Oberlin Fleet and Fuels Emissions Reduction Strategy

Final Report

Prepared for
The City of Oberlin

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clean energy coalition

bridging needs. advancing change.

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EXECUTIVE SUMMARY

In 2013, the City of Oberlin received a grant from the State of Ohio's Local Government Innovation Fund (LGIF) after requesting funding for a collaborative effort to reduce fuel use and vehicular emissions between the City and nine other local public and private fleets. The objective of the project was twofold: 1) develop cost-saving strategies for the partner fleets and 2) assess the feasibility of and demand for alternative fuel vehicles and infrastructure. The City selected Clean Energy Coalition to develop these strategies for the partner fleets and to assess the feasibility of shared alternative fuel infrastructure among fleets within the city.

Nine fleet partners, who were identified as having a significant operating or emissions footprint within the city, were selected to participate in the project. These fleets were drawn from the public, private, and educational sectors. Each partner voluntarily provided qualitative and quantitative data on fleet operations, and this information was used to develop alternative fuel and efficient driving scenarios tailored specifically to each fleet.

Altogether, Clean Energy Coalition analyzed 485 partner vehicles and pieces of equipment. The collective fleet traveled approximately 5.7 million miles and consumed over 1.9 million gallons of fuel in one year, including 1.843 million gallons of diesel and 79,000 gallons of gasoline. This equates to roughly $6.8 million spent on fuel and over 27,000 tons of greenhouse gas emissions.

Based on the information provided by each partner, Clean Energy Coalition identified a number of cost-saving solutions for reducing conventional fuel use among fleet vehicles, including driver training, hybrid vehicles, and alternative fuels. The recommendations that Clean Energy Coalition made were not intended to be universally applicable; instead, each fleet was provided with a set of scenarios tailored specifically to their operations and designed to balance fuel use reductions and return on investment.

The fueling infrastructure required to support the use of alternative fuels does not currently exist in Lorain County. To address this issue, Clean Energy Coalition created five strategies to guide the City of Oberlin toward supporting expanded use of alternative fuels within the city. These strategies focus on best practices for encouraging the use of compressed natural gas (CNG), liquefied petroleum gas (propane), biodiesel, and electric vehicles by residents and businesses.

In many cases, building alternative fuel infrastructure is prohibitively expensive for a single small to mid-sized fleet, so Clean Energy Coalition developed three strategies for financing and constructing infrastructure that could be shared among fleets within the region. These scenarios identify CNG and propane as ideal candidates for shared infrastructure use between project partners, and go on to discuss the benefits, potential obstacles, and next steps associated with pursuing each.

Clean Energy Coalition strongly recommends that the City of Oberlin pursue the construction of a CNG station at the Republic Services facility on Oberlin-Elyria road as a first priority. As a second priority, the City should build a propane fueling station at their facility on Hillcreek Drive, as a propane station would offer significant emissions reductions and fuel saving opportunities to area fleets in conjunction with CNG or on its own. The City should also begin preparing for expanded electric vehicle use within the city by modifying and streamlining planning and zoning ordinances.

SECTION 1 | INTRODUCTION

PROJECT BACKGROUND

In 2013, the City of Oberlin received a grant from the State of Ohio's Local Government Innovation Fund (LGIF) requesting funding for a collaborative effort between the City and nine other local public and private fleets. The objective of the project was to develop cost-savings strategies for the partner fleets and to assess the feasibility of and demand for alternative fuel vehicles and infrastructure. The City selected Clean Energy Coalition to develop fuel- and cost-saving strategies for the partner fleets and to assess the feasibility of shared alternative fuel infrastructure among fleets within the city.

As one of 18 Clinton Foundation Climate Positive Development Program cities, the City of Oberlin, its residents, and local businesses are committed to reducing Oberlin's greenhouse gas emissions beyond zero, thereby removing more greenhouse-gas emissions from the atmosphere than adding to it. Currently, the City is on target to reduce emissions 50% (from 2007 levels) by 2015, with 90% of its electricity coming from renewable sources.

PROJECT OBJECTIVES

The Oberlin Fleet and Fuel Emissions Reduction Strategy (OFFERS) project supports the City of Oberlin's sustainability goals by addressing emissions from fleets with a significant footprint the area. The project's objective is to develop strategies for reducing vehicle emissions within the city by 15% over three years. This was addressed in two ways: first, Clean Energy Coalition determined baseline use conditions and emissions reductions options for each fleet. Second, Clean Energy Coalition investigated strategies for shared infrastructure deployment and use between partner fleets.

PROJECT PROCESS

Ten fleets were selected to participate in the project. These fleets were identified as having a significant emissions footprint within the city, and all agreed to voluntarily share data on fuel use and vehicle duty cycles.

Clean Energy Coalition utilized its Fuel Forward® fleet analysis service to develop fuel use reduction scenarios for each fleet. This approach, which used a mix of the data voluntarily provided by each fleet partner and

Table 1 | OFFERS Fleet Partners

FLEET	SECTOR	VEHICLES
City of Oberlin	Public	92
Custom Cleaning Solutions	Private	4
Kendal at Oberlin	Private	8
Lorain County Community College	Public	40
Lorain County Joint Vocational School	Private	20
Lorain County Metro Parks	Public	42
New Russia Township	Public	15
Oberlin College	Private	71
Oberlin Schools	Public	10
Republic Services	Private	180
TOTAL		**482**

qualitative information from each fleet manager, objectively identified and evaluated the impact of alternative fuel vehicle deployment strategies by calculating fuel cost savings, GHG emissions avoided, petroleum displaced, and economic paybacks. Each fleet was provided with a report detailing the aggregate baseline of the ten fleets, along with a list of fleet-specific scenarios for fuel efficiency and alternative fuel use opportunities.

In addition to the analysis, Clean Energy Coalition held three informational meetings for all fleets to attend. The first meeting introduced the project to participants, provided guidance on efficient driving behaviors and gave an overview of different alternative fuels. The second meeting presented the aggregate results of the fleet analysis and identified opportunities for shared alternative fuel infrastructure. The final meeting focused on these infrastructure options and presented information on equipment costs, payback periods, facility upgrades, and safety. Microsoft

Excel-based calculators were provided to each participant in order to equip the fleet managers with tools to analyze alternative fuel vehicle purchase scenarios. The calculators provide side-by-side comparisons of greenhouse gas emissions reductions, petroleum displacement, and payback times for natural gas, propane, electric, and biofuel options. The fleet manager can input specific details including fuel costs, vehicle MPG, and annual miles driven in order to customize the outputs for a specific fleet application.

Throughout the OFFERS project, the focus remained on developing shared scenarios and strategies that would reduce vehicle emissions from partner fleets by 15%. Fleet analysis focused on solutions that would allow the use of shared infrastructure within the community, with the intention of recruiting other local and passthrough fleets in the future. Project meetings had a similar focus as well, highlighting information relevant to individual fleets while exploring the opportunity for collaboration on fueling infrastructure.

Table 2 | OFFERS Partner Meetings

MEETING	DESCRIPTION	DATE	LOCATION
OFFERS Meeting 1	Project Kickoff and Alternative Fuels 101	9/12/2013	New Russia Township Hall
OFFERS Meeting 2	Review of Fleet Data and Shared Opportunities	11/22/2013	Republic Services
OFFERS Meeting 3	Alternative Fuel Infrastructure 101	2/14/2014	Kendal at Oberlin

SECTION 2 | FLEET ANALYSIS OVERVIEW

For each of the OFFERS partner fleets, Clean Energy Coalition applied its Fuel Forward® analysis process in order to assess the fleet's needs and evaluate opportunities for using alternative fuels and reducing overall fuel consumption. See Appendix A for a full copy of the fleet report.

Figure 1 | Fuel Forward Process

PARTNER INTERVIEWS

The fleet analysis began by conducting interviews with each fleet partner. The resulting information was used to develop an understanding of each partner's fleet operations as well as to determine their unique needs and preferences. A matrix of common issues was developed from these interviews in order to highlight the needs and preferences of each partner, and was used at nearly every step of the analysis process in order to determine what solutions might be shared across fleets, as well as to ensure that recommendations were tailored to each fleet's unique needs. The on-site interviews were also used to develop an understanding of the potential opportunity for shared alternative fuel infrastructure in the surrounding geography.

DATA COLLECTION

At the project outset, fleet partners provided Clean Energy Coalition with existing vehicle use data. Any gaps in information were filled during the interview process. Information collected consisted of vehicle year, make, model and fuel type as well as annual fuel use, vehicle miles traveled, and /or hours of use per vehicle. In cases where annual fuel use or annual vehicle miles traveled was not recorded by individual vehicles, the aggregate data for the fleet was obtained. All collected data were stored in Microsoft Excel.

DATA CLEANING

Once the data were collected, they were cleaned. The process involved organizing and standardizing data sheets and filling in gaps such as year, make, model, vehicle type, fuel type, and annual vehicle miles traveled when not provided. This process also calculated intermediate values such as actual fuel efficiencies for fleet vehicles when annual fuel use and vehicle miles traveled were provided for each vehicle.

BASELINE FOOTPRINT

After the data were cleaned, they were summarized across all fleets into an aggregate baseline footprint for all project partners. Annual

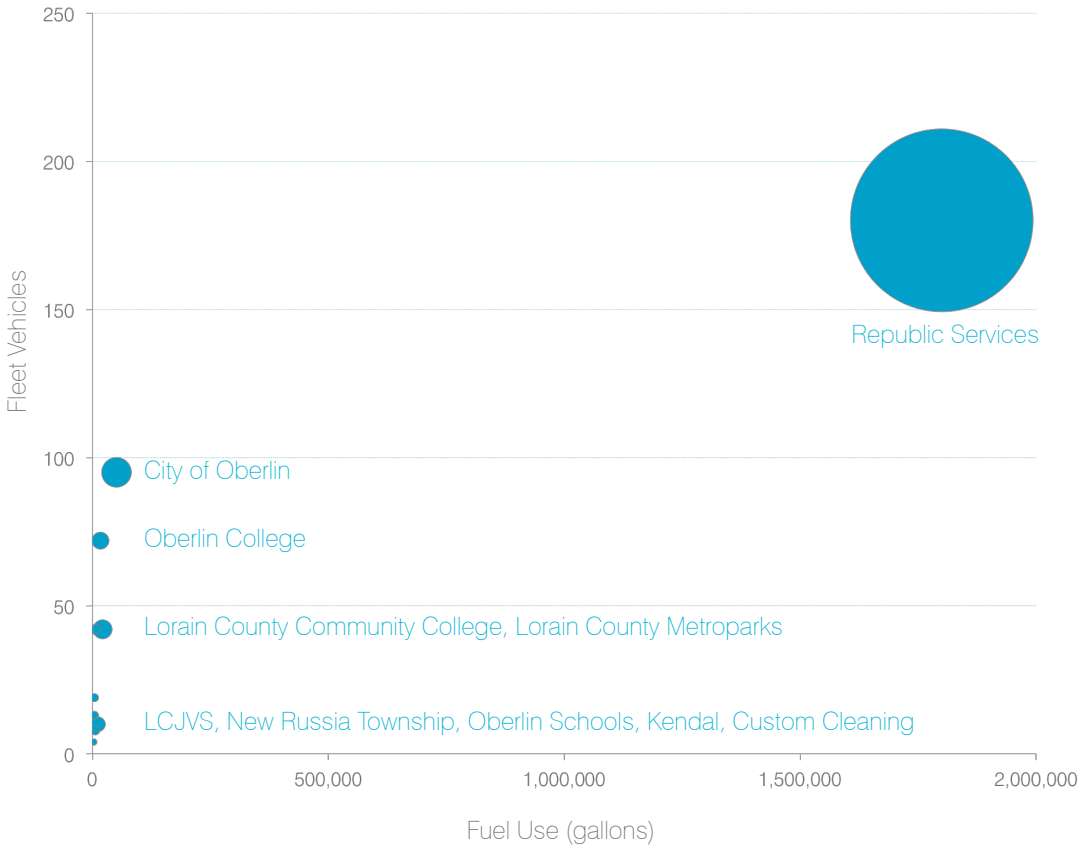
fuel cost, if not provided by the fleet partner during data collection, was determined using average fuel prices for the 2012 year. Factors used to calculate the petroleum consumption and greenhouse gas emissions were based on Argonne National Laboratory's (ANL) GREET Fleet Footprint Calculator 1.1a (available as a free download from the ANL website) and include a "well-to-wheel" fuel life-cycle, which accounts for all the energy inputs and associated emissions from the point of origination of the fuel to its combustion within the vehicle.

FUEL SCENARIOS

Vehicles for alternative fuel scenarios were chosen based on the current makeup of the fleet and a number of other metrics, including vehicles in the fleet with low fuel economy, high fuel use, and high percent of fleet composition.

The clean data was used to assume the annual vehicle miles traveled and fuel economy of the alternative fuel vehicle. Factors to calculate energy density of alternative fuels (used to calculate fuel economy loss) were also based on the GREET Fleet Footprint Calculator 1.1a. Annual fuel savings are based on the price per gallon of the alternative fuel and the price per gallon of gasoline or diesel. The values used for each price were either selected by the fleet partner or the average price if not given by the partner. Cost data and value propositions are based on dynamic pricing formulas that are subject to change. Therefore, this report is intended to be used only as a reference for decision makers, not as a substitute for strategic decision-making that may incorporate many other administrative and operational factors in each fleet's operations.

Figure 1 | Fleet Fuel Use, Vehicle Count, and Emissions



COLLECTIVE BASELINE

The City of Oberlin and nine fleet partners have a collective fleet of 485 vehicles and pieces of equipment included in this analysis. The collective fleet traveled approximately 5,689,000 miles and consumed over 1,920,000 gallons of fuel in one year. This equates to roughly $6,812,000 spent on fuel alone. Most of the fuel consumed was diesel fuel (1,843,000 gallons) by the Republic Services fleet. The collective gasoline use was approximately 79,000 gallons. Overall, these vehicles required 49,209 barrels of petroleum (oil) to operate, and produced 27,027 tons of greenhouse gas emissions.

The chart on the following page illustrates the relative fleet sizes, annual fuel use and associated greenhouse gas emissions for each fleet. Republic Services and the City of Oberlin are the largest fuel users and likely first adopters of alternative fuels for multiple vehicles. Smaller fleets may be limited in terms of financial ability to install alternative fuel infrastructure or service alternative fuel vehicles on their own. The potential for shared services managed by the larger fuel users creates an opportunity for community-wide adoption of alternative fuel vehicles.

The above chart represents the potential for emissions reductions in OFFERS partner fleets, with annual fuel use along the x-axis, total fleet vehicles along the y-axis. The size of each fleet's footprint represents that fleet's total greenhouse gas (GHG) emissions.

Table 3 | Potential Demand for Alternative Fuels

FUEL	MINIMUM FUEL DEMAND		MAXIMUM FUEL DEMAND	
	Volume	GHG Reduction	Volume	GHG Reduction
CNG	2,002,040 GGE	4,816.8 Tons	2,019,736 GGE	4,858.2 tons
LPG only	3,813 Gallons	5.1 Tons	25,993 Gallons	34.6 Tons
Electricity	16,406 kWh	60.3 Tons	16,406 kWh	60.3 Tons
B-100	3,027 Gallons	34.0 Tons	6,054 Gallons	69.0 Tons

AGGREGATE SCENARIOS

Alternative fuels displace conventional fuels and provide the benefits of reduced greenhouse gas emissions and petroleum use. Most alternative fuels also offer cost savings compared to conventional fuels, which can be significant enough to offset the higher cost of an alternative fuel vehicle within the vehicle life. The first step in understanding the potential for alternative fuel use is to examine the current volume of conventional fuels used by the fleets. The table below provides a breakdown of each fleet's fuel consumption and vehicle counts.

For each fleet, scenarios for replacing conventional vehicles with alternative fuel vehicles were developed based on the current makeup of the fleet and a number of metrics such as fuel economy, high fuel use, high percent of fleet composition, vehicle age, or other factors that made the vehicles good candidates for replacement. The scenarios developed focused on CNG, LPG, and electric or hybrid vehicle options that could replace vehicles in the current fleet. The table below represents potential maximum and minimum demand for four alternative fuels: Compressed Natural Gas, Liquefied Petroleum Gas, Electricity, and Biodiesel. Each of these estimates considers vehicle replacements or conversions where the payback period is under 10 years (see Recommendations Overview for details) and assumes all vehicles use alternative fuels under similar use conditions.

Many of the fleets examined have a choice between either CNG or LPG when considering vehicle replacements or conversions. This

Table 4 | Fleet Fuel Use

FLEET	DIESEL		GASOLINE		TOTAL		GHGs (tons)
	Fuel Use (gallons)	Vehicles (#)	Fuel Use (gallons)	Vehicles (#)	Fuel Use (gallons)	Vehicles (#)	
City of Oberlin	22,709	41	27,815	54	50,524	92	664
Custom Cleaning			2,433	4	2,433	4	30
JVS			3,897	20	3,897	20	48
Kendal			5,700	8	5,700	8	70
LCCC	1,580	10	4,500	30	6,080	40	78
Metro Parks	1,619	2	19,921	40	21,540	42	269
New Russia Township	3,073	12	573	3	3,646	15	50
Oberlin College	2,122	11	14,906	60	17,028	71	214
Oberlin Schools	11,407	10			11,407	10	161
Republic Services	1,800,000	180			1,800,000	1	25,443
TOTAL	**1,842,510**	**266**	**79,745**	**219**	**1,922,255**	**303**	**27,027**

choice, as it relates to specific fleets, is explored in greater detail in each fleet's report. For the fleets in aggregate, two scenarios were developed. The first assumes those fleets with a choice between CNG and LPG choose to adopt CNG, while the second scenario assumes fleets with a choice between CNG and LPG choose to adopt LPG. Not only are CNG, LPG, and electricity less expensive than conventional fuels on a GGE/DGE basis, but they also present the greatest collective opportunity for achieving significant greenhouse gas emission reductions. For this reason, these are the only aggregate scenarios included.

In both scenarios examined, Clean Energy Coalition assumed that all vehicles experiencing a ten year or shorter payback when switching or upgrading to a CNG fuel system were replaced or upgraded. Furthermore, each scenario assumes that any vehicle that could not be upgraded to run on CNG/LPG, but could be replaced or upgraded using a different alternative fuel, has also been switched or retrofitted. Lastly, both scenarios assume biodiesel is used at a B20 blend level.

SCENARIO 1 | CNG

In this scenario, 200 vehicles are replaced or upgraded to run on CNG, 4 on LPG, 52 on biodiesel, and 3 on a combination of gasoline and electricity. Scenario 1 results in emissions reductions of 4,992.6 tons CO2e annually, or a total greenhouse gas reduction of 18% when compared to baseline emissions. One of the stated project objectives was determining scenarios to reduce partner fleet emissions by 15% or more, and Scenario 1 would do just that. The table below outlines the fleets and vehicles that were replaced.

This scenario assumes that all vehicles experiencing a 10-year or shorter payback when switched or upgraded to a CNG fuel system are replaced or upgraded, and any vehicle that could not be upgraded to run on CNG, but could be replaced or upgraded to use a different alternative fuel, has also been switched. Lastly, this scenario assumes that all vehicles using biodiesel are running a B20 blend.

Table 5 | CNG Demand Scenario

PARTNER	VEHICLES (Type and Number)		GHGs OFFSET (Tons CO_2e)	LPG DEMAND (gallons)	CNG DEMAND (GGE)	ELEC. DEMAND (kWh)	B-100 DEMAND (gallons)
City of Oberlin	SUVs	4	8.2	4,412	3,529		
City of Oberlin	Sedans	3	11.4	6,114	4,891		
City of Oberlin	Sedans(PHEV)	3	60.3			16,406	
City of Oberlin	Pickups	2	3.0	2,250			
City of Oberlin	Heavy Duty	29	32.0				2,834
Custom Cleaning	Sedan	1	2.2	1,151	921		
Custom Cleaning	Van	1	2.3	1,216	973		
Kendall	Bus	1	4.7	2,500	2,000		
Kendall	Pickup	1	1.9	1,000	800		
LCCC	Van	1	2.3	1,250	1,000		
LCJVS	Sedan	1	1.6	852	682		
Metro Parks	Pickup	2	2.1	1,563			
Metro Parks	SUVs	3	4.8		2,040		
Metro Parks	Bus/Refuse	2	4.0				324
New Russia Twnshp	Heavy Duty	11	7.0				614
Oberlin College	Pickup	2	3.3	1,750	1,400		
Oberlin College	Van	2	3.5	1,875	1,500		
Oberlin Schools	Buses	10	26.0				2,282
Republic Services	Refuse	180	4,812		2,000,000		
TOTAL		**259**	**4,992.6**	**3,813**	**2,019,736**	**16,406**	**6,054**

SCENARIO 2 | LPG

In this scenario, 183 vehicles are replaced or upgraded to run on CNG, 21 on LPG, 52 on biodiesel, and 3 on a combination of gasoline and electricity. Scenario 2 results in emissions reductions of 4,981 tons CO2e annually, or a total greenhouse gas reduction of 18% when compared to baseline emissions. As with Scenario 1, Scenario 2 would also achieve the goal of reducing partner fleet emissions by 15% or more. The table below outlines the fleets and vehicles that were replaced.

This scenario makes similar assumptions in terms of payback and vehicles converted to the previous scenario, albeit with LPG as opposed to CNG. This scenario also assumes that all vehicles using biodiesel are running a B20 blend made from straight biodiesel (B-100).

These scenarios guided the discussion on infrastructure and shared services as the project continued. In addition to receiving information on alternative fuel options, partner fleets were provided with information on fuel efficiency, idle reduction, fleet right-sizing, and general best management practices for vehicles.

Table 6 | LPG Demand Scenario

PARTNER	VEHICLES (Type and Number)		GHGs OFFSET (Tons CO_2e)	LPG DEMAND (gallons)	CNG DEMAND (GGE)	ELEC. DEMAND (kWh)	B-100 DEMAND (gallons)
City of Oberlin	SUVs	4	5.9	4,412	3,529		
City of Oberlin	Sedans	3	8.1	6,114	4,891		
City of Oberlin	Sedans (PHEV)	3	60.3			16,406	
City of Oberlin	Pickups	2	3.0	2,250			
City of Oberlin	Heavy Duty	29	32.0				2,834
Custom Cleaning	Sedan	1	1.6	1,151	921		
Custom Cleaning	Van	1	1.6	1,216	973		
Kendall	Bus	1	3.3	2,500	2,000		
Kendall	Pickup	1	1.4	1,000	800		
LCCC	Van	1	1.7	1,250	1,000		
LCJVS	Sedan	1	1.1	852	682		
Metro Parks	Pickup	2	2.1	1,563			
Metro Parks	SUVs	3	4.8		2,040		
Metro Parks	Bus/Refuse	2	4.0				324
New Russia Twnshp	Heavy Duty	11	7.0				614
Oberlin College	Pickup	2	2.3	1,750	1,400		
Oberlin College	Van	2	2.5	1,875	1,500		
Oberlin Schools	Buses	10	26.0				2,282
Republic Services	Refuse	180	4,812		2,000,000		
TOTAL		**259**	**4,980.7**	**25,933**	**2,002,040**	**16,406**	**6,054**

SECTION 3 | FLEET RECOMMENDATIONS

During the fleet analysis process, Clean Energy Coalition identified several options that most partner fleets could pursue to reduce petroleum use. The strategies, outlined below as five distinct recommendations, cover petroleum reduction strategies that deal with fuel use, fuel efficiency, and driver behavior. These five recommendations can all be implemented by each fleet individually, although collaboration between OFFERS fleet partners could provide useful insight into effective implementation strategies. Collaborative infrastructure solutions are discussed in greater detail in Section 5.

RECOMMENDATION 1 | ALTERNATIVE FUELS

Clean Energy Coalition recommends that OFFERS fleet partners adopt hybrid vehicles as identified in each fleet's individual report. During the fleet analysis process, four alternative fuels were identified as potential candidates for use among OFFERS fleet partners: compressed natural gas, liquefied petroleum gas, electricity, and biodiesel. Use of these alternative fuels can significantly lower greenhouse gas emissions, reduce dependence on petroleum, lower maintenance costs, and in some cases, save money on fuel.

When considering the addition of alternative fuels or advanced vehicle technologies, attention should be given to the complexities that new technologies can bring to maintenance and repair facilities. While some fleets will choose to include multiple fuels or technologies, they must also consider the cost of training and tools required to service new systems. Concerns over infrastructure cost and availability are often expressed when discussing alternative fuels. For recommendations on alternative fuel infrastructure, see Section 5. For additional information on each alternative fuel, see the full Fleet Analysis report.

RECOMMENDATION 2 | HYBRID VEHICLES

Clean Energy Coalition recommends that OFFERS fleet partners adopt alternative fuels as identified in each fleet's individual report. Two types of hybrid vehices were identified for potential use among OFFERS partner fleets: hybird electric (HEV) and plug-in hybrid electric vehicles (PHEV). Hybrid electric vehicles use battery power to supplement a gasoline engine. HEVs do not need to be plugged in since the battery charges while the vehicle is in operation. While the battery alone can only power the vehicle for a few miles without gasoline, the power assistance significantly improves the gas mileage. HEV batteries are not capable of being charged from an external source and therefore do not require any external infrastructure. Alternatively, plug-in Hybrid vehicles contain a larger battery and require external charging. PHEVs are generally capable of traveling longer distances on battery power alone.

Hybrid and plug-in hybrid vehicles offer increased fuel economy over similar conventional vehicle models, and can lead to significant fuel use reductions in the right application. These vehicles also lose very little in terms of performance, making them an excellent choice for many fleets. Many HEVs and PHEVs are more expensive than similar gasoline-only models, and thus it is important to deploy hybrid and plug-in hybrid vehicles into highest use applications of the fleet to ensure any desired payback is achieved. Each fleet's individual report provides recommendations into which vehicles within the fleet could be replaced with HEVs or PHEVs.

BOX 1 | ADVANCED VEHICLES AND ALTERNATIVE FUELS CONSIDERED

- Natural Gas
- Propane/LPG
- Ethanol
- Biodiesel
- Electricity
- Hydrogen
- Hybrid
- Plug-In Hybrid
- Battery Electric

RECOMMENDATION 3 | IDLE REDUCTION

Clean Energy Coalition recommends that all OFFERS fleet partners consider the use of anti-idling policies or devices within their fleets. An idling vehicle gets zero miles to the gallon. Time spent idling reduces the average effective fuel efficiency of the fleet. Depending on how much the fleet is idling, idle reduction can be a powerful way to achieve savings. Idling time can be a result of normal fleet operations, driver choices, and routes that involve heavy traffic. It is important to consider the root cause of idling in the fleet before deciding on the best method to address it.

Two options exist for fleets interested in idle reduction. First, the fleet can institute an anti-idling policy. In general, anti-idling policies set out guidelines for when in-use vehicles should be turned off. Instituting such a policy would be a low cost way for OFFERS partner fleets to reduce petroleum use. However, the effectiveness of such policies are generally based on how well they are enforced. In general, if minimal resources are directed towards enforcing idle reduction, the decrease in fuel use will likely be minimal as well. Second, the fleet could deploy anti-idling devices for select vehicles. There are many different idle reduction technologies, including devices that automatically shut off the vehicle's engine and auxiliary power units that can be used to power on-board electronics. More information on idle reduction devices can be found in the full version of the fleet report (see Appendix A). Idle reduction technologies tend to be more effective than idle reduction policies, as they require little enforcement. However, they do carry a small upfront cost associated with the unit itself.

RECOMMENDATION 4 | EFFICIENT DRIVING

Clean Energy Coalition recommends that all OFFERS partners institute efficient driving policies within their fleets. Efficient driving is a term used to describe a number of driving behaviors that, when coupled together, can significantly reduce fuel use with little upfront investment. These behaviors include reducing vehicle weight or load, smooth acceleration and braking, skipping or reducing vehicle warm-up times, and maintaining slower rates of speed. More information on efficient driving can be found in Appendix B.

Efficient driving can be an extremely low-cost and effective tool for reducing fuel use as it requires little to no monetary resources. In fact, fleets implementing efficient driving initiatives often pursue them without any kind of outside assistance, further reducing cost. However, some form of driver education is likely to increase the success of any efficient driving program substantially, and interested fleets should consider bringing in a third-party educator if they lack the expertise in-house. The success of efficient driving initiatives, like idle reduction policies, are dependent on the level of driver engagement. As such, the extent to which these initiatives reduce fuel use will be based on how strictly they are enforced.

RECOMMENDATION 5 | RIGHT-SIZING

Clean Energy Coalition recommends that all OFFERS fleets begin right-sizing their fleets as soon as possible. Right-sizing is a fleet management practice for optimizing fleet utilization while reducing overhead costs and emissions. Right-sizing a fleet requires analysis of vehicle utilization rates, a clear understanding of how vehicles are used on the job, and setting reduction targets accordingly. There are a variety of ways to rightsize your fleet.

Right-sizing can mean more than just decreasing the vehicle count of your fleet. One way OFFERS partners can right-size their fleets is by replacing large vehicles with smaller, more fuel-efficient ones. Smart purchasing decisions may contribute significant savings and reductions. Selecting smaller, lighter, and more efficient vehicles without compromising fleet objectives is a cornerstone of any right- sizing strategy. Larger OFFERS fleet partners can also consider instituting a motor pool to ensure optimum vehicle use. Motor pool strategies range from informal, internal car sharing with a loose cost, accounting, structure to a highly automated system for managing reservations and billing. Whether vehicles and equipment are managed through long term leases or are available for occasional use, motor pooling strategies can reduce fleet size and age, increase vehicle utilization, reduce the use of personal vehicles at work and better control capital costs.

SECTION 4 | INFRASTRUCTURE RECOMMENDATIONS

During the fleet analysis process, four alternative fuels were identified as potential options for adoption among fleet partners: compressed natural gas, liquefied petroleum gas, electricity, and biodiesel. The infrastructure required to refuel vehicles running on these alternative fuels is not yet widely available in Lorain County, and if partner fleets are to adopt any of the identified fuels, there will need to be some form of infrastructure development in conjunction with their efforts. Each fuel has different considerations when it comes to infrastructure development, and it is often these differences that determine which alternative fuel a fleet will adopt. Clean Energy Coalition created an infrastructure report outlining the different requirements and considerations that accompany each fuel's infrastructure which is summarized below, the full text of which can be found in Appendix C.

A set of general recommendations is included for the City of Oberlin, as well as any fleet partner interested in pursuing alternative fuels. These are listed below as Recommendations 6 - 10. Recommendations 11 - 13 are specific suggestions for how the City and its partners can move forward on infrastructure deployment. With the exception of 11A and 11B, these recommendations are not meant to be mutually-exclusive, either. In fact, Clean Energy Coalition recommends adopting either Recommendation 11A or 11B, along with Recommendations 12 and 13, to maximize emissions reductions within the city.

RECOMMENDATION 6 | PREPARE FOR CNG

Clean Energy Coalition recommends that OFFERS partners follow these steps when pursuing CNG vehicle fueling infrastructure. The use of compressed natural gas (CNG) presents significant economic advantages and emissions reductions opportunities to the fleet partners. CNG is often significantly cheaper than gasoline and diesel, and has light-, medium-, and heavy-duty applications for fleets. Access to natural gas is widespread, and any facility interested in pursuing a station will likely have access to a gas line. However, due to the fact that the gas must be pressurized before being used to power a vehicle, infrastructure can be cost-prohibitive for many fleets. Prior to introducing CNG as a fuel, fleets must first make important decisions regarding fueling speed, station size, maintenance facility retrofits, and mechanic training.

STEP 1 | COMMUNITY SUPPORT

CNG vehicles may have a difficult time gaining support from the community primarily due to concerns associated with natural gas extraction. Inviting industry experts to participate in a public forum and holding a public forum to address public concerns relating to fracking is one way to address these concerns. Highlighting the emissions reductions potential of CNG vehicles and reinforcing that CNG is a way to reduce emissions in the near-term will likely be an effective message.

STEP 2 | FUNDING

A CNG station costs more to build than any other alternative fuel station. If OFFERS fleet partners are willing to commit to CNG, they may be able to procure funding from a granting organization. One option would be to apply for LGIF loan funding to finance the station.

STEP 3 | CONTACT GAS SUPPLIER

The local natural gas supplier would also be the likely supplier of the natural gas to the CNG fueling station. Questions for the gas provider should include distance from high pressure gas line, fuel contract price, and fuel contract length.

STEP 4 | ENGAGE AUTHORITIES EARLY

Involve the fire marshal, planning department, and building officials in the planning process to increase the likelihood of buy-in from the project's outset. This will help avoid costly delays in permitting and construction.

RECOMMENDATION 7 | PREPARE FOR LPG INFRASTRUCTURE

Clean Energy Coalition recommends that OFFERS partners follow these steps when pursuing propane vehicle fueling infrastructure. Liquefied Petroleum Gas (LPG, or simply Propane) also offers the opportunity for significant financial savings and emissions reductions to partner fleets. While propane applications for heavy-duty vehicles are still unavailable, many light- and medium-duty vehicle options exist. LPG infrastructure tends to be less expensive to install than other gasoline alternatives, making it an attractive option for many OFFERS stakeholders. Propane access is fairly widespread throughout the region, so availability of fuel should not be a concern. Considerations for fleets when switching to propane include storage tank size, leasing or owning dispensing equipment, maintenance facility retrofits, and mechanic training.

STEP 1 | CONTACT A PROPANE SUPPLIER FOR PRICING

The first step towards propane infrastructure is to contact one or more of the numerous propane suppliers in the region. Questions for the supplier should include price per unit fuel, fuel price difference when leasing dispensing equipment, and potential contract length.

STEP 2 | SELECT CONTRACTOR FOR INFRASTRUCTURE INSTALLATION

The next step would be to release a request for proposal (RFP) for station design and construction. This could be a single request, or split up into two different requests for both design and construction work. The RFP should include the station specifics and any additional requirements desired by the City.

STEP 3 | ENGAGE AUTHORITIES HAVING JURISDICTION EARLY

Similar to CNG, the City should discuss any proposed propane station with city fire marshal, planning department, and building officials in the planning process to increase the likelihood of buy-in from the project's outset. This will help avoid costly delays in permitting and construction.

BOX 2 | CNG & LPG RESOURCES

COMPRESSED NATURAL GAS

Alternative Fuels Data Center
www.afdc.energy.gov

Clean Vehicle Education Foundation
www.cleanvehicle.org

Natural Gas Vehicles for America
www.ngvc.org

Natural Gas Vehicle Institute
www.ngvi.com

LIQUEFIED PETROLEUM GAS

Alternative Fuels Data Center
www.afdc.energy.gov

National Alternative Fuels Training Consortium
www.naftc.wvu.edu

Propane Education and Research Council
www.propanesafety.com

RECOMMENDATION 8 |
PREPARE FOR ELECTRIC VEHICLE INFRASTRUCTURE

Clean Energy Coalition recommends that the City of Oberlin follow these steps when pursuing electric vehicle charging infrastructure. While there are fewer opportunities to utilize electric vehicles effectively within partner fleets, they should not be overlooked as an opportunity for further emissions reductions. Electric vehicle charging stations have the added benefits of being both modular and relatively inexpensive, and come in a variety of charge levels to fit a fleet's specific needs. Furthermore, electricity is perhaps the most widely available of the alternative fuels identified. Considerations for fleets when switching to electric vehicles include vehicle duty cycle, charge level, station placement, signage, and mechanic training. and, because of the City of Oberlin's electricity generation portfolio, is also the lowest-emission option.

BOX 3 | ELECTRIC VEHICLE RESOURCES

Plug-In Electric Vehicle Handbook
http://www.afdc.energy.gov/pdfs/pev_handbook.pdf

Community Planning Guide for Electric Vehicles
http://www.advancedenergy.org/

Electric Vehicle Readiness Scorecard
https://www.afdc.energy.gov/pev-readiness/categories

Plug-In Ready Michigan Plan
www.cec-mi.org/plugin

STEP 1 | COMPLETE A PLUG-IN ELECTRIC VEHICLE READINESS SCORECARD

The City's first step in promoting electric vehicles should be to determine where additional support is needed. The Plug-In Electric Vehicle Readiness Scorecard, created by the U.S. Department of Energy, helps communities assess their readiness for the arrival of plug-in electric vehicles (PEVs) and electric vehicle supply equipment (EVSE). See Appendix D for more details.

STEP 2 | PERMITTING/CODES

Permitting regulations and building codes will likely need to be updated to streamline the approval process for electric vehicle infrastructure. Engage building code officials and permitting staff to ensure they are familiar with electric vehicle supply equipment. The City should also consider waiving fees or expediting electric vehicle infrastructure installations.

STEP 3 | ADOPT ZONING AND PLANNING LANGUAGE

Furthermore, the City should examine current zoning and planning language to ensure seamless integration of EVSE into new and existing projects. Potential sections to update can include: ADA siting considerations, signage requirements, and enforcement for EV-only parking. For more information on zoning and planning language for electric vehicles, consult the Plug-In Ready Michigan plan, much of which is relevant to communities throughout the counry. More information can be found in Appendix D.

STEP 4 | UTILITY INVOLVEMENT

The City should also consider working with local electrical utilities to establish a separate rate for plug-in electric vehicles. Time-of-use rates have been shown to decrease the cost of overall electric vehicle charging, as well as move electricity usage to off peak hours. This will further reduce the cost of EV use and encourage adoption within the community.

STEP 5 | PROMOTE THE U.S. DEPARTMENT OF ENERGY'S EV EVERYWHERE WORKPLACE CHARGING CHALLENGE

More EV charging stations at workplaces throughout the Oberlin area means more charging stations for fleet vehicles to charge. The City should consider running a workplace charging challenge to encourage private investment in EV infrastructure. More information can be found in Appendix D.

RECOMMENDATION 9 |
PREPARE FOR BIODIESEL INFRASTRUCTURE

Clean Energy Coalition recommends that OFFERS partners follow these steps when pursuing biodiesel vehicle fueling infrastructure. As with electric vehicles, biodiesel presents fewer opportunities for emissions reductions than CNG and LPG, but should still be considered as a way to augment parallel efforts by project partners. Biodiesel is harder to find than other alternative fuels, but utilizes most of the equipment already in place (tanks, nozzles, tubes) to dispense conventional diesel fuel. Since biodiesel tends to retail slightly higher than conventional diesel, fleets should pursue it as an environmental, rather than economic, choice. Considerations for fleets when switching to biodiesel include blend level, availability of equipment, and willingness to pay a higher amount for a more sustainable fuel.

The National Alternative Fuels Training Consortium offers numerous training opportunities and resources.

STEP 1 | DETERMINE WHETHER OR NOT TO BUY PRE-BLENDED BIODIESEL

If fleet partners decide to blend their own biodiesel by purchasing B100, they should have their current tank cleaned by a qualified professional contractor. Next, they should inventory hoses, gaskets, pumps, nozzles, and seals on or attached to biodiesel tank to ensure compatibility with B100. They will also need to purchase a blender pump to mix the B100 with conventional diesel. If fleet partners decide to purchase pre-blended B20, they should still follow the same steps with the exception of purchasing a blender pump.

STEP 2 | CONTACT EQUIPMENT MANUFACTURER TO VERIFY BIODIESEL IS ACCEPTABLE FOR USE

Some vehicle manufacturers recommend against using biodiesel in their vehicles. Therefore, biodiesel may not be compatible with the engine and/or the vehicle's warranty may be voided if a biodiesel blend is used. Fleets interested in using biodiesel should contact OEMs prior to using biodiesel to ensure equipment compatibility.

