MERIDIAN TOWNSHIP PHASE II ENERGY EFFICIENCY PROJECT - PART 2

Develop a Plan to Reduce Energy for the Street Lighting System in the Township

The goal of this part of Phase II included the three tasks below.

1. Research the physical characteristics and energy economics of the current street lighting system in Meridian Township

2. Enter into discussions with Consumers Energy on future street lighting technology and maintenance plans

3. Develop pilot project for energy saving street light replacement with emphasis on economic advantages for the Township

The economics of street lighting is such that the energy consumed is not paid for directly. Instead, street lighting is billed at a fixed monthly amount depending on the size and technology of the lamp in place. Both the Lansing Board of Water and Light (BWL) and Consumers Energy were contacted to discuss plans for conversion of the street lighting grid to LEDs or other technology.

An inventory and mapping of the street lighting within Consumers Energy territory was conducted prior to this audit. The inventory of existing streetlights, including maintenance and energy charges, is presented below:

Lamp Type	Qty Fixtures	$/month per Fixture	$/year per Fixture	$/month All Fixtures	$/year All Fixtures
100 HPS	1,589	$12.10	$145.20	$19,226.90	$230,722.80
150 HPS	43	$14.90	$178.80	$640.70	$7,688.40
250 HPS	9	$22.02	$264.24	$198.18	$2,378.16
100 MV	56	$12.67	$152.04	$709.52	$8,514.24
175 MV	361	$16.88	$202.56	$6,093.68	$73,124.16
250 MV	39	$20.62	$247.44	$804.18	$9,650.16
400 MV	30	$26.17	$314.04	$785.10	$9,421.20
Totals	2,127			$28,458.26	$341,499.12

There are over 2,100 street lights documented in Consumers territory. These are a mixture of municipal owned and utility owned. There are almost 500 street lights that still use ancient mercury vapor technology. If energy savings are important, these are the streetlights to target for replacement. These streetlights will be replaced by Consumers with HPS fixtures on some unknown schedule. Street lighting changes are a low priority for Consumers.

Consumers has two options for LED streetlights (none for induction fluorescent). See graphic provided at the end of this report. The township would have to pay for the replacement of existing streetlights with new LED fixtures. Consumers has not yet established a monthly rate for LED fixtures. Consumers has already run LED street lighting pilot projects and is not interested in another.

An inventory and mapping of the street lighting within the Lansing Board of Water & Light (BWL) territory was conducted prior to this audit. The BWL appears to have lower costs per fixture than Consumers. The inventory of existing streetlights, including maintenance and energy charges, is presented below:

Lamp Type	Qty Fixtures	$/month per Fixture	$/year per Fixture	$/month All Fixtures	$/year All Fixtures
70W HPS	13	$7.08	$85.00	$93.86	$1,126.32
100W HPS	28	$8.00	$96.00	$228.20	$2,738.40
150W HPS	1	$9.42	$113.00	$9.60	$115.20
Post Top	13	$8.17	$98.00	$108.16	$1,297.92
Historic Single-Top	1	$26.92	$323.00	$27.43	$329.16
Totals	56			$467.25	$5,607.00

There are only 56 streetlights in BWL territory. The existing fixtures use high pressure sodium technology. These are all utility owned. The BWL has no plans for retrofitting street lights. The utility has already run a couple of LED pilot projects and is probably not interested in another.

The following table displays the annual energy consumption and cost per kWh used for all streetlights. Several factors effecting a potential street lighting energy efficiency project are revealed.

Utility	Technology	Watts	kWh/Yr	Qty	Total kWh	% of Total	$/fixt/Yr	Annual $	$/kWh
BWL	HPS 70	86	344	26	8,944	0.7%	$90.50	$2,353.00	$0.26
BWL	HPS 100	120	480	28	13,440	1.1%	$96.00	$2,688.00	$0.20
BWL	HPS 150	174	696	1	696	0.1%	$113.00	$113.00	$0.16
Consumers	HPS 100	120	480	1,589	762,720	61.9%	$145.20	$230,722.80	$0.30
Consumers	HPS 150	174	696	43	29,928	2.4%	$178.80	$7,688.40	$0.26
Consumers	HPS 250	290	1,160	9	10,440	0.8%	$264.24	$2,378.16	$0.23
Consumers	100 MV	120	480	56	26,880	2.2%	$152.04	$8,514.24	$0.32
Consumers	175 MV	194	776	361	280,136	22.7%	$202.56	$73,124.16	$0.26
Consumers	250 MV	290	1,160	39	45,240	3.7%	$247.44	$9,650.16	$0.21
Consumers	400 MV	455	1,820	30	54,600	4.4%	$314.04	$9,421.20	$0.17
Totals				**2,182**	**1,233,024**	**100.0%**		**$346,653.12**	

The BWL streetlights comprise only 2% of the total street lighting costs and use HPS technology, offering little opportunity for significant energy savings. The BWL appears to have lower costs per fixture and per kWh than Consumers for identical fixtures. Being a nonprofit, the BWL may have less flexibility in its cost of service to provide reduced rates for energy efficient street lighting replacements.

Nearly 2/3 of the total energy consumption for street lighting is for Consumers 100 Watt HPS fixtures. These lower wattage fixtures will have a longer return on investment because there are fewer watts to pay for the costs of fixture replacement.

The Consumers mercury vapor fixtures constitute 33% of the total current electricity load for Meridian Township street lighting. These represent the greatest opportunity for energy savings because replacement LED or induction technology is replacing low lumen per watt streetlights. Improved light levels and visual acuity are a possible result of a well planned replacement process. These fixtures will eventually be replaced with less efficient HPS technology if nothing is done.

Suspended or cobra head fixtures require special equipment to repair or replace lamps whereas post top fixtures can be reached with a simple ladder. This economic reality is not reflected in the current price rate. Larger wattage lamps will obviously consume more energy, but currently the cost of energy to the customer goes down as the lamp wattage increases. This seems contrary to the cost of service and may be a byproduct of an archaic mindset encouraging the increased use of electrical power for the purpose of generating higher profits. A street lighting efficiency project will be a challenge and an opportunity to aid the utility in transforming this part of its business model to be sustainable and increase the resiliency of the street lighting grid.

Neither utility has or is planning to have an energy efficiency municipal lighting program. The township would have to initiate any discussions and be willing to finance the lighting fixture replacement. Then there is the issue of ownership of the new fixtures and the monthly price per fixture that must be negotiated. The possibility exists that the township could end up paying more per month to the utility for the improved fixtures. For the best results, negotiations should focus on determining the true cost of service to the utility for the new fixtures and an equitable profit level for the service provided.