

RAMPING UP SAVINGS

UTAH COMMUNITY BUILDS NEW CAT® POWER PLANT TO KEEP PACE WITH GROWTH



Located on the edge of Salt Lake and Utah counties at the north end of Utah Lake, Lehi sits at the nexus of technology firms migrating from California. Dubbed the “Silicon Slopes,” the region encompasses a cluster of information technology, software development, and hardware manufacturing and research firms along the Wasatch Front.

With companies such as Adobe, Microsoft and Xactware putting down roots within its service territory—and with a 134 percent increase in population since 2000—Lehi City Power realized it

was time to replace an outdated facility with a new campus to keep pace with the explosive growth.

In 2011, city officials began a four-year planning process that ultimately led to the selection of Cat dealer Wheeler Machinery to serve as general contractor for a \$17.5 million campus, which includes the main office, warehouse, shop, and a new distributed energy facility used for peak shaving to reduce the sometimes high cost of power from the energy grid.

Wheeler has a track record of developing distributed energy systems



for municipal utilities in Utah, including Heber City, Springville, Provo and Hurricane. A unique approach developed by Ken Green, now retired from Wheeler Power Systems, involves the Cat dealer overseeing all facets of power systems installations. This gives the end user one point of contact during the development phase, and an experienced electric power dealer to fall back on for product support once the project is completed.

Before coming to Lehi City Power to serve as director, Joel Eves worked for Provo City Power, a nearby municipal utility that commissioned its own new power plant in 2017 with five Cat G3520H gas generator sets.

“I know those people really well and if I have a problem or I need something, I can call them and they’ll help me out and vice versa,” Eves says. “The fact that they have the same Cat gensets as we do—I know the exacting detail they would have gone through to make that selection. It gave us some comfort when we made the recommendation to our decision makers to go with Wheeler and Caterpillar for our new generation plant.”

Lehi City Power asked for an integrated team to come forward with an architect contractor and the generation technology provider.

“Once Wheeler was selected, we worked hard to come up with the best ideas with our team, Wheeler’s team,

and (subcontractor) Hughes General Contractors until we arrived at the end product,” Eves says. “Once that was determined, things went really smoothly. In the end, it’s amazing the relationship that we maintained with Wheeler, Hughes, and all the subcontractors. To this day, we feel like everyone did a great job.”

Broadbent Generation Facility

Located behind the new 17,000-square-foot office of Lehi City Power, the Broadbent Generation Facility first opened in March 2018. It has three Cat G3520H generator sets that produce 7.2 MW of power during times of peak demand, when energy prices are high. This typically occurs during the summer months.

Peak demand reached 120 megawatts this summer in Lehi. That compares to a peak of 19.1 MW in 2000. Lehi used 396,514 MWh of energy last year, compared to 78,454 MWh in 2000.

“At the rate we’re growing, we wanted a way to help us address the power needed for our city,” said Cameron Boyle, assistant city administrator, during a groundbreaking ceremony in 2017.

“This helps offset the cost of power we’re purchasing from other sources, and during our peak times, in July and August when everyone is using their air

conditioners, we want to have our own ability to generate power to offset the need.”

Lehi belongs to Utah Associated Municipal Power Systems (UAMPS), which provides wholesale electric energy, transmission and other energy services to community-owned power systems throughout the Intermountain West.

As a member of UAMPS, Lehi City can contract with energy providers of its choosing. Some of those energy sources include hydro power, natural gas, and renewables such as wind and solar.

Eves says having the ability to beat the cost of grid power with a local distributed energy system is critical to the future of municipal power systems.

“From all the indicators I’m seeing and all the conferences I’m attending, there’s going to be a huge need for a product like this that is load following, can ramp quickly, and come offline quickly,” Eves says. “And that’s because of all of the renewables and intermittent production that are taking place, which lead to greater fluctuations throughout the energy grid.”

Monitoring the market

Lehi has a specialist who monitors the energy market. When forecasts indicate that prices are about to spike, Lehi City Power notifies UAMPS that it plans to

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CUSTOMER PROFILE

Lehi City Power

Location: Lehi, Utah

Application: Municipal Utility - peak shaving

Cat® Equipment: Three G3520H gas generator sets (2.4 MW each)



run the generator sets based on the strike price—which is when the cost of natural gas is cheaper than power rates on the spot market.

“There’s an electric power clearinghouse that forecasts the cost of power, and if it indicates that the price of energy is going to become really high that hour, we will want the generators to run so we can beat the market price,” says Crystal Robinson, forecast and resources manager for Lehi City Power.

“So, for example, when prices reach \$100 per megawatt hour, if I can start these generators at \$35 or \$40 per megawatt hour, we save all that money,” Robinson says.

Including all operating and maintenance expenses, it costs Lehi between \$40 to \$55 per megawatt to operate the facility. Current costs to purchase energy from the grid can vary anywhere from \$20 to \$300 per megawatt hour, depending on demand.

“Having our own source of power generation is a hedge, because if we don’t have it then we know we’re just stuck to the market,” Robinson says. “If the market price is high, now we have another option.”

Once Lehi City Power finishes rebuilding a local substation, voltage on a main transmission line will increase from 46 kV to 138 kV, making its new distributed energy system more reliable and robust. This will enable the Broadbent facility to operate in island mode and provide electricity to the city in the event of a grid outage.

Currently, the time required for the Cat generators to ramp up and fully load is about 15 minutes. Once the substation rebuild is complete and the transmission line is able to carry higher voltage, it should only take about five minutes, Eves says.

“There’s an energy market that we need to be able to play in, and that’s five-minutes real-time,” Eves says. “So that’s where we really need to be.”

Clean operation

The Utah Valley is prone to an inversion that traps pollutants and leads



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Power Department Director
Lehi City Power



to a visible haze, particularly in the winter months. Much like the new Cat power plant in nearby Provo, Lehi is now one of the cleanest running plants in Utah, Eves says.

“You have to understand the area we’re in to appreciate what that means because we’re in a very poor air quality area—especially in the winter when the inversion locks everything in, Eves says. “So, to have the Utah Department of Air Quality say we’re clean enough to run 24/7 365 for our whole plant is amazing.”

Based on peak demand, the new generation facility can generate less than 10 percent of the energy needs for Lehi’s 20,000 power customers. The facility has room to expand, and could eventually accommodate three more G3520H gensets, plus two more 4 MW units. Eves



says Lehi will reevaluate its power needs within the next five years and make a decision on expanding the plant.

“As fast as we’re growing, we knew we needed a whole new facility,” Eves says. “We knew we had to have additional capacity and make the generation facility larger than we need today. As we move forward and gain more experience running the plant, market forces will dictate our next move.”