Economic Impact of Incentives to Facilitate Compressed Natural Gas Vehicles in Florida

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BACKGROUND

Natural gas prices have fallen dramatically over the last few years and they are expected to remain relatively low for an extended period of time due to increased exploration and production. In addition, the supply of natural gas by pipeline into Florida has expanded sharply as the State is currently served by five gas lines connected to 38 natural gas distribution facilities in the state of Florida. Florida Gas Transmission (FGT) and Gulfstream are the primary suppliers of natural gas for electric power generation. The Cypress Pipeline owned by Southern Natural Gas comes into NE Florida from Savannah, Georgia and connects directly to the FGT pipeline system. Southern Natural Gas also operates another pipeline serving North Florida and Gulf South Pipeline serves West Florida including Escambia and Okaloosa Counties. The low cost and abundant supply of the energy source presents an opportunity to convert delivery fleets (both public and private), school and public transit buses, and other public vehicles to natural gas. Such a conversion would have substantial, positive, economic impacts as well as significant environmental dividends. However, there are obstacles to the conversion including, but not limited to, (a) the lack of compressed natural gas ("CNG") fueling stations, (b) conversion costs, and (c) fear of reduced fuel revenues. Florida's economy could benefit if the conversion process was stimulated.

This study is designed on behalf of the Florida Natural Gas Vehicle Coalition to provide a preliminary analysis of the costs and benefits for Florida from a program to facilitate CNG conversion.

1.0 OVERVIEW OF CONVERSION OPPORTUNITY IN FLORIDA

CNG powered vehicles currently operate in some fleets in Florida and the U.S. The technologies and costs associated with CNG powered vehicles and their fueling stations are well established[1]. Therefore, the conversion opportunities are not constrained by technology, but instead are limited by costs and the availability of the fueling station infrastructure. Not only is the technology available and in some use in the United States, a number of foreign nations use natural gas vehicles extensively, including Iran and Pakistan (5.7 million natural gas vehicles – about 40% of total NGVs worldwide)[2].

[1] (1) Natural Gas Vehicles for America (NGVA), www.ngvamerica.org

(2) The U.S. Department of Energy, 2010. Issues Affecting Adoption of Natural Gas in Light- and Heavy – Duty Vehicles.

(3) Gladstein, Neandross, and Associates, 2011. NGV Roadmap for Pennsylvania Jobs, Energy Security and Clean Air.

[2] Gas Vehicle Report.

There is a substantial literature concerning the cost of CNG vehicles and the cost of CNG fuel stations. The extra cost of CNG vehicles compared to those fueled by gasoline and diesel form one part of the constraint puzzle. Therefore, assuming a properly structured incentive program coupled with the availability of fueling stations, reasonable estimates for the timing and trajectory for conversion of fleets can be developed.

The work product from this section is an analysis of and projections for the volume of fleet vehicles and other large vehicles that could potentially convert to CNG.

1.1 Review of Current Fleet and Infrastructure in Florida

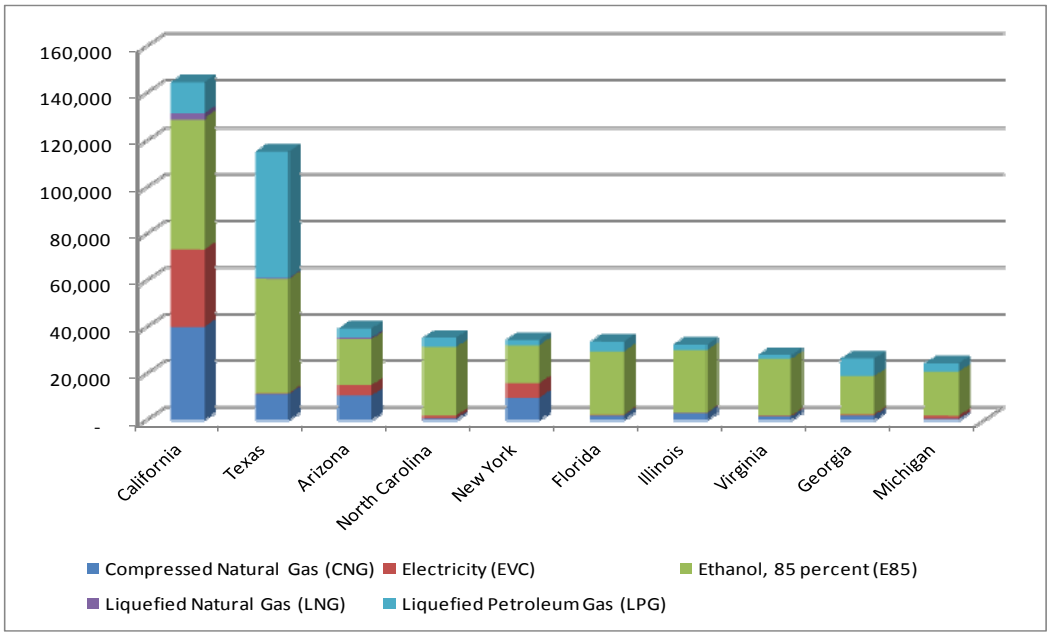
The Energy Policy Act of 1992 mandates that the U.S. Energy Information Administration ("EIA") collect data annually on Alternative Fuel Vehicles ("AFV") made available by suppliers and to estimate the number of AFVs in use in the U.S. The EIA's most recent report was released in May 2012 and includes data for 2010.

