



SOLAR ARRAY PRODUCTION UPDATE

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2017 WASTEWATER TREATMENT PLANT SOLAR PRODUCTION UPDATE

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I. Photovoltaic System Description

Located at Two Mile Bridge Road, the solar panel array provides electricity for the Red Lodge Wastewater Treatment Plant. This system is a 160 panel, 48.75 kW array facing and tilting south for optimal sun capture. The Red Lodge Climate Protection Group, a local group of volunteers, coordinated the planning for the installation. Resolution 3293 to approve the solar panel and variable frequency drive project was passed by the City Council on October 6, 2009. The Solar Array was installed and became operational in August of 2010.

II. Recap of Previous Solar Production Analysis

In September of 2016, a Solar Production Analysis was done by the previous Energy Corps member, Katelynn Essig. It was found that in the six years since the system was installed, 399,821.5 kWh of solar power had been produced. This number was calculated by estimating the projected solar production from May of 2016 to September of 2016, and adding that estimate to the previous inverter reading, which was 355,069 kWh in May of 2016. It was found that the average monthly production between August of 2010 and September of 2016 was 5,794.5 kWh.

III. Results of Current Solar Production Update

In order to increase the accuracy of the current production update, a comparison has been made between the previous meter reading in May of 2016 and the current meter reading in October of 2017. The estimated production that was calculated in September of 2016 will not be accounted for, and only actual system production will be analyzed.

On October 24, 2017, a meter reading showed that a total of 454,290 kWh have been produced by the system since it's installation in 2010. The previous meter reading in May of 2016 showed that 355,069 kWh had been produced. This means that between May of 2016 and October of 2017, 99,221 kWh were produced. This equates to 5,512 kWh per month.

Total Solar Array Production since last Meter Reading		
May 2016 to October 2017		
Total kWh Produced	Number of Months	Average kWh per month
99,221 kWh	18	5,512 kWh per month

IV. Conclusion

The current estimate of monthly energy production is less than originally projected in 2009 when the project was funded. The panels were originally projected to produce 6,500kWh per month, but are currently producing 5,512 kWh per month. The current kWh production is lower than what is ideal, but it is within the range of monthly kWh production that was estimated in 2009 when the project was funded.

At \$.11 cents per kWh, the solar array has saved the city a total of \$49,972 or about \$7,313 per year ($\$49,972 / 82 \text{ months} \times 12$). This results in an estimated payback period for the City's investment of 36 years ($\$265,567 / \$7,313$). In terms of carbon emissions, the solar array has prevented 338 metric tons of CO₂e from entering the atmosphere. This is equivalent to the amount of carbon dioxide sequestered by 72 acres of forest per year, and offsets 810,008 miles driven by an average passenger vehicle.

A maintenance plan will be implemented in the Spring of 2018 in order to increase the system's production and ensure that the panels last into the future. This will involve annual power washing and a check-up by the system installer.