Alternative Fuels
Technical Assistance Program

Borough of Indiana

ALTERNATIVE FUELS, VEHICLES & TECHNOLOGIES FEASIBILITY REPORT

Prepared by Eastern Pennsylvania Alliance for Clean Transportation (EP-ACT)
With Technical Support provided by: Clean Fuels Ohio (CFO); & Pittsburgh Region Clean Cities (PRCC)

Contents

1.0: Introduction – Fleet Feasibility Analysis:

This Alternative Fuel Vehicle (AFV) Fleet Performance Feasibility Study is designed to examine the feasibility and cost-savings potentials of deploying a range of commercially available alternative fuel, advanced vehicle, and efficiency solutions in the Borough of Indiana fleet. Many Municipalities have multiple vehicle types, for various municipal operations. Providing essential services for the borough account for large and ever-growing expenses for the borough's budget, and most these expenses come in the form of vehicle acquisition prices, fuel purchases, and equipment maintenance costs. However, a range of advanced vehicles, alternative fuels, and efficiency technologies are currently available and have the potential to significantly reduce both annual and lifecycle fleet operational costs when deployed in the right applications.

2.0: Fleet Management Goals – Scope of Work & Criteria for Analysis:

Eastern Pennsylvania Alliance for Clean Transportation (EP-ACT) and Clean Fuels Ohio (CFO) and Pittsburgh Region Clean Cities (PRCC) are pleased to present the following detailed AFV Options and Feasibility report. This report is designed to provide the following core deliverables: 1) Detail the priority criteria and goals for the fleet in evaluating technologies; 2) Provide a baseline analysis of current fleet operations with Key Performance Indicators (KPIs) on the fleets vehicles and operations; 3) Outline alternative fuel vehicle and efficiency technology options relevant to fleet operations; 4) Assess the operating costs and other investments needed to implement the various technology options; and 5) Provide Return on Investment (ROI) scenarios and recommendations based on the analyses above. We would like to thank Borough of Indiana for their assistance in gathering data and providing feedback for this report.

Priority Review Criteria for Analysis:
1. *Use life cycle cost effectiveness and return on investment projections as the primary tool for evaluating each potential fuel, vehicle technology, and station option.*
2. *Include data on environmental performance; factor into decision matrix as a secondary evaluation tool.*

We have used these criteria to evaluate alternative fuel and efficiency technologies that are most relevant and effective for the fleet's operations. In addition to these criteria, our staff have used the real-world fleet data provided by the Borough of Indiana to create key current vehicle performance profiles. Our staff utilizes these profiles to create alternative fuel vehicle replacement scenarios, charting out similar models of alternative fuel vehicles (including cost differences, mpg differences, maintenance cost differences, etc.).

The core work in this report focuses on comparing the operational costs and return on investment between the current fleet's vehicle performance and usage profiles and various alternative fuel replacement vehicle scenarios. Finally, we have looked at the Total Cost of Ownership (TCO) and Return on Investment (ROI) based on three fuel price models (a low oil model, status quo or "median" oil model, and a high oil price model). These models come from the U.S. Energy Information Administration (EIA), which collects, analyzes, and disseminates independent and impartial energy information to promote sound policymaking, efficient markets, and public understanding of energy's interaction with the economy and environment. A summary of the current performance of the fleet is detailed on the following page.