EIA collects data specifically on:

- the number of alternative fueled vehicles supplied each year; i.e., new AFVs and conventionally fueled vehicles converted to operate on an alternative fuel;
- the number and type of advanced technology vehicles supplied each year; i.e., gasoline-electric hybrids and diesel-electric hybrids;
- the number of AFVs in use and the amount of alternative transportation fuel consumed for a limited set of fleet user groups;

The figure below shows the total count of AFVs in use by fuel type for the top 10 states.

Figure 1.1.1 Alternative Fuel Vehicles in Use by State Rank (2010)



Source: U.S. Energy Information Administration

Figure 1.1.2 Alternative Fuel Vehicles in Use by State Rank - Detail (2010)

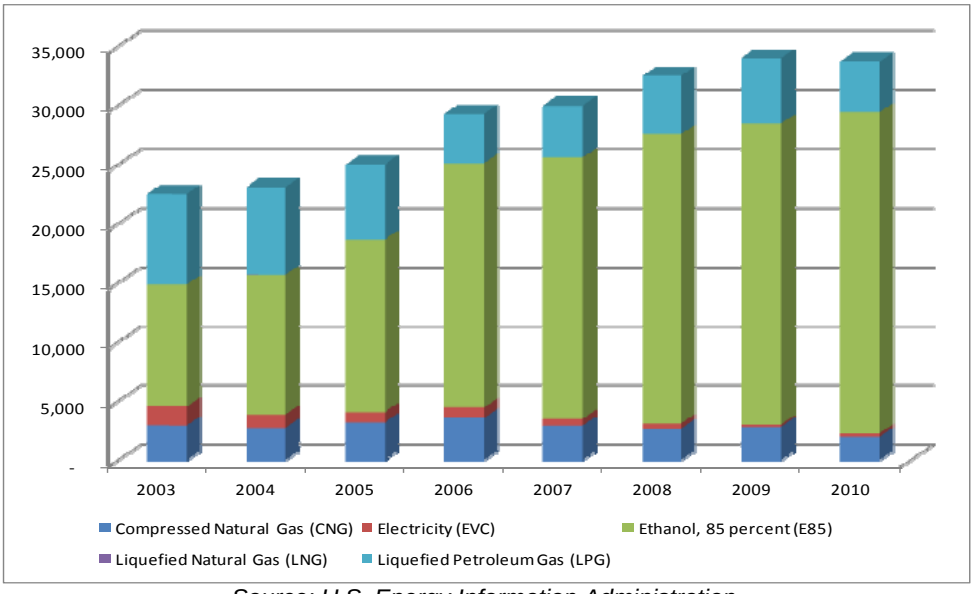
2010	Compressed Natural Gas (CNG)	Electricity (EVC)	Ethanol, 85 percent (E85)	Liquefied Natural Gas (LNG)	Liquefied Petroleum Gas (LPG)	Grand Total
California	40,022	33,217	55,867	2,092	13,371	144,569
Texas	11,275	289	49,158	319	54,333	115,374
Arizona	10,571	4,490	19,777	582	3,923	39,343
North Carolina	693	1,285	29,422		4,017	35,417
New York	9,521	6,296	16,328		2,244	34,389
Florida	1,992	288	27,143		4,270	33,693
Illinois	3,041	176	26,819		2,402	32,438
Virginia	1,683	316	24,400		1,600	27,999
Georgia	1,990	500	16,410	22	7,529	26,451
Michigan	561	1,319	18,946		3,582	24,408

Source: U.S. Energy Information Administration

California ranks number 1 with 144,569 total AFV vehicles in use followed by Texas at 115,374. Florida ranks sixth with 33,693 AFVs as of 2010. As far as the breakdown of different fuel types for AFVs, Ethanol 85 ranks first across the states constituting 55.8% of AFVs. This is followed by Liquefied Petroleum Gas ("LPG") at 18.9% and Compressed Natural Gas ("CNG") at 15.8%. Florida's make-up of AFVs by fuel type is more heavily weighted towards ethanol than the other states at 81% of AFVs. CNG vehicles constitute 5.9% of AFVs in Florida.

Narrowing the focus to the state of Florida, the next figure shows the number of AFVs in use for Florida by type from 2003 to 2010.