STEP 3 | IDENTIFY BIODIESEL SUPPLIER

Finally, interested fleets should release a request for proposals to establish per gallon costs and available quantities. See Appendix E for a sample Biodiesel RFP.

RECOMMENDATION 10 |
TRAIN FIRST RESPONDERS

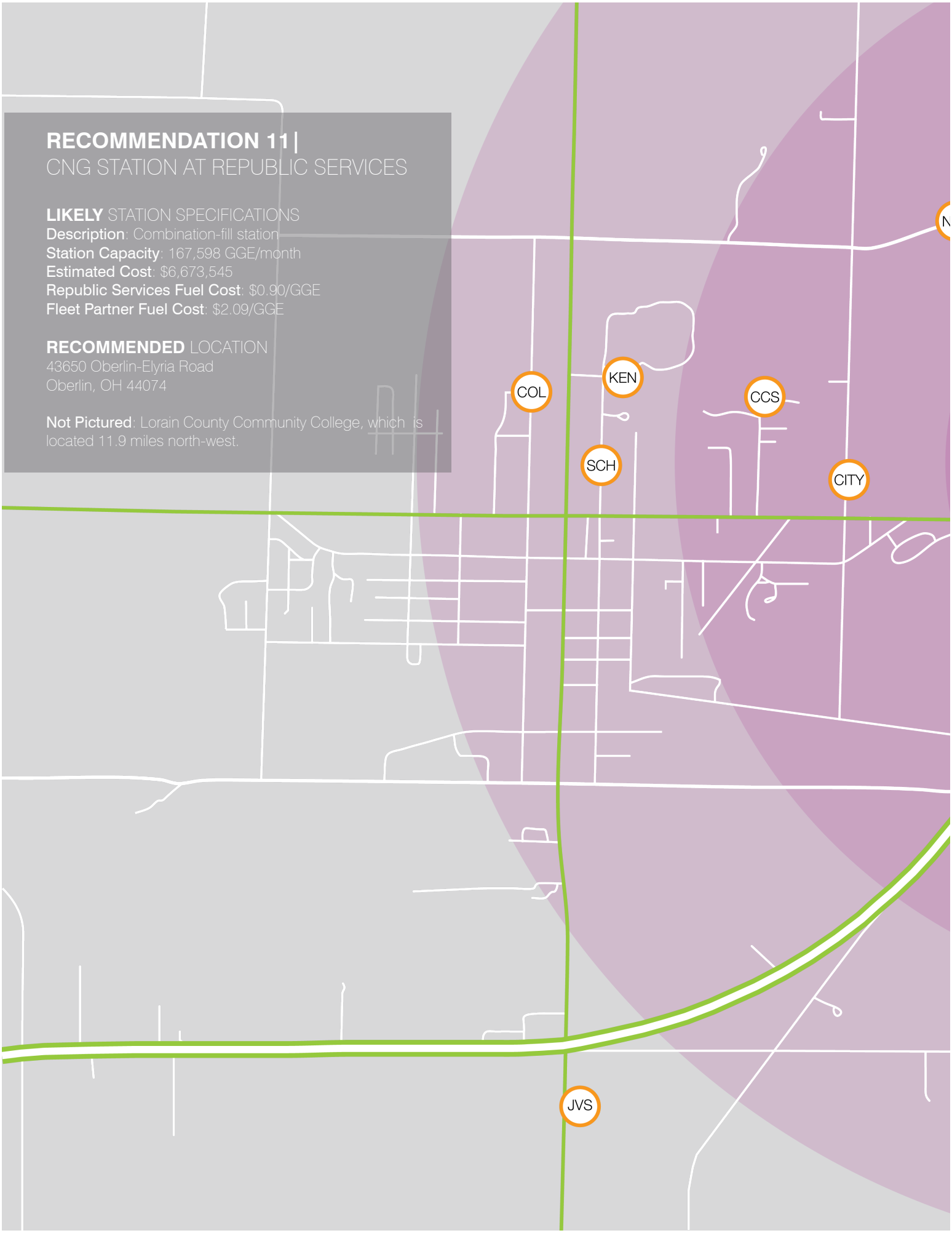
When preparing for a rise in the number of alternative fuel vehicles in the city, it is important that first responders are trained in how to respond to a situation involving AFVs. Paramedics should be trained on how to handle safety situations involving CNG, LPG, and electric vehicles. Fire response teams should also be prepared to handle situations involving LPG and CNG-equipped facilities.

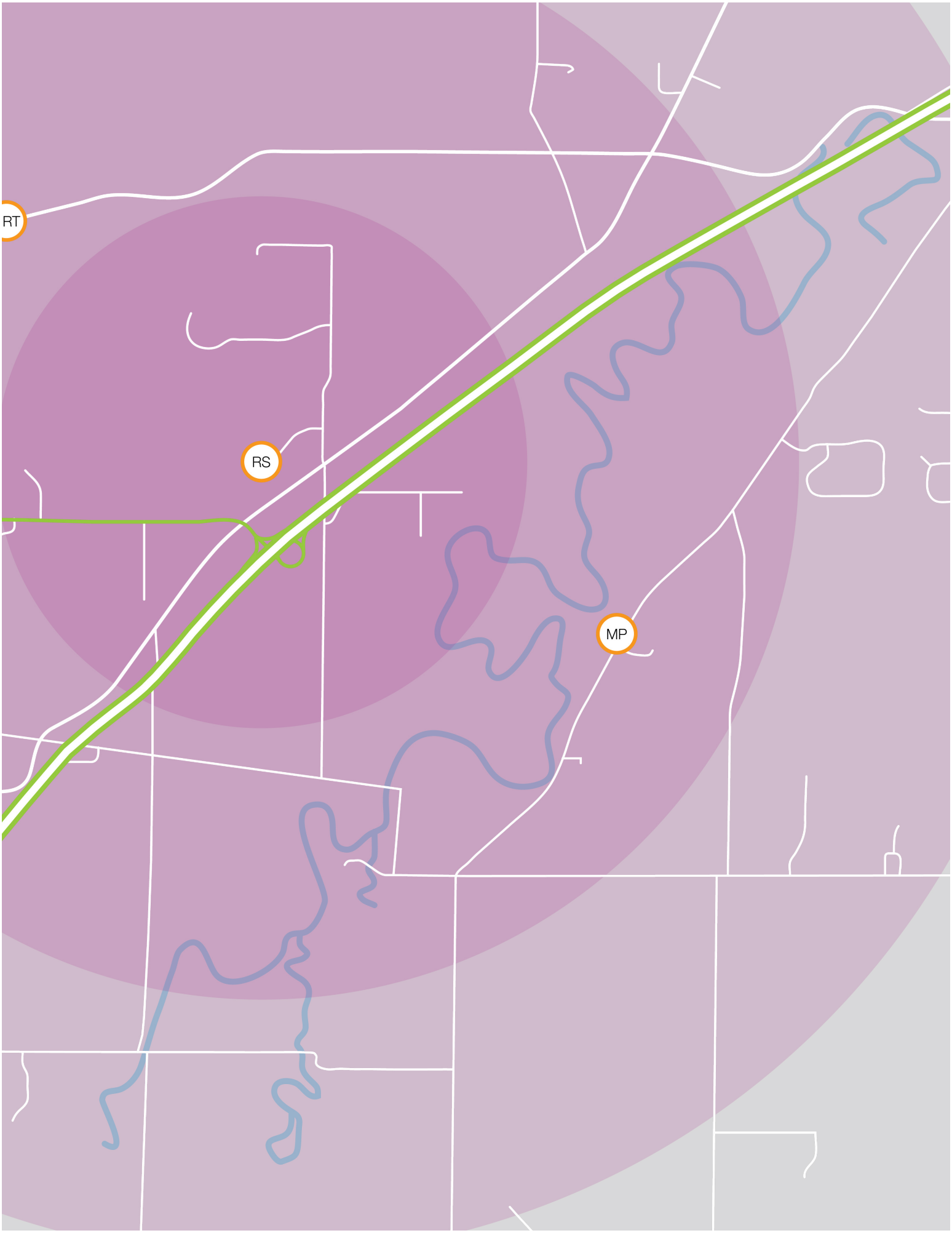
RECOMMENDATION 11 |
CNG STATION AT REPUBLIC SERVICES

LIKELY STATION SPECIFICATIONS
Description: Combination-fill station
Station Capacity: 167,598 GGE/month
Estimated Cost: $6,673,545
Republic Services Fuel Cost: $0.90/GGE
Fleet Partner Fuel Cost: $2.09/GGE

RECOMMENDED LOCATION
43650 Oberlin-Elyria Road
Oberlin, OH 44074

Not Pictured: Lorain County Community College, which is located 11.9 miles north-west.

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RECOMMENDATION 11A |
CNG STATION PURCHASED BY REPUBLIC SERVICES

LIKELY STATION SPECIFICATIONS

Description: Combination-fill station
Station Capacity: 167,598 GGE/month
Estimated Cost: $6,673,545
Republic Services Fuel Cost: $0.90/GGE
Fleet Partner Fuel Cost: $2.09/GGE

RECOMMENDED LOCATION

43650 Oberlin-Elyria Road
Oberlin, OH 44074

Clean Energy Coalition recommends that Republic Services construct a compressed natural gas station at their recycling facility located at 43650 Oberlin-Elyria Road. Republic Services would provide the capital to construct the station, as the company has in many other locations across the country. It is also recommended that Republic Services share access to this infrastructure with other fleets within the area, thus maximizing the impact the station would have on local emissions reductions.

PROJECT BENEFITS

The major benefit to this scenario is the fuel and associated cost savings for Republic Services, along with other partner fleets. As the station owner and operator, the only non-fixed cost associated with CNG would be the material cost of the gas itself. Republic Services can realistically expect to pay approximately $0.95 - $1.25 per gallon gasoline equivalent (GGE) for fuel. Republic Services will also be required to purchase new CNG-ready vehicles, or retrofit existing vehicles to run on CNG. Even with an incremental cost of $30,000 per vehicle, Republic Services can still expect to see a payback in less than three years for a station with these specifications. This does not include the revenue generated from the sale of CNG to area fleets, which would represent an additional revenue stream for Republic Services.

OFFERS fleet partners stand to benefit substantially from this arrangement as well. While they will most likely be charged a higher price for fuel, one that builds in fixed cost recovery and a certain margin for Republic Services. The price for fleet partners will likely be somewhere in the $2.50 range, which when compared to conventional fuel prices, represents a significant savings for these fleets.

One substantial cost-saving opportunity CNG offers to OFFERS fleet partners is the ability to lock in natural gas prices for up to 10 years. Most liquid fuels, including gasoline, diesel, and propane, are usually offered with contracts no longer than 12 months. While this provides some buffer from radical price changes, it does little to protect a fleet from the rising cost of fuel in the long-term. Compressed Natural Gas offers the ability for fleets to reduce the risk associated with fuel price increase and to determine, with a high degree of certainty, their fuel budget well into the future.

For the community, the benefits are numerous. Installation of a CNG station, coupled with the use of CNG in OFFERS partner fleets, has the potential to reduce carbon emissions by over 4,850 metric tons per year. This is equivalent to 18% of total fleet partner emissions, which would contribute significantly to the city's goal of becoming carbon-neutral. Access to compressed natural gas provides an economic development opportunity as well. Many national fleets with experience using CNG operate in the surrounding areas, and local access to CNG could lead to increased vehicle traffic through the surrounding area, or even increased business interest in the region. Similarly, non-partner fleets may take an interest in CNG if the infrastructure becomes available, leading to even greater citywide emissions reductions.

POTENTIAL CHALLENGES

The main challenge presented by this recommendation is ensuring Republic Services decides to construct the suggested infrastructure. It is likely that there would be competing priorities for the funds required to

construct the station, and hopefully the financial savings presents an attractive opportunity. Furthermore, there might be externally-unknown rules for allocating capital in such large amounts, hurdle rates for example, that make this investment additionally challenging. Working with Republic Services to both craft a compelling message to management and create demand within the community could help make a more attractive case.

Should Republic Services construct a station, ensuring access for fleet partners will be critical if the city is to achieve its emissions reduction targets. While Republic Services has experience using CNG around the country, it is unclear whether or not the company has allowed external use of its infrastructure in other locations. If not, this may present new and unknown challenges in terms of monetization, liability, and access. The shared use conditions developed by Republic Services, including fuel rates and access times, may not be amenable to other potential users in the area. Should Republic Services decide to construct a station with the intent of allowing third party access, it would be prudent to investigate the fueling cycles of surrounding fleets.

The proposed location on Oberlin-Elyria road is not centrally located for OFFERS partners, and most fleets would have to travel between one and three miles to fill up at this location. This could create some additional hesitation among potential users who feel the added distance outweighs any financial or environmental benefits. The same can be said for non-partner fleets who might be interested in CNG as well.

One challenge any natural gas project will face is the strong anti-hydraulic fracturing (more commonly known as "fracking") sentiment within the city's citizens. In fact, the City of Oberlin recently passed a "citizens bill of rights" that prevents the practice within the city limits. Any expansion of natural gas use within the city will likely be a tough sell to the population. Steps can likely be taken to minimize this, such as extensive public engagement and careful attention to messaging. Since the proposed location is near an existing landfill, it may be possible to divert natural gas (methane) from the landfill for use in vehicles. Currently, methane produced by the landfill is used for electricity generation and it is unclear if the contracts for this system can be modified. The feasibility of this option also depends on the added capital costs of equipment required to dry and "scrub" the gas before it can be used in vehicles.

NEXT STEPS

Many of the next steps fall on Republic Services. In order to determine the true costs associated with station construction, it will be important to determine how close the proposed site is to a high pressure gas line. If the line is too far away, either additional piping has to be laid, or additional pressurizing equipment needs to be installed at the station, both of which will increase cost and construction time. Once this is known, Republic Services will have a better idea of the financial requirements for the station and can determine how to secure the capital required. If a case needs to be presented as part of the capital budgeting process, Republic Services should consider enlisting support both internally and externally, from other locations that have installed CNG and from OFFERS partners including the City of Oberlin and Clean Energy Coalition.

After the station is approved internally, Republic Services will need to determine a structure for setting fuel prices and sharing access to infrastructure. It is possible that these protocols are already in place in other Republic Services locations, in which case the Oberlin facility should adopt similar practices. If not, Republic should look to other examples of shared access to privately-owned CNG infrastructure. Clean Energy Coalition can help make these connections.

RECOMMENDATION 11B |
CNG STATION PURCHASED BY CITY OF OBERLIN

LIKELY STATION SPECIFICATIONS

Description: Combination-fill station
Station Capacity: 167,598 GGE/month
Estimated Cost: $6,673,545
City of Oberlin Fuel Cost: $0.90/GGE
Fleet Partner Fuel Cost: $2.09/GGE

RECOMMENDED LOCATION

43650 Oberlin-Elyria Road
Oberlin, OH 44074

If Republic Services is unable to fund the infrastructure itself, but is still willing to host a CNG station at their facility, Clean Energy Coalition recommends that the City of Oberlin fund construction of a station at the Republic Services recycling center located at 43650 Oberlin-Elyria Road. Unlike the recommendation above, The City of Oberlin would be required to provide the capital for construction. It is still recommended that access to the station be shared among area fleets, thus maximizing the impact the station would have on local emissions reductions. It should be noted that Recommendation 1A is preferable to this arrangement.

PROJECT BENEFITS

The major benefit to this scenario over Recommendation 11A is the fact that infrastructure development is less dependent to internal decision-making at Republic Services, which would only be required to set aside the necessary space. The City would own and operate the station, allowing it to set rates for nearby fleets. This might be a preferable arrangement for nearby fleets, or at least assuage potential concerns of Republic Services controlling fuel prices for the only local CNG infrastructure.

All OFFERS fleet partners stand to benefit substantially from this arrangement. As with Recommendation 1A, the fuel price for fleet partners will likely be somewhere in the $2.50 per GGE range, which when compared to conventional fuel prices, represents significant savings. Republic Services, while still achieving substantial savings over the cost of diesel fuel, will likely pay the same price for fuel as other fleet partners. This price would be notably higher than if they owned the station outright. Even at $2.50 per GGE, Republic can reasonably expect to see a payback of less than 2.5 years on the incremental cost of CNG vehicles.

Community benefits are similar to those under Recommendation 1A. Installation of a CNG station, coupled with the use of CNG in OFFERS partner fleets, has the potential to reduce carbon emissions by 4,850 metric tons per year. This is equivalent to 18% of total fleet partner emissions, which would contribute significantly to the city's goal of becoming carbon-neutral. Access to compressed natural gas provides an economic development opportunity as well. Many national fleets with experience using CNG operate in the surrounding areas, and local access to CNG could lead to increased vehicle traffic through the surrounding area, or even increased business interest in the region. Similarly, non-partner fleets may take an interest in CNG if the infrastructure becomes available, leading to even greater citywide emissions reductions.

POTENTIAL CHALLENGES

There are two main challenges associated with this recommendation. The first challenge will be securing an arrangement with Republic Services that would allow the City to construct a station. It is unclear whether or not Republic Services has experience with similar arrangements in other locations, and if it does, the situation will be easier to resolve. If not, Republic Services will need to determine whether or not this is something they are interested in supporting. Ultimately, questions surrounding construction timing, liability issues, and hours of access will need to be addressed in any arrangement between the City and Republic Services.

Once the City as worked out a space-sharing

arrangement, it will need to secure the capital required to construct the station. It is unlikely that the City has the required funds to finance construction outright, so it will likely have to look elsewhere. The City will need to determine what the best option for generating capital is, be it through grants, bond measures, low-interest loans, or other sources. Some external funding sources are accompanied by limitations on where and what the funds may be spent on, and this will need to be reviewed thoroughly before pursuing any opportunity. The City of Oberlin will also have to sort out any potential legislative or zoning issues associated with constructing a publicly-owned facility outside the city limit on private property.

Other challenges are similar to those listed in Recommendation 1A, in terms of station location and public sentiment surrounding the use of natural gas. Similar steps to those recommended above can be taken here to address these potential issues.

NEXT STEPS

The first step will be for conversations between the City and Republic Services to continue, and for a land sharing arrangement to be worked out. After an agreement allowing for construction has been reached, and framework has been developed that provides clarity to the division of responsibilities between both parties has been established, both parties will need to determine where the station will be located on the site. In order to determine the true costs associated with station construction, it will be important to determine how close the proposed site is to a high pressure gas line. If the line is too far away, either additional piping has to be laid, or additional pressurizing equipment needs to be installed at the station, both of which will increase cost and construction time. Once this is known, the City will have a better idea of the financial requirements for the station and can determine how best to secure the capital required.

After funding has been secured, the City will want to begin determining rates for fuel sales. When calculating this, the City will want to include factors such as natural gas price, station operating costs, taxes, and any interest rates that might be associated with the capital used. Ultimately, the price per GGE should allow the City to continue to operate the station, finance necessary upgrades and maintenance, and make any necessary payments.

The City will also want to start engaging the public on the benefits of compressed natural gas in vehicles as soon as possible. Public sentiment seems to be against the use of natural gas, so messaging will be critical. It will be important to highlight the emissions benefits of CNG, both in terms of climate change and other criteria pollutants. The city might also consider framing the issue as a way to take action now until other technologies, such as electric or hydrogen vehicles, reach the point where they are available for heavy duty applications.


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RECOMMENDATION 12|
LPG STATION AT CITY OF OBERLIN

LIKELY STATION SPECIFICATIONS
Description: Station with vehicle and canister fill capabilities
Station Capacity: 4,000 gallons stored
Estimated Cost: $45,000
City of Oberlin Fuel Cost: $1.699/gallon
Fleet Partner Fuel Cost: $2.399/gallon

RECOMMENDED LOCATION
538 Hillcreek Drive
Oberlin, OH 44074

Not Pictured: Lorain County Community College, which is located 13.2 miles north-west.

RECOMMENDATION 12 |
LPG STATION(S) PURCHASED BY CITY OF OBERLIN

LIKELY STATION SPECIFICATIONS

Description: LPG station with vehicle and canister fill capabilities
Station Capacity: 4,000 gallons stored
Estimated Cost: $45,000
City of Oberlin Fuel Cost: $1.699/gallon
Fleet Partner Fuel Cost: $2.399/gallon

RECOMMENDED LOCATION

538 Hillcreek Drive
Oberlin, OH 44074

Clean Energy Coalition recommends that the City of Oberlin consider installing a propane station either independently, or in addition to, the aforementioned CNG infrastructure. Based on its location and the space available, the City would ideally construct the station at its garage facility at 538 Hillcreek Drive. The City would be responsible for providing both the capital required to construct the station, and the land on which it would be constructed. It is also recommended that the City own the station rather than lease it from a propane supplier, since demand is anticipated to be high enough as to make station ownership the less expensive option in less than two years. Access to the station should be open to all interested fleets, thus maximizing the opportunity for local emissions reductions.

PROJECT BENEFITS

The main benefit of propane over other liquid and gaseous alternative fuels is the price of infrastructure. When compared to compressed natural gas, propane infrastructure can be anywhere from 10x to 100x cheaper to install. This is because less expensive equipment for processing and dispensing the fuel is required. Propane infrastructure can also be less expensive to operate, as it does not require energy-intensive compression. This can make LPG much easier for organizations to pursue financially. Propane stations are also relatively easy to expand should demand ever increase past current fueling capacity.

Propane also represents significant financial savings and emissions reductions opportunities for OFFERS fleets. Similar to Recommendation 1A, there will likely be two price tiers for fuel. The first is the price paid by the City for propane from the supplier, around $1.70 per GGE. This is the price city vehicles will pay for fuel. The other price tier will likely be closer to $2.40 per GGE, which builds in station cost recovery and operations fees, and will be the price paid by non-city users. At either price, OFFERS partners can save substantially by using propane over conventional fuels in fleet vehicles.

Another benefit to propane is the diversity of applications. Most classes of light-duty vehicles can be converted to run on LPG, as can many medium-duty vehicles. Propane can be used to power other fleet assets as well, including forklifts and riding mowers. Propane upfitters also offer bi-fuel, or dual fuel, options for many light- and medium-duty vehicles, which allows the driver to switch back and forth between LPG and gasoline. Using bi-fuel LPG vehicles would allow more hesitant fleets to experience the performance improvements and fuel savings without committing fully. Bi-fuel options can also help alleviate concerns associated with range anxiety in fleets that need vehicles to travel extended distances.

There is also significantly less concern over propane amongst the citizens of Oberlin, as opposed to natural gas. LPG offers an alternative to CNG for most fleet vehicles that might be more palatable to the public.

POTENTIAL CHALLENGES

The largest challenge associated with this recommendation is the lack of propane applications for some heavy-duty vehicles. There is currently no widely-available propane retrofit for Class 7 & Class 8 trucks, meaning that many of the largest fuel-users amongst OFFERS partners will be unable to take advantage of any

propane infrastructure. This is true for Republic Services, whose fuel use comes primarily from heavy-duty refuse trucks unable to use propane. If this recommendation were to be the only one adopted, the community would be missing out on the most significant opportunity for emissions reductions within the transportation sector.

Propane also offers less of an opportunity to manage risk associated with price fluctuations. Whereas many natural gas providers will allow large-volume users to lock in commodity prices up to 10 years out, it is rare to see propane contracts that extend beyond 12 months. Instead, an organization's ability to hedge the price of LPG is based on these short-term contracts and its on-site storage capacity.

NEXT STEPS

The first step would be to finalize any details surrounding its location. The City has identified their facility at 538 Hill Creek Road as the likely home of any LPG infrastructure, but before moving forward, this needs to be confirmed. Next, the exact location of the station within the facility should be determined. This will likely be influenced by several factors including space available on-site and fleet refueling habits.

Capital needs to be located to fund station installation and construction. The City should first look at any opportunities to use internal funds, as this will likely be cheaper in the long run. If not, the City should consider external options such as the Local Government Innovation Fund.

Last, the City should begin station construction and fueling operations by releasing two requests for proposals (RFPs). The first would request bids for station design, construction, and installation. In the request, the City should include general information about the City's desire to pursue propane, as well as general and unique station specifications. Simultaneously, the City should begin looking to establish fueling contracts by releasing an RFP for fuel suppliers. By soliciting several bids from regional LPG suppliers, the City can be assured it is receiving the best price.

RECOMMENDATION 13 | PLAN FOR ELECTRIC VEHICLES

LIKELY SPECIFICATIONS

Description: Level 2 SAE J1772 Electric Vehicle Supply Equipment (EVSE)
Station Capacity: 240v
Estimated Infrastructure Cost: Varies based on charge level and additional features

Clean Energy Coalition recommends that the City of Oberlin begin planning for electric vehicles. Electric vehicles were identified by many of the project partners as an ideal alternative fuel option due to the potential for EVs to be transportation option. Though full electric vehicle adoption may be several years away, many early adopters are purchasing EVs and the city should start preparing now to encourage others to pursue EVs. Access to infrastructure is the first step towards increased EV deployment within the city. Of course, the city can't be expected to install all of the necessary EV charging stations. However, it can adopt ordinances and planning and zoning language that promotes electric vehicle infrastructure.

An assortment of EV charging levels will best suit a city the size of Oberlin. Of the three levels of electric vehicle charging available, AC Level 2 will likely be the most commonly installed option for commercial and public parking based on the speed at which it charges most widely-available electric and plug-in hybrid vehicles. While AC Level 1 may still be a good option for vehicles that are parked for a long period of time (in multi-family dwellings or workplaces), Level 1 charging systems are unlikely to meet the short term power demands of EVs with larger batteries. Therefore, Clean Energy Coalition recommends that workplaces within the City of Oberlin, along with the City of Oberlin itself, install several publicly available AC Level 2 charging stations for visitors, and privately-available AC Level 1 charging stations to serve employees.

PROJECT BENEFITS

The principal benefit to the City of Oberlin in supporting electric vehicle adoption is the reduction in emissions that will come from the expanded use of electric vehicles within the city. Electric vehicles have zero operating emissions. However, EVs do not exist in a vacuum, and the emissions from electricity generation should be included as part of any cost-benefit calculation for these vehicles. Unlike most municipalities, the City of Oberlin is in a favorable position to support electric vehicles, given that a majority of it's electricity comes from renewable sources. Even when examining electric vehicle emissions on a well-to-wheel basis, emissions are likely to be drastically lower than those from conventional fuels. Electricity is also a widely available alternative fuel. All modern residential and commercial properties are wired for electricity, and thus charging infrastructure can be deployed at existing facilities relatively easily.

For fleets and electric vehicle owners, electric vehicles can be significantly cheaper to operate. This is due, in large part, to the efficiency of modern electric motors and the relatively low price of electricity. Moving a car on electricity usually costs around 75% less than what it would cost to move a car the same distance using gasoline. Electric vehicle infrastructure is also inexpensive compared to other alternative fuels. Where LPG infrastructure can cost in the tens of thousands of dollars, and CNG infrastructure can cost nearly 100x more, electric vehicle supply equipment can cost anywhere from $500 to $15,000 per unit, depending on features. Installation costs can range as well, depending on the proximity of existing electrical conduit.

Deploying charging stations throughout the city will likely encourage additional adoption of electric and plug-in hybrid vehicles throughout the city. Availability of infrastructure is a principal barrier to alternative fuel vehicle adoption in both the residential and commercial sectors. Increasing the number of publicly-available charing stations in Oberlin directly addresses this concern, and will further establish the City as a leader in climate adaptation.

POTENTIAL CHALLENGES

Despite the fact that electric vehicle infrastructure tends to be cheaper than other alternative fuels, the full cost of installing electric vehicle supply equipment is still a significant challenge

for businesses and municipalities. Putting in stations not already equipped with the electrical infrastructure to accommodate them requires extensive electrical upgrades and trenching. These costs can be amplified based on the number of vehicles, given that a station is usually needed for each vehicle. It is significantly cheaper to run electrical conduit in while facilities they are under construction than after. Therefore, installation costs associated with electric vehicle charging stations can be largely mitigated in the long term by encouraging new developments to wire parking facilities with electrical during the design and construction phases.

NEXT STEPS

As mentioned above, the City should begin by surveying existing building codes and zoning rules to determine where language can be added in support of electric vehicle charging. Completing the U.S. Department of Energy's Plug-In Electric Vehicle Readiness Scorecard can help identify areas in permitting and inspection processes that, when addressed, will expedite infrastructure development. The scorecard also contains sections on incentives, outreach, utility involvement, and market conditions, and is an ideal place to start when determining how best to encourage EV adoption throughout the city. For example policy language, the City of Oberlin can look to "Plug-In Ready Michigan", an electric vehicle plan developed for the state of Michigan by Clean Energy Coalition. "Plug-In Ready Michigan" contains numerous examples of code and zoning language, and although developed specifically for the state of Michigan, can still provide a useful starting point for the City of Oberlin.

One area the City of Oberlin should pay special attention to is signage. Infrastructure availability is one of the most significant challenges facing the electric vehicle industry, and ensuring adequate charging station signage can help address this. First, wayfinding signs increase the visibility of charging stations, ensuring that residents and visitors are made aware of the city's existing infrastructure. Parking signage designed to ensure only electric vehicles use designated charging spaces can create additional peace of mind among EV owners over whether or not they will have access to public charging infrastructure. Examples of wayfinding and parking signage can be found in the aforementioned "Plug-In Ready Michigan" plan.

Simultaneously, if the City is interested in installing additional charging stations, it should begin thinking about which systems it would like to install. One PEP station has already been installed at the city's offices on South Main Street, but before moving forward with any future purchases, the City should first determine the level of satisfaction with its current system. Furthermore, a wishlist of features should be considered when assessing a plan to expand City-owned charging infrastructure. Examples of additional features include keycard access, which would allow only certain individuals to use the station, or internet connectivity, which can provide residents a real-time report on which stations are available for charging. These features can then be included in an RFP, or used to determine the best model(s) to purchase.

Finally, the City of Oberlin can begin contacting local businesses to assess their interest in deploying EV infrastructure for employees and customers. Engaging the private sector will enhance the City's efforts by bringing in outside resources to create a more robust charging network within the city. The City can also leverage the U. S. Department of Energy's Workplace Charging Challenge to provide resources and visibility for interested businesses. Additionally, the City can make contact with the local Clean Cities coalition, and enlist their support in reaching out to other organizations. Bulk purchaging arrangements or collaborative RFPs between the City and interested local businesses have the potential to drive the price of infrastructure down for all parties.

SECTION 5 | MOVING FORWARD

Ultimately, it will be up to the City to determine how to proceed. Clean Energy Coalition recommends adopting either Recommendation 11A or 11B, along with Recommendations 2 and 3. Rather than choosing either 11A or 11B, the City should begin by exploring the feasibility of having Republic Services fund and install a station at their facility. If Republic determines that financing a station is not possible, the City could then consider Recommendation 11B, and explore third-party funding options and collaborative land-sharing arrangements. If neither Recommendation 11A or 11B are feasible, and CNG looks unlikely, the City should strongly consider Recommendation 2.

In the absence of CNG, propane offers significant emissions reductions and fuel savings opportunities to area fleets. Given that there is a certain amount of overlap between CNG and LPG applications, the City will have to put some thought into whether or not to pursue propane if a CNG station is installed. There are benefits to having both types of alternative fuel infrastructure available within the city, as there are vehicles within OFFERS partner fleets that could only use LPG. Ultimately, the City will need to weigh the incremental emissions and financial benefits of LPG in addition to CNG against the cost of installing a station.

It will be important to maintain engagement with OFFERS partner fleets. Most fleet partners lack the capital or financial savings to make either LPG or CNG a realistic proposition on their own. Yet significant interest in alternative fuels exists among these fleets. Recent conversations with partners have shown that while unable to commit fully to alternative fuels, most are eager to launch pilot projects within their fleets should the infrastructure materialize. When fueling stations become available, OFFERS partner fleets should be re-engaged, as many will likely be willing to deploy alternative fuel vehicles.

The OFFERS Project has also placed the City of Oberlin and the surrounding fleets in a favorable position should funding become available for alternative fuel infrastructure and vehicle retrofits. There are two immediate opportunities on the horizon, the first of which is the LGIF's Local Government Innovation Program (LGIP). The LGIP provides loans for "demonstration projects to implement the results" of previous LGIF projects. As mentioned above, the City is now in a favorable position to apply for funding to implement some of these recommendations. Furthermore, a bill recently proposed in the Ohio House of Representatives could give $16 million annually to governmental entities and not-for-profit organizations for CNG vehicle conversions. For businesses, the bill would provide up to 50% of the incremental purchase or retrofit price for alternative fuel vehicles. Should the bill pass, OFFERS partner fleets would be poised to take advantage of it immediately.

Box 4 | Case Studies: Alternative Fuel Infrastructure

	City of Avon Lake | Avon Lake, OH	Licking Country Commissioners | Newark, OH
Loan Amount	$46,800	$300,000
Project Type	Propane Conversion; Single Department	CNG Filling Station; Multiple Users
Vehicle Conversion	10 police and utilities vehicles	N/A
Infrastructure	CNG Fueling station	CNG Fueling Station
Annual Fuel Savings	$19,000	$133,064
Payback time	3 years	N/A
Contact	Joseph Reitz, Engineering Manager Phone: (440) 930-4101	Beverly Adzic, Administator Phone: (740) 670-5113

APPENDIX A |
FLEET ANALYSIS REPORT

Oberlin Fleet and Fuels Emissions Reduction Strategy

Fleet Analysis Report

Prepared for
The City of Oberlin

February 14, 2014

clean energy coalition

bridging needs. advancing change.

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PROJECT OVERVIEW

The Oberlin Fleet and Fuels Emissions Reduction Strategy (OFFERS) project is a collaborative effort between the City of Oberlin and 9 other local public and private fleet partners to reduce greenhouse gas (GHG) emissions by 15% while improving fleet energy efficiency and planning for alternative fuel use. The City selected Clean Energy Coalition to develop fuel- and cost-saving strategies for the partner fleets and to assess the feasibility of and demand for alternative fuels.

Each partner has agreed to participate in a fleet assessment process by providing fleet data and information about fleet practices. All fleet partners have also agreed to participate in discussions to identify community-wide strategies for fuel use reduction and adoption of alternative fuels. The partners will attend a series of facilitated workshops to learn about alternative fuels, receive fleet-specific recommendations for fuel use reduction plans, and discuss strategies to advance the use of alternative fuels in the community.

Task Area 1: Fleet Consulting services

Clean Energy Coalition's Fuel Forward® fleet analysis service is an objective approach to identifying and evaluating the impact of alternative fuel vehicle deployment strategies and includes calculations for fuel cost savings, GHG emissions avoided, petroleum displaced, and economic paybacks. The analysis also identifies behavioral and operational improvements that will reduce overall fuel consumption and improve fleet efficiency.

Task Area 2: Fueling Strategies

Input will be gathered from fleet partners and other agencies in order to assess alternative fuel infrastructure development options. Recommendations will be provided about the type and potential locations for alternative fuel stations that will inform the City's efforts to expand the use of alternative fuels. The lessons learned and strategies identified will be shared in written and verbal forums to help the City promote its goals and to provide information to others fleets and communities that wish to adopt fuel-saving and alternative fuel strategies.

Task Area 3: Shared Solutions

Clean Energy Coalition will facilitate a series of workshops that will provide a forum for fleet participants to express concerns and organize shared solutions for reaching the City's climate positive community goals.

Goals

The goal of the project is to develop action plans to reduce fuel costs and emissions by 15% over three years and identify strategies to adopt alternative fuels. Improving fleet efficiency and encouraging the use of alternative fuels are important steps toward achieving a goal that Oberlin, Ohio will be the first climate positive city in the United States. The City of Oberlin believes the project will improve the efficiency of fleet operations and lead to sustained cost savings, environmental benefits, and encourage the use of alternative fuels.

Fleet Partners

- Custom Cleaning Services
- Kendal at Oberlin
- Lorain County Community College
- Lorain County Joint Vocational School
- Lorain County Metro Parks
- New Russia Township
- Oberlin City Schools
- Oberlin College
- Republic Services

FLEET ANALYSIS METHODOLOGY

For each of the OFFERS partner fleets, Clean Energy Coalition applied its Fuel Forward® analysis process in order to assess the fleet's needs and evaluate opportunities for using alternative fuels and reducing overall fuel consumption.

Partner Interviews

The fleet analysis began by conducting interviews with each fleet partner. The resulting information was used to develop an understanding of each partner's fleet operations as well as determine their needs and preferences. A matrix of common issues was developed from these interviews in order to highlight the needs and preferences of each partner, and was used at nearly every step of the analysis process in order to determine what solutions might be shared across fleets, as well as to ensure that recommendations were tailored to each fleet's unique needs. The on-site interviews were also used to develop an understanding of the potential opportunity for shared alternative fuel infrastructure in the surrounding geography.

Data Collection

At the project outset, fleet partners provided Clean Energy Coalition with existing vehicle use data. Any gaps in information were filled during the interview process. Information collected consisted of vehicle year, make, model and fuel type as well as annual fuel use, vehicle miles traveled, and /or hours of use per vehicle. In cases where annual fuel use or annual vehicle miles traveled was not recorded by individual vehicles, the aggregate data for the fleet was obtained. Collected data were stored in its raw format in Microsoft Excel.

Data Cleaning

Once the data were collected, they were cleaned. The process involved organizing and standardizing data sheets and filling in gaps such as year, make, model, vehicle type, fuel type, and annual vehicle miles traveled when not provided. This process also calculated intermediate values such as actual fuel efficiencies for fleet vehicles when annual fuel use and vehicle miles traveled were provided for each vehicle.

Baseline Footprint

The next step was to summarize the cleaned data. Annual fuel cost, if not provided by the fleet partner during data collection, was determined using average fuel prices for the 2012 year. Factors used to calculate the petroleum consumption and greenhouse gas emissions were based on Argonne National Laboratory's GREET Fleet Footprint Calculator 1.1a and include a "well-to-wheel" fuel life-cycle, which accounts for all the energy inputs and associated emissions from the point of origination of the fuel to its combustion within the vehicle.

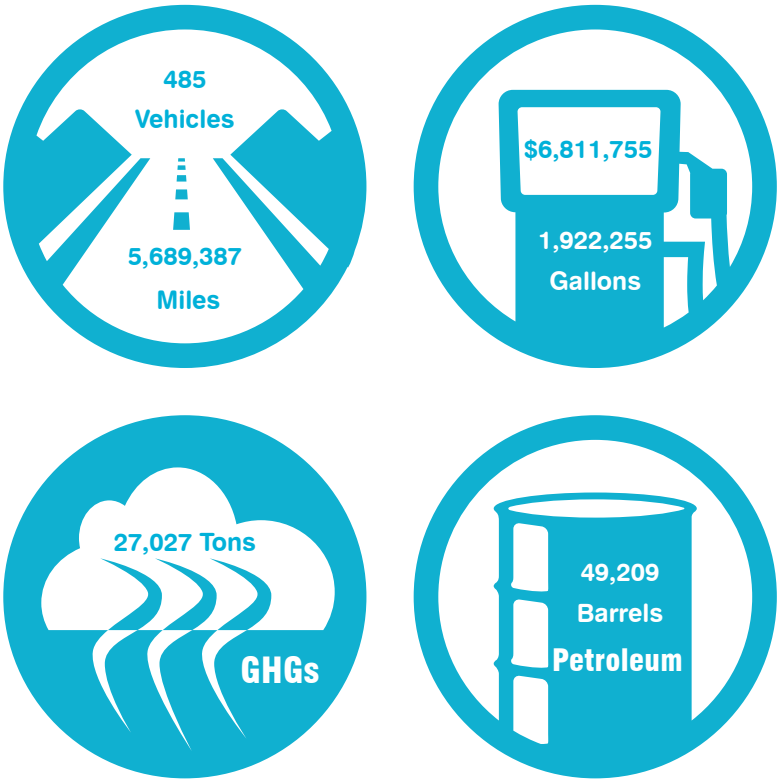
Alternative Fuel Scenarios

Vehicles for alternative fuel scenarios were chosen based on the current makeup of the fleet and a number of other metrics, including vehicles in the fleet with low fuel economy, high fuel use, and high percent of fleet composition. The clean data was used to assume the annual vehicle miles traveled and fuel economy of the alternative fuel vehicle. Factors to calculate energy density of alternative fuels (used to calculate fuel economy loss) were also based on the GREET Fleet Footprint Calculator 1.1a. Annual fuel savings are based on the price per gallon of the alternative fuel and the price per gallon of gasoline or diesel. The values used for each price were either selected by the fleet partner or the average price if not given by the partner. Cost data and value propositions are based on dynamic pricing formulas that are subject to change. Therefore, this report is intended to be used only as a reference for decision makers, not as a substitute for strategic decision-making that may incorporate many other administrative and operational factors in each fleet's operations.

