

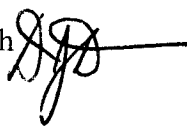


City of Bowie

15901 Excalibur Road
Bowie, Maryland 20716

MEMORANDUM

TO: City Council

FROM: David J. Deutsch 
City Manager

SUBJECT: Budget Follow-up Memo #3

DATE: April 21, 2016

1. Percent of Online Payers for Water and Sewer Bills. The City provides two electronic payment options for residents to pay their Water/Sewer bills. Option one allows residents to pay online. A visit to the City's website, www.cityofbowie.org, directs residents to the Utility Billing Online payment screen. Once there, residents then enter their customer account number and follow the menu screens to make a payment. The second option allows residents to setup automatic payments from their bank account by completing the Direct Debit Payment Application. Residents receive their quarterly bills with a notice stating that their payment will be withdrawn from their designated bank account. Online payment customers represent 32 percent, while direct debit customers make up 4 percent of paying customers.
2. Refuse Truck Mileage Costs: Diesel Fuel vs. Natural Gas. **Background – Diesel Gallon Equivalent (DGE):** Diesel fuel is measured (and sold) in gallons. Natural gas is measured in weight and sold in various unit measures (therms, BTUs, pounds and GGE). "GGE" is the unit by which natural gas is sold for transportation use. GGE is "gas gallon equivalent". A gas gallon equivalent (GGE) is the amount of natural gas that has the same energy as one gallon of gasoline. So when you buy one GGE of natural gas, you are buying an amount of natural gas that has the same energy as one gallon of gasoline (which is approximately 120 standard cubic feet of natural gas).

Natural gas can also be measured in diesel gallon equivalents. This is the amount of natural gas that has the same energy as one gallon of diesel. Diesel has more energy than gasoline, so one DGE of natural gas is about 163 standard cubic feet.

Refuse Truck Mileage: Diesel vs. Natural Gas: Since one gallon of diesel has the same energy as one DGE of natural gas, it may be assumed that the miles per gallon of diesel would equal the miles per DGE natural gas. However, the diesel engines today operate

slightly more efficiently than natural gas engines. Average refuse truck mileages are shown below:

- Diesel Refuse Truck 2.80 miles per gallon (diesel)
- Natural Gas Refuse Truck 2.51 miles per DGE (natural gas)

Cost per Mile: Diesel vs. Natural Gas: To evaluate the mileage cost, dollars per mile can be calculated by dividing the miles per gallon (or miles per DGE) by the dollars per gallon (or dollars per DGE). The mileage costs can be accurately compared for current fuel costs.

National Average Fuel Costs for Period January 1- January 15, 2016
Source: US DOE

<i>Fuel</i>	<i>Price</i>	<i>Fuel Economy</i>	<i>Cost per Mile</i>
Natural Gas (CNG)	\$2.84/DGE	2.51 mpDGE	\$1.13/mile
Diesel	\$2.23/gallon	2.80 mpg	\$0.80/mile

Since the prices of diesel and natural gas are not directly linked, future costs estimates are based only on available forecasts. Fuel cost forecasts are published by the U.S. Energy Information Administration. Based on the forecasted costs, the calculated “cost per mile” for future years is shown on the attached graphs.

Other Capital Costs and Operating Costs: Since retail fueling facilities for natural gas are not available within a reasonable distance for Bowie refuse trucks, conversion of the refuse truck fleet to natural gas would require installation of fueling facilities. Based on data published by DOE, the required fueling stations would cost approximately \$2,000,000 to construct. That cost could be spread over multiple years, adding capacity as needed as more natural gas vehicles are acquired.

The cost for a natural gas vehicle is approximately \$30,000 higher than a diesel vehicle. The City has 19 refuse trucks.

Operating and maintenance costs for the fueling station can also be accounted for in order to complete an accurate life cycle cost analysis for a natural gas conversion. Since the City would still maintain a diesel and gasoline fueling station, these costs would be in addition to existing maintenance costs. Compressed Natural Gas fuel station maintenance and electricity costs are estimated at \$120,000/year for the size station needed for City refuse trucks.