Figure 1.1.3 Alternative Fuel Vehicles in Use in Florida



Source: U.S. Energy Information Administration

Figure 1.1.4 Alternative Fuel Vehicles in Use in Florida - Detail

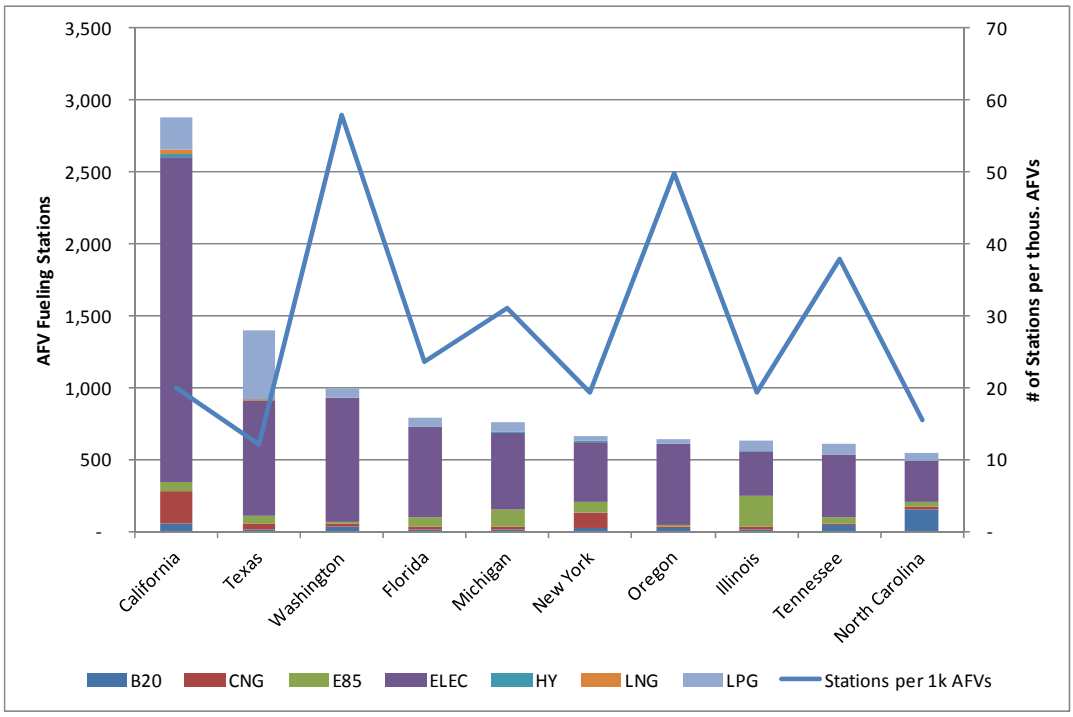
	2003	2004	2005	2006	2007	2008	2009	2010
Compressed Natural Gas (CNG)	2,958	2,764	3,187	3,561	2,932	2,683	2,846	1,992
Electricity (EVC)	1,598	1,103	874	896	559	431	181	288
Ethanol, 85 percent (E85)	10,316	11,818	14,587	20,661	22,101	24,455	25,439	27,143
Liquefied Natural Gas (LNG)	-	4	1		10		-	
Liquefied Petroleum Gas (LPG)	7,642	7,406	6,351	4,162	4,372	4,928	5,531	4,270
Total	22,514	23,095	25,000	29,280	29,974	32,497	33,997	33,693

Source: U.S. Energy Information Administration

AFV use in Florida has increased an average of 6.1% per year from 2003 to 2010. During periods of higher gasoline prices such as 2004-2006 usage increased 13% per year. Ethanol, 85 powered vehicles increased the most over the analysis time frame growing an average of 15% per year. Over this same time frame CNG vehicle usage declined an average of 4% per year with a 30% decrease from 2009-2010. As discussed further in this report the use of CNG for transportation in Florida faces limitations posed by inadequate infrastructure and lack of incentives.

The figure below presents information from the EIA on the number of AFV fueling stations in 2010 for the top 10 states. In addition the number of stations per 1,000 AFVs is shown.

Figure 1.1.5 AFV Fueling Stations by State Rank (2010)



Source: U.S. Energy Information Administration

Figure 1.1.6 AFV Fueling Stations by State Rank –Detail (2010)

								Totals
	B20	CNG	E85	ELEC	HY	LNG	LPG	by State
California	51	228	60	2,258	23	36	228	2,884
Texas	14	36	62	797	1	6	480	1,396
Washington	31	18	20	854	-	-	66	989
Florida	15	18	62	627	-	-	72	794
Michigan	13	18	123	532	4	-	66	756
New York	17	107	80	416	9	-	33	662
Oregon	23	12	8	568	-	-	31	642
Illinois	8	29	213	307	1	-	70	628
Tennessee	43	7	44	442	-	-	75	611
North Carolina	145	23	31	287	-	-	63	549

Source: U.S. Energy Information Administration

CNG-Compressed Natural Gas, E85-85% Ethanol, LPG-Propane, ELEC-Electric, B20-Biodiesel, HY-Hydrogen and LNG-Liquefied Natural Gas

The rankings are similar to the previous figure with the number of stations being the highest for those states with the most AFVs. The exception is Washington, Oregon, and Tennessee which, as the figure shows, have a higher density of stations per 1,000 AFVs which is the reason for their inclusion in the figure. Across the 10 states the average number of stations per 1,000 AFVs is 29 with Florida having 24.

The map below shows the location of the fueling stations. The figure following the map shows detail information about the 18 Compressed Natural Gas ("CNG") fueling stations in Florida. In addition, information is shown for six planned stations.