COLLECTIVE FLEET PROFILE

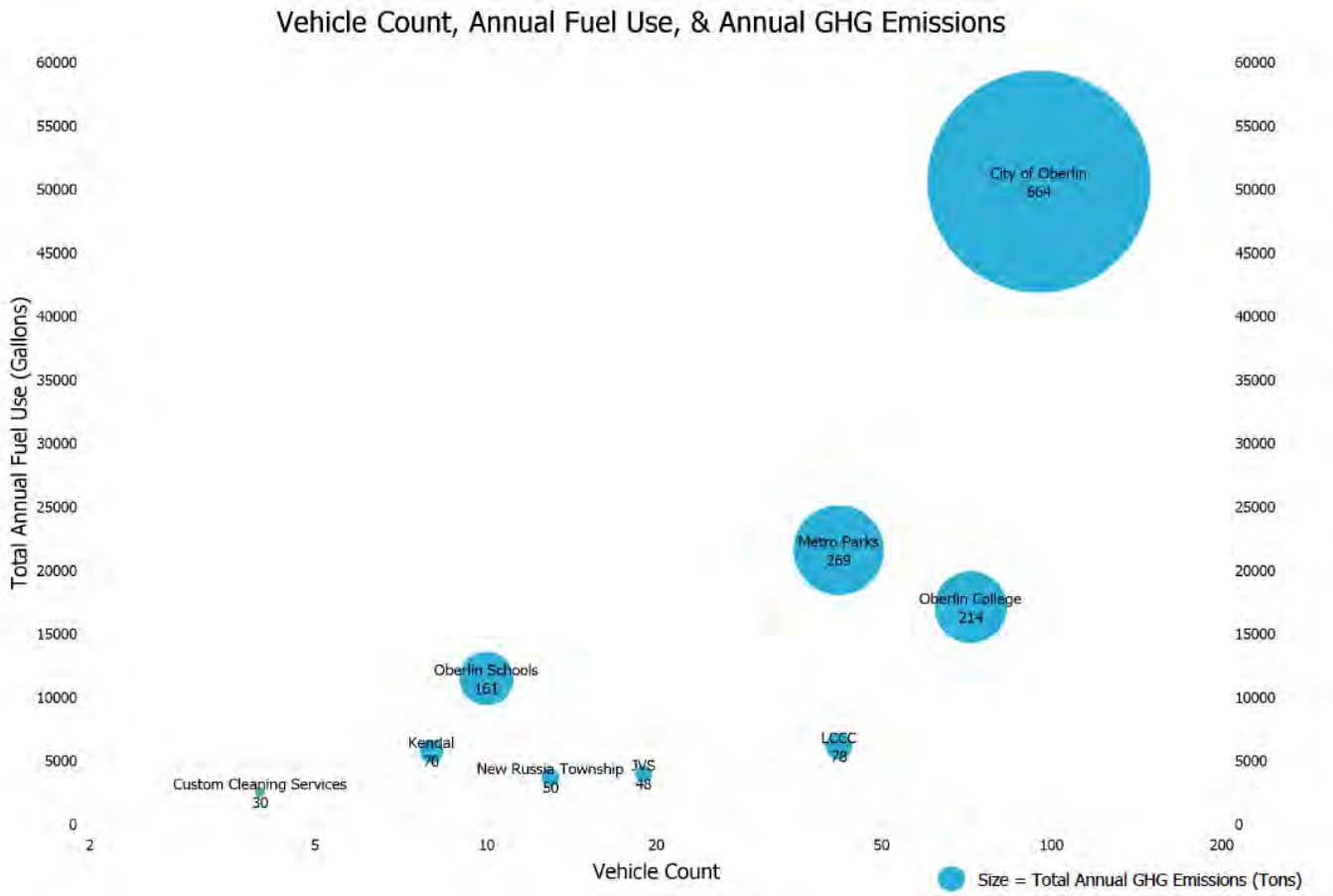
Baseline

The City of Oberlin and nine fleet partners have a collective fleet of 485 vehicles and pieces of equipment included in this analysis. The collective fleet traveled approximately 5,689,000 miles and consumed over 1,920,000 gallons of fuel, priced at approximately $6,812,000 in one year. Most of the fuel consumed was diesel fuel (1,843,000 gallons) by the Republic Services fleet. The collective gasoline use was approximately 79,000 gallons. Overall, these vehicles required 49,209 barrels of petroleum (oil) to operate, and produced 27,027 tons of greenhouse gas emissions. Factors used to calculate the petroleum consumption and greenhouse gas emissions were based on Argonne National Laboratory's GREET Fleet Footprint Calculator 1.1a.



The chart on the following page illustrates the relative fleet sizes, annual fuel use and associated greenhouse gas emissions for each fleet. Republic Services and the City of Oberlin are the largest fuel users and likely first adopters of alternative fuels for multiple vehicles. Smaller fleets may be limited in terms of financial ability to install alternative fuel infrastructure or service alternative fuel vehicles on their own. The potential for shared services managed by the larger fuel users creates an opportunity for community-wide adoption of alternative fuel vehicles.

Relative Fleet Footprints



Republic Services : Vehicle Count: 180 Total Annual Fuel: 180,000 Gallons Total Annual GHG Emissions: 25,443 Tons

(Due to is size Republic Services was not included in the chart above.)

ALTERNATIVE FUEL OVERVIEW

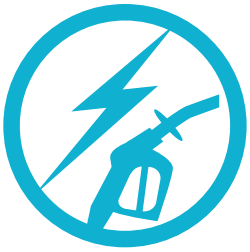
By using alternative fuels, fleets can significantly lower greenhouse gas emissions, reduce dependence on petroleum, lower maintenance costs, and in some cases, save money on fuel. When considering the addition of alternative fuels or advanced vehicle technologies, attention should be given to the complexities that new technologies can bring to maintenance and repair facilities. While some fleets will choose to include multiple fuels or technologies, they must also consider the cost of training and tools required to service new systems.

Compressed natural gas (CNG) is a widely available, domestically produced fuel. CNG is sold in gasoline gallon equivalent units (GGE), which are equal to about 5.6 pounds of natural gas. One GGE has the same energy as one gallon of unleaded gasoline so if a vehicle travels 15 miles per gallon of gas, it will travel about 15 miles per gasoline gallon equivalent of CNG. Vehicles can be converted to run exclusively on CNG (dedicated), or on either gasoline or CNG (bi-fuel). CNG is compressed to 3,000-3,600 psi and dispensed into high-pressure tanks on the vehicle. Although the fuel is typically about half the price of gasoline, fueling infrastructure can be cost-prohibitive due to the compression equipment required. CNG produces fewer greenhouse gas emissions than equivalent volumes of petroleum, and can prolong vehicle life by increasing some maintenance intervals.

Liquefied petroleum gas (LPG), also known as propane or autogas, is a widely available byproduct of natural gas and oil refining processes. Propane is compressed to between 100 and 200 psi, at which point it becomes a liquid fuel that is dispensed into tanks on the vehicle. It has a higher octane rating but a 27% lower energy density per gallon than gasoline. Fueling infrastructure is relatively inexpensive compared to CNG. Currently, propane costs less per gallon than gasoline but slightly more fuel is required due to the difference in energy density and resulting fuel economy. Like CNG, LPG is cleaner burning than petroleum and can prolong vehicle life.

Biodiesel is renewable fuel produced from vegetable oils or animal fats. It is blended with diesel fuel and results in a cleaner burning fuel with lower greenhouse gas emissions than standard diesel fuel. Newer diesel engines can burn blends up to 20% biodiesel (B20) without any conversions or modifications. There are no noticeable impacts on vehicle performance and most manufacturers approve blends up to B20 under warranty conditions. To avoid cold-start issues, users may choose to lower the blend to 5% (B5) or blend B20 with cold-weather diesel fuel, which includes additives that improve fuel flow.

Ethanol is a renewable fuel made from fibrous plant material. Any Flex Fuel vehicle can use E85, which is a blend of 85% ethanol and 15% gasoline. The fuel is cleaner burning and has lower greenhouse gas emissions than gasoline but has a 30% lower energy density as well. A Flex Fuel option with a new vehicle purchase typically costs about $100.



Hybrid electric vehicles (HEV) use battery power to supplement a gasoline engine. HEVs do not need to be plugged in since the battery charges while the vehicle is in operation. While the battery alone can only power the vehicle for a few miles without gasoline, the power assistance significantly improves the gas mileage. HEV batteries are not capable of being charged from an external source and therefore do not require any external infrastructure.

Plug-In hybrid electric vehicles (PHEV) and Battery Electric Vehicles (BEV) must be plugged in to charge the battery. PHEVs combine the range benefits of conventional gasoline engines with the fuel economy benefits of electric power. Electric-only range for a PHEV is around 40 miles, after which the vehicle can run on gasoline, resulting in an overall range of around 350 miles. BEVs (often referred to as just EVs) do not have an internal combustion engine, and instead rely purely on an electric motor. As a result, BEVs do not produce any tailpipe emissions (although there are emissions associated with producing the electricity) and have a typical range of up to 100 miles.

For further details about alternative fuels, see the U.S. Department of Energy's Alternative Fuels Data Center, a Clean Cities program resource - www.afdc.energy.gov/. Clean Cities Guides to Alternative Fuels and Advanced Vehicles are included with the supplemental materials for this report.

AGGREGATE SCENARIOS

Alternative fuels displace conventional fuels and provide the benefits of reduced greenhouse gas emissions and petroleum use. The first step in understanding the potential for alternative fuel use is to examine the current volume of conventional fuels used by the fleets. The table below provides a breakdown of each fleet's fuel consumption and vehicle counts.

Fleet	Diesel		Gasoline		Total		GHGs (tons)
	Annual Fuel Use (gallons)	# of Vehicles	Annual Fuel Use (gallons)	# of Vehicles	Annual Fuel Use (gallons)	# of Vehicles	
City of Oberlin	22,709	41	27,815	54	50,524	92	664
Custom Cleaning			2,433	4	2,433	4	30
JVS			3,897	20	3,897	20	48
Kendal			5,700	8	5,700	8	70
LCCC	1,580	10	4,500	30	6,080	40	78
Metro Parks	1,619	2	19,921	40	21,540	42	269
New Russia Township	3,073	12	573	3	3,646	15	50
Oberlin College	2,122	11	14,906	60	17,028	71	214
Oberlin Schools	11,407	10			11,407	10	161
Republic Services	1,800,000	180			1,800,000	1	25,443
Grand Total	**1,842,510**	**266**	**79,745**	**219**	**1,922,255**	**303**	**27,027**

For each fleet, scenarios for replacing conventional vehicles with alternative fuel vehicles were developed based on the current makeup of the fleet and a number of metrics such as fuel economy, high fuel use, high percent of fleet composition, vehicle age, or other factors that made the vehicles good candidates for replacement. The scenarios developed focused on CNG, LPG, and electric or hybrid vehicle options that could replace vehicles in the current fleet. The table below represents potential maximum and minimum demand for four alternative fuels: Compressed Natural Gas, Liquefied Petroleum Gas, Electricity, and Biodiesel. Each of these estimates considers vehicle replacements or conversions where the payback period is under 10 years (see Recommendations Overview for details) and assumes all vehicles use alternative fuels under similar use conditions.

Fuel	Minimum Fuel Demand		Maximum Fuel Demand	
	Volume	GHG Reduction	Volume	GHG Reduction
CNG	2,002,040 GGE	4,816.8 Tons	2,019,736 GGE	4,858.2 tons
LPG only	3,813 Gallons	5.1 Tons	25,993 Gallons	34.6 Tons
Electricity	16,406 kWh	60.3 Tons	16,406 kWh	60.3 Tons
B-100	3,027 Gallons	34.0 Tons	6,054 Gallons	69.0 Tons

Many of the fleets examined have a choice between either CNG or LPG when considering vehicle replacements or conversions. This choice, as it relates to specific fleets, is explored in greater detail in each fleet's report. For the fleets in aggregate, two scenarios were developed. The first assumes those fleets with a choice between CNG and LPG choose to adopt CNG, while the second scenario assumes LPG adoption. Not only are CNG, LPG, and electricity less expensive than conventional fuels on a GGE/DGE basis, but they also present the greatest collective opportunity for achieving significant greenhouse gas emission reductions. For this reason, these are the only aggregate scenarios included. Biofuels, such as ethanol and biodiesel, can be more expensive than conventional fuels on a GGE of DGE basis. The City of Oberlin is the most likely user of biodiesel and this scenario is explored further in the analysis of the City's fleet.

Scenario 1: Compressed Natural Gas

In this scenario, 200 vehicles are replaced or upgraded to run on CNG, 4 on LPG, 52 on biodiesel, and 3 on a combination of gasoline and electricity. Scenario 1 results in emissions reductions of 4,992.6 tons CO2e annually, or a total greenhouse gas reduction of 18% when compared to baseline emissions. One of the stated project objectives was determining scenarios to reduce partner fleet emissions by 15% or more, and Scenario 1 would do just that. The table below outlines the fleets and vehicles that were replaced.

Partner	Vehicles (Type and Number)		GHGs Offset (Tons CO_2e)	LPG Demand (gallons)	CNG Demand (GGE)	Electric Demand (kWh)	B-100 Demand (gallons)
City of Oberlin	SUVs	4	8.2	4,412	3,529		
City of Oberlin	Sedans	3	11.4	6,114	4,891		
City of Oberlin	Sedans (PHEV)	3	60.3			16,406	
City of Oberlin	Pickups	2	3.0	2,250			
City of Oberlin	Heavy Duty	29	32.0				2,834
Custom Cleaning	Sedan	1	2.2	1,151	921		
Custom Cleaning	Van	1	2.3	1,216	973		
Kendall	Bus	1	4.7	2,500	2,000		
Kendall	Pickup	1	1.9	1,000	800		
LCCC	Van	1	2.3	1,250	1,000		
LCJVS	Sedan	1	1.6	852	682		
Metro Parks	Pickup	2	2.1	1,563			
Metro Parks	SUVs	3	4.8		2,040		
Metro Parks	Bus/Refuse	2	4.0				324
New Russia Twnshp	Heavy Duty	11	7.0				614
Oberlin College	Pickup	2	3.3	1,750	1,400		
Oberlin College	Van	2	3.5	1,875	1,500		
Oberlin Schools	Buses	10	26.0				2,282
Republic Services	Refuse	180	4,812		2,000,000		
Total		**259**	**4,992.6**	**3,813**	**2,019,736**	**16,406**	**6,054**

This scenario assumes that all vehicles experiencing a 10-year or shorter payback when switched or upgraded to a CNG fuel system are replaced or upgraded. Furthermore, this scenario assumes that any vehicle that could not be upgraded to run on CNG, but could be replaced or upgraded to use a different alternative fuel, has also been switched. Lastly, this scenario assumes that all vehicles using biodiesel are running a B20 blend.

Scenario 2: Liquefied Petroleum Gas

In this scenario, 183 vehicles are replaced or upgraded to run on CNG, 21 on LPG, 52 on biodiesel, and 3 on a combination of gasoline and electricity. Scenario 2 results in emissions reductions of 4,980.7 tons CO2e annually, or a total greenhouse gas reduction of 18% when compared to baseline emissions. As with Scenario 1, Scenario 2 would also achieve the goal of reducing partner fleet emissions by 15% or more. The table below outlines the fleets and vehicles that were replaced.

Partner	Vehicles (Type and Number)		GHGs Offset (Tons CO_2e)	LPG Demand (gallons)	CNG Demand (GGE)	Electric Demand (kWh)	B-100 Demand (gallons)
City of Oberlin	SUVs	4	5.9	4,412	3,529		
City of Oberlin	Sedans	3	8.1	6,114	4,891		
City of Oberlin	Sedans (PHEV)	3	60.3			16,406	
City of Oberlin	Pickups	2	3.0	2,250			
City of Oberlin	Heavy Duty	29	32.0				2,834
Custom Cleaning	Sedan	1	1.6	1,151	921		
Custom Cleaning	Van	1	1.6	1,216	973		
Kendall	Bus	1	3.3	2,500	2,000		
Kendall	Pickup	1	1.4	1,000	800		
LCCC	Van	1	1.7	1,250	1,000		
LCJVS	Sedan	1	1.1	852	682		
Metro Parks	Pickup	2	2.1	1,563			
Metro Parks	SUVs	3	4.8		2,040		
Metro Parks	Bus/Refuse	2	4.0				324
New Russia Twnshp	Heavy Duty	11	7.0				614
Oberlin College	Pickup	2	2.3	1,750	1,400		
Oberlin College	Van	2	2.5	1,875	1,500		
Oberlin Schools	Buses	10	26.0				2,282
Republic Services	Refuse	180	4,812		2,000,000		
Total		**259**	**4,980.7**	**25,933**	**2,002,040**	**16,406**	**6,054**

This scenario assumes that all vehicles experiencing a 10-year or shorter payback when switched or upgraded to an LPG fuel system are replaced or upgraded. Furthermore, this scenario assumes that any vehicle that could not be upgraded to run on LPG, but could be replaced or upgraded to use a different alternative fuel, has also been switched. Lastly, this scenario assumes that all vehicles using biodiesel are running a B20 blend.

Fleet Management Practices

In addition to the alternative fuel scenarios outlined for each fleet partner, the following management practices can be implemented by each fleet to improve efficiency and further reduce emissions.

Idle Reduction

An idling vehicle gets zero miles to the gallon. Time spent idling reduces the average effective fuel efficiency of the fleet. Depending on how much the fleet is idling, idle reduction can be a powerful way to achieve savings. Idling time can be a result of normal fleet operations, driver choices, and routes that involve heavy traffic. It is important to consider the root cause of idling in the fleet before deciding on the best method to address it. The two technologies listed below are examples of available solutions for vehicles prone to long idle times.

Havis IdleRight2:
IdleRight2 monitors the battery's voltage while the vehicle is turned off and the lights or electronics equipment are still on. If the voltage of the battery drops below the low voltage sense level IdleRight2 triggers the vehicle's Remote Starter to idle the vehicle. The system runs the engine until the battery is charged before the Remote Starter turns the vehicle off and the process begins again. The IdleRight2 component is small, easy to install, and costs about $150 per vehicle. IdleRight2 is intended to be used with small electrical loads on the vehicle. A good example would be traffic or construction details where the vehicle's warning lights are needed for safety but the driver is not required to stay with the vehicle. The vehicle's climate control system is not intended to be used with the IdleRight system.

EnergyXtreme:
EnergyXtreme is an auxiliary battery system that is stored in the trunk of the vehicle. The system self charges via the vehicle's alternator when the car is in motion. When the vehicle is turned off, the car's electrical system draws on the EnergyXtreme's battery power. Although The EnergyXtreme is not intended to run the climate control system. There is an optional "polar package" from Espar Heater Systems that allows vehicle heaters to operate without the use of the vehicle's engine. EnergyXtreme plans to offer an AC system in the future.

Fleet Right-sizing

Right-sizing is a fleet management practice for optimizing fleet utilization while reducing overhead costs and emissions. Right-sizing a fleet requires analysis of vehicle utilization rates, a clear understanding of how vehicles are used on the job, and setting reduction targets accordingly. There are a variety of ways to rightsize your fleet.

Purchasing Decisions:
Rightsizing can mean more than just decreasing the vehicle count of your fleet. Smart purchasing decisions may contribute significant savings and reductions. Selecting smaller, lighter, and more efficient vehicles without compromising fleet objectives is part of any right- sizing strategy.

Motor Pooling:
Motor pool strategies range from informal, internal car sharing with a loose cost accounting structure to a highly automated system for managing reservations and billing. Whether vehicles and equipment are managed through long term leases or are available for occasional use, motor pooling strategies can reduce fleet size and age, increase vehicle utilization, reduce the use of personal vehicles at work and better control capital costs.

Right-Sizing Steps

The following is a simple guide for determining right-sizing options for a fleet. The steps below will guide the fleet manager through the steps of collecting vehicle data, analyzing use and replacement scenarios, determining options, and creating a plan to put a right-sizing policy into effect.

Step 1: Gather Fleet Data

Collecting data on current vehicles will allow the fleet manager to create right-sizing scenarios for their fleet. Below is an example of the data that should be collected for each fleet vehicle.

What is each vehicle used for?
This information will be helpful in determining if there are any vehicles in the fleet that are no longer useful.

What is each vehicle's utilization?
This information can help determine if there are any redundant vehicles within the fleet, or if opportunities exist for sharing vehicles among individuals or departments. Make sure to collect information on the number of miles each vehicle travels annually, and how many hours/days it is used each year.

What is each vehicle's fuel economy / yearly fuel cost?
Since alternative fuels like CNG and LPG tend to be cheaper than conventional fuels, identifying the fleet's largest fuel users will help the fleet manager determine the best candidates for replacement or upgrade to alternative fuels.

What is each vehicle's yearly maintenance cost?
Yearly maintenance costs can help determine when it becomes cheaper to replace a vehicle rather than continuing to run it.

Does the vehicle have a specialized use?
Some vehicles, firetrucks and ambulances for example, have very specialized, and often intermittent, uses. Identifying these vehicles can help identify which vehicles are right for sharing or replacement.

Step 2: Develop Right-Sizing Scenarios

Based on the information collected, the fleet manager should determine which vehicles fit different right-sizing scenarios. Below are example scenarios that exist for a variety of vehicles and situations ranging from vehicle conversions to vehicle sharing.

Scenario: Convert Vehicles to Run on Alternative Fuels
Based on the fuel and maintenance cost savings, some vehicles may be ideal for converting to alternative fuels. These vehicles will likely have low mileage, low fuel economy, and high utilization, making them ideal candidates for recovering incremental cost investments.

Scenario: Replace Existing Vehicles with Alternative Fuel Vehicles
For some high-mileage vehicles, it might make financial sense to replace them with alternative fuel vehicles. These vehicles will likely have high mileage, high utilization, and low fuel economy to ensure a return on any incremental investment. Furthermore, these vehicles will have high maintenance costs, ensuring that replacement is cheaper than continued upkeep.

Scenario: Replace Existing Vehicles with Fuel Efficient Vehicles
When considering a replacement for a light duty vehicle, a fuel-efficient gasoline vehicle may be a more effective option than an alternative fuel vehicle. Ideal candidates for replacement

will likely have high mileage, low to high utilization, and low fuel economy to ensure a return on any incremental investment. Since the payback on an alternative fuel vehicle is largely based on fuel cost savings, vehicles that use less fuel take longer to achieve a payback, and are thus better candidates for replacement with a more efficient conventional vehicle.

Scenario: Retire Vehicles
Some vehicles should be retired rather than replaced. These will be vehicles that have non-specialized uses and high mileage, low utilization, and high maintenance costs. Vehicles that fit these criteria are likely to be redundant within the fleet. In some cases, these vehicles could be retained as "back up" vehicles but due to high maintenance costs, retaining these vehicles will be expensive and inefficient.

Scenario: Motor Pool
Vehicle sharing is a viable option for reducing fleet size within or between many departments, or even among organizations. Vehicles that are ideal for sharing will have low mileage and utilization, but will have specialized functions. For example, if two departments each have a tractor backhoe that is used 100 hours each year, it might make sense to sell one and share the remaining resource. Creating a motor pool can also help reduce fleet size by allowing vehicles to be shared among staff. In a motor pool, vehicles are not assigned to specific individuals, and instead use is shared among employees. By sharing the vehicle, utilization may increase enough to justify purchasing an alternative fuel motor pool vehicle.

Step 3: Explore Right-Sizing Options

Based on the information collected on each vehicle, explore different options that exist for fulfilling selected scenarios. The fleet manager could begin by reviewing online and in-print resources. Examples include, but are not limited to, the U.S. Department of Energy's Clean Cities resources, www.fueleconomy.gov, and online information through the Alternative Fuels Data Center.

Step 4: Create a plan

Once scenarios have been selected and replacement/retirement/conversion/sharing options have been determined, the fleet manager should create a plan for institutionalizing a right-sizing policy. Reaching out to other fleet managers who have adopted right-sizing policies is a good idea when beginning to craft a policy. These individuals can provide advice on best practices, both in terms of policy creation and securing by-in from administrators and vehicle users. Finally, the fleet manager should create a path forward. This will involve writing out a plan for right-sizing the fleet and identifying the necessary decision-makers.

FLEET ANALYSIS REPORTS

The remainder of this report details each fleet's baseline and best-fit scenarios for incorporating alternative fuel vehicles. A matrix of interview highlights and a summary of vehicle scenarios is also included.

Vehicles for alternative fuel scenarios were chosen based on the current makeup of the fleet and a number of other metrics, including vehicles in the fleet with low fuel economy, high fuel use, and high percent of fleet composition. The clean data was used to assume the annual vehicle miles traveled and fuel economy of the alternative fuel vehicle. Factors to calculate energy density of alternative fuels (used to calculate fuel economy loss) were also based on the GREET Fleet Footprint Calculator 1.1a. Annual fuel savings are based on the price per gallon of the alternative fuel and the price per gallon of gasoline or diesel. The values used for each price were either selected by the fleet partner or the average price if not given by the partner. Cost data and value propositions are based on dynamic pricing formulas that are subject to change. Therefore, this report is intended to be used only as a reference for decision makers, not as a substitute for strategic decision-making that may incorporate many other administrative and operational factors in each fleet's operations.

Interview Highlights

Fleet	Propane?	CNG?	Electric?	Biodiesel?	Fueling System?	Shared Fueling?	Onboard Systems?	Shared Maintenance?	Driver Training?
City of Oberlin	Propane presents a significant safety concern for some staff	CNG is good since they already have a CNG line to the facility		Has a 2,000 gallon skid-mounted tank that could be used for biodiesel		Talked to NRT about this, but had trouble syncing accounting systems	Do not want to be guinea pigs for vehicle systems		
Custom Cleaning	ROI and space concerns	ROI and space concerns	Thinks there will be problems with employees remember to refuel				Looked into telematics, but doesn't think it will save that much		
Kendal								Worried that training their guy on propane maintenance would be too big of a drain on his time	
LCCC		Worried that bed is needed for salt spreaders in winter			Not currently tracking fuel use per vehicle				
LCJVS	Haven't looked at propane mowers, but are already using bi-fuel forklifts				Not currently tracking fuel use per vehicle	Already been thinking about sharing with nearby cattle farm			
Metro Parks	Looked at propane mowers, but couldn't make ROI work				Has looked into system similar to AIM2 but it was too expensive		Investigated rolling the cost of systems into vehicle purchase price		Interested in training, but not sure it will be effective
New Russia Township						Talked to City of Oberlin about this, but couldn't make it work			None in place, but might be interested in pursuing this
Oberlin College		Have looked into this, but ROI is unfeasible		Are already using biodiesel in trucks and tractors	Looked at AIM2. Current budget is around $40,000				
Oberlin Schools	Likes ROUSH BlueBird, but does not know where fueling would happen					Interested in sharing with City or ODOT.		Had previously considered shared bus garage with the city including shared maintenance	
Republic Services		Interested in figuring out cost to get CNG				Interested in sharing CNG fueling with community			If they go CNG, they would need driver an maintenance training

Key	shared interest	potential interest	potential disinterest	stated disinterest

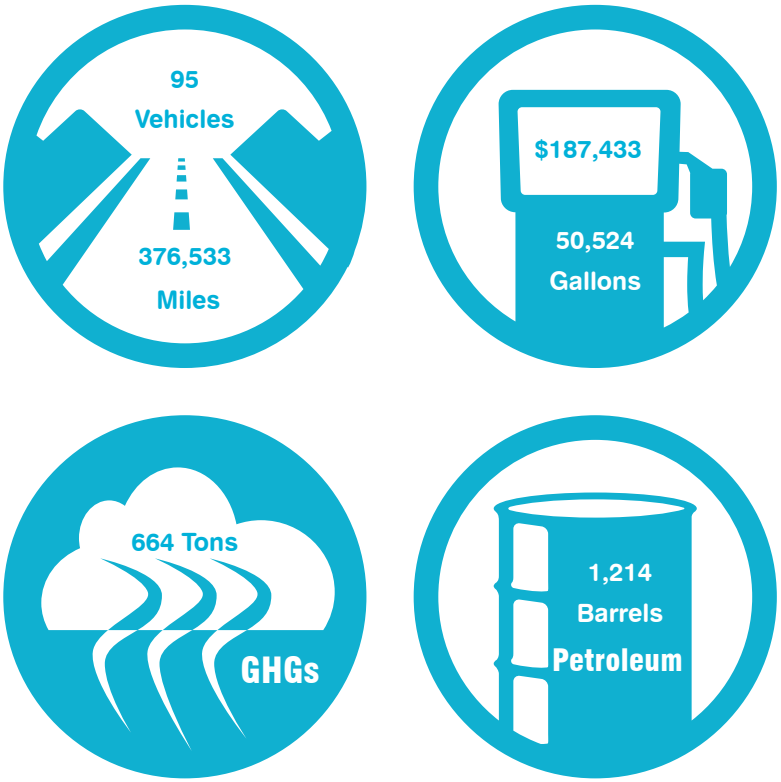
Scenario Results Overview

Partner	Scenario	# of Vehicles	Emissions Offset (Tons CO_2e)	LPG Demand (gallons)	CNG Demand (GGE)	Electricity Demand (kWh)	B-100 Demand (gallons)
City of Oberlin	Alt Fuel SUVs	4	5.9 - 8.2	4,412	3,529		
City of Oberlin	Alt Fuel Sedans	3	8.1 - 11.4	6,114	4,891		
City of Oberlin	PHEV Sedans	3	43.9 - 60.3			16,406	
City of Oberlin	Alt Fuel Pickups	2	3	2,250			
City of Oberlin	Biodiesel	29	16 - 32				1,417 - 2,834
Custom Cleaning	Alt Fuel Sedan	1	1.6 - 2.2	1,151	921		
Custom Cleaning	Alt Fuel Van	1	1.6 - 2.3	1,216	973		
Kendall	Alt Fuel Bus	1	3.3 - 4.7	2,500	2,000		
Kendall	Alt Fuel Pickup	1	1.4 - 1.9	1,000	800		
LCCC	Alt Fuel Van	1	1.7 - 2.3	1,250	1,000		
LCJVS	Alt Fuel Sedan	1	1.1 - 1.6	852	682		
Metro Parks	Alt Fuel Pickup	2	2.1	1,563			
Metro Parks	CNG SUVs	3	4.8		2,040		
Metro Parks	Biodiesel	2	2 - 4				162 - 324
New Russia Township	Biodiesel	11	3 - 7				307 - 614
Oberlin College	Alt Fuel Pickup	2	2.3 - 3.3	1,750	1,400		
Oberlin College	Alt Fuel Van	2	2.5 - 3.5	1,875	1,500		
Oberlin Schools	Biodiesel or LPG	10	13 - 26				1,141 - 2,282
Republic Services	CNG	180	4,812		2,000,000		
Total		**259**	**4,929 - 4,992**	**25,933**	**2,019,736**	**16,406**	**3,027 - 6,054**

FLEET PROFILE: CITY OF OBERLIN

Baseline

City of Oberlin is interested in improving its practices and policies relating to its fleet of vehicles in order to realize cost savings and reduce environmental impacts. Data and information provided by City of Oberlin staff created baseline values for the fleet.



In one year, the City of Oberlin's fleet of 95 vehicles traveled more than 376,500 miles and consumed over 50,500 gallons of fuel, priced at nearly $187,500. Overall, these vehicles required 1,214 barrels of petroleum (oil) to operate, which produced 664 tons of greenhouse gas emissions. Vehicle counts, miles traveled, fuel consumption, and fuel and maintenance costs data were provided by the Fleet Manager. Factors used to calculate the petroleum consumption and greenhouse gas emissions were based on Argonne National Laboratory's GREET Fleet Footprint Calculator 1.1a and include a "well-to-wheel" fuel life- cycle, which accounts for all the energy inputs and associated emissions from the point of origination of the fuel to its combustion within the vehicle.

Interview: City of Oberlin

Jeff Baumann, Public Works Director
Dave Rucker, GMD Superintendent
Wednesday, September 11, 2013
9:00 AM

Can you tell us about your fleet and why you were interested in this project?

We have 100 vehicles, including equipment. The only things we don't maintain and repair ourselves are the fire department vehicles. All vehicles are summarized in a spreadsheet. We are unsure whether this can be matched up with the actual vehicles because the spreadsheet does not include the VIN numbers and we have certain departments with the same make/model/year vehicles. After that is sorted out, my guess is that the data is something like 90% complete.

Do you have any policies in place regarding reducing emissions or fuel use?

My strategy is to put information in front of people rather than giving management directives. People don't go for the top-down management approach. We ought to be able to save at least 5% by changing behavior and being smarter. For example, police vehicles are being fueled at the end of each shift, which means they are being driven all the way over town to fill up three times each day. Some combination of management gumption and driver training/accountability is probably in order.

Can you tell us about how your vehicles are refueled?

We are paying $2.89 + $0.28 for each gallon of unleaded, totaling $3.17. We have two 5,000-gallon tanks, one for diesel and one for unleaded, that went in back in 2007. Ideally, we would have 20,000 gallon tanks. Right now we are filling 5,000-gallon tanks every 6 weeks. We are using more fuel than we thought. If you put additional tanks in, you would have to bridge the two tanks together, where filling would decrease the volume equally across both. We also have a 2,000-gallon skid-mounted tank (10–12 years old) off site. It probably needs cleaning, but it could be re-purposed for biodiesel. That's something I've thought about: how to integrate that into our software and record keeping. The biggest problem we are having in terms of fuel use is human error. Some people are entering different significant figures for mileage. Some use hours instead of miles. There are so many variables. The vehicle sensors we have do not read the odometer.

Have you thought about shared services?

Briefly, but the conversations never got very far. We didn't talk about shared accounting. We would probably need to update our software and up-size our tanks. Logistically, it would make sense to share with New Russia Township because they are so close. When we built this facility, we reserved a little more than an acre across from the fueling island for future use by the school district. It's not really on their horizon right now because they are actually on a consolidation kick. From a public perception perspective, it would be tough to spend $1 million on a new bus garage facility.

Do you have an idle reduction policy in place?

We have one, but it is hard to enforce. Some of our equipment needs to be running all the time, and some doesn't. We have not looked at anti-idling equipment. We don't want to be guinea pigs.

Have you considered alternative fuels?

We did a biodiesel trial from October 2008 through September 2010. Be used 4,000 gallons of B-10 in a Crane Carrier refuse truck. That truck is still running. Full Circle Fuels used to

have a blender pump that we used for the refuse truck. Buildings and Grounds used B-50 in their mowers. The wastewater department bought a drum and mixed the fuel themselves. We could move the skid tank we're not using right now from Oberlin Municipal Power and Light to our fleet yard and wire it up to our fuel system. We don't know how we can blend it ourselves and how much it would cost for the fuel or the blender pump. I'd be interested in using B-10 or B-20 in our big diesel vehicles that are past warranty.

We haven't really looked into other alternative fuels. We purchased two electric golf carts and will probably have charging stations up by the end of the year. Since the City has its own electric utility and an ordinance that provides for the no-cost sharing of municipal utilities (electric, water, sewer, refuse) between City Departments, our actual fuel cost for electricity for PHEV or BEV is $0. The cost of the electricity actually exists, of course, but gets spread over the entire customer base.

Propane scares us because it's highly volatile, and has limited availability. There isn't anything nearby unless we make it available here, and we would be paying retail. CNG would be easier because the line is right here.

Are drivers required to complete any kind of training?

Drivers are not required to go through any training. As far as pre- and post-trip assessments, these would be done on a departmental basis.

What kinds of operations and maintenance policies do you have?

Currently, we have two mechanics. Daily use vehicles come into the shop every 200 run hours. So far, it has made equipment last longer. All equipment has a system indicator that reminds the user that it is time for service. One thing I did see was a tire pressure cap that has an LED light to indicate low PSI.

Key Findings

The City of Oberlin's fueling infrastructure and management system is not being used as effectively as it could be, which makes it difficult to track or charge departments for actual fuel use or measure fuel use per vehicle. An updated software system and improvements in how drivers enter data could support shared services and better tracking of resource use on a per-vehicle basis.

There is space on-site for new alternative fuel infrastructure and a history of successful biodiesel use. The City is interested in relocating a fuel tank and blending their own biodiesel for use in the city's fleet.

Maintenance staff have concerns about propane and natural gas fuel safety.

Scenario Results: Replace older SUVs with new Propane SUVs

The City of Oberlin should consider propane or CNG for police or other SUVs in the fleet when planning new vehicle purchases. Options for certified bi-fuel and dedicated propane and CNG systems for SUVs are limited but do exist for Ford Escape vehicles (see Appendix). Propane systems tend to cost slightly less than CNG systems and are likely the better option for the City's SUVs. CNG is not a cost effective option for these vehicles because they are driven less than 12,000 miles per year. The City should carefully estimate annual mileage since the potential for payback regardless of the alternative fuel chosen is highly dependent on vehicle use.

The older SUVs that will need to be replaced soon include:

Year	Make	Model	Odometer
2002	Chevrolet	Blazer	86,224
2002	Chevrolet	Trailblazer	138,480
2003	Ford	Explorer	49,618
2005	Ford	Explorer	53,500

Existing police SUVs over 5 years old	
# of Vehicles	4
Expected Annual Vehicle Miles Traveled	12,000
Range of Vehicle Miles Traveled	2,114 - 12,567
Average Fuel Economy (MPG)	13.6

Propane Scenario Assumptions	
Gasoline Price per Gallon	$3.00
LPG Price per Gallon	$1.70
LPG Fuel Economy Loss	20%
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
LPG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$8,000

Propane Scenario Results	
Total Annual Fuel Cost Savings	$3,088
Annual Maintenance Cost Savings	$346
Simple Payback (Years)	9.3
Simple Payback (Miles)	111,828
GHG Emissions - Gasoline (Tons)	43.5
GHG Emissions - Propane (Tons)	37.6
GHG Emissions Saved	14%
Total LPG Demand per Year (gallons)	4,412

Existing police SUVs over 5 years old	
# of Vehicles	4
Expected Annual Vehicle Miles Traveled	12,000
Range of Vehicle Miles Traveled	2,114 - 12,567
Average Fuel Economy (MPG)	13.6

CNG Scenario Assumptions	
Gasoline Price per Gallon	$3.00
CNG Price per GGE	$1.85
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
CNG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$10,000

CNG Scenario Results	
Total Annual Fuel Cost Savings	$3,176
Annual Maintenance Cost Savings	$346
Simple Payback (Years)	11.4
Simple Payback (Miles)	136,283
GHG Emissions - Gasoline (Tons)	35.3
GHG Emissions - Pipeline CNG (Tons)	43.5
GHG Emissions Saved	19%
Total CNG Demand (GGE)	3,529

Scenario Results: Convert Police Sedans to CNG or Propane

The City of Oberlin should consider propane for existing or new police sedans. Options for certified bi-fuel and dedicated propane systems for police pursuit vehicles are becoming more common (see Appendix). Dedicated and bi-fuel conversion systems are available for several Crown Victoria model years.