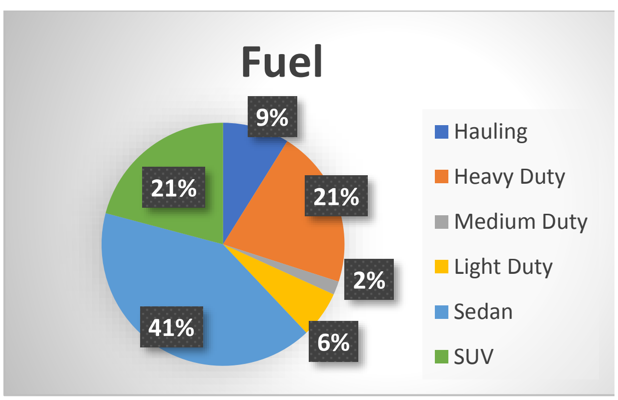
3.0: Key Performance Indicators – Existing Fleet Analysis

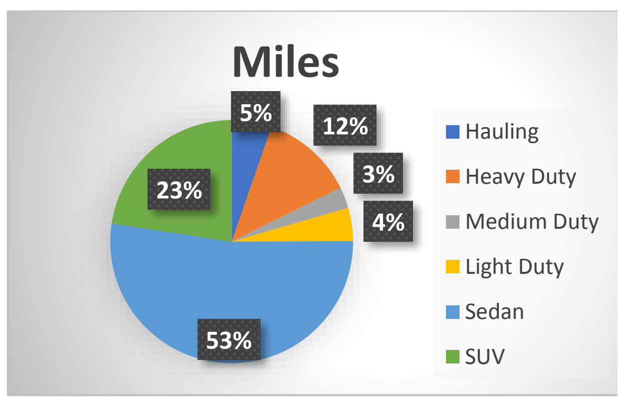
We generally recommend replacing vehicles at appropriate intervals to minimize fleet repair costs and maximize performance and efficiency. Therefore, our staff collected data including fleet vehicle inventory data, refueling practices data, and replacement plan data. Based on this data, we have performed a baseline analysis and identified six key indicators that provide a summary of the fleet's current operating parameters. These Key Performance Indicators (KPIs) are designed to provide a baseline overview of current makeup and operations of the fleet, as well as provide a high-level context for the recommendations outlined in the report that follows.

*The following KPI information has been put together using information stored within the Energy Information Administration.

Borough of Indiana Fleet							
Vehicle Type	**Units**	**Fuel**	**Miles**	**MPG**	**$/Mi**	**$/gal[1]**	**Fuel $**
Hauling	4	1,247	7,600	6.09	$0.48	$2.92	$3,647
Heavy Duty	5	2,965	17,625	5.94	$0.55	$3.29	$9,746
Medium Duty	1	253	4,000	15.81	$0.16	$2.50	$633
Light Duty	3	870	6,300	7.24	$0.35	$2.53	$2,200
Sedan	10	5,785	74,700	12.91	$0.18	$2.38	$13,746
SUV	6	2,933	32,180	10.97	$0.22	$2.43	$7,141
Total	**29**	**14,053**	**142,405**	**9.83**	**$0.32**	**-**	**$37,113**

The vehicles making up this fleet have been sorted into six broad categories of units. These categories are analyzed as follows:





As the previous charts detail, the Sedan vehicles do the bulk of the work and account for most of the fleet mileage and operational costs (~41% of fuel usage). The other two major categories that report high usage numbers are Heavy Duty and SUV vehicles. The recommendations in the report below have been specifically designed to help minimize the costs associated with the fleet's operations.

[1] United States. Energy Information Administration. Gasoline and Diesel Fuel Update. http://www.eia.gov/oil_gas/petroleum/data_publications/wrgp/mogas_history.html. 22 Jun. 2017.

4.0: Alternative Fuel Options – Summary Comparisons & Conclusions:

This report is designed to provide a full range alternative fuel and vehicle options analysis for your fleet operations. This section is designed to provide foundation information for high level comparisons of five commercially available alternative fuel types: Biodiesel (B20), Ethanol (E85), Compressed Natural Gas (CNG), Propane (LPG), and Electric vehicles (EV). The following sections of this report will provide a more detailed explanation and analysis of each fuel type, as well as chart out prospective vehicle and capital cost return on investment scenarios based on each fleet partner's real-world vehicle and usage data. The following table is designed to provide a high-level summary of each fuel option:

