEED factors contributing to the project’s overall sustainability include the residence’s careful siting (preserving and protecting the surrounding live oak trees), the use of expanding open cell



Frank Owens

Named after a set of hand-painted tiles found on the door of an original building on the property, Hacienda Ja Ja achieved LEED Platinum certification due to careful siting, a tight envelope, solar panels and an energy-efficient HVAC system from Mitsubishi Electric Cooling & Heating.

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Caecy Damm Photography



The Mitsubishi Electric VRF zoning system is able to provide the home with the flexibility to cool and heat only those rooms that are needed. An access panel to an indoor unit provides easy serviceability and is located discreetly on the back porch of the home (pictured right).

foam spray insulation, orientation to maximize natural ventilation and solar benefits, a 7 kW photovoltaic array, the use of recycled building materials, locally harvested cedar siding, fly-ash concrete floors, Pella® windows, ENERGY STAR® kitchen appliances and a 6,000-gallon below-ground storage tank to catch rainwater for all landscape irrigation needs.

According to Heather Gayle Holdridge, Lake | Flato's sustainability coordinator, VRF zoning technology, like the Mitsubishi Electric system, is a particularly good choice for the firm for a cooling and heating system for homes and buildings with high sustainability goals. "These buildings have a pretty low load already, if we've designed the envelope correctly. VRF and split-ductless are some of the only systems that have the capability to run efficiently at low load conditions, saving energy and money," Holdridge said.

Combined Gas and Electric — Usually <\$75/month

The husband said, "Over the past year, our highest utility bill for combined gas and electric in any month was for \$85 — and that was the only time that it went over \$75 during last summer, when we had more than 60 days over 100 degrees. This year the bills have been even lower. Every spring and fall we even have a negative electric bill for a few months."

Shortly after Hacienda Ja Ja's completion, an energy-monitoring system was installed to record energy use of various components within the home. With the caveat that the cost of operating a home in San Antonio is 4 cents cheaper per kWh than the state average plus the fact that the wife spends much of the year in San Francisco, Holdridge said the Hacienda Ja Ja energy use in a year was remarkably low. "An average Texas home of this size would consume 28.8 kBtu per square foot for a year of cooling and heating. The

VRF Zoning Equipment Installed

- (1) PUMY S-Series Outdoor Unit
- (2) PDFY Ceiling-concealed (Ducted) Indoor Units
- (1) PEFY Ceiling-concealed Indoor Unit
- (1) PKFY Wall-mounted Indoor Unit
- (1) PFFY Floor-standing Concealed Indoor Unit
- (4) PAC Simple MA Remote Controllers
- (1) PAR Deluxe MA Remote Controller

Hacienda Ja Ja energy dashboard measured the home's actual consumption was 11.9 kBtu per square foot for the first year of cooling and heating — an improvement of nearly 60 percent and an annual energy savings of about \$1,150 over the national family average for a single-family residential home."

The Quiet and the Zoning System

"I can say that the performance of our Mitsubishi Electric system has been excellent," the husband said. "The thing we like best is the quiet! Second best is the ingenious zoning system — the ability to crank up or down a specific area without having to drag the whole house along with it.

"When we leave the house for San Francisco, I never have to worry about the operation of our HVAC system. That's a key feature of the Mitsubishi Electric system. It works so smoothly with all of the other energy-efficiency features. Part of the architect's genius in designing this house is how the various systems work together, like an orchestra playing a symphony — it is more about how the instruments come together than how each sounds individually."