The Crown Victoria sedans with low mileage that could be converted include:

Year	Make	Model	Odometer
2008	Ford	Crown Victoria	40,436
2010	Ford	Crown Victoria	49,833
2011	Ford	Crown Victoria	31,453

Existing police sedans with low miles	
# of Vehicles	3
Expected Annual Vehicle Miles Traveled	15,000
Range of Vehicle Miles Traveled	8,798 - 20,521
Average Fuel Economy (MPG)	9.2

Propane Scenario Assumptions	
Gasoline Price per Gallon	$3.00
LPG Price per Gallon	$1.70
LPG Fuel Economy Loss	20%
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
LPG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$8,000

Propane Scenario Results	
Total Annual Fuel Cost Savings	$4,280
Annual Maintenance Cost Savings	$324
Simple Payback (Years)	5.2
Simple Payback (Miles)	78,195
GHG Emissions - Gasoline (Tons)	60.3
GHG Emissions - Propane (Tons)	52.2
GHG Emissions Saved	14%
Total LPG Demand per Year (gallons)	6,114

Existing police sedans with low miles	
# of Vehicles	3
Expected Annual Vehicle Miles Traveled	15,000
Range of Vehicle Miles Traveled	8,798 - 20,521
Average Fuel Economy (MPG)	9.2

CNG Scenario Assumptions	
Gasoline Price per Gallon	$3.00
CNG Price per GGE	$1.85
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
CNG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$10,000

CNG Scenario Results	
Total Annual Fuel Cost Savings	$4,402
Annual Maintenance Cost Savings	$324
Simple Payback (Years)	6.4
Simple Payback (Miles)	95,214
GHG Emissions - Gasoline (Tons)	60.3
GHG Emissions - Pipeline CNG (Tons)	48.9
GHG Emissions Saved	19%
Total CNG Demand (GGE)	4,891

Scenario Results: Purchase New PHEV Police Sedans

Several police fleets around the country have added Chevy Volts to their fleets. This plug-in hybrid electric vehicle runs on battery power for about 40 miles between charges and switches to gasoline seamlessly when the battery is depleted. The City of Oberlin could consider purchasing PHEV police sedans to replace older sedans. While the incremental cost is more than a propane conversion, the greenhouse gas emission reduction benefits are much greater, especially considering the City's electricity generation mix. The GHG emissions for PHEVs presented below are based on a typical electricity generation mix for the region.

The older police sedans that could be replaced include:

Year	Make	Model	Odometer
2006	Ford	Crown Victoria	102,057
2007	Ford	Crown Victoria	94,549
2008	Ford	Crown Victoria	106,832

Existing Sedans with high miles	
# of Vehicles	3
Expected Annual Vehicle Miles Traveled	15,000
Range of Vehicle Miles Traveled	9,936 - 25,836
Average Fuel Economy (MPG)	10.5

PHEV Scenario Assumptions	
Gasoline Price per Gallon	$3.00
Electricity price per kWh	$0.11
All electric range (miles)	40
Gasoline MPG	37
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
PHEV Maintenance Savings	11%
Grants & Incentives	$0
Incremental Cost	$22,000

PHEV Scenario Results	
Total Annual Fuel Cost Savings	$12,869
Annual Maintenance Cost Savings	$414
Simple Payback (Years)	5.2
Simple Payback (Miles)	77,918
GHG Emissions - Gasoline (Tons)	60.3
GHG Emissions - Hybrid (Tons)	16.4
GHG Emissions Saved	73%
Total electricity Demand per Year (kWh)	16,406

Scenario Results: Replace or Convert Some Pickup Trucks to Propane

The City of Oberlin should consider propane for new or existing pickup trucks, provided they will be highly utilized. Most pickup trucks in the fleet are driven fewer than 8,000 miles annually, which means that the extra cost of installing an alternative fuel system is not cost-effective. This creates a high threshold for cost recuperation, and since propane systems are generally less expensive than CNG systems, this scenario focuses on propane only. Conversion options for certified bi-fuel and dedicated propane systems for propane pickup trucks are common and several makes and models of propane pickups are available direct from dealerships (see Appendix).

Given the City's utilization pattern for its pickup trucks, achieving a payback is challenging. There are several older trucks in the fleet that will likely need to be replaced soon. Rather than select specific vehicles for replacement or conversion, this scenario is based on incorporating two propane pickup trucks into the fleet. The fleet manager may need to adjust vehicle assignments in order to ensure that the propane vehicles are highly utilized.

Candidate vehicles	
# of Vehicles	2
Expected Annual Vehicle Miles Traveled	9,000
Range of Vehicle Miles Traveled	at least 9,000
Average Fuel Economy (MPG)	10

Propane Scenario Assumptions	
Gasoline Price per Gallon	$3.00
LPG Price per Gallon	$1.70
LPG Fuel Economy Loss	20%
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
LPG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$8,000

Propane Scenario Results	
Total Annual Fuel Cost Savings	$1,575
Annual Maintenance Cost Savings	$130
Simple Payback (Years)	9.4
Simple Payback (Miles)	84,477
GHG Emissions - Gasoline (Tons)	22.2
GHG Emissions - Propane (Tons)	19.2
GHG Emissions Saved	14%
Total LPG Demand per Year (gallons)	2,250

Scenario Results: Use Biodiesel in Older Vehicles

The City is interested in using biodiesel fuel in older diesel vehicles and off-road equipment. The vehicles listed below are more than 5 years old. Collectively, these vehicles use 14,173 gallons of diesel fuel. Lawn equipment uses about 1,200 gallons fo diesel fuel each year. Using biodiesel blends reduces greenhouse gas emissions but the fuel may be more expensive.

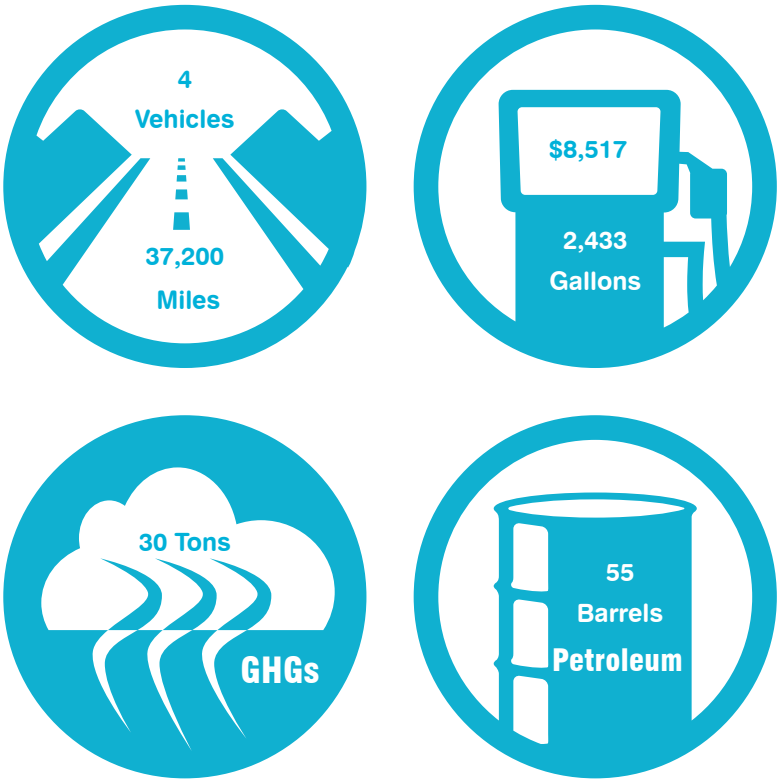
#	Year	Make	Model	Annual Diesel Gallons
E41	2001	American LaFrance	Eagle	220
SAN#4	2006	AutoCar	Side Load Refuse Packer	2,178
O-433	1983	CASE	580D	103
433	1999	CASE	580L	231
424	2001	CASE	580	569
466	1985	CHEVROLET	Dump Truck	438
SAN#2	1998	Crane Carrier	Side Load Refuse Packer	301
SAN#3	1999	Crane Carrier	Rear Load Refuse Packer	818
S-1	2002	Crane Carrier	Rear Load Refuse Packer	1,401
R-1	2002	Crane Carrier	Recycle Truck	1,604
O-425	1991	FORD	Patch Truck	31
567	1995	FORD	F800	444
564	1999	FORD	F450	362
561	1999	FORD	F350	341
415	2004	FORD	F550	70
T49	2008	FORD	F550	550
	2008	FORD	F350	250
T45	1997	Freightliner	FL112	200
R44	2003	Freightliner	FL70	220
464	1989	GMC	C7000	171
445	1997	GMC	C8500	209
560	2002	INTERNATIONAL	4900	734
413	2003	INTERNATIONAL	7400	262
577	2005	INTERNATIONAL	7400	634
425	2006	INTERNATIONAL	7400	532
566	2008	INTERNATIONAL	4300	587
417	2008	INTERNATIONAL	7400	39
T43	1998	Pierce	Dash	601
460	2003	STERLING	Vactor	74
	1990	Sutphen	Pumper	73.5
Total				14,173

Blend	# of City Vehicles	B-100 Demand or Diesel Gallons Displaced (gallons)	GHG Emissions for 14,173 Gallons Diesel (Tons)	GHG Emissions for 14,173 Gallons Bio Diesel (Tons)	GHG Emissions Saved
B-10	29	1,417	200	184	9%
B-20	29	2,834	200	167	17%

FLEET PROFILE: CUSTOM CLEANING SERVICES

Baseline

Custom Cleaning is interested in improving its practices and policies relating to its fleet of vehicles in order to realize cost savings and reduce environmental impacts. Data and information provided by Custom Cleaning staff created the baseline values for the fleet.



In one year, Custom Cleaning's fleet of 4 vehicles included in this report traveled more than 37,000 miles and consumed nearly 2,500 gallons of fuel, priced at over $8,500. Overall, these vehicles required 55 barrels of petroleum (oil) to operate, which produced 30 tons of greenhouse gas emissions. Vehicle counts, miles traveled, fuel consumption, and fuel and maintenance costs data were provided by the Fleet Manager. Factors used to calculate the petroleum consumption and greenhouse gas emissions were based on Argonne National Laboratory's GREET Fleet Footprint Calculator 1.1a and include a "well-to-wheel" fuel life- cycle, which accounts for all the energy inputs and associated emissions from the point of origination of the fuel to its combustion within the vehicle.

Interview: Custom Cleaning

Charles Horton
Wednesday, September 11, 2013
4:30 PM

Can you tell us a little bit about yourself and Custom Cleaning?

I'm originally from Detroit near Grosse Point. I went to Wayne State and got out 35 years ago. I still have family all over the place in Canton, Sterling Heights, and Southfield. I used to be a ServiceMaster franchise, and it took me 2 years to get away from it. Now, we're at a comfortable level. In terms of getting into the project, I've known Sharon for a long time. My residential work season is April–November. It then tends to slow down depending on the weather. Fire/flood cleanup season tends to run from November to March/April, so we're always busy.

Can you tell us about your fleet and why you were interested in this project?

We have downsized quite a bit recently. I used to have a fleet of 6 vehicles and 150 employees. Now, we have 2 vans (2005 GMC, other is a 1993 Ford 350), 1 car (Saab), and my car (Mercedes). We currently have 49 employees. The Saab probably gets 20–25 miles to the gallon. I get about 20–21 miles to the gallon in my Mercedes. We probably run between 20,000 and 30,000 miles per year. I have two vehicles on the road for 8–10 hours a day. I want to know what we can do to reduce our fuel use and consumption.

Can you tell us about how your vehicles are refueled?

Fuel purchasing is done at the Murphy's out by Walmart. Our discount varies between $0.03 and $0.10 per gallon, so we usually pay about $3.45–$3.50 per gallon. My guys fill up about once a week.

Do you have any policies in place regarding vehicle procurement?

I have stopped buying new vehicles and now only buy used vehicles. My staff does not care about my vehicles. I usually buy GMC and have had good experiences with Ford. When I buy a used vehicle, I want to keep it for at least three years. I bought one about two years ago, so I'm going into my third year on that one. I also just bought another heavy-duty van about 3–4 months ago. The GMC is my main vehicle, and the Ford is a backup. We usually start looking for a new vehicle when we get to around 225,000 miles or the maintenance costs start going up. I paid $4,000 for the last GMC van and $3,500 for the Saab.

Have you considered alternative fuels?

I have not looked at any conversion options. The only place I know about that does this in town is the one where they change over to biodiesel. That probably wouldn't be good for us. I could switch to propane, but I would be concerned about the cost associated with switching. There would not be enough room inside the van for a propane tank. Outside or underneath would be preferable.

Do you have a route planning strategy?

We do not have a route planning strategy, and employees are not taking it upon themselves either. Most trips are made in town. We are not driving long distances. Electric vehicles would be tough because I would run into problems with staff.

What kinds of operations and maintenance policies do you have?

In terms of vehicle use, they are turned off when we are on a job. I've looked into telematics systems as well, but I didn't feel that investing in that would save me that much. I considered doing it when we had a night shift to see when employees were checking in and out. If I had a fleet of 5–6 vehicles it might, but with 1–2 it's not worth it.

Key Findings

Custom Cleaning fuels off-site and may be willing to use alternative fuel stations if the right vehicle application can be identified.

Due to the age of the vehicles and equipment installed in the trucks, conversion options are limited. There may be an interest in purchasing used alternative fuel vehicles in the future if the cost is competitive with other use vehicles.

Scenario Results: Convert a Sedan to CNG or Propane

Custom Cleaning Services should consider converting the next new or used sedan to run on propane or CNG. Options for certified bi-fuel and dedicated systems for sedans are becoming more common (see Appendix) and may be available for the next sedan purchased. Rather than identifying a specific make or model of sedan for conversion, this scenario is based on the annual miles of the existing Mercedes 280 C. Higher annual miles reduce the payback time for the conversion costs.

Existing Sedan	
Expected Annual Vehicle Miles Traveled	17,500
Average Fuel Economy (MPG)	19

CNG Scenario Assumptions	
Gasoline Price per Gallon	$3.50
CNG Price per GGE	$1.85
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
CNG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$10,000

CNG Scenario Results	
Total Annual Fuel Cost Savings	$1,520
Annual Maintenance Cost Savings	$126
Simple Payback (Years)	6.1
Simple Payback (Miles)	106,335
GHG Emissions - Gasoline (Tons)	11.4
GHG Emissions - Pipeline CNG (Tons)	9.2
GHG Emissions Saved	19%
Total CNG Demand (GGE)	921

Propane Scenario Assumptions	
Gasoline Price per Gallon	$3.50
LPG Price per Gallon	$1.70
LPG Fuel Economy Loss	20%
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
LPG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$8,000

Propane Scenario Results	
Total Annual Fuel Cost Savings	$1,266
Annual Maintenance Cost Savings	$126
Simple Payback (Years)	5.8
Simple Payback (Miles)	100,542
GHG Emissions - Gasoline (Tons)	11.4
GHG Emissions - Propane (Tons)	9.8
GHG Emissions Saved	14%
Total LPG Demand per Year (gallons)	1,151

Scenario Results: Convert a Van to CNG or Propane

Custom Cleaning Services should consider converting the next new or used van to run on propane or CNG. Options for certified bi-fuel and dedicated systems for vans are common (see Appendix) and will likely be available for the next sedan purchased. Rather than identify a specific make or model of van for conversion, this scenario is based on the annual miles of the existing GMC 2500. Higher annual miles reduce the payback time for the conversion costs.

Existing Van	
Expected Annual Vehicle Miles Traveled	10,700
Average Fuel Economy (MPG)	11

CNG Scenario Assumptions	
Gasoline Price per Gallon	$3.50
CNG Price per GGE	$1.85
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
CNG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$10,000

CNG Scenario Results	
Total Annual Fuel Cost Savings	$1,605
Annual Maintenance Cost Savings	$77
Simple Payback (Years)	6
Simple Payback (Miles)	63,613
GHG Emissions - Gasoline (Tons)	12
GHG Emissions - Pipeline CNG (Tons)	9.7
GHG Emissions Saved	19%
Total CNG Demand (GGE)	973

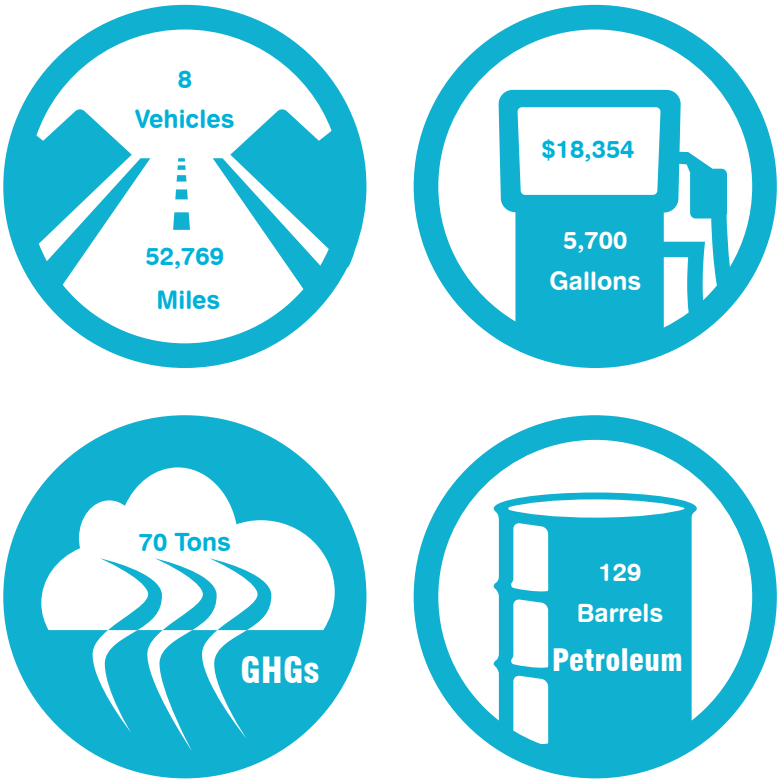
Propane Scenario Assumptions	
Gasoline Price per Gallon	$3.50
LPG Price per Gallon	$1.70
LPG Fuel Economy Loss	20%
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
LPG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$8,000

Propane Scenario Results	
Total Annual Fuel Cost Savings	$1,338
Annual Maintenance Cost Savings	$77
Simple Payback (Years)	5.7
Simple Payback (Miles)	60,514
GHG Emissions - Gasoline (Tons)	12
GHG Emissions - Propane (Tons)	10.4
GHG Emissions Saved	14%
Total LPG Demand per Year (gallons)	1,216

FLEET PROFILE: KENDAL AT OBERLIN

Baseline

Kendal is interested in improving its practices and policies relating to its fleet of vehicles in order to realize cost savings and reduce environmental impacts. Data and information provided by Kendal staff created the baseline values for the fleet.



In one year, Kendal's fleet of 8 vehicles included in this report traveled nearly 53,000 miles and consumed about 5,700 gallons of fuel, priced at over $18,000. Overall, these vehicles required 129 barrels of petroleum (oil) to operate, which produced 70 tons of greenhouse gas emissions. Vehicle counts, miles traveled, fuel consumption, and fuel and maintenance costs data were provided by the Fleet Manager. Factors used to calculate the petroleum consumption and greenhouse gas emissions were based on Argonne National Laboratory's GREET Fleet Footprint Calculator 1.1a and include a "well-to-wheel" fuel life- cycle, which accounts for all the energy inputs and associated emissions from the point of origination of the fuel to its combustion within the vehicle.

Interview: Kendal at Oberlin

Donna Smith
Thursday, September 12, 2013
11:00 AM

Can you tell us a little bit about yourself and Kendal?

I'm in charge of the vehicles used for transportation. I get residents from their home to medical appointments or other activities. There are over 300 residents here at Kendal. We have independent, assisted living, and nursing home capabilities. We just added some additional assisted living rooms, and we recently finished work on some new cottages. We are currently involved in master planning for the next 10 years.

Can you tell us about your fleet and why you were interested in this project?

Our fleet includes a Prius, a Chevy van, a Toyota Tacoma, a Ford Ranger, and two Ford buses (one 9 passenger, one 18 passenger). The Grounds department has a 4x4 truck, a dump truck, 4 golf carts (1 gas, 3 electric), 4 Toros, a diesel forklift, and a Kubota. We haven't used the 9-passenger bus very much. It rides high, and it's hard for residents to get in and out. The 9-passenger bus is not that popular since the last step is 1.5 inches higher. As I said, I haven't really looked into our [alternative fuel] options, so I'm curious to see what they might be.

Do you have any policies in place regarding reducing emissions or fuel use?

Kendal at Oberlin is part of the Kendal group of developments, and I'm not sure if there are policies or directives to reduce emissions or save fuel from headquarters, but I will check. However, the residents and administration have an Energy and Concerns Committee. I am not familiar with the city's sustainability goals.

Can you tell us about how your vehicles are refueled?

We are paying $3.22/gallon for gasoline. I'm not sure how much we pay for diesel. We get fuel from Great Lakes. The unleaded tank holds 4,000 gallons, and the diesel tank holds 1,500. I try to keep 1,500 in the unleaded tank at all times.

Do you have an idle reduction policy in place?

We talked about it. They know to not have it running when it's just sitting there. The residents themselves are good about conserving energy. When they see a bus on and the driver sitting outside, they'll say something.

Do you have any policies in place regarding vehicle procurement?

For procurement, first we see how it will accommodate the residents. Then we see what kind of mileage it gets. We had trouble in the past with a van we converted after-market to become wheelchair accessible. We would look for something off-the-shelf in the future. We also have one resident who has an electric car, so we had to install a charging station for her. She said that if she had known it was such a hassle, she might not have bothered with it. She did a sign-up and ride along thing too so other residents could check out her car.

Do you have a route planning strategy?

I try to do route planning myself. I try and see who should get dropped off first to see how

we can do things as quickly as possible. I'll question drivers when it seems like it took them too long to get somewhere. It doesn't always work out though. Sometimes I get stuck doing small trips in the bus. Yesterday, I was on the bus from 11:30 AM to 3:45 PM and it was so busy that I had to incorporate lots of single-passenger trips and medical deliveries. It does not happen a lot, but yesterday we were short one driver. Lots of times, we use the vehicles for over 100 miles in a given day. Other times we use it for 4 miles. It varies. Residents are good at self-organizing route planning too. If they see that two buses are going to a destination and the second isn't very full, they will work it so that the second bus does not need to come back and pick up just a handful of people.

What kinds of operations and maintenance policies do you have?

Drivers have radios and walkie-talkies to better coordinate between themselves. Real-time monitoring would be a little overkill. For maintenance, we have a guy here who is ASE certified to do some maintenance. If something happens that needs specialized attention, we send the vehicles out. Having him trained on propane and in-sourcing maintenance would be tough because we are a non-profit and he is kept pretty busy working on our vehicles.

Key Findings

Alternative fuel vehicle options that do not require after market conversions will save time and ease performance anxieties. An in-house technician will need to be trained to service the vehicle but may not have the capacity to in-source maintenance jobs for other alternative fuel vehicles.

Scenario Results: Convert New Ford Bus to Propane or CNG

Kendal at Oberlin should consider converting its existing 2013 Ford E350 vans to propane or CNG. Several certified conversion options are available and commonly used for shuttle bus use (see Appendix).

Existing Bus	
Expected Annual Vehicle Miles Traveled	16,000
Average Fuel Economy (MPG)	8

CNG Scenario Assumptions	
Gasoline Price per Gallon	$3.50
CNG Price per GGE	$1.85
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
CNG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$10,000

CNG Scenario Results	
Total Annual Fuel Cost Savings	$3,200
Annual Maintenance Cost Savings	$115
Simple Payback (Years)	3.5
Simple Payback (Miles)	55,502
GHG Emissions - Gasoline (Tons)	24.7
GHG Emissions - Pipeline CNG (Tons)	20
GHG Emissions Saved	19%
Total CNG Demand (GGE)	2,000

Propane Scenario Assumptions	
Gasoline Price per Gallon	$3.50
LPG Price per Gallon	$1.70
LPG Fuel Economy Loss	20%
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
LPG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$8,000

Propane Scenario Results	
Total Annual Fuel Cost Savings	$2,750
Annual Maintenance Cost Savings	$115
Simple Payback (Years)	2.8
Simple Payback (Miles)	44,674
GHG Emissions - Gasoline (Tons)	24.7
GHG Emissions - Propane (Tons)	21.3
GHG Emissions Saved	14%
Total LPG Demand per Year (gallons)	2,500

Scenario Results: Replace F250 Pickup with New CNG or Propane Pickup

Kendall at Oberlin should consider propane or CNG for pickup trucks in the fleet when planning new vehicle purchases. Options for certified bi-fuel and dedicated propane and CNG systems for pickup trucks are common, especially for Ford F-series trucks (see Appendix). Propane systems tend to cost slightly less than CNG systems and are likely the better option for Kendall. CNG may not be a cost effective option due to low annual miles. Kendall should carefully estimate annual mileage since the potential for payback regardless of the alternative fuel chosen is highly dependent on vehicle use. The new vehicle will likely have a higher fuel economy than the existing truck and the calculations in this scenario compare a new gasoline truck to a new propane or CNG truck.

The older pickup truck that will need to be replaced soon is:

Year	Make	Model	Odometer	MPG
2005	Ford	F250	64,051	6.7

New Pickup Truck	
# of Vehicles	1
Expected Annual Vehicle Miles Traveled	8,000
Expected Average Fuel Economy (MPG)	10

Propane Scenario Assumptions	
Gasoline Price per Gallon	$3.50
LPG Price per Gallon	$1.70
LPG Fuel Economy Loss	20%
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
LPG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$8,000

Propane Scenario Results	
Total Annual Fuel Cost Savings	$1,100
Annual Maintenance Cost Savings	$58
Simple Payback (Years)	6.7
Simple Payback (Miles)	55,287
GHG Emissions - Gasoline (Tons)	9.9
GHG Emissions - Propane (Tons)	8.5
GHG Emissions Saved	14%
Total LPG Demand per Year (gallons)	1,000

New Pickup Truck	
# of Vehicles	1
Expected Annual Vehicle Miles Traveled	8,000
Expected Average Fuel Economy (MPG)	10

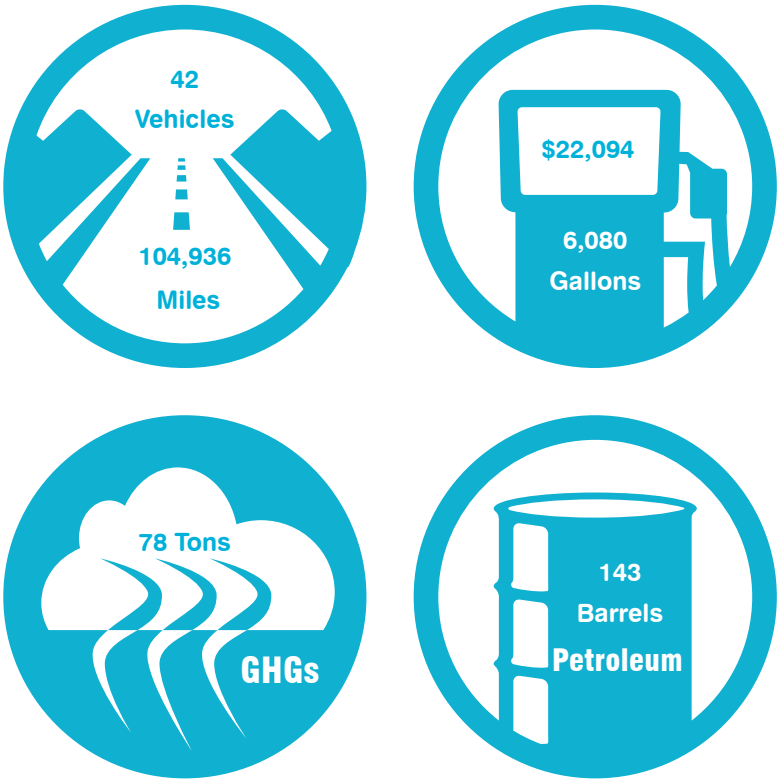
CNG Scenario Assumptions	
Gasoline Price per Gallon	$3.50
CNG Price per GGE	$1.85
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
CNG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$10,000

CNG Scenario Results	
Total Annual Fuel Cost Savings	$1,320
Annual Maintenance Cost Savings	$58
Simple Payback (Years)	7.2
Simple Payback (Miles)	58,072
GHG Emissions - Gasoline (Tons)	9.9
GHG Emissions - Pipeline CNG (Tons)	8.0
GHG Emissions Saved	19%
Total CNG Demand (GGE)	800

FLEET PROFILE: LORAIN COUNTY COMMUNITY COLLEGE

Baseline

LCCC is interested in improving its practices and policies relating to its fleet of vehicles in order to realize cost savings and reduce environmental impacts. Data and information provided by LCCC staff created the baseline values for the fleet.



In FY2012 LCCC's fleet of 42 vehicles included in this report traveled nearly 105,000 miles and consumed more than 6,000 gallons of fuel, priced at over $22,000. Overall, these vehicles required 143 barrels of petroleum (oil) to operate, which produced 78 tons of greenhouse gas emissions. Vehicle counts, miles traveled, fuel consumption, and fuel and maintenance costs data were provided by the Fleet Manager. Factors used to calculate the petroleum consumption and greenhouse gas emissions were based on Argonne National Laboratory's GREET Fleet Footprint Calculator 1.1a and include a "well-to-wheel" fuel life- cycle, which accounts for all the energy inputs and associated emissions from the point of origination of the fuel to its combustion within the vehicle.

Interview: Lorain County Community College

Courtney Deoreo, Dale Lucas, Laura Carissi
Monday, September 23, 2013
3:00 PM

Can you tell us why you were you interested in this project?

One thing we would like to know about is whether people lease their fleets. I'm starting to look at this, but I haven't gotten too far. We'd be interested in your experience with other fleets. Neutral feedback, rather than feedback from the leasing companies, would be great.

Do you have any policies in place regarding reducing emissions or fuel use?

We will provide you with what the Core Team has been working on for the past 16 months in terms of a sustainability plan (Vision 2.0), which includes articulated sustainability goals. There are some complementary policies and procedures in some departments, but there is no one overarching policy. Departmental policies may focus on other things, though, like safety, rather than sustainability. There probably should be one overarching policy.

Do you have a specific idle reduction policy?

We have a policy according to which all our folks are given the expectation that they don't idle the vehicle and walk to the site as much as possible. Most vehicles are used during the winter for snow removal. Lawn mowers are heavily scrutinized as well to save fuel. I think people follow this very closely for the most part. Keith Brown, the one in charge of security, has a few vehicles as well. I know they idle their vehicles a lot, but I do not know why. We can make an introduction.

Can you tell us about how your vehicles are refueled?

We have a bulk fueling storage system, and we don't track what goes into individual vehicles at all. Drivers use cards that are not tied to specific vehicles. We can get vehicle miles traveled per fiscal year in a week. Other than that, we could probably figure out how much fuel is dispensed on an annual basis by extrapolating some sort of information based on tank size and fill cycle. I don't think CNG is an option since we take up the entire bed with a salt spreader during the winter.

Are drivers required to complete any kind of training?

All drivers in passenger vehicles have their driving records scrutinized by our insurance. For the 15-passenger buses, we have a training course that they must pass, which is administered by a third party.

What kinds of operations and maintenance policies do you have?

Vehicles are housed in the warehouse division. Any division can request the vans or minibuses. Each time a vehicle is used, the division is charged for the use of that vehicle. We use the GSA rate for each vehicle, including the buses. One rate fits all doesn't work, but it was a political decision. We have not had the opportunity to calculate what rate would be better. Maintenance is done through the warehouse division as well, and it is completed twice per year. I have been advocating for some sort of replacement procedure but have not yet been successful. We would like to see that some percentage of the funds goes towards a replacement fund, but I have not been successful in getting that through. Without the replacement cycle or fund building, we need to compete with instructional equipment for equipment dollars.

Key Findings

LCCC is interested in leasing options for fleet vehicles and/or establishing a vehicle replacement fund based on rates charged for vehicle usage.

Alternative fuel options may be limited since most vehicles are used for snow removal and the truck bed can not be used for fuel tanks.

Scenario Results: Replace or Convert Vans to CNG or Propane

Loraine County Community College should consider propane or CNG for passenger vans in the fleet. Options for certified bi-fuel and dedicated propane and CNG systems for Ford E-series vans are common and available from several suppliers (see Appendix). Propane systems tend to cost slightly less than CNG systems and are likely the better option for LCCC. CNG can be a cost effective option if the vans are highly utilized.

LCCC should consider converting an existing van or replacing an older van with an alternative fuel van. The new or converted van needs to be highly utilized in order to be cost-effective. The City should carefully estimate annual mileage since the potential for payback regardless of the alternative fuel chosen is highly dependent on vehicle use.

Vans that could be converted or replaced soon include:

Year	Make	Model	
2005	Ford	E350	Replace
or			
2011	Ford	E350	Convert

Existing Vans	
# of Vehicles	1
Expected Annual Vehicle Miles Traveled	11,000
Average Fuel Economy (MPG)	11

Propane Scenario Assumptions	
Gasoline Price per Gallon	$3.50
LPG Price per Gallon	$1.70
LPG Fuel Economy Loss	20%
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
LPG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$8,000

Propane Scenario Results	
Total Annual Fuel Cost Savings	$1,375
Annual Maintenance Cost Savings	$79
Simple Payback (Years)	5.5
Simple Payback (Miles)	60,514
GHG Emissions - Gasoline (Tons)	12.3
GHG Emissions - Propane (Tons)	10.7
GHG Emissions Saved	14%
Total LPG Demand per Year (gallons)	1,250

Existing Vans	
# of Vehicles	1
Expected Annual Vehicle Miles Traveled	11,000
Average Fuel Economy (MPG)	11

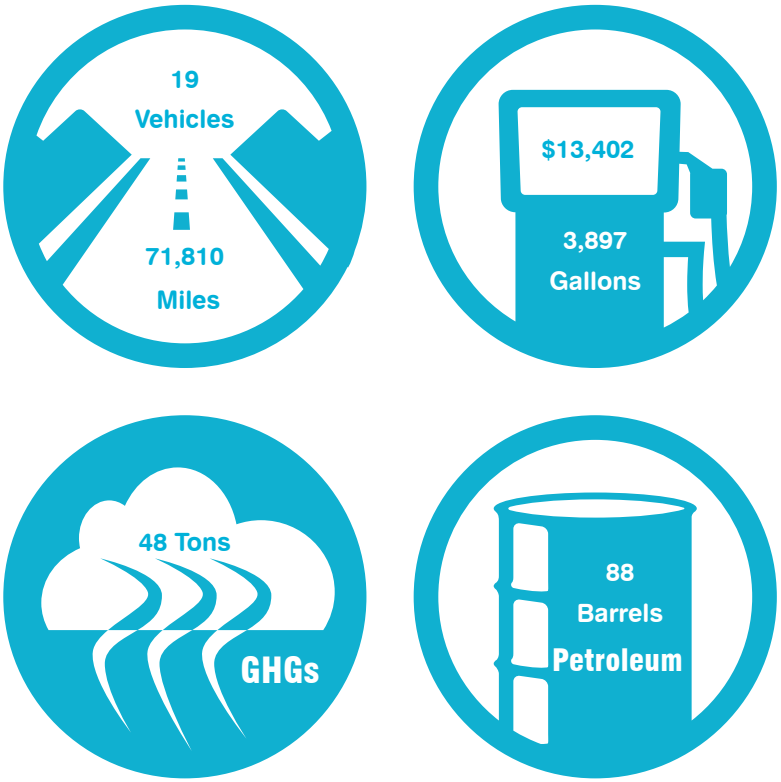
CNG Scenario Assumptions	
Gasoline Price per Gallon	$3.50
CNG Price per GGE	$1.85
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
CNG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$10,000

CNG Scenario Results	
Total Annual Fuel Cost Savings	$1,640
Annual Maintenance Cost Savings	$79
Simple Payback (Years)	5.8
Simple Payback (Miles)	63,983
GHG Emissions - Gasoline (Tons)	12.3
GHG Emissions - Pipeline CNG (Tons)	10.0
GHG Emissions Saved	19%
Total CNG Demand (GGE)	1,000

FLEET PROFILE: LORAIN COUNTY JOINT VOCATIONAL SCHOOL

Baseline

LCJVS is interested in improving its practices and policies relating to its fleet of vehicles in order to realize cost savings and reduce environmental impacts. Data and information provided by LCJVS staff created the baseline values for the fleet.



In one year, LCJVS's fleet of 19 vehicles included in this report traveled nearly 72,000 miles and consumed about 3,900 gallons of fuel, priced at more than $13,000. Overall, these vehicles required 88 barrels of petroleum (oil) to operate, which produced 48 tons of greenhouse gas emissions. Vehicle counts, miles traveled, fuel consumption, and fuel and maintenance costs data were provided by the Fleet Manager. Factors used to calculate the petroleum consumption and greenhouse gas emissions were based on Argonne National Laboratory's GREET Fleet Footprint Calculator 1.1a and include a "well-to-wheel" fuel life- cycle, which accounts for all the energy inputs and associated emissions from the point of origination of the fuel to its combustion within the vehicle.

Interview: Lorain County Joint Vocational School

Jerry Pavlik, Duane Auble
Wednesday, September 11, 2013
12:00 PM

Can you tell us a little bit about yourself and LCJVC?

We have 137 acres of grounds here. The building itself was built in 1970, and we recently finished a $4 million HB264 project to reduce electricity bills by $350,000/year. We have received some money to change around a vacant farmhouse that used to be NASA CORE. With the funds, we put in LED lighting and a natural gas well and experimented with different insulations. There is a wind turbine there too with a triangular modular base. There have been issues with the inverter for the wind turbine, but it seems to be doing fine now. We live what we teach here. Recently, the school district has had financial issues. Some of our plans have been put on the back burner because, when you're laying off teachers and building an anaerobic digester [to produce biogas], it looks bad. This is the first time employees have taken a freeze in pay. There is opportunity here, but, in the short term, it seems unlikely.

Can you tell us about your fleet and why you were interested in this project?

We have three multi-passenger vans for staff to use with students. We also have three diesel buses that we fuel off site as well. We have riding mowers, but these are not included on the equipment list. The Community College does not have an auto technician program, and we have talked to them about us becoming the arm for that program. Our interest in this process is looking at what kinds of replacement scenarios might exist for our vehicles and how alternative fuel vehicles can be used as replacements.

Do you have any policies in place regarding reducing emissions or fuel use?

We have had some great sustainability leadership. Superintendent John Nolan was really interested in discovering how to get youth and adults to be sustainable. The other half of that is making sure we walk the walk. On top of that, we want to look at the campus and how it fits in with the community's sustainability goals. LCJVS has struggled in the past with cross training and succession. We are interested in implementing strategies that protect the triple bottom line. By doing so, we can become stronger as an organization. We want to look at things from a whole-system perspective.

Can you tell us about how your vehicles are refueled?