High Level Alternative Fuel Comparisons					
	Biodiesel (B20)	**Ethanol (E85)**	**CNG**	**Propane**	**EV**
Basics	Biodiesel is a renewable fuel that can be manufactured from organic oils, fats, or recycled grease for use in diesel vehicles.	Ethanol is a widely used renewable fuel made from corn and other plant materials. It is blended with gasoline.	Natural gas is a domestically abundant gaseous fuel that can have significant fuel cost savings over gasoline and diesel fuel.	Propane is a readily available gaseous fuel that has been widely used in vehicles throughout the world for decades.	Electricity can be used to power plug-in electric vehicles, which are increasingly available. Hybrids use electricity to boost efficiency.
Retail Availability	Widely available	Widely available	Purchased through utility pipeline.	Regional / Local distributors.	Widely available but charger required
Retail Cost	Moderate	Moderate	Low	Moderate to low.	Low if charger is available
Pollution-Tailpipe	Low, except for CO2	Low, except for CO2	Low—25 percent lower CO2 than diesel and gas.	Moderate	None
Major Pros	Universal availability and moderate cost. Environmental benefit	Universal availability and moderate cost savings.	Low fuel cost. Low Emissions & Noise. Extensive distribution.	Simpler station than CNG. Fuel savings vs. gasoline likely in fleets.	Limited range and not well suited to heavy vehicles because of range and battery weight.
Major Cons	No major cost savings. Cold flow issues if not properly treated	Lower energy per gallon. Limited environmental benefit	High cost / complexity of stations.	Seasonal price spikes if not under contract. No heavy vehicle options.	A charge take hours and applications are limited based on vehicle drive cycle.
Conclusion	Use **biodiesel** only when fuel cost is same or lower than diesel fuel.	Do not use **ethanol** until it's 20-27% lower $ than gasoline.	**CNG** vehicles are not as cost-effective due to needed upgrades.	**Propane** vehicles not as cost-effective because of needed station.	***EVs*** *are most cost-effective option for Code Enforcement vehicles.*

The conclusions in the previous chart are based on detailed analysis of current vehicle operational profiles, alternative fuel replacement scenarios (including vehicle cost and performance data vs. conventional), refueling infrastructure investments needed, and any other required costs (i.e. maintenance facilities modifications).

The fleet's average numbers for fuel consumption and miles driven per vehicle limit the cost-effective alternative fuel vehicle replacement options. Other factors particularly limiting the cost-effectiveness of natural gas and propane are the additional considered costs of adding propane station or upgrading maintenance facilities for natural gas detection and safety required for compressed natural gas. The table below summarizes the units in the fleet that meet the fuel usage thresholds to get a positive Return on Investment (ROI) based on incremental cost premiums of alternative fuel units vs. conventional units, and operational cost savings based on EIA fuel price projections (for the Median Oil Price scenario).

Alternative Fuel Vehicle ROI Threshold Analysis					
Vehicle Type	**Fuel Type**	**Calculated MPG**	**Alternative**	**Annual Fuel Gals Required**	**# of Units that meet Fuel Use Threshold for ROI w/Median Fuel Price**
HD Truck/ Hauling	**Diesel**	**~6.0**	Propane	1,088	0
			CNG	805	0
	Diesel	**~6.0**	Propane	1,088	0
			CNG	805	0
MD Truck	**Gas**	**15.81**	Propane	2,025	0
			CNG	1,426	0
LD Truck	**Gas**	**7.24**	Propane	1,678	0
			CNG	1,241	0
Sedan	**Gas**	**12.91**	Propane	966	0
			CNG	835	0
			Electric	439	*8*
SUV	**Gas**	**10.97**	Propane	2,000	0
			CNG	1,409	0

Electric vehicles are the most cost-effective option for the fleet's key high use vehicle segments, and a full summary of the electric vehicle analysis is provided below. For additional information about alternative gaseous fuel vehicle comparisons, see the provided appendix.

