BUSINESS CASE MODEL
Hanceville Wastewater Treatment Plant
Solar Energy System
CWSRF Project No. CS010390-04

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The proposed Hanceville Wastewater Treatment Plant Solar Energy System is designed to reduce the amount of electricity purchased from the City of Cullman Electric Cooperative, and in turn reduce the annual expense paid to the electric utility by the Hanceville Water Works and Sewer Board. The reduction in grid power consumption is offset by the onsite generation of electricity through the implementation of a new solar panel array to be installed on readily available land at the wastewater facility site. The proposed solar panel is array is an advantageous energy source for Board as it shall harvest solar radiation - a renewable resource - and can easily be incorporated into the facilty's existing electrical system.

The solar panel array shall be comprised of approximately 510 individual ground-mounted solar panel modules. The modules shall be arranged in separate groups, including two (2) groups of 85 panel modules, five (5) groups of 65 panel modules and a single group of fifteen (15) units. Inverters shall be installed on each group of modules to convert the direct current generated to alternating current for general use by the treatment plant's various components. Power created by the solar panel array shall be directed through one of two separate electrical panels containing circuit breakers before being routed to an existing motor control center, which shall accept the power supplied by the installation and distribute it accordingly.

During calendar year 2015 the Hanceville Wastewater Treatment Plant consumed 742,760 kWh or just under an average of 62,000 kWh a month. The average Monthly power bill that year was $81,108.39. With annual electric consumption for this facility growing and the cost of grid power escaping on an annual basis, it is in the interest of the Board to seek alternative sources of energy. This 166 KW solar panel system will help reduce those annual power bills by approximately 27% for the next 30 plus years, reducing the utility energy demand by approximately 39%.

Maintenance of the individual modules shall consist of a semi-annual washing of the panels to remove any pollen or debris rain has not washed away. The expected useful life of the solar energy system is 30 years, exceeding the 20-year term of the State Revolving Fund loan sought to finance their purchase and installation.

This 166 KW solar array brings short and long term value to the Hanceville Water Works and Sewer Board. The immediate value is reduced power bills. In addition, the system will also offset some of the daytime peak load requirements as the system will feed directly to the plants electrical service room, allowing the electricity to be used on site first, reducing the demand from the grid.

BUSINESS CASE ANALYSIS
HANCEVILLE WWTP SOLAR ENERGY SYSTEM
HANCEVILLE WATER WORKS AND SEWER BOARD
CWSRF PROJECT NUMBER CS010390-04

UTILITY ENERGY CONSUMPTION SUMMARY

	Jan.	Feb.	March.	April	May	June
Base kWh	15,000	15,000	15,000	15,000	15,000	15,000
Add. kWh	66,520	51,840	52,680	60,920	49,240	44,080
Total	**81,520**	**66,840**	**67,680**	**75,920**	**64,240**	**59,080**

	July	August	Sept.	Oct.	Nov.	Dec.
Base kWh	15,000	15,000	15,000	15,000	15,000	15,000
Add. kWh	45,240	42,280	37,080	31,800	33,720	47,360
Total	**60,240**	**57,280**	**52,080**	**46,800**	**48,720**	**62,360**

	Total	Avg. Monthly	Reduction	App. Avg. Monthly
Base kWh	180,000	15,000.00	-	15,000.00
Add. kWh	562,760	46,896.67	24,208.30	22,688.37
Total	**742,760**	**61,896.67**		**37,688.37**

PEAK DEMAND SUMMARY

	Jan.	Feb.	March.	April	May	June
Peak kW	128.2	122.88	120.4	117.52	112.48	100

	July	August	Sept.	Oct.	Nov.	Dec.
Peak kW	100	105.24	123.32	100	100	125.12

	Total	Avg. Monthly	Reduction	App. Monthly Avg.
Peak kW	1355.16	112.93	20%	90.34

ADDITIONAL CHARGES

	Monthly	Yearly
Customer Charge	$ 110.00	$ 1,320.00
Sanitation Charge	$ 135.83	$ 1,629.96

	2015 Utility Invoice
January	$ 8,074.59
February	$ 7,126.01
March	$ 7,101.81
April	$ 7,538.54
May	$ 6,933.16
June	$ 6,351.74
July	$ 6,691.98
August	$ 6,631.00
September	$ 6,488.27
October	$ 5,678.36
November	$ 5,623.88
December	$ 6,869.05
Total	**$ 81,108.39**
Avg. Monthly	**$ 6,759.03**

Calculated Daily Energy Cost Following Project Implementation

Description	Usage (kWh)	Charge	Total
Base Charge	15000.00	$ 0.08709	$ 1,306.35
Energy Charge	22688.37	$ 0.04115	$ 933.63
TVA Fuel Adj. Cost	15000.00	$ 0.02238	$ 335.70
TVA Fuel Adj. Cost	22688.37	$ 0.02182	$ 495.06
TVA Env.l Charge	15000.00	$ 0.00201	$ 30.15
TVA Env. Charge	22688.37	$ 0.00196	$ 44.47
TVA Env. Charge	112.93	$ 0.48000	$ 54.21
Customer Charge			$ 110.00
Demand Charge	90.34	$ 13.14	$ 1,187.12
Sanitation Charge			$ 135.83
Alabama State Tax	4496.68	$ 0.04	$ 179.87
License Tax	4496.68	$ 0.022	$ 98.93
		Total Avg. Monthly	**$ 4,911.31**
		Annual Total	**$ 58,935.68**

Ex. Avg. Daily Utility Energy Consumption	61,896.67	kWh
Calculated Avg. Daily Utility Energy Consumption	37,688.37	kWh
Reduction	**39%**	

Ex. Avg. Monthly Utility Energy Bill	$ 6,759.03
Calculated Avg. Monthly Utility Energy Bill	$ 4,911.31
Reduction	**27%**