Economic Analysis: The National Renewable Energy Laboratory (NREL) built a Compressed Natural Gas Vehicle and Infrastructure Cash-Flow Evaluation (VICE) tool that is publicly available. The tool provides financial calculations taking into account capital investment, operating and maintenance costs. Using currently available data the results of an evaluation to convert the City’s refuse truck fleet to compressed natural gas is shown below. The study assumes current diesel trucks would be replaced as they come to the normal end of useful life. The investments for fueling stations and vehicles are spread over several years. The chart shows 38 vehicles acquired. The City owns 19 vehicles. The VICE tool considers a 20-year period, so during the 20 years, each vehicle would be purchased twice; once to replace the existing diesel vehicle and a second time when the CNG vehicle comes to the end of its assumed useful life.

VICE 2.0 Results

Project/investment type: Independent vehicle and infrastructure investment (decoupled)

Business Case Results Summary	
Net Present Value	(\$4,727,874)
Payback Period (yrs)	19.50
Simple Payback Period (yrs)	19.50

Petroleum and Greenhouse Gas Reduction Summary	
Displaced Diesel (GGEs)	3,338,338
Displaced Gasoline (GGEs)	0
Total Petroleum Displacement (GGEs)	3,338,338
Project Lifetime GHG Displaced (tons)	35,156

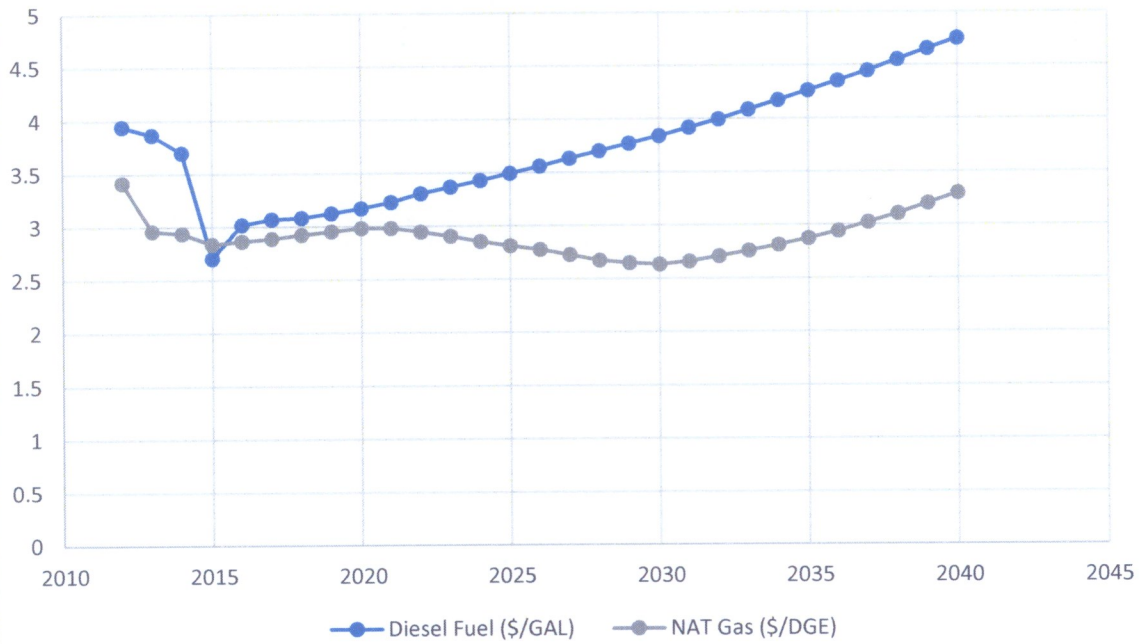
Vehicle Types	Vehicles Acquired	Total Incremental Cost (\$)
Transit Bus	0	\$0
School Bus	0	\$0
Trash Truck	38	\$1,151,210
Para. Shuttle	0	\$0
Delivery Truck	0	\$0
Gasoline PU Truck	0	\$0
Gasoline Taxi	0	\$0
		\$1,151,210
Total Infrastructure Investment (\$)	\$2,279,750	

3. Driveway Aprons to Replace. A list of streets that still have driveway aprons to be replaced is attached. The FY17 Budget contains \$560,000 to complete the driveway apron program. A projected savings of approximately \$500,000 annually between FY18 and FY22 results in cost avoidance of \$2.5 million that will not need to be included in multi-year cost projections.