4.1: Detailed Electric Vehicle Options Analysis:

All-electric vehicles (EVs) and Plug-in electric vehicles (PEVs) use a battery to store the electrical energy that powers the motor. EVs are sometimes referred to as battery electric vehicles (BEVs). EV batteries are charged by plugging the vehicle into an electric power source. Although electricity production might contribute to air pollution, the U.S. Environmental Protection Agency categorizes all-electric vehicles as zero-emission vehicles because their motors produce no exhaust or emissions. Because EVs use no other fuel, widespread use of these vehicles could dramatically reduce petroleum consumption.

Limited heavy-duty electric vehicles are now available, and a few light-duty EVs are also commercially available. Currently available EVs have a shorter range per charge than most conventional vehicles have per tank of gas, with manufacturers typically targeting a minimum range of 100 miles. Although EVs are more expensive than similar conventional and hybrid vehicles, some costs can be recovered through fuel savings, a federal tax credit, or state incentives. As the tables below demonstrate, current commercially available EV models are quickly becoming cost effective, even resulting in lifetime savings if vehicles receive continued use beyond 10 years.

Select Electric Vehicle Annual Operating Cost Comparison					
Vehicle	**Fuel Use**	**Electricity Use**	**Operating Cost**	**Cost/ Mile**	**Emissions (lbs. CO2)**
2017 Chevrolet Cruze (Gas)	379 gal	0 kWh	$3,209	$0.24	9,087
2017 Nissan Leaf (EV)	0 gal	4,089 kWh	$2,734	$0.21	4,274
Annual Savings	**379 gal**	**-**	**$475**	**-**	**4,813**
10-Year Savings	**3790 gal**	**-**	**$4,750**	**-**	**48,130.00**

Electric vehicle infrastructure can also be very cost effective. Charging equipment for plug-in electric vehicles (PHEVs or EVs) is classified by the rate at which the batteries are charged. Charging times vary based on how depleted the battery is, how much energy it holds, the type of battery, and the type of EVSE. The charging time can range from 20 minutes to 20 hours or more, depending on these factors. Offering the use of Electric Vehicle Supply Equipment (EVSE's) or EV charger's to other fleet's or the public can also be a good practice for sustainability goals and adoption for others in your community.

AC Level 1 Charging	**AC Level 2 Charging**	**DC Fast Charging**
2 to 5 miles of range per 1 hour of charging	10 to 20 miles of range per 1 hour of charging	50 to 70 miles of range per 20 minutes of charging
AC Level 1 EVSE (often referred to simply as Level 1) provides charging through a 120-volt (V) AC plug. Most, if not all, plug-in electric vehicles (PEVs) will come with an AC Level 1 EVSE cord set, so no additional charging equipment is required.	AC Level 2 equipment (often referred to simply as Level 2) offers charging through 240V (typical in residential applications) or 208V (typical in commercial applications) electrical service. All commercially available PEVs can charge using AC Level 1 and AC Level 2 charging equipment.	Direct-current (DC) fast charging equipment, sometimes called DC Level 3 (typically 208/480V AC three-phase input), enables rapid charging. There are three types of DC fast charging systems, depending on the type of charge port on the vehicle: a J1772 combo, CHAdeMO, or Tesla.
Cost: $0-$500 Most facilities have level 1 outlets available, cost only involved if new electric service and outlet installations are required.	**Cost**: $500-$5,000+ Cost of installing, non-networked, wall mounted 208V Level 2 chargers range ~$500. Pedestal mounted Level 2 chargers usually run $5,000+ range, with variability based on charger features and cost electric service	**Cost**: $15,000-$40,000 Level 3 DC Fast Charging equipment is most expensive and requires new electric service and wiring in nearly every installation scenario based on power usage.

