



# State-of-the-Art Technology Helps Irvine Office Building Achieve Energy Savings

By **Charles Fletcher**, Executive Vice President, EMCOR Services Mesa Energy Systems, Irvine, CA

According to a recent study by the New Buildings Institute (NBI), new buildings certified under the U.S. Green Building Council's (USGBC) LEED certification system are, on average, performing 25 to 30 percent better than non-LEED certified buildings when it comes to energy use. Average energy savings for Gold and Platinum LEED certified buildings approach 50 percent. Energy savings under EPA's ENERGY STAR program are equally impressive: buildings that have earned the ENERGY STAR label use an average of almost 40 percent less energy than average buildings, and emit 35 percent less carbon.

The 2008 NBI study establishes a clear correlation between energy efficiency and sustainability. Given the fact that oil prices are not likely to significantly decline for the long-term, energy savings are not only good for the planet, they are also good for a building's operating budget. Improving a facility's energy efficiency is a smart business decision, and building owners and managers are constantly on the look-out for creative solutions that will make their existing properties competitive with LEED certified new construction.

## Routine Maintenance Identifies Energy-Saving Opportunity

A case in point is the office building at 19000 MacArthur Boulevard in Irvine, a nine-story Class A 154,530 square foot property. Tired of dealing with the high maintenance and other costs associated with an inefficient and unreliable air conditioning system, LBA Realty, and the building owner, CM Stratplan, Inc., turned to EMCOR Services Mesa Energy Systems for help. A thorough analysis of energy saving



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opportunities resulted in solutions that would enable the owner to meet his efficiency goals at a payback rate that was highly favorable.

EMCOR Services Mesa Energy Systems' engineers first performed several intermediate measures to the building's systems that significantly reduced overall maintenance costs. They then decided that installing new, technologically advanced centrifugal compressors to replace the existing outdated reciprocating compressors would bring about even greater efficiencies and cost savings.

The compressors selected were leading-edge Turboacor high-efficiency, oil-free units. The semi-hermetic variable-speed driven centrifugal two-stage compressor is not only virtually maintenance free, it can also be up to three times more efficient than traditional systems, thanks to the use of magnetic-bearing technology similar to that driving Maglev trains in Europe. While a typical reciprocating compressor has an Integrated Part Load Value (IPLV) of 0/9 to 1.0, the Turboacor has an IPLV of 0.374.



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Using state-of-the-art technology like TurboCor to achieve energy efficiency was a natural choice for the MacArthur Boulevard building. To further optimize operations, the existing vane axial fans were rebuilt and variable speed drives and high-efficiency supply fan motors were installed to run them. In addition, the control system was upgraded to meet the new equipment's requirements and enable the building engineer to monitor and adjust operations directly from his office.

Working on one circuit at a time, starting with the third of three, Mesa installed, tested, and ran the new equipment, leaving the other two circuits running to avoid down-time and allow for a smooth transition. The new equipment achieved an annual reduction of 478,249 kWh, which translates into annual energy consumption savings of \$95,500.00, including KW demand savings dollars.

## Much more than Energy Savings

It quickly became apparent the new equipment offered far more than greater energy efficiency. While the TurboCor compressor boosted previous overall system performance to 500 tons of capacity, it also provided the flexibility to operate at loads as low as 20 tons, thanks to an integrated variable speed drive. This feature is especially helpful during after-hours operation at lower capacity. In the past, three floors of the building would have had to operate at once; the new system requires only those floors with on-going A/C needs to be engaged.

Moreover, the compressors weigh 80 percent less than traditional chillers and take up only half as much space. At an operating sound level of 70 dBA at five feet, they are inaudible to tenants. The gearless design, along with rotor shafts and impellers that float on a magnetic cushion, virtually eliminates the need for maintenance. On start up, the equipment draws less than 2 amps compared to the 500 to 600 pulled by a conventional compressor with across-the-line starters, thus the resulting KW demand reduction.

Admittedly, the cost of a TurboCor centrifugal compressor is 30 percent higher, on an installed basis, than the capital cost of a conventional piece of equipment. However, annual energy savings as well as an initial \$66,000 rebate from Southern California Edison — which the system earned for its outstanding energy efficiency — more than offset the initial cost of purchase and installation. Building owner, CM Stratplan, Inc., and building manager, LBA Realty, expect to recoup their investment in two and a half years, while building managers and tenants enjoy a more reliable system, and a more environmentally friendly and a sustainable facility.



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949.460.0460

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