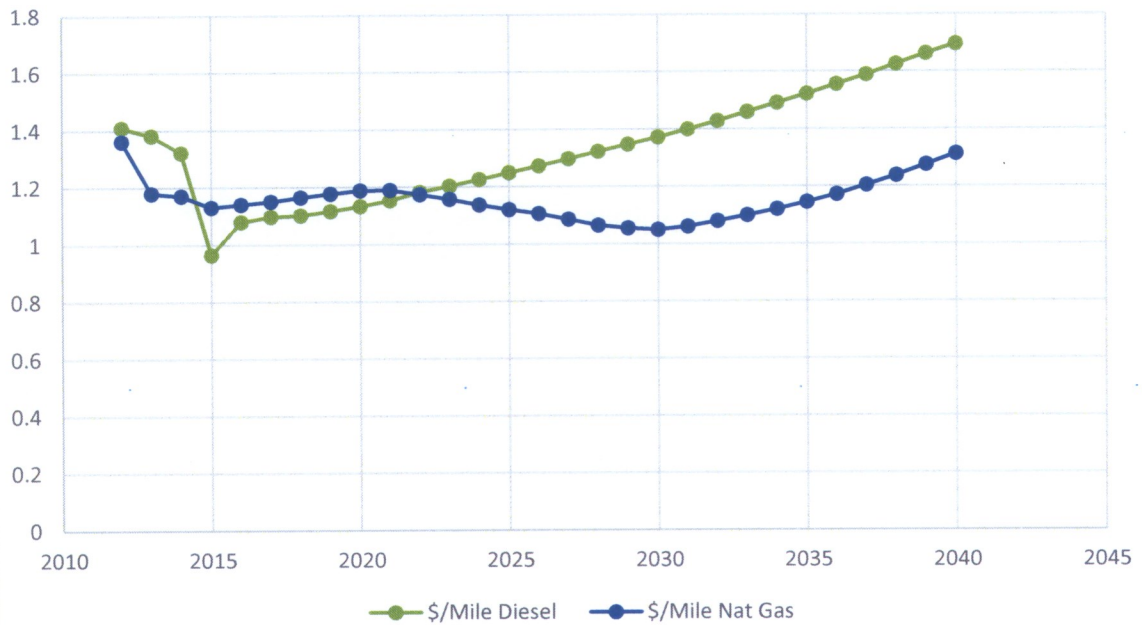
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Attachments

EIA Fuel Price Projections Transportation Fuels



Cost per Vehicle Mile (Refuse Truck) Diesel vs Natural Gas



Section	Street	Section	Street
Buckingham	Balsam Pl	Pointer Ridge	Puritan Pl
Buckingham	Bunting Lane	Pointer Ridge	Packton Ct
Buckingham	Botany Lane	Pointer Ridge	Pagaent Ct
Buckingham	Bermuda Lane	Pointer Ridge	Page Ct
Chapel Forge	Claxton Pl	Pointer Ridge	Penn Pl
Chapel Forge	Cliffe Pl	Pointer Ridge	Pernell Ct
Chapel Forge	Chanler Lane	Pointer Ridge	Post Lane
Foxhill	Farris Lane	Pointer Ridge	Penn Manor Lane
Foxhill	Fleming Lane	Pointer Ridge	Perrell Lane
Heather Hills	Hyson Pl	Pointer Ridge	Pennant Lane
Kenilworth	Kinder Pl	Pointer Ridge	Panther Lane
Kenilworth	Kenway Lane	Rockledge	Rochester Lane
Kenilworth	Kernel Cir	Rockledge	Royal Crossing
Kenilworth	Kresson Pl	Rockledge	Rustic Pl
Kenilworth	Kincaid Lane	Rockledge	Ryland Ct
Kenilworth	Keystone Lane	Rockledge	Rockvue Pass
Long Ridge	Lytic PL	Rockledge	Roundtree Lane
Long Ridge	Lynn Pl	Rockledge	Riverton Lane
Long Ridge	Largo Pl	Rockledge	Rolling Hills
Meadowbrook	Media Lane	Victoria Heights	Viser Ct
Meadowbrook	Marman Pl	Victoria Heights	Viewpoint Lane
Meadowbrook	Myra Pl	Whitehall	Waldorf Way
Meadowbrook	Mayo Pl	Whitehall	Weywood Pl
Meadowbrook	Marvel Lane	Whitehall	William Lane
Meadowbrook	Moreland Pl	Yorktown	Yellowstone Ct
Meadowbrook	Madeley Lane	Yorktown	Yeadon Ct
Somerset	Saber Lane	Yorktown	Yardley Ct
Somerset	Shawmont Lane	Yorktown	Yarnell Ct
Tulip Grove	Tinder Pl	Yorktown	Yarland Lane
Tulip Grove	Teal Lane		