

NEVADA SURE BET PROGRAM

Sierra Pacific Power Company and Nevada Power Company

3-G Farms

Pivot Irrigation System Retrofit

Project Description

Pivot irrigation systems are used to replace wheel line irrigation systems in agricultural applications. Pivot irrigation systems operate at lower pressure and provide a more consistent application than wheel lines, thus allowing a lower application rate (about 3.5 feet per acre per year). This translates into reduced pumping and reduced electricity usage. A pivot system irrigates in a circular pattern around a single point, while the wheel lines irrigate in a rectangular pattern along a single line. The wheel lines require someone to constantly move the hose feeding the wheel line from source to source as it moves along the field. The pivot system rotates around a center fixed installation and therefore does not require labor to move the source.

Application

3-G Farms grows alfalfa in the Smith Valley near Wellington, Nevada. Two sites are farmed, Desert Creek field and Triangle field. Irrigation for both fields was previously applied using wheel lines, supplied from ponds filled with a mixture of well water and stream water from the nearby Desert Creek.

The 240 acre Desert Creek field had a system of eleven (11) ¼-mile wheel lines with a total of 418 impact sprinklers. The system operated at 60 psig and delivered water at 2,700 gallons per minute. A 125-hp well pump was used to deliver water into a pond, and then two of three 50-hp booster pumps delivered water to the wheel lines. These pumps operate during the irrigation season, generally from April through October. Through the conversion to the pivot system, the system pressure was reduced to 20 psig and one 50-hp booster pump was eliminated. Only one 50-hp booster pump operates now, along with the 125-hp well pump.

The 199 acre Triangle field had a system of twenty three (23) ¼-mile wheel lines with a total of 882 impact sprinklers. The system operated at 60 psig and delivered water at 2,700 gallons per minute. A 125-hp well pump was used to deliver water into a pond, while a 100-hp booster pump delivered water to the wheel lines. Through the conversion to two new pivot systems, the system pressure was able to be reduced to 20 psig. The supply to this field using stream water from Desert Creek was eliminated, as was the holding pond. As a result, there was no longer a need for a separate well pump and booster pump. The 125-hp well pump was replaced with a 150-hp pump and the 100-hp booster pump was eliminated. Additionally, a variable frequency drive (VFD) was installed on the new pump motor to adjust the pump as necessary to maintain 20 psig at the wheel lines. Aside from the savings through elimination of the booster pump, the farm is also saving on the pumping energy of the new well/booster pump.



Wheel Line



Pivot Irrigation System at 3-G Farms

As a result of the irrigation system retrofit, the facility can expect energy savings of over 579,000 kWh and a reduction in peak demand of approximately 141 kW annually. At current electric rates, the facility will realize an overall annual savings potential of approximately \$45,200. 3-G Farms received an incentive of \$32,495 from Sierra Pacific Power Company through the 2007 Nevada Sure Bet Program.

Project Results

Peak Demand Reduction	140.8 kW
Annual Energy Savings	579,445 kWh
Annual Energy Cost Savings	\$45,197
Project Cost	\$245,000
Custom Incentive	\$32,495