

# Out in Front



## Phoenix Convention Center, in the LEED, mechanically

By John Vastyan

**O**n April 10, 1874, President Grant issued a patent for the present site of Phoenix. Total cost of the 320-acre town site was set at \$550. Downtown lots were selling for \$7 to \$11 each. A year later, there were 16 saloons, four dance halls and two banks.

In the 134 years since then, Phoenix – which now boasts about 5 million people in the metro area – has grown from a dusty crossroad to become the most populous state capital in the United States, serving as the region’s primary political, cultural, economic and transportation center.

Today, Copper Square in downtown Phoenix is where history meets the future, showcasing the city’s historic sites and recent revitalization. The 24-acre Phoenix Convention Center is in the center of it all. Now in the midst of a \$600 million expansion – and surrounded by restaurants, premier hotels, retail shops, museums and a sports arena – the facility is one of the world’s finest venues for large conventions.

## Growth mode

City managers, well aware of the potential for growth stemming from a premier convention center, planned for the three-phase expansion in advance of the big conventions that continue to come to town. By 2113, convention center managers estimate the number of trade show visitors to reach 375,000.

One of the main thrusts of the convention center was to make it green, with sustainability being the core value. From its partnership with local farmers to its green purchasing program and solar power plant, sustainability is integral to its daily operation.

The fully “sustainable” facility is based chiefly on use of renewable materials, energy efficiency, continuous IAQ, water conservation (a very hot topic in Phoenix), recycling programs and the use of earth-friendly chemicals for cleaning and maintenance. The West building is certified by the U.S. Green Building Council with a Leadership in Energy and Environmental Design (LEED) Silver rating, while the construction of the North building incorporated the USGBC’s, City of Phoenix green criteria and LEED standards.

## Building systems

During phase one of the construction schedule, much of the major work was accomplished, and it was also during this phase that most of the key, ultra-efficient mechanical and electrical systems were installed, including new photovoltaic solar panel technology and a bank of high efficiency gas boilers by Laars.

Crews from Phoenix-based Code Electric installed peel-and-stick solar panels on roughly a third of the West Building’s 2-acre roof. The panels help supply power to the building at an anticipated rate of 150,000 KWH annually, a small fraction of what the building uses.

The \$850,000, 732-panel project was the biggest solar-panel installation on a downtown building, and it was the first time this type of solar-energy technology has been used in downtown Phoenix. It’s estimated that, in putting the sun’s energy to work, the center’s carbon-dioxide pollution will be cut by 95 metric tons each year.



In addition, the Phoenix Convention Center and its Executive Conference Center are responsible for more than 1,400 tons of recycled materials between 2009 and 2011 through the use of the following practices

“I think it will definitely be an added incentive to many groups that the facility is a green building,” says Douglas MacKenzie, spokesman for the Greater Phoenix Convention & Visitors Bureau.

In fact, the move toward LEED certification was one of the first mandates from the City of Phoenix when early planning meetings were held. Green Ideas, an environmental building consultant group and a variety of other LEED certified professionals were commissioned to assist with compliance.

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## Heating in Phoenix?

Well, sure. Even in Phoenix, winter can take the thermometer into the 20s and 30s, though – on average – they get less than a week of below-freezing temperatures a year. But since the city’s new convention center is now a hot winter destination for large groups of people, they must accommodate the need for heating.

Phoenix-based Imcor Inc., a 400-plus employee, commercial and industrial mechanical contracting firm, worked on all of the key Phase 1 and Phase 2 plumbing, piping, HVAC and hydronic installations. During these phases, Bill Mason, president of Imcor, says his crews installed 10 high efficiency Rheos+ boilers by Laars Heating Systems Company, a subsidiary of Bradford White Corp.

“Each of the 10 Rheos+ boilers installed by Imcor were two million BTUs in size, for a total heat load of 20 million BTUs,” says Victor Rilling, president of the Mechanical Room Inc., the Phoenix-based manufacturer’s rep firm that helped specify the boilers, ideally suited for the convention center’s needs.

“The boilers feed 58,000 lineal feet of carbon steel and copper heating water piping,” says Dan Brown, Imcor’s project manager for all of the firm’s Phase 1 and 2 work. “From the boilers, its 800 feet to the newly renovated South Hall where the boilers are heating 145,000 square feet of space through air handlers, coils and VAVs. The other building, 300 feet from the West Hall where the boilers are, is the Phoenix Symphony Hall where we provide for 90,000 square feet of heated space.”

It’s in the convention center’s West Hall, where the boilers are providing heat for 210,000 square feet through 22 air handlers, 178 VAV boxes and 81 fan coil units, most of which require heating, though some of which carry only chilled water for use during the summer.

A unique feature to Imcor’s installation was the way they configured the multiple boiler’s exhaust flue. “We manifolded all of the boilers two exhaust headers, each with five boilers, all of them connected to a computerized draft control system,” Brown says. “This allowed us to carry exhaust through roof in just two locations, discharging into VFD-driven chimney fans, minimizing the need for multiple penetrations.”

“And, with our series, lead-lag boiler arrangement, we set up the system so that each boiler runs for a set number of hours before it cycles off as another system comes on board to meet the need,” he adds. “This way, we’ve set equal run time for all of the boilers.”

Brown says that when demand requires multiple boilers, they activate one at a time until heat needs are met. “We haven’t yet seen a situation where all boilers were on at the same time, though it’s possible. In most instances, just a few of the systems – somewhere between four and six – are operating simultaneously. But that’s just as we knew it would be. This way, all boilers get run time, and we’ve secured the redundancy the convention center needs for the assurance of no down time, ever.”



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In the West Hall’s mezzanine level is the mechanical room where the boilers are lined up on two sides like soldiers in formation. A bevy of Grundfos TP 80-160/2 pumps circulate the heated water in many different directions.

“We were also thrilled to have an application for 10 of the Rheos+ systems,” Rilling says. “The boilers are perfectly suited for the job because their controls monitor the demand for hot water and automatically adjust each boiler’s capacity to meet the required heating load from 1.2 million to 2 million BTU’s with variability of modulation between 100 percent and 25 percent of the input rate.”

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“They’re an ‘environmental’ win, too,” Mason says. “These are among the ‘greenest’ heating systems on the marketplace with NOx levels of less than 10ppm and low CO greenhouse gas emissions, and offer up to 96 percent efficiency – a big plus in Phoenix and with the USGBC.”

“Another key need was that the units we selected would need to have a small footprint; the boiler’s compact size allowed us to install 10 units in a space where only a couple three-pass boilers could’ve been installed – if we could have gotten them in there. These boilers will pass through a standard 36-inch doorway and can be transported on any service elevator. The high efficiency boilers have also reduced the amount of natural gas required to heat the domestic water, lowering energy consumption and operating cost.”

“We particularly like the Grundfos circulators because of their reliable, wet rotor design,” Brown says. “They’re cooled by the liquid they circulate.”

For convention centers, LEED certification is a distinction that sets them apart. To date, only a few venues in the United States are LEED-certified, including the David L. Lawrence Convention Center in Pittsburgh, the Oregon Convention Center in Portland, Ore., and the Spokane Convention Center in Spokane, Wash.

The project in Phoenix implemented basic recommendations of the USGBC, including the use of construction materials from within a 500-mile radius of the project and recycling paper, plastic, cardboard and glass. ■

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