Electric Vehicles – All-electric vehicles (EVs) and Plug-in electric vehicles (PEVs) use a battery to store the electrical energy that powers the motor. EVs are sometimes referred to as battery electric vehicles (BEVs). EV batteries are charged by plugging the vehicle into an electric power source. Although electricity production might contribute to air pollution, the U.S. Environmental Protection Agency categorizes all-electric vehicles as zero-emission vehicles because their motors produce no exhaust or emissions. Because EVs use no other fuel, widespread use of these vehicles could dramatically reduce petroleum consumption.

The upcoming information provides insight into alternative fuel vehicle comparisons related to fuel consumption and maintenance costs. Operation and maintenance costs are derived from average miles per vehicle type, assuming costs per mile found in the referenced. To compare dissimilar fuel types, we need to break down the cost to compare BTU content of each fuel type. The calculations used to convert electricity to Gasoline Gallon Equivalents (GGE's) are produced by the Department of Energy's- EV gas gallon Efficiency factor (Alternative Fuel Data Center and found in Appendix 1 sheet 3) Petroleum based fuels are normally priced by the gallon, while electricity cost is measured in price per kilowatt hours ($/kWh). For the purpose of seeing a fair comparison we have used this conversion calculation to show what a "cost per gallon equivalent" would be for electricity compared to gasoline.

Total costs are calculated by adding operation and maintenance costs with the product of average annual gallons consumed and specific, projected fuel prices for each year, 2018 through 2027. The following table helps visualize the overall difference in fuel costs by providing the ten-year average price for each fuel type in three different projected scenarios:

10 Year Average of Fuel Prices						
	Low Oil Price		Median Oil Price		High Oil Price	
	Gas	Electricity	Gas	Electricity	Gas	Electricity
10 Year Average*	$1.69	$1.22	$2.63	$1.25	$4.56	$1.29
Maintenance Costs/Mile**	$0.03	$0.015	$0.03	$0.015	$0.03	$0.015

* There is an individual price applied to each fuel type, which can be seen more completely in the supplied appendix.
** AAA maintenance reduced based on: DeLuchi, Mark and Lipman, Timothy, An Analysis of the Retail and Life Cycle Cost of Battery-Powered Electric Vehicles; UC-Davis Institute of Transportation Studies. http://escholarship.org/uc/item/50q9060k

The following table demonstrates the lifetime cost savings for an electric sedan vehicle versus that of a current conventional fuels sedan vehicle, using US EIA projected price data. The efficiency factor for electric vehicles has been factored into the associated fuel price[2].

Gas/Electric Vehicle Comparisons: Sedan			
Current Vehicle		Electric Replacement	
Base Cost	$19,765	Incremental Cost	$9,355
Avg. Fuel/Year	579	Avg. Fuel/Year	579
Annual Mileage	7,470	Annual Mileage	7,470
Maintenance Costs/Mile	$0.03	Maintenance Costs/Mile	$0.015

Gas vs. Electric Operating Costs: Sedan						
	Low Oil Price		Median Oil Price		High Oil Price	
	Gas $1.69 per gallon	Elec $1.22 cost per GGE	Gas $2.63 cost per gallon	Elec $1.25 cost per GGE	Gas $4.56 cost per mile	Elec $1.29 cost per GGE
O&M	$2,241	$1,121	$2,241	$1,121	$2,241	$1,121
Total	$12,030	$8,175	$17,491	$8,367	$28,630	$8,575
Total Savings	$3,855		$9,124		$20,055	
Net Savings	$5,500		$231		$10,700	