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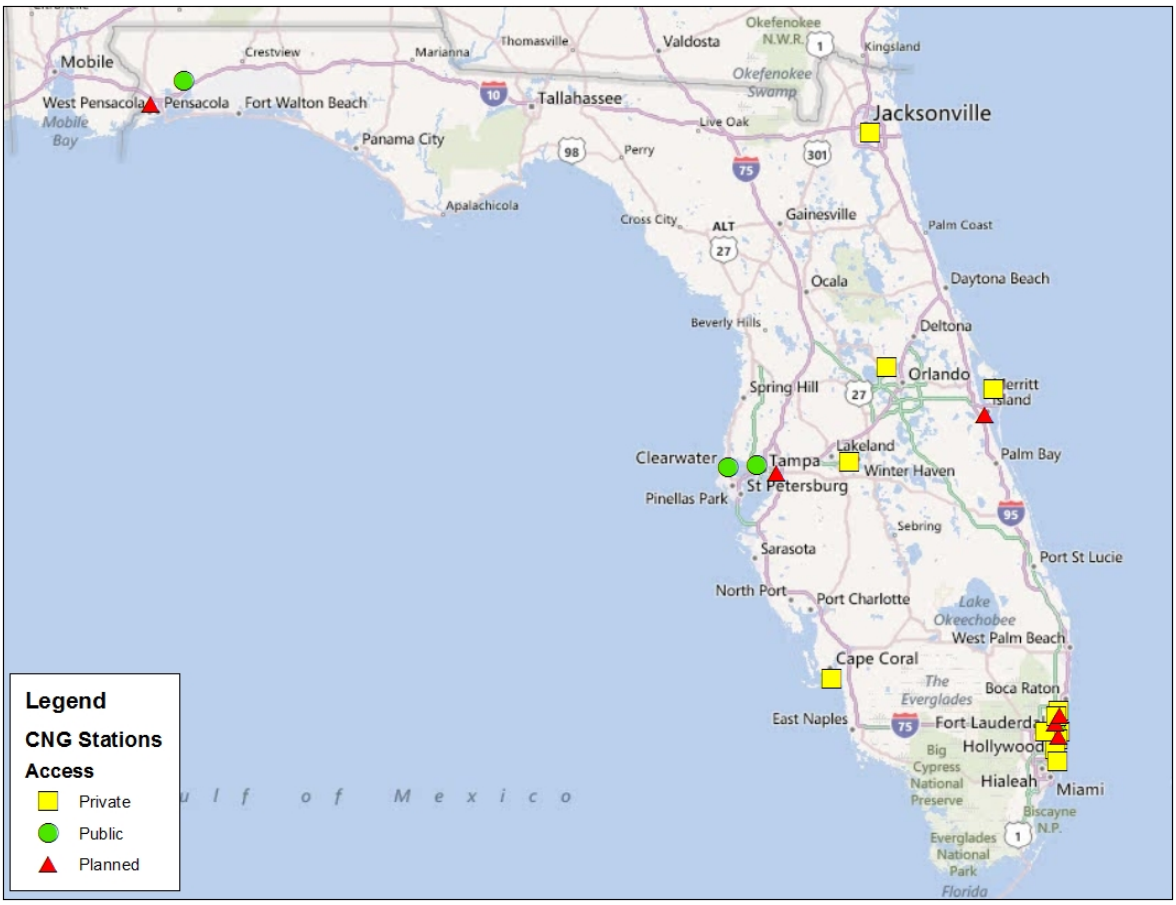
Figure 1.1.7 Florida CNG Fueling Station Map



Source: Fishkind & Associates based on U.S. Department of Energy, through March 2012

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Figure 1.1.8 Florida CNG Fueling Station Detail

Name	Address	City	Type of Access
City of Apopka	320 E 8th St	Apopka	Private - government only
City of Clearwater - Clearwater Gas Systems	1020 N Hercules Ave	Clearwater	Public - card key at all times
Broward County	115 S Andrews Ave	Fort Lauderdale	Private - government only
Wise Gas	650 NW 27th Ave	Fort Lauderdale	Public - card key at all times
Broward County	1501 SW 43rd St	Fort Lauderdale	Private - government only
Veolia Environmental Services - Fort Myers Hauling	17101 Pine Ridge Rd	Fort Myers Beach	Private access only
City of Hollywood	1600 S Park Rd	Hollywood	Private access only
TECO Peoples Gas	4040 Philips Hwy	Jacksonville	Private access only
TECO Peoples Gas	4040 Phillips Hwy	Jacksonville	Private access only
Kennedy Space Center	C & 3rd St	Kennedy Space Center	Private access only
Travis Career Center	3225 Winterlake Rd	Lakeland	Private access only
City of Milton	6738 Dixon St	Milton	Public - card key at all times
City of North Miami Motor Pool	1855 NE 142nd St	North Miami	Private - government only
Veolia Environmental Services - Northbrook Hauling	2800 Shermer Rd	Northbrook	Private access only
Broward County	1 University Dr	Plantation	Private - government only
Clean Energy - Choice Environmental Services	3101 NW 16th Terrace	Pompano Beach	Private access only
Broward County	1600 NW 30th Ave	Pompano Beach	Private - government only
Clean Energy - Hillsborough County Aviation Authority	4750 W South Ave	Tampa	Public - credit card at all times
Broward County Fleet Services	2515 SW 4th Ave	Fort Lauderdale	PLANNED - not yet accessible
Broward County	2300 W Commercial Blvd	Fort Lauderdale	PLANNED - not yet accessible
Energy Services of Pensacola	3050 Godwin Ln	Pensacola	PLANNED - not yet accessible
Wise Gas	1126 Hammondville Rd	Pompano Beach	PLANNED - not yet accessible
Florida City Gas	4180 US Highway 1 S	Rockledge	PLANNED - not yet accessible
TECO Peoples Gas	7800 Palm River Rd	Tampa	PLANNED - not yet accessible

