

CITY OF CLINTON



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COMPANY PROFILE

The Clinton Regional Water Reclamation Facility (RWRF) is responsible for the collection, transport, and treatment of wastewater for the cities of Clinton, Camanche, and Low Moor. Their mission is to operate and maintain the Clinton RWRF to produce clean water that meets all federal and state regulations for discharge into Beaver Slough and eventually into the Mississippi River; to utilize the bio-solids generated in the treatment process in an environmentally beneficial way; and to operate and maintain wastewater pumping stations to transport wastewater in a manner that protects public health and protects the environment today and for future generations.

PROJECT BACKGROUND

When moving to a new state of the art facility in 2012, the wastewater recovery process was changed from anaerobic to aerobic. The new facility is the first in Iowa to utilize an advanced biological nutrient removal system. While this method has superior water quality results, the new process also consumes more energy. As the Clinton RWRF strives to meet sustainability goals, it also seeks to diminish the cost of electricity needed to run blowers and pumps by supplementing its electrical usage with alternative energy.

INCENTIVES TO CHANGE

As energy prices have increased and the costs of alternative energy technologies have decreased, alternative energy sources have become a more viable option for municipal facilities. The city is exploring the potential benefits of an alternative energy system to help offset energy costs and slow future increases of sewer rates for its customers. Iowa has a favorable climate for wind generation and Clinton RWRF has

ample land to use for a solar array. The Pollution Prevention intern was tasked with conducting a preliminary feasibility study of using wind turbines or solar panels to supply electricity to the RWRF site.

RESULTS

Feasibility Study for Alternative Energy: When considering alternative energy sources, many factors must be considered in addition to installation and operating costs. The feasibility study included an audit of energy usage, a study of the historical and current policies regarding alternative energy, and an economic analysis of how an alternative energy source could benefit the facility. Wind conditions in northeast Iowa along with the associated maintenance and storage costs make wind energy a less than favorable option for the city of Clinton.



PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
FEASIBILITY STUDY FOR ALTERNATIVE ENERGY	\$30,000 (one time)	-	IMPLEMENTED
500 KW SOLAR ARRAY	\$12,400	657,000 kWh	MOST VIABLE

A solar array was found to be a more viable alternative energy system for the RWRF. The first option analyzed was a ground mounted, fix-tilt, 2,000 kW aggregate capacity solar array installed on RWRF property. A second option explored was a similarly structured array, but at a pilot size of 500 kW. Due to size restrictions in current policy, the proposed 500 kW array was estimated to hold the most potential to be a cost-effective option. A 500 kW array could provide approximately 12 percent of projected annual electrical usage of the water reclamation plant.

Electricity charges at the RWRF were determined to have the largest effect on the viability of installing an array. The plant's electrical bill has two major components; a kWh consumption charge and a peak demand charge. Demand charges can account for 50 percent of the monthly electricity bill at the RWRF and cannot be offset with alternative energy sources.

Another consideration is net metering policies. A 500 kW array is not expected to create any more electricity than is demanded by equipment at the RWRF. In the case of the RWRF, net-metering may be available for a system of 500 kW in size. The grid system has a finite capacity and is highly regulated. If the City of Clinton was to build a larger array, the permitting, survey, and possible transmission changes could significantly increase the cost of installation.



A power purchase agreement (PPA) was explored as a possible means to finance a solar project. As of a 2014 Iowa Supreme Court ruling, purchasing power produced by an onsite solar array owned by a third party has been a legal way to financially plan a solar installation. Similar to a lease, a PPA allows the user to purchase the generated power at a determined rate, without the large upfront costs that come with a solar installation. A PPA could be a desirable arrangement for the water reclamation plant.

While the preliminary study indicated that a 500 kW array installed through a PPA would be the most viable option for alternative energy at the RWRF, at the current state, this option was determined to still be outside the desired financial considerations. However, an understanding of alternative energy costs and considerations was obtained for key city employees, allowing them to better evaluate any future cost or technology changes in the city's favor.