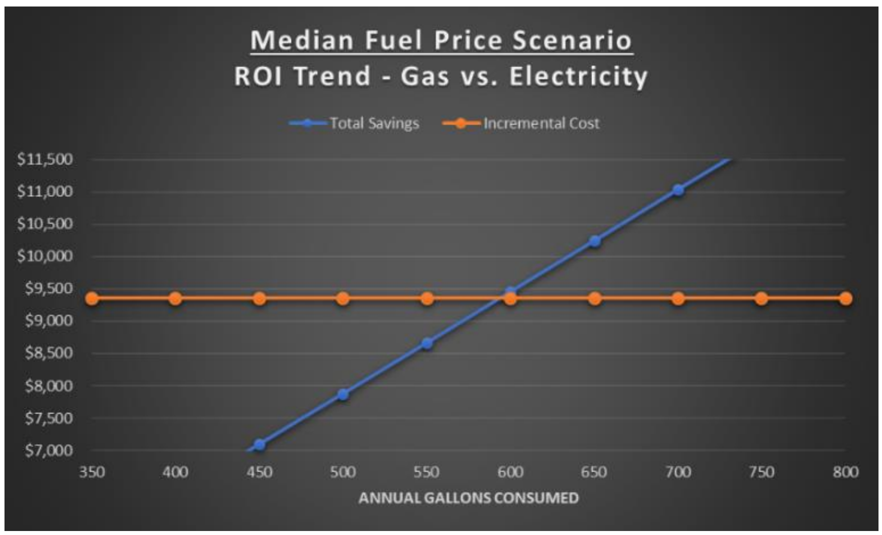
As shown in the previous table, based on current fleet fuel use averages, electric sedan vehicles are likely to have a positive ROI over the 10-year timeframe in the high fuel price scenario. The calculations above

[2] https://www.afdc.energy.gov/fuels/prices.html

considered fleet vehicle average fuel use amounts of ~579 gallons per year. Multiple sedan vehicles in the Borough of Indiana fleet consume more gallons than the fleet average, but many of these vehicles are specialty vehicles, such as police patrol vehicles, and electric vehicles will not serve as practical replacements. Electric vehicles have specific driving ranges, and proper planning is needed to ensure that they are "charged" up to provide maximum driving range. The inherent nature of a police patrol car, with the need of being fueled up instantaneously is not practical for an EV replacement at this time.

It is a good practice to plug the vehicles in at the end of the work day, and rotate charging days with vehicles throughout your fleet to minimize the need to have multiple chargers installed.

The following information demonstrates a vehicle threshold profile for sedan vehicle types that will return a positive ROI based on the same median fuel price scenario used in previous charts and tables. This threshold profile uses the fleet average MPG for the sedan vehicle type to generate the figures shown in the following chart:



Using fuel prices presented in the median fuel price scenario, a current fleet sedan vehicle would have to consume ~594 gallons of gasoline and travel ~7,664 miles to show a positive ROI over 10 years in the median fuel price scenario when replaced with an electric vehicle. The fleet average numbers for sedan vehicles in the Borough of Indiana fleet are not far from the numbers presented by the threshold vehicle profile, with several vehicles showing numbers higher than the fleet average, making them eligible for reasonable replacement. The chart below realizes that an EVSE is needed to charge the vehicles. This equates to having a fueling station to fill regular gasoline vehicles. Therefore, we have included that cost (the EVSE) into the average fuel needed to be consumed per year to pay for that EVSE. Please note that the more vehicles that are converted, the lower the fuel consumed will be on a per vehicle basis.

Gas/Electric Vehicle Comparisons: Sedan			
Current Vehicle		**Electric Replacement**	
Base Cost	$19,765	**Incremental Cost**	$9,355
Avg. Fuel/Year	800	**Avg. Fuel/Year**	800
Annual Mileage	10,000	Annual Mileage	10,000
Maintenance Costs/Mile	$0.03	Maintenance Costs/Mile	$0.015

Gas vs. Electric Operating Costs: Sedan						
	Low Oil Price		**Median Oil Price**		**High Oil Price**	
	Gas $1.69 per gallon	**Elec** $1.22 cost per GGE	**Gas** $2.63 cost per gallon	**Elec** $1.25 cost per GGE	**Gas** $4.56 cost per mile	**Elec** $1.29 cost per GGE
O&M	$3,000	$1,500	$3,000	$1,500	$3,000	$1,500
Total	$16,525	$11,247	$24,071	$11,513	$39,461	$11,799
Total Savings	**$5,278**		**$12,558**		**$27,662**	
Net Savings	**$4,077**		**$3,203**		**$18,307**	

As seen above, fuel consumption and miles driven numbers for a sedan vehicle that are higher than the fleet average numbers show a positive ROI in the median and high fuel price scenarios.