Source: U.S. Department of Energy, through March 2012

Note: The above figures are the most recent available from the U.S. Department of Energy. The City of Tallahassee has broken ground on a new station and we understand, anecdotally, that stations in Jacksonville and Tampa, and perhaps others, may break ground in 2012.

As the map shows the stations are largely located in major metropolitan areas. Of the eighteen existing stations, only four are available for use by the public. The remaining stations serve government fleets or private company fleets.

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1.2 Current Cost Structure for Vehicles and Refueling Stations

There is substantial literature concerning the cost of CNG vehicles and the cost of CNG fuel stations[2]. A report prepared in September 2010 by the U.S. Department of Energy, "Issues Affecting Adoption of Natural Gas Fuel in Light and Heavy-Duty Vehicles" GA Whyatt ("DOE Report") provides excellent and up to date detail cost information for new and conversion light and heavy duty vehicles as well as cost data for refueling stations. The following sections provide the Consultant's review.

Light Duty

New vehicle

In the U.S. the only fully CNG alternative fuel vehicle available to consumers is the Honda Civic GX, which costs roughly $6,935 more than its gasoline powered equivalent.

Conversion

The DOE Report found that the cost of converting a gasoline engine to CNG is significantly higher than the incremental cost for the Civic GX. The report cites cost estimates from the Natural Gas Vehicles for America (NGVA) website as follows:

- Crown Victoria/Lincoln Town Car/Mercury Marquis with 13 GGE: $13,500
- E350 cargo/passenger van with 20 GGE fuel: $15,500
- F150/250/350 pickup truck with 20 GGE: $16,500. With 30 GGE: $18,500
- E450 cutaway shuttle van with 24 to 38 GGE: $18,500 to $22,500
- Sierra/Silverado 1500/2500HD pickup truck with 11 GGE: $12,500. With 20 GGE: $15,500
- Savana/Express G1500/2500 cargo/passenger van 12 to 20 GGE: $12,500 to $16,000

The report further notes that non-EPA approved conversion kits cost significantly less to implement with some in Brazil ranging from $800 to $1,400 in 2005 dollars. This suggests compliance with EPA regulations substantially contributes to the high cost of conversion.

[2] (1) Natural Gas Vehicles for America (NGVA), www.ngvamerica.org

(2) The U.S. Department of Energy, 2010. Issues Affecting Adoption of Natural Gas in Light- and Heavy – Duty Vehicles.

(3) Gladstein, Neandross, and Associates, 2011. NGV Roadmap for Pennsylvania Jobs, Energy Security and Clean Air.

Heavy Duty

The DOE report provides a comparison of the cost for a CNG heavy duty vehicle to an equivalent diesel truck. This is shown in the following table.

Figure 1.2.1 Cost Comparison for CNG Heavy Duty Truck

	Diesel	CNG Truck
Base Truck	$84,000	$84,000
Westport HD System		$60,000
Extended Warranty	$4,400	$8,000
Total w/out Incentives	$88,400	$152,000

Source: Issues Affecting Adoption of Natural Gas Fuel in Light and Heavy-Duty Vehicles, Table 3.11.

In the table above, the CNG truck costs $63,600 more than the diesel equivalent prior to any incentives. In addition, the DOE Report states that because taxes are based on the cost of the truck, the CNG vehicle is also at a tax disadvantage potentially increasing the differential to $76,100.

The Consultant has found the overall base CNG truck cost of $152,000 consistent with an estimate of $165,000 provided in "NGV Roadmap for Pennsylvania Jobs, Energy Security and Clean Air" prepared by Gladstein, Neandross, & Associates on behalf of the Marcellus Shale Coalition in April 2011 ("GNA Report").

Refueling Stations

Based on data provided in the DOE report, the cost for refueling stations varies with capacity and whether they will carry CNG and liquefied natural gas ("LNG") or both. The following table shows cost information from the DOE report that is based on a California Energy Commission Report, "2010-2011 Investment plan for the alternative and renewable fuel and vehicle technology program."

Figure 1.2.2 Cost for CNG Refueling Station

NG Refueling Station Type	Maximum Capacity	Maximum Capacity, gge Equivalent2	Estimated Cost
CNG, small	<500 scfm	4.0 gge/min	$400,000
CNG, medium	500-2000 scfm	4.0-15.8 gge/min	$600,000
CNG, large	>2000 scfm	>15.8 gge/min	$1,700,000
LNG, large	15,000 gallon storage	8,670 gge storage	$1,700,000
CNG/LNG, large	>2000 scfm	>15.8 gge/min	$2,000,000

Source: Issues Affecting Adoption of Natural Gas Fuel in Light and Heavy-Duty Vehicles, Table 5.5

The DOE report found these costs consistent with the estimated range of $1,000,000 to $4,000,000 for LNG fueling stations estimated in an analysis by the U.S. Energy Information Administration. They were also found consistent with information from the Idaho National Laboratory that estimated just the mechanical systems for an LNG station costing from $350,000 to $1,000,000.

