CASE STUDY SUMMARY

Arden Realty's subsidiary next>edge combined lighting and HVAC retrofits with an advanced EMS to lower energy costs and boost tenant comfort.

- Participant: Arden Realty, Inc.
- Building Type: Multi-tenant office building
- Size: 417,463 ft²
- Project Cost: $1,875,000
- Project Incentives: $725,000
- Annual Savings: Approximately $310,000 per year
- Primary Benefit: Energy savings and occupant comfort

Arden Realty's enhanced automation lowers energy costs and increases tenant satisfaction in 45 southern California buildings.

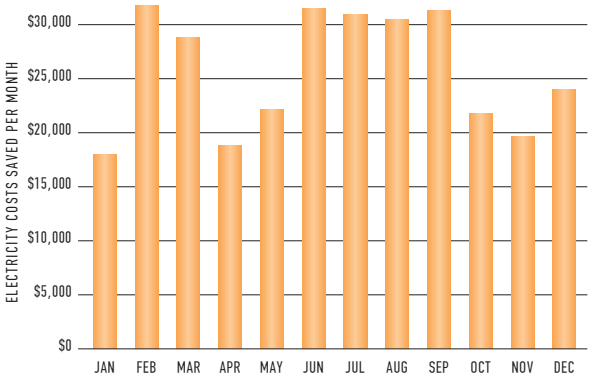
As southern California's largest commercial office landlord, Arden Realty considers reducing energy costs and improving tenant satisfaction a top priority. For example, at its 8383 Wilshire Boulevard building, Arden Realty—through its energy efficiency subsidiary next>edge—installed enhanced automation systems that helped cut operational costs more than $1 per square foot while improving indoor air quality and occupant comfort.

- Meeting the diverse energy needs for multi-tenant facility
- Rising energy costs due to aging building equipment

PROBLEM

Rising energy costs and electric reliability have always been top concerns for Arden Realty, a real estate investment trust (REIT) that operates 192 buildings with 18.5 million square feet of rentable space. In fact, Arden has treated energy efficiency as a strategic business tool, starting a separate energy efficiency consulting arm called next>edge. Arden's multi-tenant 8383 Wilshire Boulevard building in Beverly Hills serves diverse tenants—including retail space, a post office, commercial office, and even a server room. Built in 1971, most of the mechanical and electrical systems in the 417,463 – square foot building were at the end of their life cycles. As a result, operating costs prior to the retrofit exceeded $3 per square foot and building engineers were getting an increasing number of tenant complaints that they were either "too hot" or "too cold."

Arden saves approximately $310,000 per year with EMS system



The EMS, HVAC, and lighting improvements at the 8383 Wilshire Building save Arden approximately $310,000 annually in electricity costs. Average annual electricity costs have gone from $2.47 down to $1.63 per square foot. Savings estimates are derived by comparing post retrofit 2003 electricity bills to pre-retrofit 1998 bills, normalized for occupancy levels and electrical rates.

- Install advanced energy management system
- Upgrade HVAC and lighting systems
- Install CO sensors

SOLUTION

Arden and next>edge reduced operational costs and dramatically cut tenant comfort complaints at 8383 Wilshire by installing a new, more sophisticated energy management system (EMS) and upgrading all major mechanical and electrical systems. Southern California Edison's Standard Performance Contract program provided $725,000 in incentives for the $1,875,000 project.

The EMS now integrates all the new mechanical and electrical equipment, including fan operation, chiller loading, and condenser water temperature set points. To lower energy use during high cost on-peak periods, Arden keeps the building demand within pre-defined limits by using the advanced EMS to tactically adjust equipment energy levels as needed. The EMS also synchronizes the garage exhaust fans for a new carbon monoxide system to mirror increased morning and evening traffic.

"The new EMS system and HVAC upgrades have dramatically cut down our tenant complaint calls by 95 percent and have therefore greatly reduced our maintenance costs."

Duane Lappinga, Vice President of Engineering and Design, next>edge

"Because we can fine tune the EMS system for each of the ten floors of this building, we can now optimize the heating and cooling needs for each tenant."

- Increase occupant comfort and productivity
- Lower maintenance costs
- Lower peak energy demand

BENEFITS

Enhanced automation and system upgrades reduced annual electricity use at 8383 Wilshire by 1,880,000 kWh and cut annual electricity costs by $310,000. The system's effectiveness at improving tenant comfort is demonstrated by the fact that it eliminated over 95 percent of the tenant requests to adjust indoor air temperatures.

Across the board, Arden has reduced peak demand in its 192 southern California buildings by 9 megawatts.

