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Phoenix Convention Center, in the LEED, Mechanically **New**

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On April 10, 1874, President Grant issued a patent for the present site of Phoenix, AZ. 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.

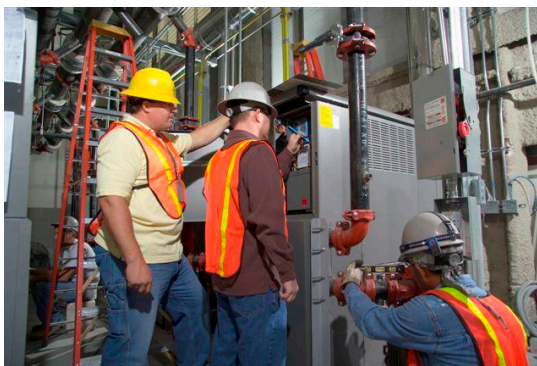
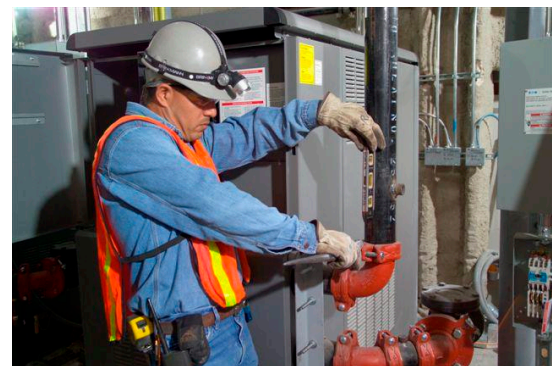
In the 134 years since then, Phoenix – with about 5 million people in the metro area – has grown from a dusty crossroad to become the most populous state capital in the US and is the region's primary political, cultural, economic, and transportation center.

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 soon to be 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, began planning for the three-phase expansion several years ago. Currently in phase two of the expansion, the center is now open for convention business and will be nearing completion by January 2009; at that time all key facilities will be operable. And that's good news for Phoenix because big conventions are coming to town.



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The National Rifle Association - so far, the biggest group signed on - is coming in May, 2009 with an estimated 60,000 delegates. That's compared with conventions that, just a few years earlier, averaged 2,600 attendees. By 2113, convention center managers estimate the number of trade show visitors to reach 375,000.

The convention center's expanded size - with three times the floor space of its puny predecessor, the Phoenix Civic Plaza - shifts the convention center's status in '06 from the 67th largest convention facility in the US, now into the top 20. Within a few months, the facility can offer nearly 900,000 square feet of rentable space and more than 2 million square feet total.



The mandate: LEED

When the the second phase is complete in early '09, managers hope to get the blessing of the U.S. Green Building Council with approval of the Convention Center's having met LEED standards as a fully "sustainable" facility, 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.

"I think it will definitely be an added incentive to many groups that the facility is a green building," said 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.

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.

Last year, crews from Phoenix-based Code Electric installed peel-and-stick solar panels on roughly a third of the West Building's two-acre roof. The panels will help supply power to the building at an anticipated rate of 150,000 KWH annually, though city officials admit the amount is a small fraction of what the building will use.

The \$850,000, 732-panel project will be the biggest solar-panel installation on a downtown building, and it's 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.

According to Lexie Van Haren, director of communications for the convention center, the mechanical equipment specified for the facility is the key ingredient to achieving energy efficiency. "And, an energy management system track sand optimizes

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energy consumption levels, further reducing heating and cooling costs.”

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+ employee, commercial and industrial mechanical contracting firm, was brought in to do all of the key Phase 1 and Phase 2 plumbing, piping, HVAC and hydronic installations. During the Phase 1 work, according to Bill Mason, president of Imcor, their crews installed 10 high efficiency Rheos+ boilers by Laars Heating Systems Company, a subsidiary of Bradford White Corporation.

“Each of the ten Rheos+ boilers installed by Imcor were two million BTUs in size, for a total heat load of 20 million BTUs,” said 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,” explained Dan Brown, Imcor’s project manager for all of the firm’s phase 1 and 2 work. “From the boilers, it’s 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 s.f. of heated space.”



It’s in the convention center’s West Hall where the boilers are providing heat for 210,000 s.f. 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. This allowed us to carry exhaust through roof in just two locations, discharging into VFD-driven chimney fans, minimizing the need for multiple penetrations,” added Brown.

"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," continued Brown. "This way, we've set equal run time for all of the boilers."

"When demand requires multiple boilers, they activate one at a time until heat needs are met," said Brown. "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 4 and 6 – 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."

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," said Rilling. "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% and 25% of the input rate."

"They're an 'environmental' win too," added Mason. "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% 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," said Brown. "They're cooled by the liquid they circulate."

LEEDing convention centers, still a rarity

For convention centers, LEED certification is a distinction that sets them apart. To date, only three existing venues in the United States are LEED-certified: the David L. Lawrence Convention Center in Pittsburgh, the Oregon Convention Center in Portland, OR, and the Spokane Convention Center in Spokane, WA.

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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