5.0: Maximize Incentives – Pursue Federal, State, and Local Subsidies:

Securing funding is often critical to the success of efforts to reduce petroleum use and vehicle emissions in fleet operations. The Pennsylvania Department of Environmental Protection (DEP) has and will continue to offer grant funding for clean, alternative fuel projects in Pennsylvania and investment in Pennsylvania's energy sector through the Alternative Fuels Incentive Grant Program (AFIG). The AFIG program is designed to reimburse up to 50% of the incremental cost to purchase alternative fuel fleet vehicles or convert vehicles to utilize alternative fuels up to a maximum of $20,000 for each vehicle and $300,000 per application. Station cost can be applied for in a separate application provided you have 10 or more vehicles in your fleet that are less than 26,000lbs. Gross Vehicle Weight (GVW). Borough of Indiana can apply for an infrastructure project, which will pay 50% of the cost of the station costs, if needed. The Pennsylvania DEP has opened the program, details of the program and the RFP can be found here at: http://www.dep.pa.gov/citizens/grantsloansrebates/alternative-fuels-incentive-grant/pages/default.aspx.

The following table demonstrates the lifetime cost savings for an electric sedan vehicle versus that of a conventional fuels sedan vehicle when reimbursement through AFIG is applied, and using US EIA projected price data. The sedan vehicle fleet average for fuel consumption and miles driven are used. The efficiency factor for electric vehicles have been factored into the associated fuel price[3]

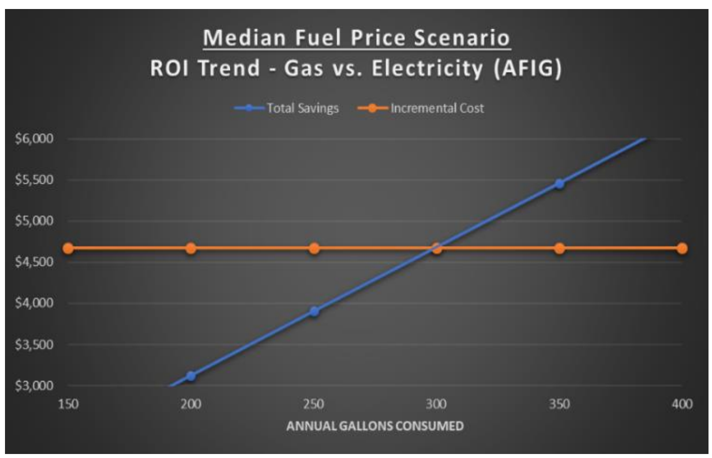
[3] https://www.afdc.energy.gov/fuels/prices.html

Gas/Electric Vehicle Comparisons: Sedan (AFIG)			
Current Vehicle		**Propane Replacement**	
Base Cost	$19,765	**Incremental Cost**	$4,678
Avg. Fuel/Year	800	**Avg. Fuel/Year**	800
Annual Mileage	10,000	Annual Mileage	10,000
Maintenance Costs/Mile	$0.03	Maintenance Costs/Mile	$0.015

Gas vs. Electric Operating Costs: Sedan (AFIG)						
	Low Oil Price		**Median Oil Price**		**High Oil Price**	
	Gas **$1.69 per gallon**	**Elec** **$1.22 cost per GGE**	**Gas** **$2.63 cost per gallon**	**Elec** **$1.25 cost per GGE**	**Gas** **$4.56 cost per mile**	**Elec** **$1.29 cost per GGE**
O&M	$3,000	$1,500	$3,000	$1,500	$3,000	$1,500
Total	$16,525	$11,247	$24,071	$11,513	$39,461	$11,799
Total Savings	**$5,278**		**$12,558**		**$27,662**	
Net Savings	**$600**		**$7,880**		**$22,984**	

