Lower Merion Township Energy Program
Background and Impacts

The Township of Lower Merion has been exploring an energy efficiency and cost reduction program that is highly detailed and complex in its review of equipment alternatives and smart purchasing in retail markets. At its meeting of August 5, 2019, the Township Public Works Committee voted to recommend approval of a project for consideration by the full Board of Commissioners, who subsequently voted to table the measure until more information could be gathered for critical review.

The intent of this summary is to clarify some of the data and interim reports presented at the August 5, 2019 Commissioners meeting, with an outline of key assumptions and data to help facilitate substantive discussion and deliberation in advance of decision making by the Board of Commissioners.

Annual Purchasing Savings: Pre-Efficiency Reductions

Type	Annual Usage	Pre-Purchasing Supply Rate	Post-Purchasing Supply Rate	Cost Reduction
Street Lighting - kWh	3,525,755	$0.06722	$0.03413	$116,667
Buildings - kWh	7,675,862	$0.06722	$0.05519	$92,341
Subtotal - kWh	**11,201,617**			**$209,008**
Buildings - Dkth	12,706	$4.49000	$3.58400	$11,512
Total				**$220,520**

Annual Energy Efficiency Savings: Post-Procurement Rates

Type	Annual Reduction	Distribution Savings	Post-Purchasing Supply Rate	Efficiency Savings
Street Lighting - kWh	2,569,608	$23,589	$0.03413	$111,290
Buildings - kWh	452,200	$8,606	$0.05519	$33,563
Subtotal - kWh	**3,021,808**			**$144,853**
Buildings - Dkth	1,471	$7,631	$3.58400	$12,903
Total				**$157,755**

Annual Consumption: Post-Program

Street Lighting - kWh	956,147
Buildings - kWh	7,223,662
Subtotal - kWh	8,179,809
Buildings - Dkth	11,235

Efficiency Project Impacts: Post-Procurement Rates / Procurement Benefits Excluded

ECM Type : Facility / Description		Installed Cost	Savings			Simple Payback	20 Year Life-Cycle View	
			Rebates	Energy	Material		Total Savings	Total Savings NPV@3%
01 - Lighting - Street Lighting / Parking Lots								
	4 Sided Colonial	$549,451	$40,550	$13,290	$3,000	31.24	$413,801	$313,198
	Cobra Head	$1,737,127	$197,850	$90,815	$16,000	14.41	$2,627,424	$1,975,827
	Tear Drop Pole Painting	$86,400	$0	$0	$0		$0	$0
	Decorative Fixtures	$240,730	$8,200	$7,185	$1,600	26.47	$209,393	$155,569
01 - Lighting Interior / Exterior / Parks								
	Ardmore Pool Complex	$38,934	$1,500	$2,833	$100	12.76	$66,575	$49,357
	Bala Avenue Gymnasium	$3,693	$520	$137	$7	21.92	$3,744	$2,877
	Belmont Pool Complex	$37,890	$1,400	$1,590	$76	21.89	$38,468	$28,637
	Koegel Complex	$246,806	$12,500	$18,649	$680	12.12	$441,383	$327,821
	Parks	$13,223	$750	$753	$0	16.57	$17,320	$12,935
	Vernon Park	$7,803	$0	$5,161	$300	1.43	$121,709	$89,545
04 - Heating System Upgrades								
	Township Administration Building - Board RM RTU Replacement	$108,160	$440	$199	$0	542.46	$4,812	$3,648
05 - HVAC Mechanical Systems								
	Ardmore Public Library- HE Boilers	$227,826	$0	$705	$1,000	133.60	$42,400	$30,857
	Bala Avenue Gymnasium - HE Boilers	$206,442	$0	$479	$1,000	139.57	$37,421	$27,189
	Belmont Hills Community Center - HE Boiler	$119,312	$0	$712	$1,000	69.68	$42,554	$30,971
06 - HVAC Control Upgrades								
	Ardmore Public Library	$21,937	$222	$684	$750	15.14	$35,439	$25,876
	Public Safety Building	$14,886	$902	$2,723	$750	4.03	$81,020	$59,613
	Township Administration Building	$20,267	$1,804	$5,447	$750	2.98	$141,887	$104,662
	Belmont Hills Library	$21,937	$96	$359	$0	60.90	$27,965	$20,374
18 - Recommission Controls								
	Ardmore Public Library	$9,345	$290	$271	$250	17.36	$12,986	$9,540
	Belmont Hills Community Center	$9,345	$408	$207	$250	19.56	$11,680	$8,606
	Bryn Mawr Community Center	$9,345	$468	$201	$250	19.66	$11,622	$8,577
	Ludington Library	$9,345	$2,000	$2,769	$250	2.43	$69,682	$51,706
	Public Safety Building	$10,279	$684	$865	$250	8.60	$26,452	$19,552
	Township Administration Building	$10,279	$2,283	$2,079	$250	3.43	$54,781	$40,795
TOTAL		$3,760,762	$272,866	$158,114	$28,514	18.69	$4,540,518	$3,397,732