We have on-site unleaded and diesel fueling capabilities, which are used for vehicles that run on site. These facilities are intended for maintenance equipment. The diesel and unleaded tanks are 500 gallons. We get gas at a discount. I need to see if I can get you an average gas price for your calculations. There is a 1,000-head cattle farm on our property line, and we've talked about the opportunity for shared fueling services there. We do not track fuel use by vehicle.

Do you have any policies in place regarding vehicle procurement?

We try and reuse everything. Over half of the vehicles we purchase are brand new and bought at an auction. Everything is salvage titled. We had an electric car donated as well, contingent on the fact that the vehicle be used as an educational tool. We want to take it off the grid too, by using solar panels to power the charging stations.

Have you considered alternative fuels?

We haven't looked at propane mowers. All forklifts, except for one larger specialty forklift, are electric. The specialty forklift is dual-fuel propane.

What kinds of operations and maintenance policies do you have?

We have someone going around and checking engine lights every day to make sure that when people get in the cars, they are gong to be safe. Students perform all the maintenance, except for the buses. As I said, we live what we teach.

Do you have a route planning strategy?

We are trying to maximize efficiency for each trip. We have made a very concerted effort to manage vehicle use, including more planning on who is using vehicles when. Dwayne is very conscious about not sending someone out for one thing [and does his best to plan combined trips for errands].

Key Findings

The Loraine County Joint Vocational School perceives alternative fuels and advanced vehicle technologies as a way to improve the quality of education on campus through technical training and demonstration projects. Adoption also demonstrates leadership within the community and a willingness to try new fuels. They are interested in projects that use renewable resources to create fuel or electricity.

Scenario Results: Convert Sedan to CNG or Propane

The Loraine County Joint Vocational School should consider a propane conversion for the 2009 Chevy Impala sedan in the fleet. Impco Technologies offers a certified bi-fuel propane system for this make and model year (see Appendix). When considering a new vehicle purchase, propane systems tend to cost slightly less than CNG systems and are likely the better option for the JVS. CNG may be a cost effective option for new a JVS sedan if it will be highly utilized. The JVS should carefully estimate annual mileage and the expected remaining life of the vehicle since the potential for payback regardless of the alternative fuel chosen is highly dependent on vehicle use.

Existing 2009 Impala	
Expected Annual Vehicle Miles Traveled	15,000
Average Fuel Economy (MPG)	22

CNG Scenario Assumptions	
Gasoline Price per Gallon	$3.50
CNG Price per GGE	$1.85
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
CNG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$10,000

CNG Scenario Results	
Total Annual Fuel Cost Savings	$1,125
Annual Maintenance Cost Savings	$108
Simple Payback (Years)	8.1
Simple Payback (Miles)	121,655
GHG Emissions - Gasoline (Tons)	8.4
GHG Emissions - Pipeline CNG (Tons)	6.8
GHG Emissions Saved	19%
Total CNG Demand (GGE)	682

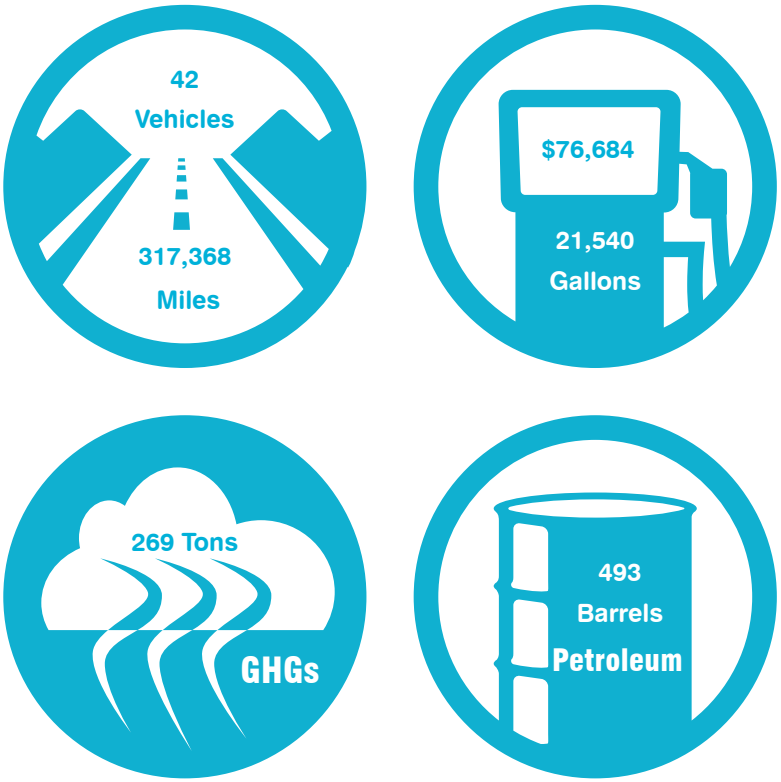
Propane Scenario Assumptions	
Gasoline Price per Gal.	$3.50
LPG Price per Gallon	$1.70
LPG Fuel Economy Loss	20%
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
LPG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$8,000

Propane Scenario Results	
Total Annual Fuel Cost Savings	$938
Annual Maintenance Cost Savings	$108
Simple Payback (Years)	7.7
Simple Payback (Miles)	114,778
GHG Emissions - Gasoline (Tons)	8.4
GHG Emissions - Propane (Tons)	7.3
GHG Emissions Saved	14%
Total LPG Demand per Year (gallons)	852

FLEET PROFILE: LORAIN COUNTY METRO PARKS

Baseline

Lorain County Metro Parks is interested in improving its practices and policies relating to its fleet of vehicles in order to realize cost savings and reduce environmental impacts. Data and information provided by Metro Parks staff created the baseline values for the fleet.



In one year, Lorain County Metro Parks' fleet of 42 vehicles included in this report traveled more than 317,000 miles and consumed over 22,500 gallons of fuel, priced at nearly $77,000. Overall, these vehicles required 493 barrels of petroleum (oil) to operate, which produced 269 tons of greenhouse gas emissions. Vehicle counts, miles traveled, fuel consumption, and fuel and maintenance costs data were provided by the Fleet Manager. Factors used to calculate the petroleum consumption and greenhouse gas emissions were based on Argonne National Laboratory's GREET Fleet Footprint Calculator 1.1a and include a "well-to-wheel" fuel life- cycle, which accounts for all the energy inputs and associated emissions from the point of origination of the fuel to its combustion within the vehicle.

Interview: Lorain County Metro Parks

Mitch Beursken
Wednesday, September 11, 2013
3:00 PM

Can you tell us about your fleet and why you were interested in this project?

When I started 13 years ago, the fleet was all full size trucks vans. As you can see, we have the most fuel-efficient stuff we can get from state bids. The only thing better is hybrids, which I wouldn't be putting enough miles on to be cost effective. I've also gone all-electric on my utility vehicles. I'd say we have 7 of them and 7 of the old gas ones. The only problem we have with those is where to plug them in. Our mowers are still diesel. We've looked at propane mowers, but we never made up the cost and we are seeing the same numbers that we do with diesel. We have gone to hybrid mowers on the golf course.

Do you have any policies in place regarding reducing emissions or fuel use?

There are no sustainability goals from the board, other than to get the fuel consumption down. As a result, my fuel budget went up by 30% this last year. I'm the only one pushing this stuff. Public image is important, so our PR Department and assistant director both drive hybrids, but that doesn't translate to the fleet. I can't do anything about the law enforcement guys either. I bought a few dirt bikes to try and wean them off gas. The guys who want to use bikes are going to use them, but the guys who don't want to use them won't. Reducing emissions is not a priority.

Can you tell us about how your vehicles are refueled?

We are using paper fuel tickets, and I'm putting them into the computer manually. We have diesel and gasoline tanks, and each is 1,000 gallons. This is the first year we're pulling almost entirely from our tanks, so our tanks get turned over 15-20 times a year. Our director was pushing for bigger tanks, which would reduce turnover to 6 times annually. We see a 12% drop in fuel efficiency during the winter because of all the additives, but it's 12% cheaper. The opposite is true for the summer. I don't think we have issues with fuel theft since it would be hard to pull off. I can't govern fuel theft at the other three locations though. The only place they could get me would be gas cans.

Do you have an idle reduction policy in place?

We don't have a policy currently in place. I can do well with maintenance and the naturalists, but as I said, I can't do anything about law enforcement.

Do you have any policies in place regarding vehicle procurement?

Our focus has been on the most fuel-efficient vehicles possible. We have recently been rightsizing the fleet as well.

Are drivers required to complete any kind of training?

We currently don't have this in place, but I would be interested in doing some sort of training. Not right now since it's a busy time of year, but sometime in the winter when things have cooled down. My car, for example, gets 34 MPG. I show my wife how to do it, and she's good for a week, then she's back down to 26 MPG. The thing is our guys want to drive through the park at 20 MPH. We can't change that. You don't change people unless you give people a reason to want to change.

What kinds of operations and maintenance policies do you have?

I have looked into stuff like the Bully Dog or Diablo add-on, onboard computers that adjusts the performance of vehicles to offer better efficiency. This would allow us to monitor driver behavior in real time. We thought as new vehicles come in, we'd add this to the cost of the vehicle. A digital fuel system would be great as well, but it isn't cost effective. Realistically, we said $75,000 for the four locations. It would be nice to have it to collect data on the vehicles and determine when maintenance is due, but it was cost prohibitive.

Key Findings

Lorain County Metro Parks is primarily concerned with reducing fuel consumption through better driving habits and idle reduction. An upgraded fuel dispensing system could be helpful for monitoring fuel use and impacts of fuel-reduction initiatives but this is currently cost-prohibitive.

Hybrid vehicles are used in some cases but the public image benefit does not resonate with many drivers, especially law enforcement. There must be a demonstrated ROI in order to move forward with alternative fuels or other technologies.

Scenario Results: Replace Old Pickup Trucks with Propane Pickups

The Metroparks should consider propane for new pickup trucks, provided they will be highly utilized. The F250 trucks in the fleet are driven an average of 5,300 miles annually, which means that achieving a payback is challenging. Since propane systems are generally less expensive than CNG systems, this scenario focuses on propane only. Conversion options for certified bi-fuel and dedicated propane systems for pickup trucks are common and several makes and models of propane pickups are available direct from dealerships (see Appendix). The fleet manager may need to adjust vehicle assignments in order to ensure that the propane vehicles are highly utilized.

There are two older trucks in the fleet that will likely need to be replaced soon.

Year	Make	Model	Odometer
2003	Ford	F250	66,830
2003	Ford	F250	49,151

Candidate vehicles	
# of Vehicles	2
Expected Annual Vehicle Miles Traveled	5,300
Range of Vehicle Miles Traveled	4,400 - 6,200
Average Fuel Economy (MPG)	8

Propane Scenario Assumptions	
Gasoline Price per Gallon	$3.50
LPG Price per Gallon	$1.70
LPG Fuel Economy Loss	20%
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
LPG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$8,000

Propane Scenario Results	
Total Annual Fuel Cost Savings	$1,719
Annual Maintenance Cost Savings	$72
Simple Payback (Years)	8.9
Simple Payback (Miles)	44,674
GHG Emissions - Gasoline (Tons)	15.4
GHG Emissions - Propane (Tons)	13.3
GHG Emissions Saved	14%
Total LPG Demand per Year (gallons)	1,563

Scenario Results: Convert SUVs to CNG

Lorain County Metro Parks should consider retrofitting its Ford Escape SUVs with CNG systems. Some of the SUVs (including hybrids) are heavily utilized and driven over 17,000 miles annually, which means that achieving a payback is feasible during the life of the vehicle. Conversion options for certified bi-fuel and dedicated CNG systems for several Ford Escape model years are common (see Appendix). Propane conversions options for Ford Escape vehicles are not as common, and were excluded from this analysis. The fleet manager may need to adjust vehicle assignments in order to ensure that the CNG vehicles are highly utilized.

There are three new SUVs with low mileage in the fleet that are good candidates for conversion.

Year	Make	Model	Odometer
2012	Ford	Escape	35,504
2013	Ford	Escape	5,665
2013	Ford	Escape	NA

Existing SUVs over 5 years old	
# of Vehicles	3
Expected Annual Vehicle Miles Traveled	17,000
Range of Vehicle Miles Traveled	5,868 - 31,620
Average Fuel Economy (MPG)	25

CNG Scenario Assumptions	
Gasoline Price per Gallon	$3.50
CNG Price per GGE	$1.85
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
CNG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$10,000

CNG Scenario Results	
Total Annual Fuel Cost Savings	$3,366
Annual Maintenance Cost Savings	$367
Simple Payback (Years)	8.26
Simple Payback (Miles)	136,612
GHG Emissions - Gasoline (Tons)	15.2
GHG Emissions - Pipeline CNG (Tons)	20.4
GHG Emissions Saved	19%
Total CNG Demand (GGE)	2,040

Scenario Results: Use Biodiesel in Older Vehicles

Lorain County Metro Parks should consider using biodiesel fuel in older diesel vehicles. The vehicles listed below used 1,619 gallons of diesel fuel annually. Using biodiesel blends reduces greenhouse gas emissions but the fuel may be more expensive.

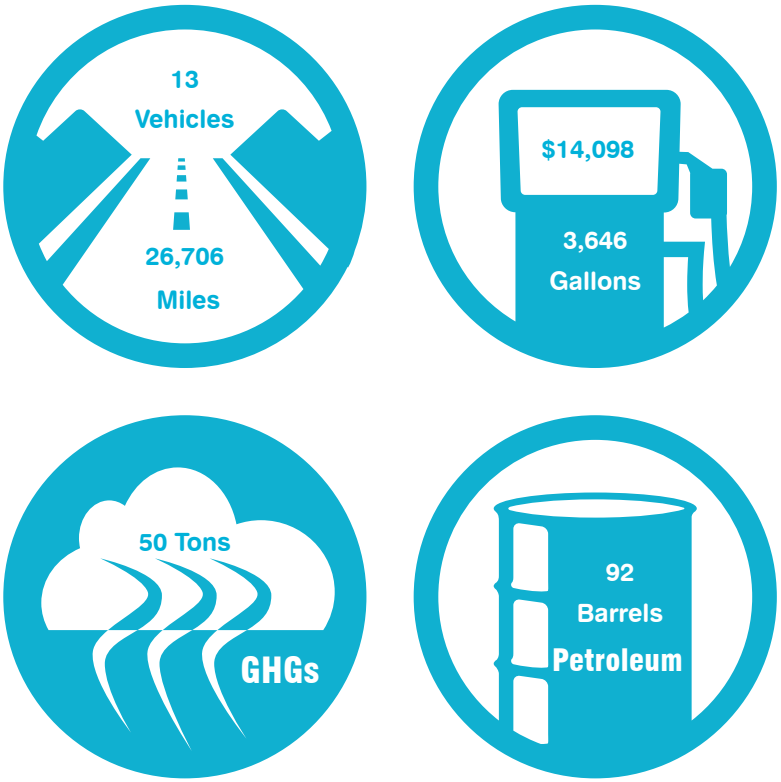
Year	Make	Model	Description	Annual Diesel Gallons
2001	GMC	C6500	Dump Truck	849
2009	Chevrolet	C5500	Bus	770

Blend	# of Vehicles	B-100 Demand or Diesel Gallons Displaced (gallons)	GHG Emissions for 1,619 Gallons Diesel (Tons)	GHG Emissions for 1,619 Gallons Bio Diesel (Tons)	GHG Emissions Saved
B-10	2	162	23	21	9%
B-20	2	324	23	19	17%

FLEET PROFILE: NEW RUSSIA TOWNSHIP

Baseline

New Russia Township is interested in improving its practices and policies relating to its fleet of vehicles in order to realize cost savings and reduce environmental impacts. Data and information provided by New Russia Township staff created the baseline values for the fleet.



In one year, New Russia Township's fleet of 13 vehicles included in this report traveled nearly 27,000 miles and consumed more than 3,500 gallons of fuel, priced at over $14,000. Overall, these vehicles required 92 barrels of petroleum (oil) to operate, which produced 50 tons of greenhouse gas emissions. Vehicle counts, miles traveled, fuel consumption, and fuel and maintenance costs data were provided by the Fleet Manager. Factors used to calculate the petroleum consumption and greenhouse gas emissions were based on Argonne National Laboratory's GREET Fleet Footprint Calculator 1.1a and include a "well-to-wheel" fuel life- cycle, which accounts for all the energy inputs and associated emissions from the point of origination of the fuel to its combustion within the vehicle.

Interview: New Russia Township

Fred Swanson
Thursday, September 5, 2013
1:00 PM

Can you tell us about your fleet and why you were interested in this project?

We have two pickups/plows, an SUV, a one-ton dump truck, a few tractors, and two riding mowers. Most of our vehicles are fairly new. Our drivers include a number of part-time employees during the winter and summer seasons.

Do you have any policies in place regarding reducing emissions or fuel use?

Policy directives come from 3 township trustees (elected) and a fiscal officer (elected). The general feeling is that we are "small potatoes" compared to other fleets. We are not resistant to the idea of sustainability, but we are not really thinking about green efforts either. There are no real targets in place.

Have you thought about shared services?

Originally, we were talking to the City about a deal to use their fueling system, but the City used a different fuel card system. Instead, we went to buying fuel in bulk. We would be interested in sharing alternative fuel infrastructure though.

Do you have an idle reduction policy in place?

We don't have a formal policy in place, but it is not really a problem.

Do you have any policies in place regarding vehicle procurement?

Our procurement options are limited due to our organization being downsized, and we need our fleet to have specific capabilities.

Have you considered alternative fuels?

We haven't considered it, but we aren't against it either.

Are drivers required to complete any kind of training?

Currently, we don't have anything in our employee manual about driver efficiency, but we might be willing to include something. This is not a high priority.

What kinds of operations and maintenance policies do you have?

Our vehicles get dealership service, and they get an oil change every once in a while. Our newer vehicles have dashboard monitors for vehicle systems, and drivers are required to fill out a vehicle condition log every time they drive. We also keep track of annual miles traveled by each vehicle. We could probably back out the number of days the vehicle is utilized.

Do you have a route planning strategy?

Every driver knows where he or she need to plow, but they may have different ways of getting there. Maps are readily available, but, other than that, there is no real way to save on miles traveled.

Key Findings

New Russia Township will consider alternative fuels if the infrastructure to support them is available. The small fleet size and specific vehicle duties does not create a sense of urgency in terms of pursuing alternative fuels, driver training, or other cost-saving strategies.

Scenario Results: Use Biodiesel in Older Vehicles

New Russia Township is interested in using biodiesel fuel in older diesel vehicles and off-road equipment. The vehicles listed below are the diesel vehicles and equipment in the fleet. Collectively, these vehicles and equipment use 3,073 gallons of diesel fuel annually. Using biodiesel blends reduces greenhouse gas emissions but the fuel may be more expensive.

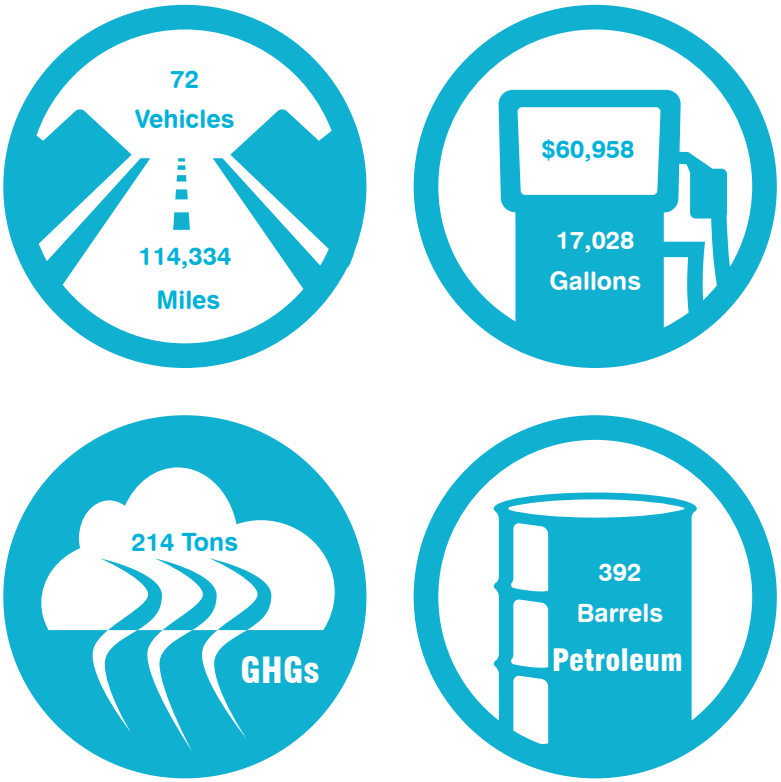
Year	Make	Model	Odometer/Hours
2006	Ford	F250	48,000
2009	International	7400	19,500
2009	International	7400	2,900
2003	Chevrolet		23,300
2004	Bobcat	341G-Series	957
2004	Bobcat	Skid Steer	691
2011	John Deere	6430	165
2011	John Deere	4720	221
2012	John Deere	Z-Trak	327
2012	John Deere	Z-Trak	389
2006	Bobcat	5600	2,660

Blend	# of Vehicles	B-100 Demand or Diesel Gallons Displaced (gallons)	GHG Emissions for 3,073 Gallons Diesel (Tons)	GHG Emissions for 3,073 Gallons Bio Diesel (Tons)	GHG Emissions Saved
B-10	11	307	43	40	8%
B-20	11	614	43	36	16%

FLEET PROFILE: OBERLIN COLLEGE

Baseline

Oberlin College is interested in improving its practices and policies relating to its fleet of vehicles in order to realize cost savings and reduce environmental impacts. Data and information provided by Oberlin College staff created the baseline values for the fleet.



In one year, Oberlin College's fleet of 74 vehicles included in this report traveled more than 114,000 miles and consumed over 17,000 gallons of fuel, priced at nearly $61,000. Overall, these vehicles required 392 barrels of petroleum (oil) to operate, which produced 214 tons of greenhouse gas emissions. Vehicle counts, miles traveled, fuel consumption, and fuel and maintenance costs data were provided by the Fleet Manager. Factors used to calculate the petroleum consumption and greenhouse gas emissions were based on Argonne National Laboratory's GREET Fleet Footprint Calculator 1.1a and include a "well-to-wheel" fuel life- cycle, which accounts for all the energy inputs and associated emissions from the point of origination of the fuel to its combustion within the vehicle.

Interview: Oberlin College

Bill Frawley
Wednesday, September 11, 2013
10:00 AM

Can you tell us about your fleet and why you were interested in this project?

I took over the role in 2008, and since then I have decreased the overall size of the fleet (60 down to 53). We had a surplus of vehicles, so we started sharing vehicles that weren't in use for certain shifts. Campus security has 2 escape hybrids and a Chevy Equinox. They have a van and an electric golf cart. Dennis has six trucks and six Kubota as well. We are already doing everything you guys talked about.

Do you have a specific idle reduction policy?

There is an anti-idling policy, and that is being followed as far as I know. Security vehicles are supposed to follow this policy as well.

Do you have any policies in place regarding vehicle procurement?

We always look to replace vehicles with more efficient ones. I have done a lot of research into different emissions with online tools like fleet.gov. Since taking over, we have gone from 16 to 12 club carts, with a target of getting down to 10. They are a combination of gas and electric. I have purchased three electric club cars since 2008, but the most recent one I purchased was gas. Gas and electric models both have had catastrophic maintenance issues. We actually looked at Segways, but climactic conditions made it a poor choice. We've been replacing V8s with V6s too. The replacement schedule depends on the specific vehicle. For instance, we have a stake box truck that we got new in 1985 that we still use. In general, most of the vehicles we are replacing are from the 1990s. Ideally, we would have a 10-year replacement cycle; something like 3,000 miles per year and selling after 30,000 sounds about right. I don't believe in leasing vehicles professionally or personally.

Have you considered alternative fuels?

We are currently running biodiesel trucks and tractors (for mowing lawns) with excess cooking oil from the college. We have looked at all the natural gas options, but it's not something we can do financially; we would never get a return on investment. Fueling is the other issue. It just doesn't make sense. In terms of hybrids, our security department had 3 Ford Escape hybrids that didn't work well. We were forced to spend a lot of money on battery and battery filter replacements. The last vehicle we purchased was a 2012 Chevy Equinox that we got instead of another hybrid.

Can you tell us about how your vehicles are refueled?

I'm not sure how much we are paying for fuel, but Dennis should know. He also knows how big the tanks are. We are currently looking at the AIM2 system. I went and saw it in action in Holland, OH. It's a pump that reads the vehicle data when it fills and tracks everything associated with the vehicle. All of this is fed into a system I can look at any time. Our budget is right around $40,000. Fuel theft used to be a big problem, and this would virtually eliminate that issue. I wish we had it 10 years ago.

Are drivers required to complete any kind of training?

New employees are not required to go through training, and there is only mild interest in creating a training program. It's a hard thing to convince people to do it. Either people are motivated to make the change or they aren't.

What kinds of operations and maintenance policies do you have?

There are five vehicles that are shared, but, other than that, each vehicle is assigned to a specific person.

Key Findings

Oberlin College has made a significant effort to reduce fleet costs and improve fleet efficiency through right-sizing and purchasing decisions.

The new fuel dispensing system will create new levels of transparency that will be helpful for tracking the impacts of fuel-saving strategies in the future.

The College produces its own biodiesel fuel for two vehicles but is skeptical about recovering the costs associated with other kinds of alternative fuels.

Scenario Results: Replace Some Pickup Trucks with Propane or CNG Pickups

Oberlin Colelge should consider propane or CNG for new or existing pickup trucks, provided they will be highly utilized. Most pickup trucks in the fleet are driven fewer than 6,000 miles annually, which means that the extra cost of installing an alternative fuel system will not be cost-effective unless they are more highly utilized. Conversion options for certified bi-fuel and dedicated alternative fuel systems for pickup trucks are common and several makes and models of propane pickups are available direct from dealerships (see Appendix).

Given the College's utilization pattern for its pickup trucks, achieving a payback is challenging. There are several older trucks in the fleet that will likely need to be replaced soon. Rather than select specific vehicles for replacement or conversion, this scenario is based on incorporating two new propane or CNG pickup trucks into the fleet. The fleet manager may need to adjust vehicle assignments in order to ensure that the alternative fuel vehicles are highly utilized.

Candidate vehicles	
# of Vehicles	2
Expected Annual Vehicle Miles Traveled	7,000
Range of Vehicle Miles Traveled	at least 7,000
Average Fuel Economy (MPG)	10

Propane Scenario Assumptions	
Gasoline Price per Gallon	$3.50
LPG Price per Gallon	$1.70
LPG Fuel Economy Loss	20%
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
LPG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$8,000

Propane Scenario Results	
Total Annual Fuel Cost Savings	$1,925
Annual Maintenance Cost Savings	$101
Simple Payback (Years)	7.8
Simple Payback (Miles)	55,287
GHG Emissions - Gasoline (Tons)	17.3
GHG Emissions - Propane (Tons)	14.9
GHG Emissions Saved	14%
Total LPG Demand per Year (gallons)	1,750

Existing SUVs over 5 years old	
# of Vehicles	2
Expected Annual Vehicle Miles Traveled	7,000
Range of Vehicle Miles Traveled	at least 7,000
Average Fuel Economy (MPG)	10

CNG Scenario Assumptions	
Gasoline Price per Gallon	$3.50
CNG Price per GGE	$1.85
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
CNG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$10,000

CNG Scenario Results	
Total Annual Fuel Cost Savings	$2,310
Annual Maintenance Cost Savings	$101
Simple Payback (Years)	8.3
Simple Payback (Miles)	58,072
GHG Emissions - Gasoline (Tons)	17.3
GHG Emissions - Pipeline CNG (Tons)	14.0
GHG Emissions Saved	19%
Total CNG Demand (GGE)	1,400

Scenario Results: Replace Some Vans with Propane or CNG Vans

Oberlin College should consider propane or CNG for new or existing vans, provided they will be highly utilized. Most vans in the fleet are driven fewer than 6,000 miles annually, which means that the extra cost of installing an alternative fuel system will not be cost-effective unless they are driven often. Conversion options for certified bi-fuel and dedicated alternative fuel systems for vans are common and several makes and models of propane vans are available direct from dealerships (see Appendix).

Given the College's utilization pattern for its vans, achieving a payback is challenging. There are several older vans in the fleet that will likely need to be replaced soon. Rather than select specific vehicles for replacement or conversion, this scenario is based on incorporating two new propane or CNG vans into the fleet. The fleet manager may need to adjust vehicle assignments in order to ensure that the alternative fuel vehicles are highly utilized.

Candidate vehicles	
# of Vehicles	2
Expected Annual Vehicle Miles Traveled	6,000
Range of Vehicle Miles Traveled	at least 6,000
Average Fuel Economy (MPG)	8

Propane Scenario Assumptions	
Gasoline Price per Gallon	$3.50
LPG Price per Gallon	$1.70
LPG Fuel Economy Loss	20%
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
LPG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$8,000

Propane Scenario Results	
Total Annual Fuel Cost Savings	$2,063
Annual Maintenance Cost Savings	$86
Simple Payback (Years)	7.5
Simple Payback (Miles)	44,674
GHG Emissions - Gasoline (Tons)	18.5
GHG Emissions - Propane (Tons)	16.0
GHG Emissions Saved	14%
Total LPG Demand per Year (gallons)	1,875

Existing SUVs over 5 years old	
# of Vehicles	2
Expected Annual Vehicle Miles Traveled	6,000
Range of Vehicle Miles Traveled	at least 6,000
Average Fuel Economy (MPG)	8

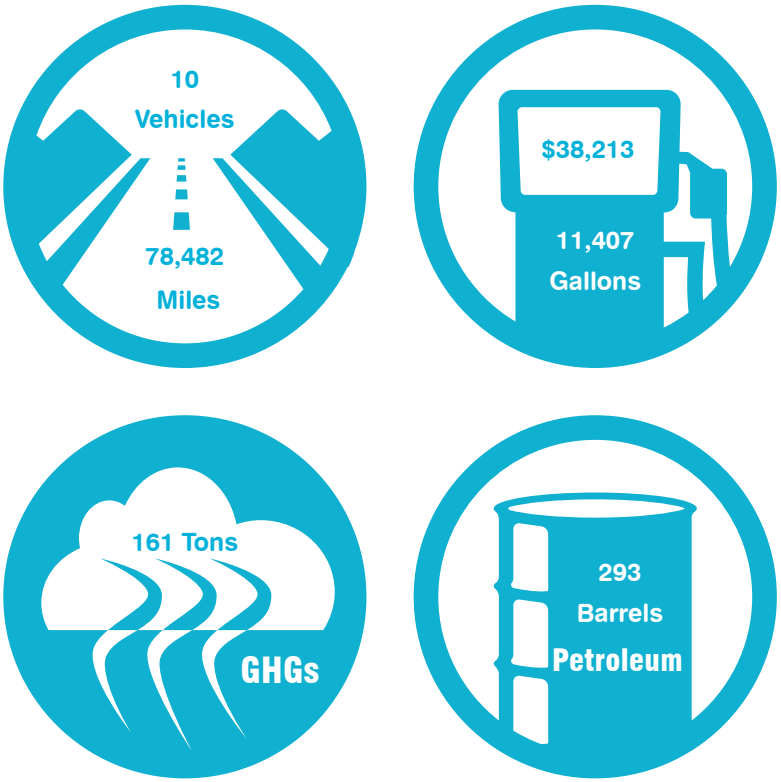
CNG Scenario Assumptions	
Gasoline Price per Gallon	$3.50
CNG Price per GGE	$1.85
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
CNG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$10,000

CNG Scenario Results	
Total Annual Fuel Cost Savings	$2,475
Annual Maintenance Cost Savings	$86
Simple Payback (Years)	7.8
Simple Payback (Miles)	46,849
GHG Emissions - Gasoline (Tons)	18.5
GHG Emissions - Pipeline CNG (Tons)	15.0
GHG Emissions Saved	19%
Total CNG Demand (GGE)	1,500

FLEET PROFILE: OBERLIN SCHOOLS

Baseline

Oberlin Schools is interested in improving its practices and policies relating to its fleet of vehicles in order to realize cost savings and reduce environmental impacts. Data and information provided by Oberlin Schools staff created the baseline values for the fleet.



From 2010 to 2011 the Oberlin Schools fleet of 10 vehicles included in this report traveled nearly 78,500 miles and almost consumed 11,500 gallons of fuel, priced at over $38,000. Overall, these vehicles required 293 barrels of petroleum (oil) to operate, which produced 161 tons of greenhouse gas emissions. Vehicle counts, miles traveled, fuel consumption, and fuel and maintenance costs data were provided by the Fleet Manager. Factors used to calculate the petroleum consumption and greenhouse gas emissions were based on Argonne National Laboratory's GREET Fleet Footprint Calculator 1.1a and include a "well-to-wheel" fuel life- cycle, which accounts for all the energy inputs and associated emissions from the point of origination of the fuel to its combustion within the vehicle.

Interview: Oberlin Schools

Cathy Moyer
Thursday, September 12, 2013
9:00 AM

Can you tell us why you were interested in this project?

I have 14 aging buses that need to be replaced. The city doesn't have money, and the state is taking more away from us every year. We need to come up with the money to buy buses on our own. Replacing the fleet sounds wonderful on paper, but, realistically, it's not feasible. The city has set aside an acre of land as part of the service complex down the road for us to build a bus garage on. We would store buses there and do shared maintenance with the city. Instead of building garage lifts and a service infrastructure, we would use their maintenance facilities. The idea here is that we would be able to bring someone in house to do maintenance. We do some shared services with other places as well, like Oberlin College.

Do you have any policies in place regarding reducing emissions or fuel use?

No, but I go to the OAPT (Ohio Association of Pupil Transportation) conference in March every year.

Can you tell us about how your vehicles are refueled?

We have an 8,000-gallon tank that we'd like to get rid of. We go through 6,500 gallons of fuel in over 6 months. We don't need such a large tank. It's a money pit.

Do you have any policies in place regarding vehicle procurement?

The first thing we look at when we replace a vehicle is the cost. We then look at specialized maintenance and the cost of fuel. Finally, we need to know whether there is any kind of driver training.

Have you considered alternative fuels?

We like the Blue Birds. ROUSH has a Blue Bird propane system. It was so nice. I tried to get a grant to get a propane bus, but I came in somewhere in the middle. I can't even replace the aging buses I have now. The only problem is I don't know where I would put a propane station for our buses. CNG is the most expensive, followed by propane and then conventional. I ran some analyses to figure out how the payback would work on my own. The best AFV situation for us would be working something out with the city. The second best would be something with the ODOT highway garage. The third would be Republic Services.

Can you tell us about how your vehicles are refueled?

We have a fuel guy who calls around to find the best rate. Then we purchase it and fill the 8,000-gallon tank we have on-site. The last time we got diesel, it was $3.3547 per gallon. On the vehicle side, when I see a bus using too much fuel, I dig into what it is.

Do you have a route planning strategy?

I use VersiTrans for route planning. To be honest, I do it in my head for the most part. We do some group stops in town when we can, and we try to make stops within a mile and a half of each other. For field trips, if we can do two loads in one bus, we do that.

Are drivers required to complete any kind of training?

A pre-trip inspection is required before each trip. We look for anything that might be wrong with the engine or the bus itself. The more children you put on a bus, the harder it is to take off. Starting and stopping probably use the most fuel. We talk about the feather method. I tell them to pretend there is an egg under the pedal. When we take off, we want it to be nice and easy. Diesel engines aren't designed to take off like a car. On the highway, the speed limit is 70 MPH, but I discourage that. A lot of the buses are governed at 65 MPH. They spend a lot of time on the turnpike, and I encourage them to use cruise control when possible. Other than that, I encourage the drivers to go to a school bus rodeo each year. There are two written tests about pre-trip inspection and general bus knowledge, and then they go outside and drive through an obstacle course.

What kinds of operations and maintenance policies do you have?

We don't service our buses here. We used to have a beautiful bus garage that was going to get torn down and replaced, but that did not happen. Now Matt Tipple services them. He's a bit pricey, but he's the best mechanic in the county.

Key Findings

Oberlin Schools is interested in propane school buses but sees barriers in terms of conversion costs and fueling infrastructure. There is an interest in sharing fueling and vehicle services with the City.

Scenario Results: Use Biodiesel in Older Vehicles

The Oberlin Schools bus fleet manager should consider using biodiesel fuel in older diesel vehicles. The vehicles listed below are the active buses in the school bus fleet. Collectively, these ten vehicles use 11,407 gallons of diesel fuel. Using biodiesel blends reduces greenhouse gas emissions but the fuel may be more expensive.

#	Annual Miles	Annual Diesel Gallons
1	1,267	9,721
3	95	585
4	1,,299	10,080
6	1722	11,126
8	1,573	10,672
9	1,080	8124
10	2,254	15,741
11	83	0
14	1,155	6,474
16	879	5,959
Total	**78,482**	**11,407**

Blend	# of Buses	B-100 Demand or Diesel Gallons Displaced (gallons)	GHG Emissions for 11,407 Gallons Diesel (Tons)	GHG Emissions for 11,407 Gallons Bio Diesel (Tons)	GHG Emissions Saved
B-10	10	1,141	161	148	8%
B-20	10	2,282	161	135	16%

Scenario Results: Purchase New Propane School Buses

The Oberlin School district should consider propane for new school buses, provided they will be highly utilized. Most buses in the fleet are driven fewer than 8,000 miles annually, making the extra cost of installing an alternative fuel system cost-ineffective. Since propane systems are generally less expensive than CNG systems, this scenario focuses on propane only.

Most of the district's buses will need to be replaced soon. Given the school's utilization pattern for its buses, achieving a payback on propane is challenging. However, given the district's history of long-term vehicle ownership, propane buses are likely a sound investment overall. Rather than select specific vehicles for replacement or conversion, this scenario recommends replacing all 10 vehicles with propane options. Should replacing all vehicles prove cost-prohibitive, it will be important to ensure that any new vehicles purchased are highly utilized. The fleet manager may need to adjust vehicle assignments in order to ensure optimum use of propane vehicles. This will expedite return on investment.

Candidate vehicles	
# of Vehicles	10
Expected Annual Vehicle Miles Traveled	9,000
Range of Vehicle Miles Traveled	at least 9,000
Average Fuel Economy (MPG)	10

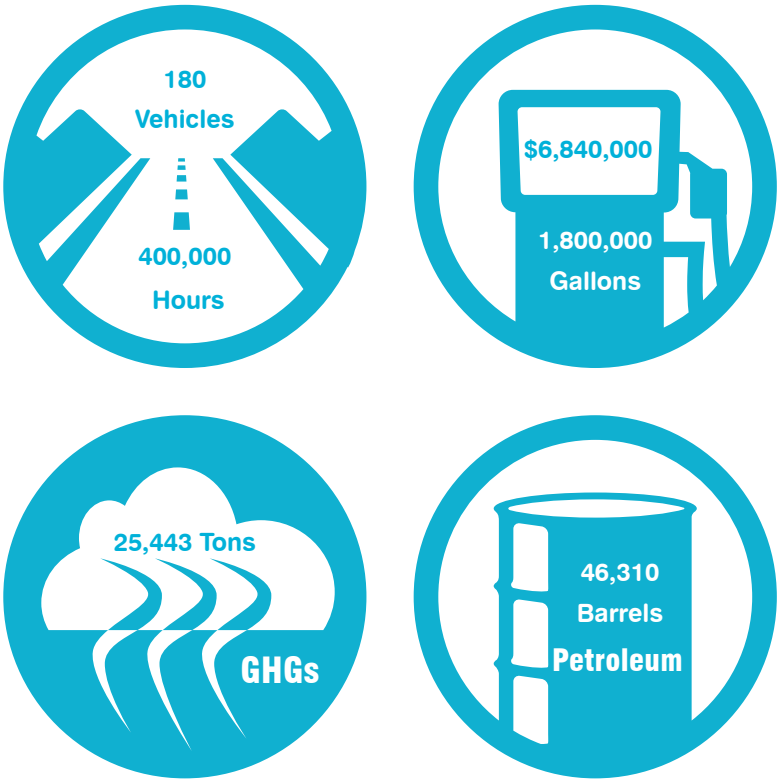
Propane Scenario Assumptions	
Gasoline Price per Gallon	$3.00
LPG Price per Gallon	$1.70
LPG Fuel Economy Loss	20%
Payback Goal (years)	10
Maintenance Cost per Mile	$0.08
LPG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$8,000

Propane Scenario Results	
Total Annual Fuel Cost Savings	$1,575
Annual Maintenance Cost Savings	$130
Simple Payback (Years)	9.4
Simple Payback (Miles)	84,477
GHG Emissions - Gasoline (Tons)	22.2
GHG Emissions - Propane (Tons)	19.2
GHG Emissions Saved	14%
Total LPG Demand per Year (gallons)	2,250

FLEET PROFILE: REPUBLIC SERVICES

Baseline

Republic Services is interested in improving its practices and policies relating to its fleet of vehicles in order to realize cost savings and reduce environmental impacts. Data and information provided by Republic Services staff created the baseline values for the fleet.