In addition, the Consultant has found these costs consistent with an estimate of $2.6-million for a turnkey installation of a CNG/LNG station from the GNA Report.

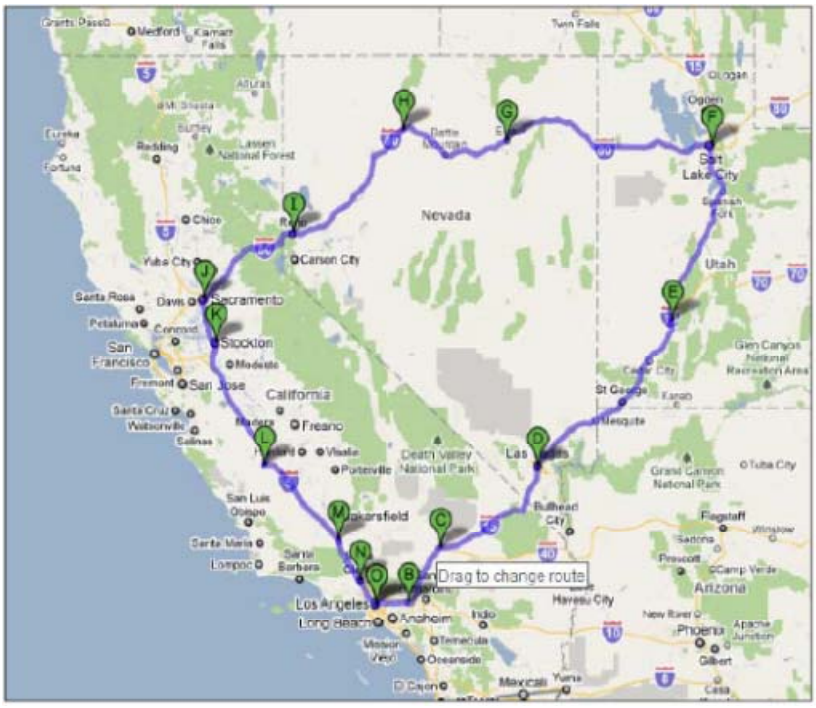
1.3 Projections for Volume of Fleet Vehicles

When approaching the issue of widespread implementation of CNG for use in transportation there exists the quintessential chicken and the egg dilemma: currently there are not enough public refueling stations available to persuade a vehicle purchaser to consider a CNG powered alternative to gasoline while, at the same time, there are not enough AFVs to make investment in refueling infrastructure feasible (DOE Report). To overcome this, both the DOE Report and GNA Report suggest focusing on heavy duty return-to-base fleet operations as a starting point. The logic behind this is two-fold: if the fleet returns to base every night this ensures that the refuel capacity will be utilized; and second, the high fuel use nature of their operations ensures that the station is sufficiently utilized to justify the capital investment in a relatively short period of time without a significant cost premium charged to the end user. Furthermore, fleet vehicles drive significantly more miles per year than passenger vehicles thus allowing greater savings per year on fuel to offset the higher cost of the vehicles. The DOE Report had similar findings also noting the efficiency of repairs and maintenance as parts inventories and repair expertise supports a centralized fleet of vehicles. The DOE Report cites examples of fleets that have potential for conversion to CNG as follows: taxis, delivery trucks, utilities trucks, shuttle vans, garbage trucks, and buses.

The GNA report recommends that refueling stations be strategically located in major metropolitan areas of the state and be open to the general public and outside fleets in addition to the target fleet. Eventually as multiple refueling stations are rolled out along a set corridor they begin to support CNG use for longer haul trucking operations and stimulate the use of additional CNG vehicles within local markets.