Principal inputs and assumptions utilized in the 'Efficiency Project Impacts Summary'

- Energy savings were calculated using post-procurement rates, separate from procurement benefits.
- Energy rates were increased at 1%/year; Material and Labor costs were increased at 3%/year.
- Simple payback represents only the benefits from Year 1 and, therefore, is not a true indicator of savings from long-life measures delivering benefits for over 20 years from an upfront installed cost.
- The 20 Year Lifecycle View reflects a more meaningful financial picture, given the over 20-year lifetime expected from the main measures, i.e., street lighting and boilers.
- 'Total Savings' represent benefits from 'Rebates', 'Energy' and 'Material' over 20 years, in both current year dollars and discounted at 3% (estimated cost of money) to yield a NPV for comparison purposes.

Green-e Certified Renewable Energy Credits

As part of an overall energy management cost reduction strategy, Lower Merion Township undertook a competitive energy procurement that resulted in a reduction of $220,000 from its 2017 energy spend. In concert with this electricity purchasing effort, the Township incorporated the purchase of Renewable Energy Credits (RECs) for 100% of its total electricity usage. Through this action, the Township is demonstrating its commitment to the environment by purchasing RECs from a pool of previously built renewable projects, thereby making an environmental statement in support of green energy production.

In addition to the purchase of RECs, the reduction of energy consumption through an energy efficiency project like the one being considered lessens the reliance of the regional power grid on the most expensive to operate and generally 'dirtiest' power plants. By reducing the electricity needed from the regional power grid, the Township would be reducing the amount of fossil fuel burned to generate electricity, and correspondingly, the GHG emissions associated with that process. Since energy efficiency may provide a more direct impact on the Township's carbon footprint and the purchase of RECs has an indirect impact by supporting the national renewable energy market, the Township can more directly reduce local GHG emissions and its carbon footprint.

GHG avoided (Metric Tons)	
Energy Efficiency: Electricity	2,137
Energy Efficiency: Natural Gas	78
Energy Purchasing of RECs	2,828
TOTAL	**5,043**

Summary Benefits:

The energy efficiency project being considered offers multiple areas of benefit to the Township of Lower Merion and its residents, including the following:

- A key aspect of this decision analysis is that the investment in high efficiency equipment through a project like the one being considered is that ***there will still be costs incurred for most if not all of these same measures in the rather near future, regardless of whether they are allocated through CIP as contracted work, "bid and spec", or some other structured approach. The cost of maintaining the "status quo" in facility upkeep has been estimated to be in the range of $1.5M-$1.6M as shown in the summary box below.***
- A strong economic advantage is realized from an investment in long-life energy utilization equipment, such as street lighting, park lighting, and HVAC, with boilers and controls, rather than making these necessary expenditures utilizing standard or lower efficiency equipment.
- Combining energy efficiency with smart energy procurement offers a synchronous and integrated structure for a measurable energy cost reduction and management program that can be closely monitored at regular intervals.
- Qualitative benefits beyond measurable financial impacts
  - LED Street Lighting installations that offer directed light to the actual roadway
  - Reduction of light pollution, including washing of light onto private lots/yards
  - Driver Safety through improved illumination, reduced glare and consistency of light coloration and intensity while traveling through the Township.
  - HVAC installations that include high efficiency redundant boilers to eliminate operational 'hiccups'
  - "Controls" upgrades that allow for better operation of facilities for efficiency and comfort.

The following table summarizes some key metrics of the proposed program.

Installed Project Cost:	**$3,760,762**
Total Savings:	**$4,540,518 (current $)**
	$3,397,732 (NPV@3%)
Status Quo Cost:	*$1,569,258*
Incremental Cost:	*$2,191,504*
Internal Rate of Return on Incremental Investment:	**8.7%**
Reduction in Electricity Usage:	**27%**
Reduction in Natural Gas Usage:	**12%**