In one year, the Republic Services fleet of 180 vehicles included in this report operated for about 400,000 hours and consumed around 1,800,000 gallons of fuel, priced at approximately $6,840,000. Overall, these vehicles required 46,310 barrels of petroleum (oil) to operate, which produced 25,443 tons of greenhouse gas emissions. Vehicle counts, miles traveled, fuel consumption, and fuel and maintenance costs data were provided by the Fleet Manager. Factors used to calculate the petroleum consumption and greenhouse gas emissions were based on Argonne National Laboratory's GREET Fleet Footprint Calculator 1.1a and include a "well-to-wheel" fuel life- cycle, which accounts for all the energy inputs and associated emissions from the point of origination of the fuel to its combustion within the vehicle.

Interview: Republic Services

Eric Van Houten
Thursday, September 12, 2013
8:00 AM

Can you tell us a little bit about yourself and Republic Services?

The vast majority of what goes into the landfill is from our trucks. When looking at new equipment, the most important thing for me is being able to build the business case. Everything we do is based on return on investment.

Can you tell us about your fleet and why you were interested in this project?

We have 183 trucks, some container vehicles, and heavy-duty diesel pickups. We also have some cart delivery. I am most interested in figuring out what it will cost me to get CNG here. If it won't work at this location, I want to see if it will work at our nearby location, the future home of Elyria Hauling. In the surrounding area, we have some other haulers. There would probably be a lot of buses heading to Lorain County JVS, so there could be some interest.

Do you have any policies in place regarding reducing emissions or fuel use?

The message coming down from above is all about fuel efficiency.

Have you considered alternative fuels?

We've examined the CNG issue. The problem with CNG is that it isn't readily available, so we would need to retrofit the facility for fueling. I like the slow fill option because it cuts down on active fueling time. We've been hoping we could get CNG at an off-site area. A third party owns the methane recovery (8800 CFM) at the landfill, and we have access to any excess gas. We wouldn't be able to rely solely on that, so we would need a line coming in. I would like to talk to talk to someone and get some more details, if you have someone I could talk to. If we were to move to CNG, we would convert the whole fleet at once. There are 400 Republic Services locations, and we would just push these trucks to another fleet somewhere else.

Can you tell us about how your vehicles are refueled?

What I can tell you is that our new trucks are getting worse fuel economy. We used to burn 3.5 gallons per hour, but now we're burning 4.5 gallons per hour.

Do you have a route planning strategy?

We have a guy that does nothing but route sequencing and route planning.

Are drivers required to complete any kind of training?

Driver behavior training is tough with refuse truck drivers, because there is not a lot you can do. They need to be starting and stopping all the time. If we were to move to CNG, we would need some training and all the non-explosive safety equipment. Drivers would be skeptical at first, and they would like not standing around in line to fill.

What kinds of operations and maintenance policies do you have?

We are running a combination of conventional and synthetic motor oils in the trucks. We service all 183 trucks here. We do send some stuff out, but the bulk of what we do is here. For operations, we have a corporate team that looks at stuff like that. I don't get to make that decision. I get to choose whether it has a cup holder.

Key Findings

Republic Services is a likely first-adopter of CNG vehicles and a host for shared fueling infrastructure. The potential exists to retrofit the existing maintenance facility or build the new facility to service CNG vehicles. In order to move forward, detailed cost analysis is needed to justify the investment.

Scenario Results: Replace all refuse trucks with CNG trucks

Republic Services should consider a transition to CNG for all refuse trucks in the fleet. Using examples from other Republic Services locations and infrastructure development payback calculators, Clean Energy Coalition will support the development of the business case for making the transition and installing the necessary fueling infrastructure and building retrofits.

Existing Refuse Trucks	
# of Vehicles	180
Expected Annual Hours	400,000
Estimated Annual Miles	28,000
Annual Diesel Fuel Use	1,800,000
Estimated MPG Diesel	2.8

CNG Scenario Assumptions	
Gasoline Price per Gallon	$3.85
CNG Price per GGE	$1.85
Payback Goal (years)	2
Maintenance Cost per Mile	$0.08
CNG Maintenance Savings	9%
Grants & Incentives	$0
Incremental Cost	$30,000

CNG Scenario Results	
Total Annual Fuel Cost Savings	$3,600,000
Annual Maintenance Cost Savings	$36,288
Simple Payback (Years)	1.5
Simple Payback (Miles)	41,581
GHG Emissions - Gasoline (Tons)	22,810
GHG Emissions - Pipeline CNG (Tons)	17,998
GHG Emissions Saved	21%
Total CNG Demand (GGE)	2,000,000

APPENDIX

Several resources to help fleet managers identify alternative fuel vehicle options are available for download from the folowing sources

Clean Cities 2014 Vehicle Buyers Guide

Clean Cities Guide to Alternative Fuel and Advanced Medium- and Heavy-Duty Vehicles

Download the latest vehicle guides and browse alterntive fuel vehicle information by visiting the Clean Cities web site

http://www1.eere.energy.gov/cleancities/publications.html

Environmental Protection Agency list of certified vehicle conversions

Download a sortable spreadsheet, available on the EPA web site:

http://www.epa.gov/otaq/consumer/fuels/altfuels/documents/certified-conversions.xls

APPENDIX B | EFFICIENT DRIVING GUIDELINES

RULE 1 | REDUCE LOAD

An additional 100 lbs within a vehicle can reduce fuel economy by 2%. As such, unnecessary items in fleet vehicles should be removed when they are not in use. Though storing equipment in fleet vehicles can be convenient, doing so has the potential to significantly reduce vehicle performance and fuel efficiency.

RULE 2 | SKIP WARM UPS WHEN POSSIBLE

One common misconception is that vehicles need to be warmed up prior to driving, especially in the winter months. However, vehicles are designed to warm up by being driven rather than by idling. According to J.D. Power, vehicles only need about 30 seconds of warm up time before they can be driven. Therefore, skipping or drastically reducing warmup time is a simple way to reduce fuel use.

RULE 3 | SLOW DOWN

Drivers should strive to maintain slower speeds on highway trips. Most vehicles have a peak fuel economy 60 miles per hour (mph). Going 30 mph over or under this threshold can cause a loss in fuel economy of around 30%. Most highways have speed limits between 65 and 70 mph, and while matching or exceeding these limits gets drivers to their destination faster, it ultimately requires more fuel. When possible, drivers should attempt to leave earlier and slow down to reach peak fuel economy.

RULE 4 | CRUSE CONTROL

Maintaining consistent speeds can also increase fuel efficiency. To maintain consistent speeds, drivers should consider using cruise control whenever possible. Drivers often lose track of their speed during long drives, finding themselves speeding up or down unexpectedly. Cruise control eliminates this variable and has been shown to improve fuel economy by up to 7% when compared to a trip when cruise control is not used.

RULE 5 | SMOOTH ACCELERATION AND BRAKING

Gentle and well-time acceleration and braking can improve the fuel economy of fleet vehicles significantly. Drivers should do their best to avoid hard stops and starts. This includes avoiding aggressive behavior, which can reduce fuel economy by between 20-30%. While aggressive drivers tend to accelerate and brake hard, even cautious drivers may break more often than necessary. Once a vehicle has momentum, it uses less energy to keep the vehicle moving, and any unnecessary use of the brakes reduces fuel efficiency.

APPENDIX C |
INFRASTRUCTURE REPORT

Oberlin Fleet and Fuels Emissions Reduction Strategy

Infrastructure Report

Prepared for
The City of Oberlin

May 1, 2014

clean energy coalition

bridging needs. advancing change.

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CONTENTS

INTRODUCTION

The following is the second of three reports prepared under the Oberlin Fleet and Fuels Emissions Reduction Strategy (OFFERS) project for the city of Oberlin, Ohio and partner fleets by Clean Energy Coalition. The first report, presented in January 2014, examined the baseline fuel and vehicle use of all 10 partner fleets in aggregate, as well as individually. The report went on to identify four different alternative fuel options for OFFERS partner fleets. For each fleet, scenarios for replacing conventional vehicles with alternative fuel vehicles were developed based on the current makeup of the fleet and a number of metrics such as fuel economy, high fuel use, high percent of fleet composition, vehicle age, or other factors that made the vehicles good candidates for replacement. The scenarios developed focused on CNG, LPG, and electric or hybrid vehicle options that could replace vehicles in the current fleet. The table below represents potential maximum and minimum demand for four alternative fuels: Compressed Natural Gas, Liquefied Petroleum Gas, Electricity, and Biodiesel. Each of these estimates considers vehicle replacements or conversions where the payback period is under 10 years (see Recommendations Overview for details) and assumes all vehicles maintain their current duty cycles.

Fuel	Minimum Fuel Demand		Maximum Fuel Demand	
	Volume	GHG Reduction	Volume	GHG Reduction
CNG	2,002,040 GGE	4,816.8 Tons	2,019,736 GGE	4,858.2 tons
LPG only	3,813 Gallons	5.1 Tons	25,993 Gallons	34.6 Tons
Electricity	16,406 kWh	60.3 Tons	16,406 kWh	60.3 Tons
B-100	3,027 Gallons	34.0 Tons	6,054 Gallons	69.0 Tons

Many of the fleets examined have a choice between either CNG or LPG when considering vehicle replacements or conversions. This choice, as it relates to specific fleets, is explored in greater detail in the previous report. While the focus of this report is to examine likely financial scenarios for both CNG and LPG infrastructure under a maximum fuel demand scenario, considerations for biodiesel and electric vehicle infrastructure are included. Additional considerations are highlighted as well, including station citing, appropriate signage, and safety concerns.

CNG FUELING INFRASTRUCTURE

The use of compressed natural gas (CNG) presents significant economic advantages to the fleet partners, as well as opportunities for significant greenhouse gas (GHG) emissions reductions. Prior to introducing CNG as a fuel, fleets must first make important decisions regarding fueling infrastructure and maintenance facility retrofits.

On-Site Infrastructure Options

There are two types of fueling stations available for dispensing CNG for large fleets: fast-fill and time-fill. Compressing natural gas off a utility line can be slow, so a fast-fill station will utilize a series of cascading tanks of varying pressures to store pre-compressed gas. A fast-fill station is typically capable of filling a 20 gallon tank in less than five minutes. These stations are often used in retail applications or in private facilities where large numbers of vehicles must be able to fill up quickly and/or often. In general, on-site fast-fill infrastructure can cost several millions of dollars, which is feasible when the capital costs can be spread out over a number of vehicles in a single fleet or shared across several organizations.

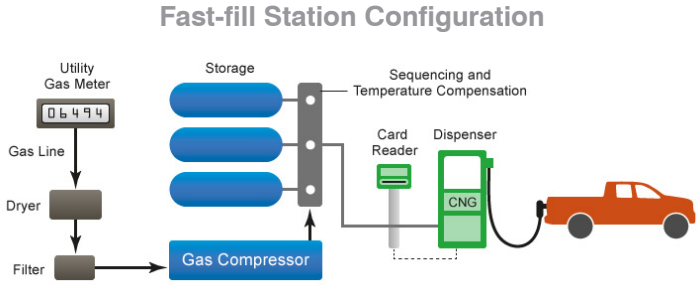


Figure 1: Fast-fill CNG station configuration

Time-fill stations are optimal for fleets with predictable schedules that allow vehicles to be parked at pumps for extended periods of time. Unlike fast-fill stations, time-fill stations typically deliver CNG directly from a compressor to the vehicles (with additional buffer storage to keep the compressor from running unnecessarily). Time-fill stations tend to be less expensive due to the fact that they require fewer high-pressure storage tanks. The cost associated with building a time-fill station can be between $500,000 and $1 million, depending on the size of the fleet. Operating a time-fill station may be less expensive than operating a fast-fill station as well, provided a fleet's refueling schedule is able to take advantage of off-peak electricity rates.

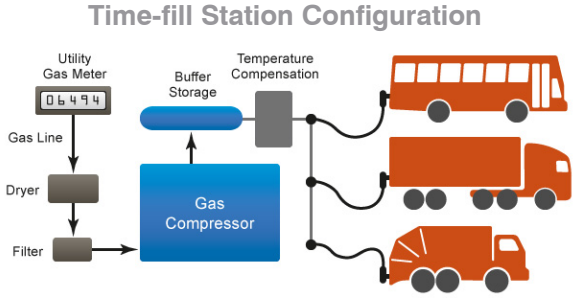


Figure 2: Time-fill CNG station configuration

Small-scale fueling systems exist as well that are better suited for home or small fleet applications. Of these, the *FuelMaker* and *Phill* systems from BRC are the most widely used. The *FuelMaker* costs approximately $7,000, but will only fill a vehicle at about the equivalent of one gallon of gasoline (GGE) per hour, so its use in fleet applications is limited.

Facility Safety

Natural gas is flammable but non-toxic. It is lighter than air and quickly dissipates when released. Because CNG exists in a gaseous state, an accidental release in an area that is not well ventilated could lead to combustion or asphyxiation.

Maintenance facilities must take the necessary safety precautions to be CNG-ready before any work on these vehicles can occur. Whether or not an upgrade is required for a facility depends on whether the facility is classified as a *major* repair or *minor* repair facility. Most regulatory codes regarding working on CNG vehicles and equipment typically only apply to major repair facilities. Generally, national codes consider major repair facilities to do work that includes engine overhauls, painting, body and fender work, repairs requiring draining vehicle fuel tanks, and work on the vehicle's fuel system or use of open flames or welding.

Building modifications or upgrades may be needed for the following:

- Increased ventilation
- Restrictions on sources of ignition, including the facilities heating equipment
- Lighting
- Gas detection

As with all alternative fuel infrastructure installation scenarios, the authorities having jurisdiction (including the fire marshal) should be consulted early in project planning in order to understand the changes that will be necessary. The national codes most pertinent to CNG in vehicle maintenance facilities listed below.

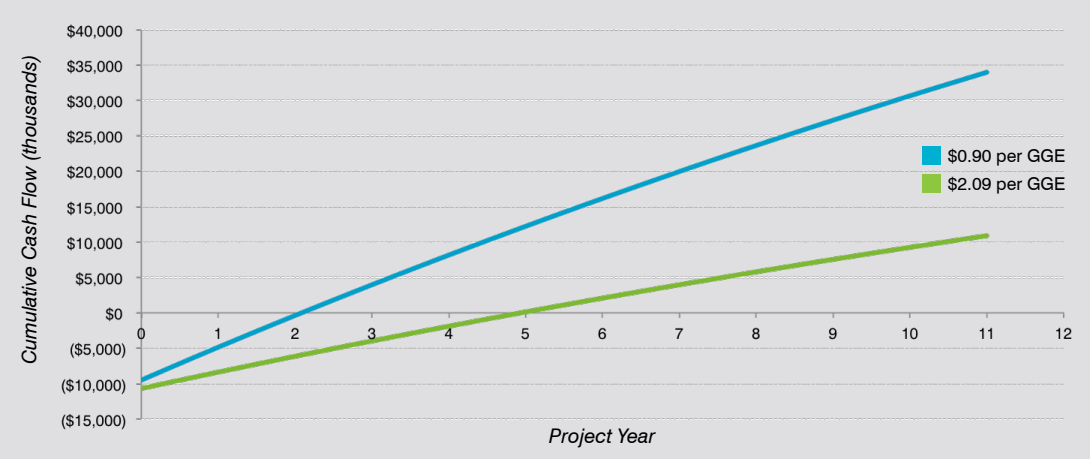
Designation	Code
IFC 2012	International Code Council's International Fire Code
IMC 2012	International Mechanical Code
IBC 2012	International Building Code
NFPA 30A 2012	National Fire Protection Association's Code for Motor Fuel Dispensing Facilities and Repair Garages
NFPA 52 2010	Vehicular Gaseous Fuel Systems Code
NFPA 88A 2007	Standards for Parking Structures

CNG Station Economics

The Vehicle and Infrastructure Cash-Flow Evaluation (VICE) 2.0 model, developed by the National Renewable Energy Laboratory (NREL), is a model designed for fleet managers to assess the financial realities of converting a fleet to operate on CNG. The VICE model includes the cost of CNG infrastructure, whereas many other models only include vehicle costs. The assumptions inherent in the VICE 2.0 calculator are for a buffered fast-fill station, which is best suited for quickly fueling large numbers of heavy-duty, high-fuel-capacity vehicles. The model uses regressed data from actual stations built with Department of Energy (DOE) grant funding.

The model, run with the assumptions listed in the box below, illustrates that even with the high costs of building a CNG fueling station, a positive payback can be achieved in a relatively low period of time. Two prices are used in this analysis: $0.90 and $2.09 per GGE. $0.90 is the anticipated cost to the station owner to fill a vehicle with one GGE of CNG (i.e. the cost of CNG off the line), whereas $2.09 is the anticipated price at which the station owner might sell CNG to other fleets.

CNG STATION SCENARIO
CUMULATIVE CASH FLOW ANALYSIS



Republic Services CNG Station Scenario Assumptions	
# of Vehicles	180
Incremental Cost per Vehicle	$30,000
Total Incremental Cost	$5,400,000
Total Station Infrastructure Investment	$6,673,545
Price of CNG (per GGE)	$0.90 - $2.09
Diesel Fuel Price	$3.85
Diesel Price Inflation (annual)	2.50%
CNG Price Inflation (annual)	2.70%
Diesel Maintenance Cost	$0.52/mile
CNG Maintenance Cost	$0.47/mile

Republic Services CNG Station Scenario Results	
@ $0.90 per GGE	
Net Present Value	$35,652,237
Simple Payback Period	2.42 years
@ $2.09 per GGE	
Net Present Value	$11,752,164
Simple Payback Period	4.69 years

PROPANE FUELING INFRASTRUCTURE

The second scenario addressed involves the use of propane, or liquefied petroleum gas (LPG) in OFFERS partner fleet vehicles. While propane applications for heavy-duty vehicles are still unavailable, many light- and medium-duty vehicle options exist. Furthermore, LPG infrastructure tends to be less expensive to install, making it an attractive option for smaller or cash-strapped fleets. According to the DOE's Alternative Fueling Station Locator, there are 2,715 propane fueling stations in the U.S., 59 of which are located in Ohio. Additional propane station capacity is necessary if the City of Oberlin is interested in converting any part of its fleet to propane.

System Characteristics

Fleets typically install their own fueling infrastructure to support their propane-powered vehicles. A large storage tank, similar to tanks used in residential applications, is used to store the fuel. Tanks can be vertical or horizontal in their orientation to the ground, and can be either skid-mounted (elevated off the ground by metal skids attached to the tank), buried underground, or secured to a concrete pad with bollards for protection. A card reader for tracking and security purposes is located next to the unit, along with a fuel dispenser specially designed for propane vehicles (see Figure 4). The fuel dispensing rate for propane stations is similar to that of a typical gasoline station, or around 10-15 gallons per minute.

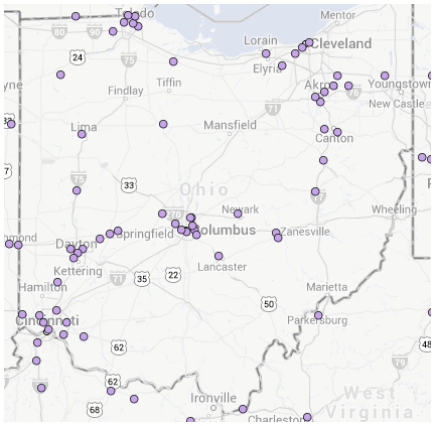


Figure 3: Ohio's propane stations

The total volume of propane storage used by a fleet ultimately depends on the number of vehicles and the frequency with which it is utilized. If more propane is needed, additional tanks can likely be added to the system to meet demand. Additionally, increased tank storage capacity would decrease the number of propane deliveries required, minimize the risk from short-term price fluctuations, and will likely reduce costs in the long run. More storage could also allow the city to endure price increases during periods of high demand, such as an exceedingly cold winter. If OFFERS fleet partners were to adopt propane vehicles as previously recommended, the demand for propane fuel would be approximately 2,200 gallons per month, on average. The size of the propane tank should be discussed with the propane supplier to determine if any additional delivery fees can be avoided by investing in a larger tank.

When siting a propane fueling station, it is important to consider the distance to a source of electrical power, as electrical lines will need to be run for the fuel dispenser, pump, and card reader. Propane station fuel dispensers are available with two separate nozzles, one for the vehicles and another for filling propane canisters. Propane canisters can be used in applications such as forklifts and lawn mowers.

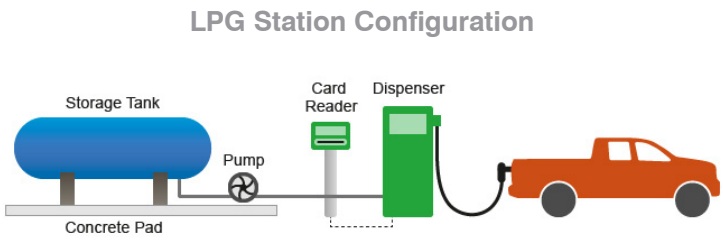


Figure 4: Propane dispenser configuration

Safety

The propane industry is highly regulated with a good safety record. Propane is a nontoxic, non-carcinogenic, and non-corrosive fuel. It poses no harm to groundwater, surface water, or soil. Because propane is odorless and colorless, an odorant called ethanethiol is added to enable leak detection.

Propane gas turns into a liquid while under pressure, making it easier to transport and store in vehicle fuel tanks. Propane is stored at 250 psi compared to CNG at 3,600 psi. Propane fuel storage tanks are constructed of carbon steel. The tanks are 20 times more puncture resistant than gasoline tanks, and are designed to withstand 1,000 psi, even though normal operating pressure is less than 300 psi. Furthermore, every propane tank is equipped with an internal pressure relief valve that opens automatically to relieve pressure within the tank should it rise higher than the set point.

Figure 5: Example propane refueling infrastructure

The propane station (including tank) must be located outdoors, and should be surrounded entirely by six-inch steel bollards to prohibit damage from vehicular impact (see Figure 5). Fire suppressants should be placed next to the station, and all personnel involved with fueling propane vehicles should be trained on proper technique and safety.

It is common for adopters of new technology to be concerned with safety. While it is true that some additional precautions, most of which have been outlined above, need to be taken while using propane as an auto fuel, the fact remains that most public concerns about propane safety the result of misconceptions. Any other concerns can be largely addressed with adequate planning and preparation for propane vehicles. For more detailed information, see Appendix A.

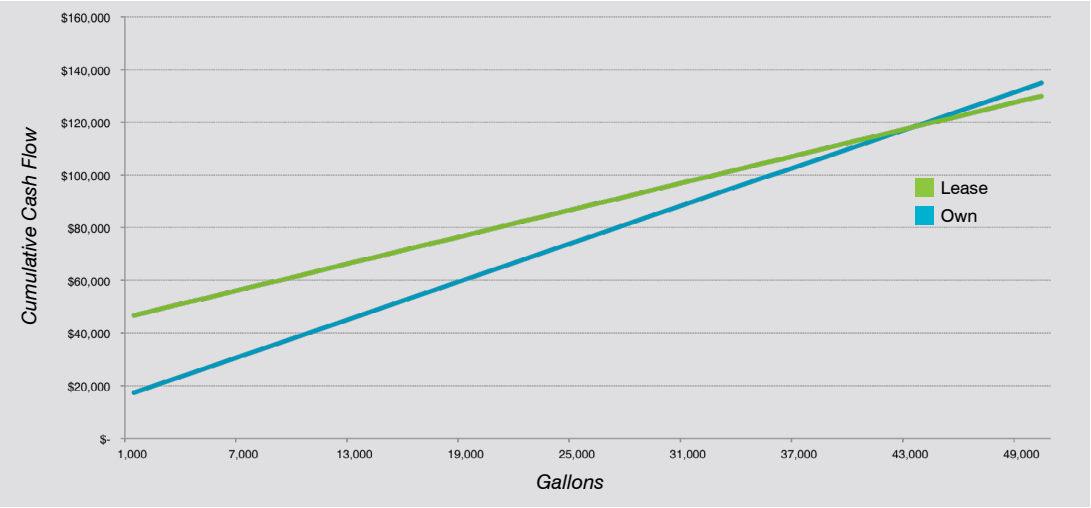
Economic Analysis

Propane station equipment and installation costs can range from $45,000 to $175,000[1], depending on the amount of storage and any additional functions of the station. The assumptions for the economic analysis are listed on the following page.

Should the City of Oberlin decide to pursue propane, the primary decision it faces is whether they should own or lease the propane tank and dispensing equipment from the fuel supplier. Typical propane fuel contracts will roll leasing fees into the cost of the fuel itself. As the difference in price per gallon between station leasing and ownership increases, the ownership option becomes increasingly attractive. This scenario uses a price spread of 70 cents (1.699/gallon for ownership and 2.399/gallon for leasing), a price spread that is not uncommon. In this scenario, ownership of the station will become economically feasible when roughly 43,000 gallons of propane are used. Based on the presented scenario, this could be as little as two years if the entire recommended fleet is converted to propane. It should also be noted that owning the propane station might allow the fleet to more easily shop around for fuel prices from multiple suppliers, and while this will likely result in further cost savings, it was not included in this analysis.

1 http://www.transportation.anl.gov/pdfs/AF/633.PDF

LPG STATION LEASE VS. OWN
COMPARATIVE CASH FLOW ANALYSIS



Scenario Assumptions	
Dispenser / Car Reader	$20,000
2x 2,000 gallon tanks (new)	$10,000
Electrical Installation	$5,000
Concrete and Barrier Installation	$10,000
Annual Propane Fuel Use	25,993 gallons

Option #1 - Lease	Year 1	Year 2	Year 3	Year 4	Year 5
Dispensing Station	$-	$-	$-	$-	$-
Tanks	$-	$-	$-	$-	$-
Construction	$15,000.00	$-	$-	$-	$-
Fuel Cost	$62,213.27	$62,213.27	$62,213.27	$62,213.27	$62,213.27
Yearly Total	$77,213.27	$62,213.27	$62,213.27	$62,213.27	$62,213.27
Cumulative Cost	**$77,213.27**	**$139,426.53**	**$201,639.80**	**$263,853.07**	**$326,066.34**

Option #2 - Own	Year 1	Year 2	Year 3	Year 4	Year 5
Dispensing Station	$20,000.00	$-	$-	$-	$-
Tanks	$10,000.00	$-	$-	$-	$-
Construction	$15,000.00	$-	$-	$-	$-
Fuel Cost	$44,060.17	$44,060.17	$44,060.17	$44,060.17	$44,060.17
Yearly Total	$89,060.17	$44,060.17	$44,060.17	$44,060.17	$44,060.17
Cumulative Cost	**$89,060.17**	**$133,120.33**	**$177,180.50**	**$221,240.67**	**$265,300.84**

ELECTRIC VEHICLE INFRASTRUCTURE

Charging equipment for electric vehicles (EVs) is classified by the rate at which it charges the vehicle's on-board battery. Efforts to standardize electric vehicle charging infrastructure have resulted in three standard charging levels: AC Level 1 (110 - 120 volts), AC Level 2 (208 - 220 volts), and DC Level 3 (480 volts). Similar efforts have been made to standardize charging equipment, and today, The Society of Automotive Engineers (SAE) recognizes all three levels of charging and the standard J1772 connector, which should address drivers' concerns about whether their vehicles are compatible with available infrastructure.

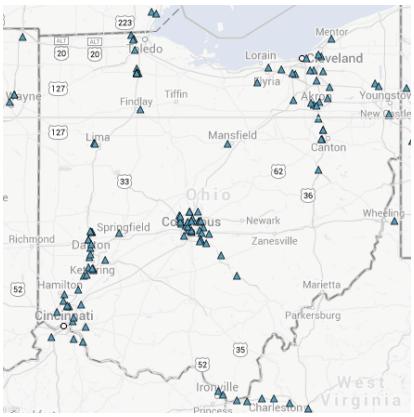


Figure 6: Ohio's EV charging stations

According to the Alternative Fuels Data Center's Station Locator, there are currently 97 public electric vehicle stations in Ohio, of which two are located in the city of Oberlin. Additional stations will likely be required if OFFERS fleet partners anticipate adding additional electric vehicles to their fleets. Placing public charging stations in highly visible locations can effectively promote electric vehicles and drive public interest as well.

The following section will give an overview of electric vehicle charging infrastructure, so that the fleet manager can make a decision that will minimize costs and maximize the efficiency of their EV fleet.

Electric Vehicle Supply Equipment Overview

Fleets interested in electric vehicles will likely need a dedicated parking space with some form of charging station for each electric vehicle (EV) in their fleet. As mentioned above, there are three levels of charging stations, commonly referred to as electric vehicle supply equipment (EVSE). AC (alternating current) Level 1 and Level 2 stations are far more common, and both utilize the SAE J1772 charger coupler (Figure 7) to connect the vehicle to the charging source. There are two commonly used charging couplers for DC Level 3 charging.

AC Level 1

All EVs come with a cord that can plug into a common 120-volt outlet to charge the vehicle, albeit slowly. Of the three standard charging levels, Level 1 takes the longest, and is typically not able to meet the power demands of full EVs. A Nissan Leaf battery, for example, could take 16 to 25 hours to charge on Level 1. Vehicles with smaller batteries are good candidates to operate solely on Level 1 charging. A Chevrolet Volt, for example, is able to charge from zero to full capacity in 8 to 11 hours on a Level 1 charge, which coincides well with the amount of time a typical vehicle is parked either at work or at home. Level 1 chargers could also work for a fleet of EVs if the vehicles have small batteries (less than 20 kWh) and are routinely charged overnight.


Figure 7: SAE J1772 charger coupler

AC Level 2

Level 2 charging stations are the most commonly installed for public areas, parking facilities, and commercial businesses – though many EV owners will also install Level 2 EVSE for private charging at home. Level 2 charging specifies a single-phased branch circuit with a voltage rating of 240 volts. The higher voltage allows for a faster charge of the vehicle's battery. AC Level 2 stations can be either wall or pedestal mounted, and any units intended for outdoor use should have a NEMA electrical enclosures rating of at least 3R, meaning it is rain tight, sleet resistant, and will remain undamaged by any external ice accumulation on the enclosure.

DC Quick (or Fast) Charge

As the name suggests, Quick Charging is the fastest way to charge an EV's battery. A Quick Charger is capable of charging a fully depleted Nissan LEAF battery to 80% capacity in less than 30 minutes. Quick Charging is ideal for places like retail and convenience stores, or other destinations in which the vehicle would only be parked for a short period of time.

Figure 8: CHAdeMO Quick Charge connector

The most commonly available Quick Charging connector is the "CHAdeMO" connector, which is currently only available on Japanese model EVs. The SAE has released a "hybrid connector" for fast charging that adds two high-voltage DC power contact pins underneath the standard J1772 connector, allowing AC Level 1 and AC Level 2 charging to use the same charge port.

Figure 9: SAE combo coupler

Quick Charging infrastructure can cost more than $15,000 each to install, and currently very few vehicle models can utilize this technology. Given this, and the fact that the charge port can vary based on the specific manufacturer, it is recommended that OFFERS fleet partners wait before deciding to install any Quick Charging infrastructure in the area.

Charging Level	Application	Voltage	Average Cost	Charge Rate
AC Level 1	Private	110 - 120v AC	$300 - $500	2 - 5 miles per hour
AC Level 2	Private/Public	220 - 240v AC	$1000 - $2000	10 - 20 miles per hour
DC Level 3	Public/Commercial	480v DC	$15,000 - $50,0000	60 - 80 miles per 20 minutes

The biggest factor affecting the time it takes for an EV to charge isn't always the level of charging; it can also depend on the size of the vehicle's battery, and the sizes of plug-in electric vehicle (PEV) batteries vary widely. The 2012 Prius Plug-in Hybrid has only a 4.4 kWh battery, the 2012 Chevrolet Volt has a 16 kWh battery, and the 2012 Nissan LEAF has a 24 kWh battery. Another PEV, the Tesla Model S, has 40 kWh, 60 kWh, and 85 kWh options for the battery.

Siting Considerations

While charging station equipment can be expensive, most of the cost incurred for electric vehicle infrastructure is a result of hardware installation rather than purchase. Therefore, a thorough site plan should be completed before commencing an agreement to install any stations. All EVSE installations should comply with local zoning, building and electrical codes. Future station owners should contact the appropriate authorities having jurisdiction early in the planning process to ensure things move quickly and smoothly.

Wall mount vs. Pedestal mount

Wall mounted charging stations tend to be less expensive than pedestal mounted stations and are ideal for parking spaces with adjacent walls. In areas where wall access is not feasible, a pedestal-mounted station may be necessary to ensure proximity to the parked vehicle. These stations may also require bollards when curbs are not available to protect the EVSE.

Minimizing cable/conduit runs

An effort should be made to site any charging stations as close to the electrical source as possible. As the distance form the electrical source increases, so does the installation

cost. This is due to the need for additional conduit to bring electricity from the source to the station. The cost increases even further if there is a need to cross under an existing hard surface, such as a parking lot.

Electrical upgrades
An increase in electrical demand could require upgrades in the building's electrical equipment, such as supplemental meters and circuit breakers. This possibility becomes more and more likely as the number of stations increases. It is recommended that the EVSE be installed with a separate meter or monitoring device to be able to accurately track the electricity used to charge the vehicle(s). Any electrical upgrades should be discussed with a qualified electrician.

ADA requirements
EV parking spaces should be located in an area that also allows compliance with the Americans with Disabilities Act (ADA). Siting a charging station between an existing barrier-free parking space and a standard parking space such that either space could use the access aisle and the charging station is one way to provide accessibility accommodations.

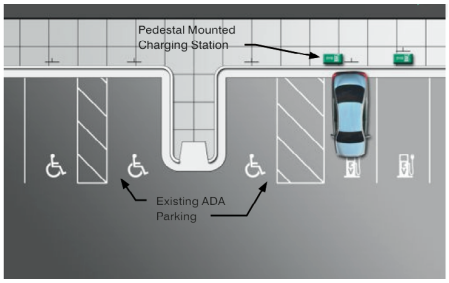


Figure 10: ADA-compliant EV parking

Signage
It is important that station owners designate EV parking spaces with signage so charging stations remain available for EVs. A recognizable symbol helps EV drivers locate available charging stations, and, accompanied by a city ordinance, provides station owners with a means to enforce EV-only parking if violations become an issue.

Pavement markings should be used to further identify EV parking spaces. Either the approved symbol or the letters "PEV" are generally acceptable. It is recommended that the paint color used match the color of the adjacent parking lines to ensure consistency of appearance. In situations where matching the original aesthetic is not possible, cool colors, including darker greens and blues, should be avoided as they are difficult color to distinguish on asphalt or concrete.

Figure 11: EV charging parking sign

Lighting
For stations where night use is anticipated, adequate lighting levels should be provided to allow for use regardless of vehicle plug port location.

City Planning and Zoning
The City should adopt an ordinance for EV parking spaces and allows for enforcement of parking space use on private property. Such ordinances have the benefits of both encouraging EV adoption and infrastructure development. Sample zoning ordinance language is available in the Plug-in Ready Michigan plan with a link to the plan located in Appendix A.

BIODIESEL FUELING INFRASTRUCTURE

Biodiesel is a domestically-produced, renewable fuel that can be manufactured from vegetable oils, animal fats, recycled restaurant grease, or other organic compounds. Biodiesel is most commonly made from soybean oil, and is often blended with petroleum diesel as a replacement for conventional diesel fuel. The number following the "B" refers to the percentage of biodiesel in the fuel, i.e. B5=5% biodiesel and B100=100% biodiesel. Biodiesel is nontoxic, biodegradable, and cleaner-burning alternative to conventional diesel fuel.

B20 is the most commonly used biodiesel blend because it can be used in most diesel equipment with no or only minor modifications. Equipment that can use B20 includes, but is not limited to, compression-ignition engines, fuel oil and heating oil boilers, and turbines.

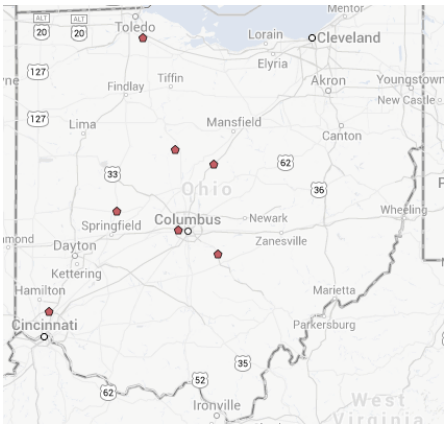


Figure 12: Ohio's biodiesel stations

Storage and Fuel

Biodiesel, just like conventional diesel, can be stored in aboveground or underground storage tanks. If a tank is going to be used for biodiesel, it is crucial that the tank be thoroughly cleaned. B100 will dissolve any accumulated sediments in a diesel storage tank – this is often referred to as the "cleaning effect." These dissolved sediments can contaminate the fuel and lead to clogged fuel filters and potential fuel injection failure in an engine.

It is very important to verify that biodiesel can work with current fueling systems and engines. Higher grades of biodiesel have been shown to degrade certain hoses, gaskets, pumps, nozzles, seals, glues, and plastics. Nitrile rubber compounds (including polypropylene, poly vinyl, and Tygon) are especially vulnerable to corrosion from B100. Most storage tanks designed to store diesel fuel can also store B100. It should be noted that in some areas, an Underwriters Laboratories (UL) listing is required by insurance companies or by state and local jurisdictions for fuel dispensers.

The National Biodiesel Board recommends only purchasing fuel from a reputable source and never buying fuel from someone making fuel in his or her garage or backyard. The NBB also recommends buying fuel that is already blended as it would help ensure that the biodiesel has been properly handled and treated for climatic needs. This would especially make sense for smaller fleets that may not be able to blend their own fuel and perform required testing on the fuel.

Biodiesel, just like regular diesel, should be sampled and tested regularly. Be sure your test lab follows procedures outlined in ASTM D-4057-81 and D-4177-82.