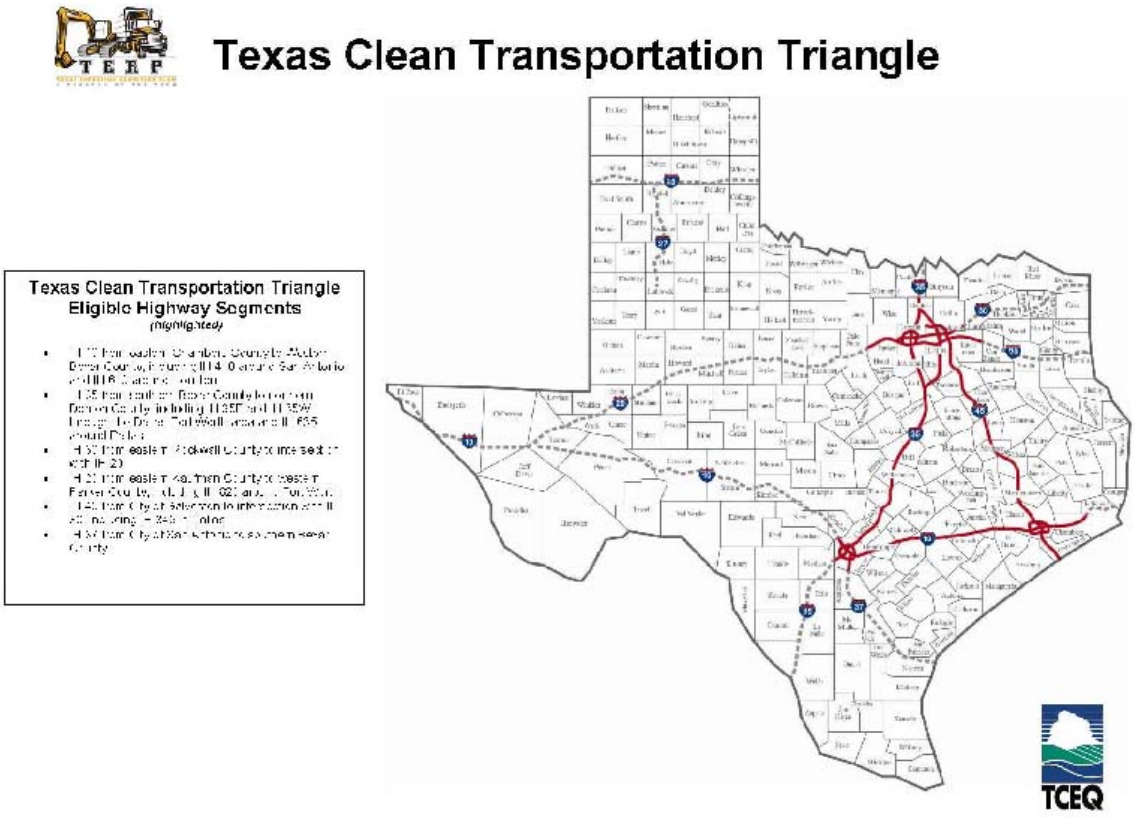
Gladstein, Neandross, and Associates (“GNA”) has successfully implemented this approach as part of the Interstate Clean Transportation Corridor (“ICTC”), the nation’s most successfully clean corridor which connects Southern California, Northern California, Salt Lake City, and Las Vegas along 1,800 miles of highway. A map of the corridor is shown below.

Figure 1.3.1 Map of Interstate Clean Transportation Corridor Natural Gas Refueling Network



Source: NGV Roadmap for Pennsylvania Jobs, Energy Security and Clean Air" prepared by Gladstein, Neandross, & Associates on behalf of the Marcellus Shale Coalition, Figure 5

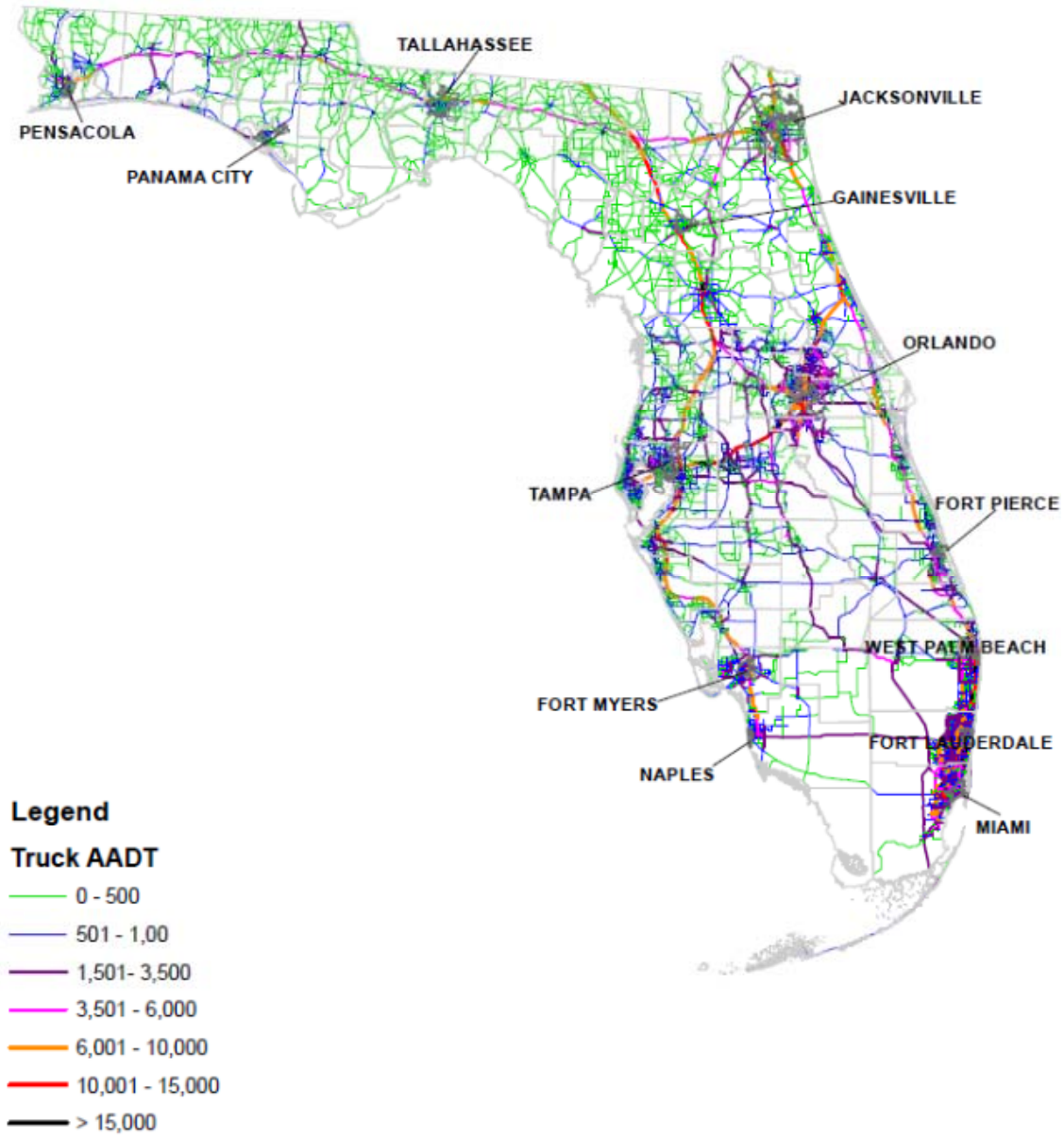
In addition to the California-Las Vegas corridor, GNA has also implemented, or is implementing, similar approaches in the Central Valley of California and the Dallas/Fort Worth, Houston, and San Antonio metropolitan regions of Texas.