As shown in the table above, based on current fleet fuel use averages, electric sedan vehicles are likely to have a positive ROI over the 10-year timeframe in all fuel price scenarios. The calculations above considered fleet vehicle above-average fuel use amounts of 800 gallons per year. Several sedan vehicles in the Borough of Indiana fleet consume those above average amounts, but only if these vehicles are not specialty vehicles (such as police patrol) will electric vehicles serve as practical replacements.

The following information demonstrates a vehicle threshold profile for sedan vehicle types that will return a positive ROI based on the same median fuel price scenario used in previous charts and tables, as well as factoring in reduced incremental cost after AFIG reimbursement. This threshold profile used the fleet average MPG for this vehicle type to generate the figures shown the Chart to the right:



Using fuel prices presented in the median fuel price scenario, a current fleet vehicle would have to consume 300 gallons of gasoline and travel 3,577 miles to show a positive ROI in the median fuel price scenario over 10 years when replaced with an electric vehicle and factoring in reimbursement of incremental costs of vehicles purchases, through the AFIG program. The average numbers for the entire Borough or Indiana fleet are above these numbers, making the large majority of sedan vehicle types eligible for replacement.

By replacing gas powered sedan vehicle types whose gas consumption and miles driven numbers are above the fleet average with electric vehicle alternatives, and by utilizing reimbursement funding through AFIG, the borough of Indiana fleet will realize savings that could cover electric vehicle charging infrastructure costs, which vary depending on location, type of charger used and kind of vehicles purchased.

Even for the best managed fleet operations a periodic rightsizing or downsizing study will usually uncover vehicles and other assets that are simply no longer needed. The utilization review and rightsizing study ranks as one of the best practices that a fleet manager can employ. Combining these studies with realistic assignment justification procedures and clear guidelines for vehicle utilization will help ensure cost control and consistently high productivity for your fleet operations. We also suggest looking at any SUV vehicle types with annual fuel usage over 300 gallons and mileage over 3,577 miles, and consider replacing them with an electric sedan vehicle type, if it can be used as a replacement for typical work cycles duties.

6.0: Key Recommended Actions – Conclusion

The following recommendations for further action are based on our review and assessment of data supplied and current fleet Key Performance Indicators. While EV sedans can have a positive ROI for eight of the Borough's units, unfortunately all eight qualifying vehicles are currently deployed in Police / Pursuit operations. Because of EV charging requirements (~4+ hours), EVs will not likely be the best fit for these service vehicles based on needs for on demand fueling and potential pursuit or round the clock deployment operations.

Key Recommended Actions:
Fuel Options Assessment:
1. Though EVs have an ROI for 8 vehicles in the fleet – All 8 vehicles are deployed in Police/Detective Operations and EVs may not meet operational needs (i.e. on-demand, fast fueling). **i. Identify if detective vehicles are not used in emergency / pursuit operations and consider targeting those vehicles for replacement** **ii. Ensure new EVs are deployed on routes with threshold/minimum usage** **iii. Consider right sizing any SUV vehicle types that fit gas to electric threshold profile by replacing with an electric sedan vehicle.**
2. Pursue state and federal incentives, subsidies, grant programs, and other incentives to help reduce the implementation costs of strategies and technologies outlined in this report.

More information describing the methodology and full analysis results for each of the alternative fuel options scenarios is available upon request. This report has researched many possible scenarios based on the current fleet profile, as Borough of Indiana shifts its fleet structure to utilizing different types of vehicles and other scenarios not examined here, the recommendations made herein might change as well.