Cloud Point

The cloud point, or the temperature at which the wax in diesel begins to show a cloudy appearance and can clog fuel filters, is especially relevant to biodiesel. Biodiesel's specific cloud point depends on the blend of the diesel, however in most cases, the higher percentage of biodiesel used, the higher the cloud point. For instance, pure diesel fuel has a cloud point of 10 to 20 degrees Fahrenheit but pure soy biodiesel has been reported to have a cloud point as high as 32 degrees Fahrenheit. Some specially formulated blends have been able to reduce the cloud point in B20 blends to -4 degrees Fahrenheit – though even at this temperature cloud point remains a concern for fleets interested in using biodiesel in colder climates.

Economics

In the most recent Clean Cities price report the average price of diesel in the Midwest was $3.85, whereas the average price of biodiesel (B20) in the Midwest was $3.97. Because the cost of the fuel is more than the price of the conventional fuel, biodiesel can never have a financial payback. As with many alternative fuels, the environmental benefits of the fuel need to be taken into consideration and the fleet owner should decide whether these environmental benefits outweigh the current cost premium for the fuel.

Other Forms of Biodiesel

Algae

Breakthroughs in using algae as a feedstock for creating biodiesel have occurred in the past few years. While promising, this technology is most likely at least 10 years from being deployed on a commercial scale.

Straight Vegetable Oil

Some diesel vehicles are capable of using straight vegetable oil (SVO), or filtered used vegetable oil, as fuel. However, studies have repeatedly shown that it can result in reduced engine life due to a buildup of carbon deposits inside the engine and SVO potentially leaking into the engine's oil. For these reasons, straight vegetable oil should not be considered as an option for project partners.

Next Steps

If the fleet partners decide to pursue the use of biodiesel, it is recommended that they clean an older diesel storage tank rather than purchase new equipment. Since biodiesel will "clean out" and absorb contamination left behind by years of petroleum fuel storage, the tank should be thoroughly cleaned by a trained professional. Existing tank lines must also be thoroughly cleaned or replaced prior to storing biodiesel. For additional resources, see Appendix A.

APPENDIX A

ADDITIONAL RESOURCES: COMPRESSED NATURAL GAS

Guideline for Determining the Modifications Required for Adding Compressed Natural Gas and Liquefied Natural Gas Vehicles to Existing Maintenance Facilities
http://www.cleanvehicle.org/committee/technical/PDFs/GuidelinesDocumentFinal.pdfe

ADDITIONAL RESOURCES: PROPANE

National Alternative Fuels Training Consortium
http://www.naftc.wvu.edu/cleancitieslearningprogram/petroleumreduction/propane

Propane Education & Research Council (PERC)
http://www.propanesafety.com

ADDITIONAL RESOURCES: ELECTRIC VEHICLES

Plug-In Electric Vehicle Handbook for Fleet Managers
http://www.afdc.energy.gov/pdfs/pev_handbook.pdf

Community Planning Guide For Plug-In Electric Vehicles
http://www.advancedenergy.org/_files/pages/Community-Planning-Guide-for-Plug-in-Electric-Vehicles.pdf

Clean Cities 2014 Vehicle Buyer's Guide
http://www.afdc.energy.gov/uploads/publication/60448.pdf

Plug-in Ready Michigan Plan
http://cec-mi.org/plugin

ADDITIONAL RESOURCES: BIODIESEL

Biodiesel, U.S. DOE Alternative Fuels Data Center
http://www.afdc.energy.gov/fuels/biodiesel.html

Biodiesel Handling and Use Guide, 4th Edition, Revised January 2009, NREL
http://www.biodiesel.org/docs/using-hotline/nrel-handling-and-use.pdf

Materials Compatibility, National Biodiesel Board
http://www.biodiesel.org/docs/ffs-performace_usage/materials-compatibility.pdf

Straight Vegetable Oil as a Diesel Fuel?, U.S. DOE Clean Cities
http://www.afdc.energy.gov/uploads/publication/54762.pdf

APPENDIX D | ADDITIONAL RESOURCES

ADDITIONAL RESOURCES | COMPRESSED NATURAL GAS

- Guideline for Determining the Modifications Required for Adding Compressed Natural Gas and Liquefied Natural Gas Vehicles to Existing Maintenance Facilities
  http://www.cleanvehicle.org/committee/technical/PDFs/GuidelinesDocumentFinal.pdf

ADDITIONAL RESOURCES | PROPANE

- National Alternative Fuels Training Consortium
  http://www.naftc.wvu.edu/cleancitieslearningprogram/petroleumreduction/propane

- Propane Education & Research Council (PERC)
  http://www.propanesafety.com

ADDITIONAL RESOURCES | ELECTRIC VEHICLES

- Plug-In Electric Vehicle Handbook for Fleet Managers
  http://www.afdc.energy.gov/pdfs/pev_handbook.pdf

- Plug-In Electric Vehicle Readiness Scorecard
  https://www.afdc.energy.gov/pev-readiness/categories

- Community Planning Guide For Plug-In Electric Vehicles
  http://www.advancedenergy.org/_files/pages/Community-Planning-Guide-for-Plug-in-Electric-Vehicles.pdf

- Clean Cities 2014 Vehicle Buyer's Guide
  http://www.afdc.energy.gov/uploads/publication/60448.pdf

- Plug-in Ready Michigan Plan
  http://cec-mi.org/plugin

ADDITIONAL RESOURCES | BIODIESEL

- Biodiesel, U.S. DOE Alternative Fuels Data Center
  http://www.afdc.energy.gov/fuels/biodiesel.html

- Biodiesel Handling and Use Guide, 4th Edition, Revised January 2009, NREL
  http://www.biodiesel.org/docs/using-hotline/nrel-handling-and-use.pdf

- Materials Compatibility, National Biodiesel Board
  http://www.biodiesel.org/docs/ffs-performace_usage/materials-compatibility.pdf

- Straight Vegetable Oil as a Diesel Fuel?, U.S. DOE Clean Cities
  http://www.afdc.energy.gov/uploads/publication/54762.pdf

APPENDIX E |
SAMPLE BIODIESEL RFP

STATE OF DELAWARE
EXECUTIVE DEPARTMENT
OFFICE OF MANAGEMENT AND BUDGET

State of Delaware

Biodiesel - B20 and B5 Fuels

Invitation to Bid

Contract No. GSS12503-BIODIESEL

January 10, 2012

- Deadline to Respond -
January 31, 2012
1:00 PM (Local Time)

CONTRACT NO. GSS12503-BIODIESEL

ALL BIDDERS:

The enclosed packet contains an "INVITATION TO BID" for GSS12503-BIODIESEL. The invitation consists of the following documents:

INVITATION TO BID - CONTRACT NO. GSS12503-BIODIESEL

1 DEFINITIONS and GENERAL PROVISIONS
2 SPECIAL PROVISIONS and TECHNICAL SPECIFICATIONS
3 BID QUOTATION REPLY SECTION
ATTACHMENTS:
A – PROPOSAL REPLY REQUIREMENTS or BID QUOTATION
B – NO BID REPLY FORM
C – NON-COLLUSION STATEMENT AND ACCEPTANCE
D – [BLANK PAGE – NO VENDOR INPUT REQUIRED]
E – SUBCONTRACTOR INFORMATION FORM
F – BUSINESS REFERENCES
G – ITB EXCEPTIONS
H – CONFIDENTIAL AND PROPRIETARY INFORMATION
I – OFFICE OF MINORITY AND WOMEN BUSINESS ENTERPRISE (OMWBE) APPLICATION

4 APPENDIX A – Pricing
APPENDIX B – Utilization – FOR REFERENCE ONLY

Both appendixes are made part of this solicitation and are available for download at the following site:

http://bids.delaware.gov/

In order for your bid to be considered, the bid quotation reply section shall be executed completely and correctly and returned in a sealed envelope clearly displaying the contract number, by January 31, 2012 at 1:00 PM (Local Time).

Bids shall be submitted to:

STATE OF DELAWARE
GOVERNMENT SUPPORT SERVICES
CONTRACTING SECTION
100 ENTERPRISE PLACE - SUITE 4
DOVER, DE 19904-8202

Please review and follow the information and instructions contained in the general and special provisions section of the invitation. Should you need additional information, please contact Peter Korolyk at 302-857-4559 or peter.korolyk@state.de.us .

S:\12503 ITB

STATE OF DELAWARE
Office of Management and Budget
Government Support Services

GOVERNMENT SUPPORT SERVICES

DEFINITIONS
AND
GENERAL PROVISIONS

The attached Definitions and General Provisions apply to all contracts and are part of each invitation to bid. The requirement to furnish a bid bond and performance bond is applicable unless waived in the Special Provisions. Should the General Provisions conflict with the Special Provisions, the Special Provisions shall prevail. Bidders or their authorized representatives are required to fully acquaint themselves as to State procurement laws and regulations prior to submitting bid.

STATE OF DELAWARE
Office of Management and Budget
Government Support Services

DEFINITIONS

Whenever the following terms are used, their intent and meaning shall be interpreted as follows:

STATE: The State of Delaware

AGENCY: State Agency as noted on cover sheet.

DESIGNATED OFFICIAL: The agent authorized to act for the Agency.

BID INVITATION: The "bid invitation" or "invitation to bid" is a packet of material sent to vendors and consists of General Provisions, Special Provisions, specifications, and enclosures.

GENERAL PROVISIONS: General Provisions are instructions pertaining to contracts in general. They contain, in summary, requirements of laws of the State, policies of the Agency, and instructions to vendors.

SPECIAL PROVISIONS: Special Provisions are specific conditions or requirements peculiar to the contract under consideration and are supplemental to the General Provisions. Should the Special Provisions conflict with the General Provisions, the Special Provisions shall prevail.

BIDDER OR VENDOR: Any individual, firm, or corporation formally submitting a proposal for the material or work contemplated, acting directly or through a duly authorized representative.

PROPOSAL: The offer of the bidder submitted on the approved form and setting forth the bidder's prices for performing the work or supplying the material or equipment described in the specifications.

SURETY: The corporate body which is bound with and for the contract, or which is liable, and which engages to be responsible for the contractor's payments of all debts pertaining to and for its acceptable performance of the work for which its has contracted.

BIDDER'S DEPOSIT: The security designated in the proposal to be furnished by the bidder as a guaranty of good faith to enter into a contract with the Agency if the work to be performed or the material or equipment to be furnished is awarded to the bidder.

CONTRACT: The written agreement covering the furnishing and delivery of material or work to be performed.

CONTRACTOR: Any individual, firm, or corporation with whom a contract is made by the Agency.

CONTRACT BOND: The approved form of security furnished by the contractors and its surety as a guaranty of good faith on the part of the contractor to execute the work in accordance with the terms of the contract.

LOCAL TIME: Eastern Standard Time/Eastern Daylight Time

STATE OF DELAWARE
Office of Management and Budget
Government Support Services

SECTION A - GENERAL PROVISIONS

1. **BID INVITATION**:

   See "Definitions".

2. **PROPOSAL FORMS**:

   The invitation to bid shall contain pre-printed forms for use by the vendor in submitting its bid. The forms shall contain basic information such as description of the item and the estimated quantities and shall have blank spaces for use by the vendor for entering information such as unit bid price, total bid price, etc.

3. **INTERPRETATION OF ESTIMATES**:

   a. The attention of bidders is called to the fact that, unless stated otherwise, the quantities given in the proposal form are to be considered to be approximate only and are given as a basis for the comparison of bids. The Agency may increase or decrease the amount of any item as may be deemed necessary or expedient, during the period of the contract.

   b. An increase or decrease in the quantity for any item is not sufficient ground for an increase or decrease in the unit price.

4. **SILENCE OF SPECIFICATIONS**:

   The apparent silence of the specifications as to any detail, or the apparent omission from it of detailed description concerning any point, shall be regarded as meaning that only the best commercial practice is to prevail and only material and workmanship of the first quality are to be used. Proof of specifications compliance will be the responsibility of the vendor.

5. **EXAMINATION OF SPECIFICATIONS AND PROVISIONS**:

   The bidder shall examine carefully the proposal and the contract forms for the material contemplated. The bidder shall investigate and satisfy itself as to the conditions to be encountered, quality and quantities of the material to be furnished, and the requirements of the Special Provisions and the contract. The submission of a proposal shall be conclusive evidence that the bidder has made examination of the aforementioned conditions.

6. **PREPARATION OF PROPOSAL**:

   a. **The bidder's proposal shall be written in ink or typewritten** on the form provided.

   b. If items are listed with a zero quantity, bidder shall state unit price **ONLY** (intended for open end purchases where estimated requirements are not known). The proposal shall show a total bid price for each item bid and the total bid price of the proposal excluding zero quantity items.

7. **PRICES QUOTED**:

The prices quoted are those for which the material will be furnished F.O.B. Ordering Agency and include all charges that may be imposed during the period of the contract.

All prices must be quoted in U.S. Dollars.

8. **DISCOUNT**:

No qualifying letter or statements in or attached to the proposal, or separate discounts will be considered in determining the low bid except as may be otherwise herein noted. Cash or separate discounts should be computed and incorporated into unit bid price(s).

9. **SAMPLES OR BROCHURES**:

Samples or brochures may be required by the agency for evaluation purposes. They shall be such as to permit the Agency to compare and determine if the item offered complies with the intent of the specifications.

10. **PROPOSAL GUARANTY; BID BOND**:

a. Each bidder shall submit with its proposal a guaranty in sum equal to at least 10% of the total value of its bid, according to Delaware Code Title 29, Section 6927(a).

b. This bid bond shall be submitted in the form of good and sufficient bond drawn upon an insurance or bonding company authorized to do business in the State of Delaware, to the State of Delaware for the benefit of the Agency, or a certified check drawn on a reputable banking institution and made payable to the Agency in the requirement amount. If Agency bond form is not utilized, the substituted bond forms must conform to the minimum of conditions specified in the Agency bond form.

11. **DELIVERY OF PROPOSALS**:

Proposals shall be delivered in sealed envelopes, and shall bear on the outside the name and address of the bidder as well as the designation of the contract. Proposals forwarded by U.S. Mail shall be sent first class to the address listed below. Proposals forwarded by delivery service other than the U.S. Mail or hand delivered must be delivered to the address listed below. All bids must clearly display the bid number on the envelope.

STATE OF DELAWARE
Office of Management and Budget
Government Support Services, Contracting Section
100 Enterprise Place – Suite 4
Dover, DE 19904-8202

All proposals will be accepted at the time and place set in the advertisement. Bidder bears the risk of delays in delivery. Proposals received after the time set for public opening will be returned unopened.

12. **WITHDRAWAL OF PROPOSALS**:

A bidder may withdraw its proposal unopened after it has been deposited, if such a request is made prior to the time set for the opening of the proposal.

13. **PUBLIC OPENING OF PROPOSALS**:

The bids shall be publicly opened at the time and place specified by the Agency. Bidders or their authorized representatives are invited to be present.

14. **PUBLIC INSPECTION OF PROPOSALS**:

If the bidder designates a portion of its bid as confidential, it shall isolate and identify in writing the confidential portions. The bidder shall include with this designation a statement that explains and supports the firm's claim that the bid items identified as confidential contain trade secrets or other proprietary data.

15. **DISQUALIFICATION OF BIDDERS**:

Any one or more of the following causes may be considered as sufficient for the disqualification of a bidder and the rejection of its proposal or proposals:

a. More than one proposal for the same contract from an individual, firm, or corporation under the same or different names.
b. Evidence of collusion among bidders.
c. Unsatisfactory performance record as evidenced by past experience.
d. If the unit prices are obviously unbalanced either in excess or below reasonable cost analysis values.
e. If there are any unauthorized additions, interlineations, conditional or alternate bids or irregularities of any kind which may tend to make the proposal incomplete, indefinite, or ambiguous as to its meaning.
f. Non-attendance of mandatory pre-bid meetings may be cause of disqualification.

16. **ADDENDA TO THE ITB**:

If it becomes necessary to revise any part of this ITB, revisions will be posted at http://bids.delaware.gov/ . By submitting an offer to the State, vendors have acknowledged receipt, understanding and commitment to comply with all materials, revisions, and addenda related to the Invitation to Bid.

SECTION B - AWARD AND EXECUTION OF CONTRACT

1. **CONSIDERATION OF BIDS**:

   a. After the proposals have been opened, the bids will be tabulated and the results will be made available to the public. Tabulations of the bids will be based on the correct summation of items at the unit price bid.

   b. The right is reserved to waive technicalities, to reject any or all bids, or any portion thereof, to advertise for new proposals, to proceed to do the work otherwise, or to abandon the work, if in the judgment of the Agency or its agent, the best interest of the State will be promoted thereby.

2. **MATERIAL GUARANTY**:

   Before any contract is awarded, the successful bidder may be required to furnish a complete statement of the origin, composition and manufacture of any or all of the material to be used in the contract together with such samples as may be requested for the purpose of testing.

3. **CONTRACT AWARD**:

   Within thirty days from the date of opening proposals, the contract will be awarded or the proposals rejected.

4. **EXECUTION OF CONTRACT**:

   a. The bidder to whom the award is made shall execute a formal contract and bond within twenty days after date of official notice of the award of the contract.

   b. If the successful bidder fails to execute the required contract and bond, as aforesaid, within twenty days after the date of official notice of the award of the contract, its proposal guaranty shall immediately become forfeited as liquidated damages. Award will then be made to the next lowest qualified bidder of the work or re-advertised, as the Agency may decide.

5. **REQUIREMENT OF CONTRACT BOND**:

   a. Successful bidders shall furnish bond, simultaneously with the execution of the formal contract, to the State of Delaware for the benefit of the Agency with surety in the amount of 100% of the total contract award or as otherwise provided in the Special Provisions. Said bonds shall be conditioned upon the faithful performance of the contract.

   b. The bond forms shall be provided by the Agency and the surety shall be acceptable to the Agency.

6. **WARRANTY**:

   The successful bidder(s) shall be required to extend any policy guarantee usually offered to the general public, FEDERAL, STATE, COUNTY, or MUNICIPAL governments, on material in this contract against defective material, workmanship, and performance.

7. **THE CONTRACT(S)**:

The contract(s) with the successful bidder(s) will be executed with the Office of Management and Budget, Government Support Services acting for all participating agencies.

8. **RETURN OF BIDDER'S DEPOSIT**:

The deposits shall be returned to the successful bidder upon the execution of the formal contract. The deposits of unsuccessful bidders shall be returned to them immediately upon the awarding of the contract or rejection of their bids.

9. **INFORMATION REQUIREMENT**:

The successful bidder's shall be required to advise the Office of Management and Budget, Government Support Services of the gross amount of purchases made as a result of the contract.

10. **CONTRACT EXTENSION**:

The State reserves the right to extend this contract on a month-to-month basis for a period of up to three months.

11. **TERMINATION FOR CONVENIENCE**:

Contracts shall remain in effect for the time period and quantity specified unless the contract is terminated by the State. The State may terminate the contract at any time by giving written notice of such termination and specifying the effective date thereof, at least sixty (60) days before the effective date of termination.

12. **TERMINATION FOR CAUSE**:

If, for any reasons, or through any cause, the Contractor fails to fulfill in timely and proper manner its obligations under this Contract, or if the Contractor violates any of the covenants, agreements, or stipulations of this Contract, the State shall thereupon have the right to terminate this contract by giving written notice to the Contractor of such termination and specifying the effective date thereof, at least 5 days before the effective date of such termination. In that event, all finished or unfinished documents, data, studies, surveys, drawings, maps, models, photographs, and reports or other material prepared by the Contractor under this Contract shall, at the option of the State, become its property, and the Contractor shall be entitled to receive just and equitable compensation for any satisfactory work completed on such documents and other materials which is usable to the State.

SECTION C - GENERAL

1. **AUTHORITY OF AGENCY**:

On all questions concerning the interpretation of specifications, the acceptability and quality of material furnished and/or work performed, the classification of material, the execution of the work, and the determination of payment due or to become due, the decision of the Agency shall be final and binding.

2. **LAWS TO BE OBSERVED**:

The contractor is presumed to know and shall strictly comply with all National, State, or County laws, and City or Town ordinances and regulations in any manner affecting the conduct of the work. The contractor shall indemnify and save harmless the State of Delaware, the Agency, and all Officers, Agency and Servants thereof against any claim or liability arising from or based upon the violation of any such laws, ordinances, regulations, orders, or decrees whether by itself or by its employees.

3. **PERMITS AND LICENSES**:

All necessary permits, licenses, insurance policies, etc. required by local, State or Federal laws, shall be provided by the contractor at its own expense.

4. **PATENTED DEVICES, MATERIAL AND PROCESSES**:

a. The contractor shall provide for the use of any patented design, device, material, or process to be used or furnished under this contract by suitable legal agreement with the patentee or owner, and shall file a copy of this agreement with the Agency.

b. The contractor and the surety shall hold and save harmless the State of Delaware, the Agency, the Director, their Officers or Agents from any and all claims because of the use of such patented design, device, material, or process in connection with the work agreed to be performed under this contract.

5. **EMERGENCY TERMINATION OF CONTRACT**:

a. Due to restrictions which may be established by the United States Government on material, or work, a contract may be terminated by the cancellation of all or portions of the contract.

b. In the event the contractor is unable to obtain the material required to complete the items of work included in the contract because of restrictions established by the United States Government and if, in the opinion of the Agency, it is impractical to substitute other available material, or the work cannot be completed within a reasonable time, the incomplete portions of the work may be cancelled, or the contract may be terminated.

6. **TAX EXEMPTION**:

a. Material covered by this proposal is exempt from all FEDERAL and STATE TAXES. Such taxes shall not be included in prices quoted.

b. Any material which is to be incorporated in the work or any equipment required for the work contemplated in the proposal may be consigned to the Agency. If the shipping papers show clearly that any such material is so consigned, the shipment will be exempt from the tax on the transportation of property under provisions of Section 3475 (b) of the Internal Revenue Code, as amended by Public Law 180 (78th Congress). All transportation charges shall be paid by the contractor. Each bidder shall take its exemption into account in calculating its bid for its work.

7. **OR EQUAL (PRODUCTS BY NAME)**:

Specifications of products by name are intended to be descriptive of quality or workmanship, finish and performance. Desirable characteristics are not intended to be restrictive. Substitutions of products for those named will be considered provided the vendor certifies that the function, characteristics, performance and endurance qualities of the material offered is equal or superior to that specified.

8. **BID EVALUATION AND AWARD**:

The Office of Management and Budget, Government Support Services will award this contract to the lowest responsible bidder(s) which in their judgment best serves the interest of the State of Delaware in accordance with Delaware Code Title 29, Section 6923(k). Personnel with experience and technical background may be utilized by the Office of Management and Budget, Government Support Services in making judgment. In case of error in price extension, the unit price(s) shall prevail.

9. **INVOICING**:

After the awards are made, the agencies participating in the bid may forward their purchase orders to the successful bidder(s) in accordance with State Purchasing Procedures. The State will generate a payment voucher upon receipt of an invoice from the vendor.

STATE OF DELAWARE
Office of Management and Budget
Government Support Services

SECTION D - EQUAL OPPORTUNITY

1. **EQUALITY OF EMPLOYMENT OPPORTUNITY ON PUBLIC WORKS**:

During the performance of any contract for public works financed in whole or in part by appropriation of the State of Delaware, the contractor agrees as follows:

a. The contractor will not discriminate against any employee or applicant for employment because of race, creed, color, sex, age, or national origin. The contractor will take affirmative action to ensure that applicants are employed and that employees are treated equally during employment without regard to their race, creed, color, sex, age, or national origin. Such action shall include, but not be limited to the following: advertising, lay-off or termination, rates of pay or other forms of compensation, and selection for training including apprenticeships. The contractor agrees to post in conspicuous places, notices to be provided by the contracting agency setting forth the provisions of this non-discrimination clause.

b. The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, color, sex, age, or national origin.

c. The term "contractor for public works" means construction, reconstruction, demolition, alteration, and/or repair work, maintenance work, and paid for in whole or in part out of the funds of a public body except work performed under a vocational rehabilitation program. The manufacture or furnishing of materials, articles, supplies or equipment is not a public work within the meaning of this subsection unless conducted in connection with and at the site of the public work.

STATE OF DELAWARE
Office of Management and Budget
Government Support Services

CONTRACT NO. GSS12503-BIODIESEL
Biodiesel - B20 and B5 Fuels
SPECIAL PROVISIONS

1. **CONTRACT REQUIREMENTS**:

This contract will be issued to cover the Biodiesel Fuel requirements for all State Agencies and shall be accessible to any School District, Political Subdivision, Municipality or Volunteer Fire Company.

2. **MANDATORY USE CONTRACT**:

REF: Title 29, Chapter 6911(d) Delaware Code. Every state department and agency within the Executive Branch and Judicial Branch of the state government shall procure all material, equipment and nonprofessional services through the statewide contracts administered by Government Support Services, Office of Management and Budget. Delaware State University, Delaware Technical and Community College, the operations funded by Public School Districts, Delaware Transit Corporation, the Legislative Branch and the Board of Pension Trustees and their consultants are specifically exempted from the requirements of this subsection.

3. **CONTRACT PERIOD**:

Each vendor's contract shall be valid for two (2) years from February 15, 2012 through February 14, 2014. Each contract may be renewed for three (3) additional one (1) year extension periods through negotiation between the contractor and Government Support Services. Negotiation must be initiated no later than ninety (90) days prior to the termination of the current agreement.

4. **PRICES**:

Price shall be **net** per gallon F.O.B. delivered to agency storage tanks.

The calculated price established from the Oil Price Information System (OPIS) end of day report on Tuesday, shall be used to establish the delivery price for the week.

A. **Calculated Floating Price**:

Biodiesel – B100:

Prices quoted for the Biodiesel – B100 fuel shall be on a per gallon basis. The price shall correspond to the Oil Price Information System (OPIS) posting for **Baltimore, MD** as published in the end of the day report on **Tuesday**, and shall be used for the week of delivery. The OPIS report section to be utilized is titled "OPIS Gross Wholesale B100 SME Biodiesel Prices".

For purposes of completing a bid, all bidders shall supply quotes which utilize the Baltimore, MD biodiesel rack price. **Vendors may offer an alternative and separate benchmark location in their proposal package, but any alternates must be listed in the Comments/Exceptions attachment provided.** (GSS may elect to change the benchmark location on award, but only if the benchmark can be shown to be competitive and does not exceed the prices charged for an independent benchmark location. Currently, GSS is utilizing Harrisburg, PA as its benchmark audit location).

Ultra Low Sulfur Diesel:

Prices quoted for the Ultra Low Sulfur Diesel (ULSD) fuel shall be on a per gallon basis. The price shall correspond to the **RACK AVERAGE** posting for **Wilmington, DE**, as published in the OPIS Closing Benchmark File on **Tuesday** for the week of delivery. The ULSD component price shall be the price quoted for clear ULSD (DO NOT utilize the red dyed ULSD price). The OPIS report section to be utilized is titled, "OPIS Gross Ultra Low Sulfur Distillate Prices" and shall be the No. 2 Rack Average price.

B20 and B5 Calculated Floating Price:

All floating price calculations are shown per gallon, and do not reflect delivery or additive charges.

B20 = (B100 * 20%) + (ULSD * 80%)

B5 = (B100 * 5%) + (ULSD * 95%)

Prices retrieved from the OPIS closing report on Tuesday for B100 and ULSD will be used to calculate the weekly delivery price. For example, Tuesday, January 10, 2012 prices would be used to calculate prices for Monday, January 9, 2012 through Sunday, January 15, 2012.

The bid quotation response shall be based on the posting for both the Biodiesel – B100 and the Ultra Low Sulfur Diesel as published for **Tuesday, January 10, 2012.**

Government Support Services will reserve the right to switch the referenced benchmark location(s) for any extensions by mutual agreement. Additionally, the benchmark locations may be altered if the market conditions change (i.e. become uncompetitive) and the change can be adequately documented during the contract period.

B. **Delivery Price**:

The prices quoted regardless of quantity and method shall be net per gallon F.O.B. agency storage tanks and shall remain firm for the duration of the contract period including any extensions. (For illustration purposes, $0.05 is being used as the delivery charge per gallon).

Example of B20 Delivery Price Calculation (without additives)

Biodiesel – B100	$5.95/Gal	X	.20	=	$1.1900
Ultra Low Sulfur Diesel	$3.50/Gal	X	.80	=	$2.8000
Delivery Charge	$0.05/Gal				$0.0500
Total Price Per Gallon for B20					**$4.0400**

Example of B5 Delivery Price Calculation (without additives)

Biodiesel – B100	$5.95/Gal	X	.05	=	$0.2975
Ultra Low Sulfur Diesel	$3.50/Gal	X	.95	=	$3.3250
Delivery Charge	$0.05/Gal				$0.0500
Total Price Per Gallon for B5					**$3.6725**

If the above examples were to be used for the purchase of winter mix, and the additional charge was $0.01/Gal, that figures would be $4.0500 and $3.6825.

If the above example were to be used for the purchase of algae prevention additive (Soyshield), and the additional charge was $0.01/gal, that figure would be added to 2.2308/Gal for a total of 2.2408/Gal.

Your quoted price and your invoiced price SHALL be exclusive of all Federal and State taxes, with the exception of the following:

The Delaware Hazardous Substance Clean-Up Tax. This tax is on the Ultra Low Sulfur Diesel Fuel. This tax shall be billed as a separate line item on all invoices. The current rate is (.009). This tax is on the total dollar amount of the invoice, not on the per gallon price (.009 X amount of invoice)

The Federal Leaking Underground Storage Tank Tax. This tax is on the Ultra Low Sulfur Diesel. This tax shall be billed as a separate line item on all invoices. The current rate is (.0010). This tax is on the per gallon price.

The invoiced price shall be based on the price in effect on the date of delivery. In the event that a delivery is late at the fault of the vendor, the ordering agency at its option may request that the invoice reflect the index price for the promised delivery date rather than the actual delivery date had the index gone up during that time.

Delivery and additive charges shall remain firm for the term of the contract.

5. **COOPERATIVES**:

Vendors, who have been awarded similar contracts through a competitive bidding process with a cooperative, are welcome to submit the cooperative pricing for this solicitation.

6. **PRICE ADJUSTMENT**:

If agreement is reached to extend this contract for the first, optional year, the Division of Government Support Services shall have the option of offering a determined price adjustment and shall not exceed the current Philadelphia All Urban Consumers Price Index (CPI-U), U.S. City Average. If the CPI-U is used, any increase/decrease shall reflect the change during the previous published twelve (12) month period at the time of renegotiation.

7. **SHIPPING TERMS**:

F.O.B. destination; freight pre-paid.

8. **QUANTITIES**:

The attention of bidders is called to the fact that, unless stated otherwise, the quantities given in the proposal are best estimates and are given as a basis for the comparison of bids. Quantities ordered may be increased or decreased by any eligible agency as deemed necessary during the period of the contract.

Prior contract utilization may be viewed at the following site:

http://bids.delaware.gov/

9. **FUNDING OUT**:

The continuation of this contract is contingent upon funding appropriated by the legislature.

10. **BID BOND REQUIREMENT**:

The Bid Bond requirement has been waived.

11. **PERFORMANCE BOND REQUIREMENT**:

The Performance Bond requirement has been waived.

12. **MANDATORY INSURANCE REQUIREMENTS**:

A. Certificate of Insurance and/or copies of insurance policies for the following:

1. As a part of the contract requirements, the contractor must obtain at its own cost and expense and keep in force and effect during the term of this contract, including all extensions, the minimum coverage limits specified below with a carrier satisfactory to the State. All contractors must carry Comprehensive General Liability and at least one of the other coverages depending on the type of service or product being delivered.

a. Comprehensive General Liability - $1,000,000.00 per person/$3,000,000 per occurrence.

and

b. Medical/Professional Liability - $1,000,000.00 per person/$3,000,000 per occurrence.

or

c. Miscellaneous Errors and Omissions - $1,000,000.00 per person/$3,000,000 per occurrence.

or

d. Product Liability - $1,000,000.00 per person/$3,000,000 per occurrence.

- Automotive Liability Insurance covering all automotive units used in the work with limits of not less than $100,000 each person and $300,000 each accident as to bodily injury and $25,000 as to property damage to others.

- Forty-five (45) days written notice of cancellation or material change of any policies is required.

Administrator, Government Support Services
Contract No. GSS12503-BIODIESEL
State of Delaware
100 Enterprise Place, Suite 4
Dover, DE 19904-8202

Note: The State of Delaware shall not be named as an additional insured.

13. **BASIS OF AWARD**:

Government Support Services shall award this contract to the lowest responsible and responsive bidder(s) who best meets the terms and conditions of the bid. The award will be made on basis of price, product evaluation, and prior history of service and capability.

Government Support Services reserves the right to reject any or all bids in whole or in part, to make multiple awards, partial awards, award by types, item by item, or lump sum total, whichever may be most advantageous to the State of Delaware.

14. **STATE OF DELAWARE BUSINESS LICENSE**:

Prior to receiving an award, the successful vendor shall either furnish Government Support Services with proof of State of Delaware Business Licensure or initiate the process of application where required. An application may be requested in writing to: Division of Revenue, Carvel State Building, P.O. Box 8750, 820 N. French Street, Wilmington, DE 19899-8750 or by telephone to one of the following numbers: (302) 577-8201 - Public Service, (302) 577-8205 - Licensing Department.

Information regarding the award of this contract will be given to the Division of Revenue. Failure to comply with the State of Delaware licensing requirements may subject your organization to applicable fines and/or interest penalties.

15. **HOLD HARMLESS**:

The successful bidder agrees that it shall indemnify and hold the State of Delaware and all its agencies harmless from and against any and all claims for injury, loss of life, or damage to or loss of use of property caused or alleged to be caused, by acts or omissions of the successful bidder, its employees, and invitees on or about the premises and which arise out of the successful bidder's performance, or failure to perform as specified in the Agreement.

16. **OWNERSHIP OF INTELLECTUAL PROPERTY**:

All copyright and patent rights to all papers, reports, forms, materials, creations, or inventions created or developed in the performance of this contract shall become the sole property of the State of Delaware. On request, the contractor shall promptly provide an acknowledgment or assignment in a tangible form satisfactory to the State to evidence the State's sole ownership of specifically identified intellectual property created or developed in the performance of the contract.

17. **NON-PERFORMANCE**:

In the event the vendor does not fulfill its obligations under the terms and conditions of this contract, the ordering agency may purchase equivalent product on the open market. Any difference in cost between the contract prices herein and the price of open market product shall be the responsibility of the vendor. Under no circumstances shall monies be due the vendor in the event open market products can be obtained below contract cost. Any monies charged to the vendor may be deducted from an open invoice.

18. **FORCE MAJEURE**:

Neither the vendor nor the ordering agency shall be held liable for non-performance under the terms and conditions of this contract due, but not limited to, government restriction, strike, flood, fire, or unforeseen catastrophe beyond either party's control. Each party shall notify the other in writing of any situation that may prevent performance under the terms and conditions of this contract.

19. **CONTRACTOR NON-ENTITLEMENT**:

State of Delaware Contractors for Materiel and for Services shall not have legal entitlement to, nor seek business from another Contractors' Central Contract. Additionally, they shall not utilize other Central Contracts to fulfill the requirements of their respective contract as they are not a "Covered Agency" as defined by Title 29 Chapter 69 of the State Procurement Code.

20. **EXCEPTIONS**:

Bidders may elect to take minor exception to the terms and conditions of this ITB. Government Support Services shall evaluate each exception according to the intent of the terms and conditions contained herein, but Government Support Services must reject exceptions that do not conform to State bid law and/or create inequality in the treatment of bidders. Exceptions shall be considered only if they are submitted with the bid or before the date and time of the bid opening. (See Attachment G)

21. **REQUIRED REPORTING**:

One of the primary goals in administering this contract is to keep accurate records regarding its actual value/usage. This information is essential in order to update the contents of the contract and to establish proper bonding levels if they are required. The integrity of future contracts revolves around our ability to convey accurate and realistic information to all interested Vendors.

A Monthly Usage Report (first report shown immediately following this section) shall be furnished on the 15th (or next business day after the 15th day) of each month by the successful Vendor **Electronically in Excel format** detailing the purchasing of all items on this contract. The Monthly Usage Reports shall be submitted electronically in EXCEL and sent as an attachment to vendorusage@state.de.us . It shall

contain the six-digit department and organization code. Any exception to this mandatory requirement may result in cancellation of the award. Failure to provide the report with the minimum required information may also negate any contract extension clauses. Additionally, Vendors who are determined to be in default of this mandatory report requirement may have such conduct considered against them, in assessment of responsibility, in the evaluation of future proposals.

In accordance with Executive Order 14 and 29 – Increasing Supplier Diversity Initiatives within State Government and Ensuring Representation of Veteran-Owned Businesses…, the State of Delaware is committed to supporting its diverse business industry and population. The successful Vendor will be required to report on the participation by a minority and/or women owned business (MWBE) under this awarded contract. The reported data elements shall include but not be limited to; name of state contract/project, the name of the MWBE, MWBE contact information (phone, email), type of product or service provided by MWBE and any MWBE certifications for the subcontractor (State MWBE certification, Minority Supplier Development Council, Women's Business Enterprise Council). The format used for this Subcontracting 2nd Tier report is found below (and shown as the second report immediately following this section).

Subcontracting 2nd tier reports shall be submitted to the contracting Agency's Supplier Diversity Liaison found at http://gss.omb.delaware.gov/omwbe/docs/sdc/mwbe_liasions.xls and the OMWBE at vendorusage@state.de.us on the 15th (or next business day) of the month following each quarterly period. For consistency quarters shall be considered to end the last day of March, June, September and December of each calendar year. Contract spend during the covered periods shall result in a report even if the contract has expired by the report due date.

STATE OF DELAWARE
Office of Management and Budget
Government Support Services

State of Delaware
Monthly Usage Report

State of Delaware									
Monthly Usage Report									
Supplier Name:				GSS12503-BIODIESEL	**Report Start Date:**				
Contact Name:					**Report End Date:**				
Contact Phone:					**Today's Date:**				
Agency Name or School District	**Division or Name of School**	**Budget Code**	UNSPSC	**Item Description**	**Contract Item Number**	**Unit of Measure**	**Qty**	**Contract Proposal Price/Rate**	**Total Spend**
									$0.00
									$0.00
									$0.00
									$0.00
									$0.00
									$0.00
									$0.00
									$0.00
									$0.00
									$0.00
									$0.00
									$0.00

Note: A copy of the Usage Report will be sent by electronic mail to the Awarded Vendor. The report shall be submitted electronically in **EXCEL** and sent as an attachment to vendorusage@state.de.us . It shall contain the six-digit department and organization code for each agency and school district.

STATE OF DELAWARE
Office of Management and Budget
Government Support Services

State of Delaware																	
Subcontracting (2nd tier) Quarterly Report																	
Prime Name:							**Report Start Date:**										
Contract Name/Number							**Report End Date:**										
Contact Name:							**Today's Date:**										
Contact Phone:							*Minimum Required		Requested detail								
Vendor Name*	**Vendor TaxID***	**Contract Name/ Number ***	**Vendor Contact Name***	**Vendor Contact Phone***	**Report Start Date***	**Report End Date***	**Amount Paid to Subcontractor ***	**Work Performed by Subcontractor UNSPSC**	**M/WBE Certifying Agency**	**Veteran/Service Disabled Veteran Certifying Agency**	**2nd tier Supplier Name**	**2nd tier Supplier Address**	**2nd tier Supplier Phone Number**	**2nd tier Supplier email**	**Description of Work Performed**	**2nd tier Supplier Tax Id**	**Date Paid**

Note: A copy of the Usage Report will be sent by electronic mail to the Awarded Vendor

Completed reports shall be saved in an Excel format, and submitted to the following email address: vendorusage@state.de.us

22. **BUSINESS REFERENCES**:

In order to have your bid considered, please supply three (3) business references consisting of current or previous customers with your reply. Please include name, address, telephone number, and a contact person.