Arden and next>edge added value to this enhanced automation project by commissioning the building during the EMS installation. Commissioning ensures that all building systems are performing interactively according to design intent and has saved Arden between 8 and 20 percent per building in operating expenses. For example, use of trending data from the EMS system at 8383 Wilshire helped Arden identify a malfunctioning variable frequency drive (VFD), and through commissioning, that equipment was replaced.

PROJECT SITE DESCRIPTION

- Location:
  8383 Wilshire Boulevard,
  Beverly Hills, CA
- Size:
  417,463 ft², ten floors
- Space Function:
  Multi-tenant building
- Site Contact:
  Duane J. Lappinga, VP
  Engineering and Design

Equipment Installed

- Siemens APOGEE energy management system
- VFDs, fans and pumps
- CO sensors
- T8 lamps with electronic ballasts

Energy Usage

- 2004 electricity: 7,219,821 kWh (down 20% from pre-retrofits)

Project Cost

- $1,875,000

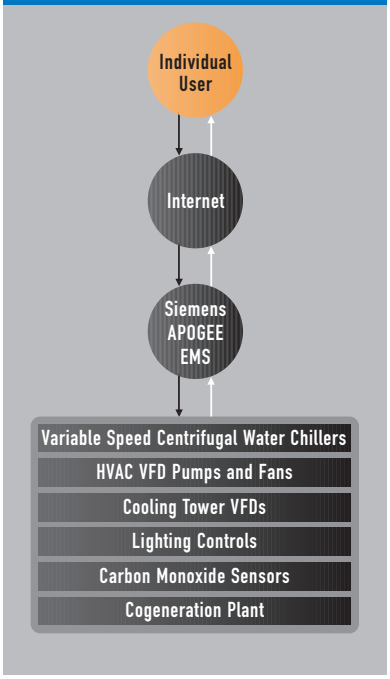
Project Incentives

- $725,000

Technical Information

Next>edge installed a Siemens APOGEE Energy Management System to link their newly upgraded mechanical and electrical systems at Arden's 8383 Wilshire Blvd. facility. The Siemens APOGEE is programmed to centrally monitor, analyze, and control their building equipment to achieve optimal tenant comfort and energy efficiency. next>edge then installed its highly customizable Advanced Energy-Management-System Sequencing (AES™) software to expand the capabilities of the APOGEE system. The AES™ was coupled with building commissioning to optimize the set points based on building size, location, usage, and equipment. The system is a "smart" system, constantly self-regulating itself and automatically resetting thousands of times per day.

Schematic of Arden Realty Energy Management System



The system has the capability to progressively shed demand based on certain price signals, time of day, or other critical events. The building manager interfaces with the system via Internet access and can collect, view, and analyze different trend information such as kW, kWh, discharge air temperatures, and relative humidity.

next>edge improved the HVAC system by installing high efficiency motors and VFDs on major equipment, including a 700-ton centrifugal chiller. By linking the VFDs—which change the rotation speed of the building's motors to better match actual power needs—to the energy management system, Arden can increase energy savings by 40 percent compared to a VFD installed in a local loop setup with only one fixed set point.

Ten variable air volume economizers were installed on each floor and now interact with the EMS to fine tune the static pressure set-points. The system can sense if the outside air temperature is sufficient to provide cooling needs for the building's interior on a floor by floor basis, thus reducing energy use from the mechanical HVAC system. The direct digital controls, a networked system of microprocessor-based controllers, interact with the EMS for specialized environmental and energy monitoring and adjust building equipment accordingly.

The carbon monoxide sensors reduce ventilation fan speed and power use in the parking garages during low traffic hours. Prior to the installation, the system was designed to supply enough fresh air during the heaviest traffic periods – morning and evening – but did not ramp down during non-busy periods. Now the sensors measure the carbon monoxide (which corresponds to traffic levels) and regulate the exhaust fans to efficiently achieve a specified air quality level.

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TAKING THE NEXT STEP

A list of certified demand response contractors is available at: www.energy.ca.gov/demandresponse/documents/qualified_firms.html

Free resources are available from the California Energy Commission at: www.energy.ca.gov/enhancedautomation/

- Business Case Guidebook
- Technical Options Guidebook
- Case Studies
  1. Alameda County
  2. Hewlett-Packard
  3. Comerica Building
  4. Foothill-De Anza Community Colleges
  5. Staples, Inc.
  6. Doubletree Hotel Sacramento
  7. Albertsons
  8. Arden Realty/next>edge
  9. Contra Costa County
  10. Hilton, Palm Springs
  11. PETCO
  12. Swinerton Inc.

Research on Demand Response:

- http://drrc.lbl.gov/drrc-1.html

Additional Resources:

- www.fypower.org/now/demand_resp.html
- www.sdge.com/business/drp_index.shtml
- www.pge.com/biz/demand_response/
- www.sce.com/RebatesandSavings/LargeBusiness/DemandResponse/