

ATTACHMENT “D”

TVA BUSINESS CASE FOR ENERGY SAVINGS

BUSINESS CASE
 UPGRADES AT FORT PAYNE WASTEWATER TREATMENT PLANT
 PROPOSED ENERGY EFFICIENCY IMPROVEMENTS
 SRF LOAN AND GRANT INCLUDING TVA ENERGY EFFICIENCY PROGRAM

SITE LIGHTING

The existing site lighting is high pressure sodium, 1000 HPS Highbays. There is a total of 21 fixtures on the treatment plant site. The proposed project includes installed LED lighting in lieu of the high pressure sodium in order to realize an energy savings. The City had an energy efficiency study performed, and the following chart summarizes the existing and proposed system:

Electrical Cost: \$ 0.10 per kW-hr				
	No. Fixtures	kW per Fixture	Hrs Operating Per Year	Energy Cost Per Year
Existing System: 1000 HPS Highbays	21	1.10	4,380	\$ 10,118
Proposed System: LED FLOOD FL560L4A	21	0.235	4,380	2,162
ENERGY SAVINGS:				7,956
PERCENT SAVINGS:				79%

The proposed lighting will realize an energy savings of 79% for the City compared to the existing lighting system. Refer to the attached study performed on behalf of the City.

The total existing wattage is $21 \times 1.1 \text{ kW} = 23.1 \text{ kW}$. The total proposed wattage is $21 \times 0.235 \text{ kW} = 4.935 \text{ kW}$. The total power savings is $(23.1 - 4.935) / 23.1 = 79\%$.

Calculate the energy costs associated with existing and proposed lighting systems and (optional) show environmental impact. Click on the first "Blue" cell and tab to the other input cells.

					Energy Rate (\$ per kWh)	0.10			
Existing Systems					Proposed System				
Existing Systems	Fixture count	Watts/Fixture	Hr burn per year	Energy \$ per yr.	Proposed Systems	Fixture count	Watts/Fixture	Hr burn per year	Energy \$ per yr.
1000 HPS HIGHBAYS	21	1100	4380	\$10,118	LED FLOOD FL560L4A	21	235	4380	\$2,162
Energy used per yr. (Existing System)				\$10,118	Energy used per yr. (Proposed System)				\$2,162
Electrical Load (kilo-watts) (Existing System)				23.1	Electrical Load (kilo-watts) (Proposed System)				4.9
Potential Energy Savings per year					\$7,956	kilo-Watt load reduction		18.2	
Estimated total cost for complete upgrade							Simple Payback (based on energy savings alone)		months
Cost of Waiting (Cost of postponing the Lighting Upgrade)					\$663 per month	or	\$7,956 per year		

Environmental Impact of Lighting Upgrade
Changing your lights can benefit the environment!

Annual Carbon Dioxide emission reduction	122,527 lbs.	Coal burning avoided (EPA Nov. 2004)	57,255 lbs. Or 26 tons	Equivalent acres of forest added	15 acres
Annual Sulfur Dioxide emission reduction	481 lbs.	Atmospheric mercury contamination avoided	1,237 mg.	Equivalent cars removed from road for a year	11 cars
Annual Nitrogen Oxide (NO, NO2) reduction	236 lbs.	50% US Electric Power is from coal-burning power plants.			

Numbers used (based on EPA Energy Star Facts and Assumptions sheet, 2007)

Emission Factors: gases released per kWh of electricity generated (EPA 2007)		Carbon dioxide and mercury released per lb. of coal burned (EPA 2007) (can vary based on type of coal)		Annual carbon dioxide (lbs.) sequestration by forest and emission by cars (EPA 2007)	
lbs. of CO ₂ released	1.54	lbs. of CO ₂ generated	2.14	CO ₂ sequestration per acre	8066
lbs. of SO ₂ released	0.00604	lbs. of mercury released	0.0216	CO ₂ emission per average car	11,470
lbs. of NO _x released	0.00297	Click here to open EPA Energy Star Facts and Assumptions sheet, 2007.			

Customer:	WASTE WATER TREATMENT FORT PAYNE	9/15/15
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