PLEASE DO NOT UTILIZE STATE OF DELAWARE PERSONNEL AS REFERENCES.

23. **ORDERING PROCEDURE**:

Successful contractors are required to have either a local telephone number within the (302) area code, a toll free (800) number, or agree to accept collect calls. Each agency is responsible for placing their orders and may be accomplished by written purchase order, telephone, fax or computer on-line systems. The contractor or vendor must accept full payment by procurement (credit) card and/or conventional check and/or other electronic means at the State's option, without imposing any additional fees, costs or conditions.

24. **BILLING**:

The successful vendor is required to "Bill as Shipped" to the respective ordering agency(s). Ordering agencies shall provide contract number, ship to and bill to address, contact name and phone number.

25. **PAYMENT**:

The agencies or school districts involved will authorize and process for payment each invoice within thirty (30) days after the date of receipt of a correct invoice. The contractor or vendor must accept full payment by procurement (credit) card and/or conventional check and/or other electronic means at the State's option, without imposing any additional fees, costs or conditions.

26. **PRODUCT SUBSTITUTION**:

All items delivered during the life of the contract shall be of the same type and manufacture as specified or accepted as part of the bid proposal unless specific approval is given by Government Support Services to do otherwise. However, awarded vendors are highly encouraged to offer any like substitute product (s); either generic or brand name, at any time during the subsequent contract term, especially if an opportunity for cost savings to the state exists. In such cases, the state may require the submission of written specifications and/or product samples for evaluation prior to any approvals being granted.

27. **OPPORTUNITY BUYS**:

The Director for the State of Delaware, Office of Management and Budget, Government Support Section can waive use of a central contract pursuant to 29 Del. C. §6911(e). A process has been developed to permit any vendor the opportunity to submit an Opportunity Buy offer to the State for goods and/or services for consideration despite the existence of a central contract. See http://gss.omb.delaware.gov/contracting/documents/agencyboilers/opportunity_buy_flowchart.pdf. The Director will afford any vendor on an existing central contract an opportunity to match or to beat the Opportunity Buy offer made by a non-contracted vendor prior to a waiver being granted.

28. **I FOUND IT CHEAPER**:

Director for the State of Delaware, Office of Management and Budget, Government Support Section can waive use of a central contract pursuant to 29 Del. C. §6911(e). A process has been developed to permit any State employee or Vendor to identify a lower price for material and or services for consideration despite the existence of a central contract. See http://gss.omb.delaware.gov/contracting/documents/agencyboilers/opportunity_buy_found_cheaper_flowchart.pdf. The Director will afford any Vendor on an existing central contact an opportunity to match or to beat the I Found It Cheaper suggestion and if not matched or beaten, approve the purchase via a waiver.

29. **BID/CONTRACT EXECUTION**:

Both the non-collusion statement that is enclosed with this Invitation to Bid and the contract form delivered to the successful bidder for signature **shall** be executed by a representative who has the legal capacity to enter the organization into a formal contract with the State of Delaware, Government Support Services. The awarded vendor(s) will be required to complete the new W-9 Form by visiting the Division of Accounting's Website: http://accounting.delaware.gov .

30. **CONTRACTOR RESPONSIBILITY**:

The State will enter into a contract with the successful contractor. The successful contractor shall be responsible for all products and services as required by this ITB. Subcontractors, if any, shall be clearly identified in the financial proposal.

31. **PERSONNEL**:

a. The Contractor represents that they have, or will secure at their own expense, all personnel required to perform the services required under this contract.

b. All of the services required hereunder shall be performed by the Contractor or under its direct supervision, and all personnel, including subcontractors, engaged in the work shall be fully qualified and shall be authorized under State and local law to perform such services.

c. None of the work or services covered by this contract shall be subcontracted without the prior written approval of the State.

32. **LIFE CYCLE COSTING**:

If applicable, the specifications contained within this ITB have been developed through Life Cycle Cost Analysis that will allow the State to realize the lowest total cost of ownership and operation over the useful life of the equipment.

33. **ENERGY STAR PRODUCTS**:

Contractors are encouraged to provide products that earn the ENERGY STAR rating and meet the ENERGY STAR specifications for energy efficiency. The offeror is encouraged to visit www.energystar.gov for complete product specifications and updated lists of qualifying products.

34. **TERMINATION FOR CONVENIENCE**:

Contracts shall remain in effect for the time period and quantity specified unless the contract is terminated by the State. The State may terminate the contract at any time by giving written notice of such termination and specifying the effective date thereof, at least sixty (60) days before the effective date of termination.

35. **TERMINATION FOR CAUSE**:

If, for any reasons, or through any cause, the Contractor fails to fulfill in timely and proper manner its obligations under this Contract, or if the Contractor violates any of the covenants, agreements, or stipulations of this Contract, the State shall thereupon have the right to terminate this contract by giving written notice to the Contractor of such termination and specifying the effective date thereof, at least 5 days before the effective date of such termination. In that event, all finished or unfinished documents, data, studies, surveys, drawings, maps, models, photographs, and reports or other material prepared by the Contractor under this Contract shall, at the option of the State, become its property, and the Contractor shall be entitled to receive just and equitable compensation for any satisfactory work completed on such documents and other materials which is usable to the State.

36. **VENDOR EMERGENCY RESPONSE POINT OF CONTACT**:

The awarded vendor(s) shall provide the name(s), telephone, or cell phone number(s) of those individuals who can be contacted twenty four (24) hours a day, seven (7) days a week to meet a critical need for commodities or services when the Governor of the State of Delaware declares a state of emergency under the current Delaware Emergency Operations Plan. Failure to provide this information could render the bid as non-responsive.

37. **ELECTRONIC CATALOG**:

The successful vendor(s) may be required to submit their items list in electronic format designated by the State.

Note: The State of Delaware is in the process of implementing a new financials system, which will require the use of:

- Electronic catalogs
- Commodity/classification code: United Nations Standard Products and Services Code (UNSPSC).
- A unique item ID for all items in our system

The state has made the determination to include the requirement in this contract for two reasons:

1. To find out what vendors can offer.
2. To give the agencies and school districts a level of comfort in using electronic catalogs.

38. **SUBCONTRACTS**:

Subcontracting is permitted under this ITB and contract. However, every subcontractor shall be identified in the Proposal (Attachment E) and agreed to in writing by the State or as are specifically authorized in writing by the Agency during the performance of the contract. Any substitutions in or additions to such subcontractors, associates, or consultants will be subject to the prior written approval of the State.

The Vendor(s) shall be responsible for compliance by the subcontractor with all terms, conditions and requirements of the RFP and with all local, State and Federal Laws. The Vendor shall be liable for any noncompliance by any subcontractor. Further, nothing contained herein or in any subcontractor agreement shall be construed as creating any contractual relationship between the subcontractor and the State.

If a company elects to be a subcontractor for another vendor, the subcontractor may not independently bid on this solicitation.

39. **CONFIDENTIALITY**:

All documents submitted as part of the vendor's proposal will be deemed confidential during the evaluation process. Vendor proposals will not be available for review by anyone other than the State of Delaware/Proposal Evaluation Committee or its designated agents. There shall be no disclosure of any vendor's information to a competing vendor prior to award of the contract.

The State of Delaware is a public agency as defined by state law, and as such, it is subject to the Delaware Freedom of Information Act, 29 *Del. C.* Ch. 100. Under the law, all the State of Delaware's records are public records (unless otherwise declared by law to be confidential) and are subject to inspection and copying by any person. Vendor(s) are advised that once a proposal is received by the State of Delaware and a decision on contract award is made, its contents will become public record and nothing contained in the proposal will be deemed to be confidential except proprietary information.

Vendor(s) shall not include any information in their proposal that is proprietary in nature or that they would not want to be released to the public. Proposals must contain sufficient information to be evaluated and a contract written without reference to any proprietary information. If a Vendor feels that they cannot submit their proposal without including proprietary information, they must adhere to the following procedure or their proposal may be deemed unresponsive and will not be recommended for selection. Vendor(s) must submit such information in a separate, sealed envelope labeled "Proprietary Information" with the RFP number. The envelope must contain Attachment 5 describing the documents in the envelope, representing in good faith that the information in each document is not "public record" as defined by 29 *Del. C.* § 10002(d), and briefly stating the reasons that each document meets the said definitions.

Upon receipt of a proposal accompanied by such a separate, sealed envelope, the State of Delaware will open the envelope to determine whether the procedure described above has been followed.

If the Vendor does not have any documents it declares confidential or proprietary, Attachment H should be completed by checking the appropriate box found at the top of the attachment.

STATE OF DELAWARE
Office of Management and Budget
Government Support Services
TECHNICAL SPECIFICATIONS

1. **ZONES**:

The contract scope has been segregated into the three (3) zones listed below:

Zone 1 – Includes all of New Castle County north of the C & D canal.

Zone 2 – Includes New Castle County south of the C & D canal and Kent County

Zone 3 – Sussex County

Each zone has been divided into two (2) separate tank sizes, which are:

- Tank "A" – storage tanks which are 2000 gallons and over
- Tank "B" – storage tanks up to 1999 gallons

Prior year utilization has been provided as a reference for this bid solicitation, which is referred to as Appendix B – Utilization. Vendors are encouraged to review this information prior to completing a bid.

2. **DELIVERY REQUIREMENTS/RESTRICTIONS**:

Delivery of the biodiesel (B20 or B5) fuel shall be made by metered truck or via transport. Each metered delivery shall be accompanied with a printed meter slip. Deliveries that are made via transport shall be accompanied by the bill of lading for both the diesel fuel and soybean oil, and shall be left with the delivery and or given to the person at the facility.

If it is found that the quantities used to produce the final blended biodiesel (B20 or B5) fuel are incorrect, the contractor will be responsible to immediately supply the required additional amount of either the Ultra Low Sulfur Diesel fuel or 100% biodiesel to ensure that the required 80:20 or 95:5 ratios are maintained throughout the life of the contract. In the event the contractor cannot supply the necessary fuel, the agency shall order the purchase of the required amount from any available source and charge the contractor the excess costs.

Deliveries to all Department of Transportation locations in New Castle County will be made between the hours of 8:00 a.m., and 3:00 p.m., Monday through Friday, unless otherwise requested for emergencies.

3. **ORDERING PROCEDURE**:

Each agency is responsible for placing their orders. These orders will be placed by purchase orders, telephone, fax or computer access, depending on the individual agency and their procedures. The successful vendor is required to have either a local telephone number within the (302) area code, a toll free (800) number, or agree to accept collect calls.

4. **DELIVERY RESPONSE REQUIREMENT**:

A. Normal Delivery - All deliveries shall be completed within two (2) days, following receipt of a written purchase order or verbal notification by the agency. **Agencies are responsible for obtaining samples of product from each tank prior to delivery into the facilities tank.**

B. Emergency Delivery – Emergency deliveries are to be made within twelve (12) hours after receipt of a verbal order from the Using Agency. The Using Agency makes the determination concerning what is an emergency.

C. Automatic Delivery - Keeping the tank filled shall be the responsibility of the vendor. It is expected that these accounts shall have the highest priority for service should they be allowed to reach an emergency situation.

D. Subcontractors – In the event the bidder proposes to use sub-contractors for the actual delivery, the names and addresses shall be submitted to the Director for approval. The Director reserves the right to inspect their facilities to determine their ability to satisfactorily perform under the delivery terms of the contract.

5. **LATE DELIVERY/VENDOR-AGENCY RESPONSIBILITIES**:

As soon as the vendor determines that the delivery will be late the following steps shall be taken:

A. Vendor shall contact the ordering agency and confirm a realistic delivery time. The agency must then determine if that is acceptable. If the projected delivery time is unacceptable then:

B. Vendor may select another distributor who is able to make the delivery on time. The ordering agency must then give permission to the vendor for this alternative. Contracted pricing and invoicing shall be the responsibility of our contracted vendor.

C. If the vendor fails to contact the ordering agency regarding a late delivery or if another distributor cannot be mutually secured in order to make an on time delivery, then the ordering agency may after it determines that a critical situation exists, place an order on the open market. In that situation the vendor shall pay the consequences as stated on page 18, Item 17 - Non-Performance.

D. It shall be the responsibility of both the vendor and the ordering agency to establish a contact person and telephone number in order to handle late delivery situations.

These requirements are designed to help open communications between the agencies and the vendor. They are not designed to open the door for SUB-CONTRACTING deliveries.

6. **SPILLAGE**:

All spillages must be corrected to the satisfaction of the ordering agency concerned within forty-eight (48) hours. All associated cost including materials and labor shall be borne by the vendor. Damage resulting from a spillage shall be the responsibility of the vendor. The vendor must notify the Department of Natural Resources and Environmental Control of all spillages. The following office must be contacted immediately in the event of a spill:

Division of Air and Waste Management
24 hour Hotline
In State Phone No.: 800-662-8802
In/Out of State Phone No.: (302) 739-5072

In the event that it becomes necessary for the State of Delaware to remedy or provide for remedying the damaged area, the cost of remediation shall be deducted from any moneys due the contract. See page 8, Item 13 - Non-Performance. If there are no moneys due, the remediation costs shall be the responsibility of the contractor or submitted as a claim to the bonding company.

7. **BULK DELIVERY**:

Any agency that does not have the capability to receive bulk delivery is authorized to use at the pump service.

8. **FUEL QUALITY**:

a. ULTRA LOW SULFUR DIESEL

Blended biodiesel fuel is a blend of 20% biodiesel fuel and 80% Ultra Low Sulfur Diesel fuel.

The Ultra Low Sulfur Diesel must be of a grade now regularly manufactured and suitable for use in compression ignition, internal combustion (diesel) engines. It shall be uniform, first quality, ultra low sulfur type, which shall conform in all aspects to the requirements, as set forth in US Department of Commerce Standards CS-12-48, for domestic and industrial fuels.

The fuel oil shall be clear hydrocarbon oil, free from sediment, water or suspended matter.

Physical and Chemical: The diesel fuel must conform to the following minimum requirements.

PROPERTIES	VALUES
Flash Point, degree F, minimum	125 or legal
Cloud Point, degree F, maximum	20
Kinematic Viscosity @ 100 Degrees F Centistoko, Minimum Centistoko, Maximum	 2.0 4.3
Distillation temperature Degrees F 90% Point Maximum 90% Point Minimum	 640 540
Sulfur, % by weight maximum	0.005
Copper Strip Corrosion 3 hour @122 Degrees F	 3
Cetane Number, minimum	40
Water & Sediment, % by Volume, Maximum	0.05

B. 100% BIODIESEL (B100):

The 100% Biodiesel must be of a grade manufactured in accordance with the ASTM specifications listed in this ITB, as a minimum, for 100% Biodiesel manufactured for use in compression ignition, internal combustion (diesel) engines.
The 100% Biodiesel supplied under this contract shall be produced from pure Soybean oil, Corn oil or Canola oil free from sediment, water or suspended foreign matter.

STATE OF DELAWARE
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Government Support Services

NOTE: No animal fat or animal fat byproducts thereof shall be utilized in the process to make the 100% Biodiesel.

This specification is for 100% Biodiesel. The vendor shall use VIRGIN base vegetable oil feedstock **ONLY** to produce the 100% Biodiesel.

AMERICAN SOCIETY OF TESTING AND MEASUREMENTS (ASTM)
November 2008
Biodiesel Component (B100) Specifications (ASTM D6751-09)

Property	**ASTM Method**	**Limits**	**Units**
Calcium & Magnesium. combined	EN 14538	5 max.	Ppm (ug/g)
Flash Point	D93	93 min.	Degrees C
Alcohol Control (1 of the 2)			
1. Methanol Content	EN 14110	0.2 max	% volume
2. Flash Point	D 93	130 min.	Degrees C
Water & Sediment	D2709	0.05 max	% Vol.
Kinematic Viscosity, 40C	D445	1.9-6.0	mm2/sec.
Sulfated Ash	D874	0.02 max.	% mass
Sulfur S500 Grade	D5453	0.05 max.	% mass
Sulfur S15 Grade	D5453	0.0015 max	% mass
Copper Strip Corrosion	D130	No. 3 max.	
Cetane number	D613	47 min.	
Cloud Point	D2500	Report	Degrees C
Carbon Residue 100% sample	D4530	0.05 max	% mass
Acid Number	D664	0.50 max.	mg KOH/g
Free Glycerin	D6584	0.020 max.	% mass
Total Glycerin	D6584	0.240 max.	% mass
Phosphorus Content	D4951	0.001 max.	% mass
Distillation, T90 AET	D1160	360 max.	Degrees C
Sodium/Potassium, combined	EN 14538	5 max.	ppm
Oxidation Stability	EN 14112	3 min.	hours
Cold Soak Filtration	Annex to D6751	360 Max.	seconds
Cold Soak Filtration – For use in temperatures below -12 Degrees C.	Annex to D6751	200 Max.	seconds

NOTE: The entire ASTM Standard is available from the AMERICAN SOCIETY OF TESTING AND MEASUREMENTS (ASTM) Customer Service Office (610) 832-9585.

C. DIESEL WINTER MIX:

The purpose and intent of this specification is to obtain Diesel - Winter Mix, which is a blend of Ultra Low Sulfur Diesel with the addition of a chemical additive.

The Winter Mix, regardless of method of formulation used, must meet or exceed the following criteria:

Property	Value
Cloud Point - Degrees F, Maximum	+5
Pour Point - Degrees F, Maximum	0
Sulfur - Percent, Maximum	0.0015

Period of availability for the Diesel – Winter Mix, will be from October 15 through April 15, yearly.

Bidder to indicate the method of blend (mix). It is essential that the bidder list the requested information as it may be a factor in determining an award. **Failure to provide the required information may be cause for rejection of the bid.**

Bidders are asked to identify the manufacturer and type of Diesel Winter additive mix that will be supplied. Additionally, bidders are asked to explain how the additive is blended with the fuel stock to achieve the desired results. In the Appendix A – Pricing, Tab 1 there is space to indicate the price per gallon for the supplied additive, and immediately below, a place to indicate manufacturer, type and method of blend.

The bidder should be aware that when an order has been placed for the Winter Mix, it must already have been blended at the vendor location and delivered to the Using Agency as such.

The B20 blend must meet the cloud point specification for Ultra Low Sulfur Diesel fuel diesel-winter mix), as applicable, depending on the month in which the fuel is supplied.

9. **FUEL OIL – GENERAL**:

Ultra Low Sulfur Diesel fuel sold for On-Road Use MUST contain a sulfur content of 0.0015% max.

For “Winter Blend Mix", the vendor offers a blend Ultra Low Sulfur Diesel Fuel and a chemical additive, and charges an additional fee for blending the two prior to delivery.

The diesel fuel supplied shall also meet the EPA Testing Standard by using one (1) of the following ASTM methods: D129, D1552, D2622, or D4294 (or most recent ASTM registered and approved method). These standards are used to determine the percent of sulfur in Diesel Fuel.

The State of Delaware will be the sole judge of the equivalencies regarding samples and specifications.

10. **TEST SAMPLING / ANALYSIS / LIABILITY**:

Ultra Low Sulfur Diesel

Product sold to Agencies purchasing under the terms and conditions of his contract shall be tested according to the procedures and specifications outlined by ASTM designation D396 and ASTM designation D975 ASTM or any subsequent revision. Additionally, D2622 will be used as a basis for enforcement of any sulfur content violations.

Certified analysis of oil may be requested by the using agency at any time the product is delivered. The analysis shall be made by an independent Testing Laboratory at no cost to the using agency or the State of Delaware.

The using agency may take periodic samples of the fuel delivered to their locations, from the delivery tank or container in which the delivery is made. Upon delivery of the fuel, the using agency shall use a clean, sealable one gallon container, and take a sample from the top of the delivery tank, seal the container and send it to an independent testing laboratory for the necessary testing and billing to the contractor. Samples will be obtained in a manner that precludes contamination by foreign substances.

Samples will also be tested if changes in, or problems with equipment operation or performance point to a specific need for confirmation of product quality.

If, during testing, it is determined that moisture and sediment and/or ash content exceed specifications limits (as a % of Weight), the vendor will credit the purchasing facility according to the following calculation.

% Ash* + % Moisture & Sediment ** X Purchase Quantity X $ * % Ash = Measured Ash (%Weight) Maximum Allowable Ash (%Weight)

% Moisture & Sediment = Measured Moisture & Sediment (% Volume) - Maximum Allowable Moisture & Sediment (% Volume)

10. **TEST SAMPLING / ANALYSIS / LIABILITY**: (Continued)

Ultra Low Sulfur Diesel

In the event liabilities are assessed against the vendor, the purchasing agency may deduct the amount assessed from unpaid invoices prior to payment. Additionally, the State of Delaware reserves the right to cancel the contract for inferior deliveries or if the fuel is found to contain dirt or sediment, or it is of a structure that will cause clogging and prevent proper operation of a vehicle.

The contractor shall be liable if products fail to meet specification. Liability shall include, but is not limited to the cost of engine repair, i.e., materials, parts replacements, and labor. Liability shall also include the cost of product remaining in the storage tank.

Biodiesel 100

A sample of each B100 shipment shall be collected by the biodiesel supplier, prior to blending, and retained for sixty (60) days or for the estimated life of the product, whichever is longer.

11. **LOCATIONS**:

There are numerous locations throughout the entire State of Delaware that will be ordering fuel. When calls are made for the fuel; it will be the bidder's responsibility to become familiar with each location, and have the proper equipment and personnel to service those locations.

12. **INSPECTION AND ACCEPTANCE**:

If applicable, the bidder's current "Inspection and Test Certification Seals", on delivery measuring meters and compartments will be accepted in connection with Form 50 "Weights and Measures Certificate", previously obtained by the bidder from the Delaware Bureau of Weights and Measures.

The Government Support Services reserves the right to have all measuring devices re-checked, at any time during the life of the contract. Spot Checks at delivery points may also be made.

If rechecks disclose any discrepancy in the number of gallons shown on the delivery ticket and the actual number of gallons delivered, use of such equipment will not be permitted until certification has been received from Delaware Bureau of Weights & Measures that the measuring device is accurate, or has been corrected.

Upon notification to the Government Support Services the Using Agency has the right to refuse delivery on metered trucks with broken seals. The contractor with the defective measuring device will be charged the added cost of obtaining fuel from an emergency source, until the defective metering device has received the necessary certification.

13. **#139 SOYSHIELD**:

SoyShield is a concentrated multi-functional premium diesel additive that is specially formulated for use in all types of diesel fuel. It upgrades Ultra Low Sulfur Diesel to premium. It is not an algaecide. It will not kill algae if it is established in the fuel system. It is designed to eliminate/reduce the conditions which promote the establishment of algae in fuel systems.

SoyShield contains a unique blend of methyl soyate biodiesel derived from soybean oil and a highly concentrated multi-functional additive package. When used at the recommended treatment rate, this unique combination allows SoyShield to provide the following performance benefit:

1. Supports the use of a renewable farmer-supplied fuel source.
2. Boosts the fuel's Cetane rating up to 3 to 4 points.
3. Faster warm-up.
4. Reduced misfiring at lower air inlet temperatures.
5. Superior Cummins L-10 and N-14 performance.
6. Detergency to provide cleanliness throughout the entire fuel system.
7. Clean up and keep clean performance for the entire fuel system.
8. Improved combustion of the fuel by completely vaporizing he fuel into smaller particles, thus providing better fuel economy and preventing a significant loss in engine power.
9. Increased fuel economy up to 5% - 7%.
10. Up to 5% improvement in Horsepower.
11. Dispersion of insoluble gums and varnish present in low quality fuels.
12. Modification of existing injector deposits, allowing for their removal and safe passage into the combustion chamber where they can be burned.
13. Reduced emissions, exhaust smoke and particulates.
14. A reduction in black smoke.
15. Increased fuel lubricity. Soy based biodiesel has 3 times the lubricity of diesel fuel.
16. Excellent anti-wear protection for the injectors and the fuel pump especially for those engines burning Ultra Low Sulfur Diesel fuel.
17. Lubrication of the upper cylinders, fuel pumps and injectors.
18. Supplemental ring and valve-train anti-wear protection.
19. Increased thermal stability to the diesel fuel in order to provide the ability to resist thermal degradation.
20. Inhibition of oxidation during storage.
21. Extended storage ability.
22. Helps control the acidic by-products produced by the combustion of diesel fuel.
23. Rust and corrosion protection to the entire fuel system.
24. Dispersion of water present in diesel fuel in order to prevent fuel icing and other problems associated with water.
25. Prevention of the formation of stable fuel-water emulsions.
26. Allows moisture to be rapidly separated from the fuel.
27. Allows the diesel fuel to meet the NCWM's Premium Diesel Fuel Specifications
28. Helps control the conditions that lead to foul smelling fuel, stringiness and plugged filters

TREATMENT LEVEL:

One gallon of SoyShield to every 500 gallons of diesel fuel.

SoyShield is registered and meets the US EPA requirements for blending into Ultra Low Sulfur Diesel fuels. When used at the recommended treatment ratio SoyShield will not cause a measurable increase in the sulfur content of the diesel fuel and will not have any measurable affect on the Cetane index or aromatic content of the diesel fuel.

TYPICAL PROPERTIES

SPECIFIC GRAVITY @ 60 ° F	.894
FLASH POINT °F/°C PMCC (ASTM D-93)	200°/93.33°
POUR POINT °F/°C (ASTM D-97)	-5°/-20.56°
COPPER STRIP CORROSION TEST (ASTM D-130)	1a

14. **FEDERAL TAX SUBSIDY CONSIDERATION**:

As of December 31, 2011 Federal biodiesel subsidies expired. If new tax subsidies are enacted during the contract term, the supplying vendor(s) shall reimburse purchasing agencies as appropriate. This includes retroactively reimbursing agencies for tax subsidies that are retroactively enacted.

STATE OF DELAWARE
Office of Management and Budget
Government Support Services

NCC NORTH OF CANAL – ZONE 1

DEPARTMENT OF TRANSPORTATION - DELDOT

TANK SIZE	BUILDING	ADDRESS	CITY	ANNUAL USAGE GALLONS	CONTACT (302) AREA CODE
10,000 6,000	North District	39 E. Regal Blvd. Newark, DE	Newark	55,750	Chuck Keithley 302-894-6314
6,000	Area 11-Kiamensi	815 Stanton Road	Wilmington	22,000	
1,500	I-95 & Marsh Rd. Salt Barn	I-95 & Marsh Rd. Off Ramp, on left between ramp and I-95	Wilmington		
900	I-495 & Terminal Ave. Salt Barn	I-495 & Terminal Ave. NB. Off Ramp, on left between ramp and I-495	Wilmington		
1,000	I-95 & Talley Rd. Salt Barn	1300 Talley Road	Wilmington	15,800	

NCC SOUTH OF CANAL & KENT COUNTY – ZONE 2

CITY OF DOVER

TANK SIZE	BUILDING	ADDRESS	CITY	ANNUAL USAGE GALLONS	CONTACT (302) AREA CODE
10,000	City of Dover	710 William Street	Dover		Peter Gregg 736-7178

STATE OF DELAWARE
Office of Management and Budget
Government Support Services

NCC SOUTH OF CANAL & KENT COUNTY – ZONE 2

DEPARTMENT OF TRANSPORTATION - DELDOT

TANK SIZE	BUILDING	ADDRESS	CITY	ANNUAL USAGE GALLONS	CONTACT (302) AREA CODE
2,000	Area 7	1235 Briarbush Rd.	Magnolia		
4,000	Area 6	129 Jackson Ditch Rd.	Harrington		
10,000	Area 9	5369 Summit Bridge Rd.	Middletown	11,500	Debbie Cox 326-4413
10,000	Area 10	250 Bear-Christiana Road	Bear		Debbie Cox 326-4413
1,000	South St. Georges Salt Barn	Under SB. RT 1, South side of Bridge	South St. Georges		Debbie Cox 326-4413
2,800	Bear Yard Shop, Fuel Delivery Truck	250 Bear-Christiana Rd.	Bear	21,800	Debbie Cox 326-4413

STATE OF DELAWARE
Office of Management and Budget
Government Support Services

SUSSEX COUNTY – ZONE 3

DEPARTMENT OF TRANSPORTATION – DELDOT

TANK SIZE	BUILDING	ADDRESS	CITY	ANNUAL USAGE GALLONS	CONTACT (302) AREA CODE
5,000	Area #1	10930 Salt Barn Rd.	Laurel	16,600	Linda Rollison 853-1321
5,000	Area #2	22136 Bridgeville Hwy	Seaford	18,700	"
5,000	Area #3	20368 Milton-Ellendale Hwy.(Rt. 16)	Ellendale	20,000	"
5,000	Area #4-Gravel Hill (Back)	20106 Gravel Hill Rd.	Georgetown	1,000	"
5,000	Area #5	27643 Dagsboro Rd.	Dagsboro	11,800	"
10,000 5,000 (2)	Area #20-Gravel Hill Float (Front)	24450 Lewes-Georgetown Rd.	Georgetown	19,700	"
2,800	Are #20-Gravel Hill Float (Front), Fuel Delivery Truck	2444 Lewes-Georgetown Rd.	Georgetown	3,400	"

STATE OF DELAWARE
Office of Management and Budget
Government Support Services

BID QUOTATION REPLY SECTION

CONTRACT NO. GSS12503-BIODIESEL

Biodiesel - B20 and B5 Fuels

Please fill out the attached forms fully and completely and return with your bid in a sealed envelope clearly displaying the contract number to Government Support Services by January 31, 2012 at 1:00 PM (Local Time) at which time bids will be opened.

Bids shall be submitted to:

STATE OF DELAWARE
GOVERNMENT SUPPORT SERVICES
CONTRACTING SECTION
100 ENTERPRISE PLACE - SUITE 4
DOVER, DE 19904-8202

PUBLIC BID OPENINGS

The public bid opening insures the citizens of Delaware that contracts are being bid fairly on a competitive basis and comply with Delaware procurement laws. The agency conducting the opening is required by law to publicly open the bids at the time and place specified and the contract shall be awarded within thirty (30) days thereafter. The main purpose of the bid opening is to reveal the name(s) of the bidders(s), not to serve as a forum for determining the apparent low bidders. The disclosure of additional information, including prices, shall be at the discretion of the contracting agency until such time that the responsiveness of each bid has been determined.

After receipt of a fully executed contract(s), the Delaware public and all bidders are invited to make an appointment with the contracting officer in order to review pricing and other non-confidential information.

NOTE: ONLY THE BIDDER'S NAME WILL BE READ AT THE BID OPENING

Attachment A

Proposal Reply Requirements

[If electing to utilize this format, please identify minimum specified requirements below. For example:]

The response should contain **at a minimum** the following information:

1. Brief Vendor Cover Letter including an Applicant's experience, if any, providing similar services.

2. One (1) paper copy of the **Appendix A** bid response paperwork.

   The Appendix A – Pricing Spreadsheet is available at the following website:

   www.bids.delaware.gov

   Vendors MUST provide printed copies of all pricing spreadsheet tabs.

3. One (1) complete, signed and notarized copy of the non-collusion agreement (see Attachment C). **MUST HAVE ORIGINAL SIGNATURES AND NOTARY MARK**

4. One (1) complete OMWBE application (see link on Attachment D) – only provide if applicable

5. One (1) complete and signed copy of the Subcontractor Information Form (See Attachment E) for each subcontractor – only provide if applicable.

6. One (1) completed Business Reference form (See Attachment F) – please provide references other than State of Delaware contacts. Form must be included.

7. One (1) completed ITB Exception form (See Attachment G) – please check box if no information. Form must be included.

8. One (1) completed Confidential Information form (See Attachment H) – please check box if no information provided will be considered confidential or proprietary. Form must be included.

The items listed above provide the basis for evaluating each vendor's proposal. **Failure to provide all appropriate information may deem the submitting vendor as "non-responsive" and exclude the vendor from further consideration.** If an item listed above is not applicable to your company or proposal, please make note in your submission package.

Attachment B

CONTRACTING SECTION
100 ENTERPRISE PLACE – SUITE 4
DOVER, DELAWARE 19904-8202

NO BID REPLY FORM

BID # GSS12503-BIODIESEL **BID TITLE: Biodiesel - B20 and B5 Fuels**

To assist us in obtaining good competition on our Request for Bids, we ask that each firm that has received an invitation, but does not wish to bid, state their reason(s) below and return in a clearly marked envelope displaying the contract number. This information will not preclude receipt of future invitations unless you request removal from the Bidder's List by so indicating below, or do not return this form or bona fide bid.

Unfortunately, we must offer a "No Bid" at this time because:

_____ 1. We do not wish to participate in the bid process.

_____ 2. We do not wish to bid under the terms and conditions of the Request for Bid document. Our objections are:

_____

_____

_____ 3. We do not feel we can be competitive.

_____ 4. We cannot submit a Bid because of the marketing or franchising policies of the manufacturing company.

_____ 5. We do not wish to sell to the State. Our objections are: _____

_____

_____ 6. We do not sell the items/services on which Bids are requested.

_____ 7. Other:_____

_____ _____
FIRM NAME SIGNATURE

_____ We wish to remain on the Bidder's List **for these goods or services**.

_____ We wish to be deleted from the Bidder's List **for these goods or services**.

Attachment C

CONTRACT NO.: GSS12503-BIODIESEL
TITLE: Biodiesel - B20 and B5 Fuels
OPENING DATE: **January 31, 2012** at 1:00pm (Local Time)

NON-COLLUSION STATEMENT

This is to certify that the undersigned bidder has neither directly nor indirectly, entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this bid submitted this date to Government Support Services.

It is agreed by the undersigned bidder that the signed delivery of this bid represents the bidder's acceptance of the terms and conditions of this Invitation to Bid including all specifications and special provisions.

NOTE: Signature of the authorized representative **MUST** be of an individual who legally may enter his/her organization into a formal contract with the State of Delaware, Government Support Services.

	Corporation
	Partnership
	Individual

COMPANY NAME _____ (Check one)

NAME OF AUTHORIZED REPRESENTATIVE
(Please type or print) _____

SIGNATURE _____ TITLE _____

COMPANY ADDRESS _____

PHONE NUMBER _____ FAX NUMBER _____

EMAIL ADDRESS _____

FEDERAL E.I. NUMBER _____ STATE OF DELAWARE LICENSE NUMBER _____

	(circle one)		(circle one)		(circle one)	
COMPANY CLASSIFICATIONS: CERT. NO._____	Women Business Enterprise (WBE)	Yes No	Minority Business Enterprise (MBE)	Yes No	Disadvantaged Business Enterprise (DBE)	Yes No

[The above table is for information and statistical use only.]

PURCHASE ORDERS SHOULD BE SENT TO:
(COMPANY NAME) _____

ADDRESS _____

CONTACT _____

PHONE NUMBER _____ FAX NUMBER _____

EMAIL ADDRESS _____

AFFIRMATION: Within the past five years, has your firm, any affiliate, any predecessor company or entity, owner, Director, officer, partner or proprietor been the subject of a Federal, State, Local government suspension or debarment?

YES _____ NO _____ if yes, please explain _____

THIS PAGE SHALL BE SIGNED, NOTARIZED AND RETURNED FOR YOUR BID TO BE CONSIDERED

SWORN TO AND SUBSCRIBED BEFORE ME this _____ day of _____, 20 _____

Notary Public _____ My commission expires _____

City of _____ County of _____ State of _____

Attachment D

[ATTACHMENT D INTENTIALLY LEFT BLANK]

Attachment E

STATE OF DELAWARE
OFFICE OF MANAGEMENT AND BUDGET
GOVERNMENT SUPPORT SERVICES

Subcontractor Information Form

CONTRACT NO. **GSS12503-BIODIESEL**
Contract Name: **Biodiesel - B20 and B5 Fuels**

<table>
<tr><th colspan="4">PART I – STATEMENT BY PROPOSING VENDOR</th></tr>
<tr><td colspan="2">1. CONTRACT NO.

GSS12503-BIODIESEL</td><td colspan="2">2. Proposing Vendor Name:</td><td>3. Mailing Address</td></tr>
<tr><td colspan="2">4. SUBCONTRACTOR</td><td colspan="3"></td></tr>
<tr><td colspan="2">a. NAME</td><td colspan="3">4c. Company OMWBE Classification:

Certification Number: _____</td></tr>
<tr><td colspan="2">b. Mailing Address:</td><td colspan="3">4d. Women Business Enterprise ☐ Yes ☐ No
4e. Minority Business Enterprise ☐ Yes ☐ No
4f. Disadvantaged Business Enterprise ☐ Yes ☐ No</td></tr>
<tr><td colspan="5">5. DESCRIPTION OF WORK BY SUBCONTRACTOR</td></tr>
<tr><td>6a. NAME OF PERSON SIGNING

6b. TITLE OF PERSON SIGNING</td><td colspan="2">7. BY (Signature)</td><td colspan="2">8. DATE SIGNED</td></tr>
<tr><th colspan="5">PART II – ACKNOWLEDGEMENT BY SUBCONTRACTOR</th></tr>
<tr><td>9a. NAME OF PERSON SIGNING

9b. TITLE OF PERSON SIGNING</td><td colspan="2">10. BY (Signature)</td><td colspan="2">11. DATE SIGNED</td></tr>
</table>

Attachment F

Business References

CONTRACT NO. **GSS12503-BIODIESEL**
Contract Name: **Biodiesel - B20 and B5 Fuels**

List a minimum of three business references, including the following information:

- Business Name and Mailing address
- Contact Name and phone number
- Number of years doing business with
- Type of work performed

Please do not list any State Employee as a business reference. If you have held a State contract within the last 5 years, please list the contract.

1. Business Name/Mailing Address:
   Contact Name/Phone Number:
   Number of years doing business with :
   Describe type of work performed:

2. Business Name/Mailing Address:
   Contact Name/Phone Number:
   Number of years doing business with :
   Describe type of work performed:

3. Business Name/Mailing Address:
   Contact Name/Phone Number:
   Number of years doing business with :
   Describe type of work performed:

PLEASE DO NOT INCLUDE STATE OF DELAWARE PERSONNEL AS REFERENCES.

Attachment G

ITB Exceptions

CONTRACT NO. **GSS12503-BIODIESEL**
Contract Name: **Biodiesel - B20 and B5 Fuels**

Proposals must include all exceptions to the specifications, terms or conditions contained in this ITB. If the vendor is submitting the proposal without exceptions, please state so below.

☐ By checking this box, the Vendor acknowledges that they take no exceptions to the specifications, terms or conditions found in this ITB.

Paragraph # and page #	Exceptions to Specifications, terms or conditions	Proposed Alternative

Note: **use additional pages as necessary.**

Attachment H

Confidential Information Form

CONTRACT NO. **GSS12503-BIODIESEL**

Contract Name: **Biodiesel - B20 and B5 Fuels**

☐ By checking this box, the Vendor acknowledges that they are not providing any information they declare to be confidential or proprietary for the purpose of production under 29 Del. C. ch. 100, Delaware Freedom of Information Act.

Confidentiality and Proprietary Information

Note: Add additional pages as needed.

Attachment I

State of Delaware

Office of Minority and Women Business Enterprise
Certification Application

The most recent application can be downloaded from the following site:
http://gss.omb.delaware.gov/omwbe/docs/certapp_022510.pdf

Complete application and mail, email or fax to:

Office of Minority and Women Business Enterprise (OMWBE)
100 Enterprise Place, Suite 4
Dover, DE 19904-8202
Telephone: (302) 857-4554 Fax: (302) 677-7086
Email: deomwbe@state.de.us
Web site: http://gss.omb.delaware.gov/omwbe/index.shtml