Based on the success of this approach in laying the foundation for widespread alternative fueling networks the Consultant feels this model could serve as a useful basis for facilitating CNG vehicles in Florida. Therefore, in order to develop reasonable estimates for the timing and trajectory for conversion of fleets in Florida, assuming a properly structured incentive program, the Consultant has developed a base case and aggressive scenario for the placement of fueling stations in strategic areas within the state.

To guide the location of potential fueling stations the Consultant has reviewed volumes of heavy-duty truck traffic around the state. The figure below shows the average annual daily traffic (AADT) for trucks as of May 2012 taken from a Florida Department of Transportation GIS shapefile.

Figure 1.3.2 Average Annual Daily Truck Traffic



Source: Florida Department of Transportation GIS shapefile, May 2012

The graphic shows high volumes of truck traffic concentrated around major metropolitan areas and key transportation routes such as Interstate 75, Interstate 95, Interstate 4, U.S. Route 27, and the Florida Turnpike. In order to facilitate the goal of first providing stations for large return-to-base fleets in metropolitan areas and later, when a corridor becomes well defined, attracting longer haul trucking operations, the following scenarios for an alternative fuel network are proposed.

Figure 1.3.3 Number of Stations by Location

	Base	Aggressive
Location	**Case**	**Scenario**
Miami	2	3
Ft. Lauderdale	0	1
West Palm Beach	1	1
Ft. Myers	1	1
Tampa	1	2
Lakeland	0	1
Orlando	2	3
Ocala	1	1
Jacksonville	2	3
Lake City	0	1
Tallahassee	1	2
Pensacola	1	1
Total	**12**	**20**

Source: Fishkind & Associates, Inc.

Based on the spatial distribution of Florida's metropolitan areas and configuration of the transportation system the base case proposes a minimum of 12 stations and the aggressive scenario proposes 20.

The GNA Report omitted existing fueling stations from the analysis because only a few of them were available for public use, and those that were catered to light duty vehicles. Florida's situation for existing stations is very similar and as such the Consultant will not consider them in the analysis.

Using data from the EIA and US DOE the Consultant has reviewed the ratio of CNG vehicles to stations for the top 10 states with CNG fueling stations and found there is on average 113 vehicles per station, which includes all vehicle types. For this analysis the Consultant has reduced this number to 60 vehicles per station to account for only heavy duty, return-to-base vehicles. This is consistent with the GNA Report which used 50 vehicles per station.

The Consultant has utilized a cost per vehicle of $152,000 based on the DOE Report and a cost per station of $2,000,000 also based on the DOE Report. The following table summarizes the total cost of each scenario utilizing these inputs.

Figure 1.3.4 Total Cost of Alternative Fuel Network

	Base Case	Aggressive Scenario
Trucks	720	1,200
Cost/Truck	$152,000	$152,000
Stations	12	20
Cost/Station	$2,000,000	$2,000,000
Total Cost	$133,440,000	$222,400,000

Source: Fishkind & Associates, Inc.

The table shows that under the base case the 12 stations could support 720 heavy duty trucks with a total cost of $133.4-million. The aggressive scenario of 20 stations could support 1,200 heavy duty trucks and has a cost of $222.4-million. In addition, under each scenario hundreds of light duty vehicles could also be accommodated in addition to the heavy duty trucks.

The costs shown above are for vehicles and stations only and do not include updates required for maintenance garages, personnel training, and project management.

2.0 ECONOMIC AND POLITICAL CONSTRAINTS TO CONVERSION

There are distinct economic constraints to conversion of fleet vehicles to CNG. This section provides an identification and analysis of the constraints.

2.1 Cost of Conversion and Payback Period

The cost premium for CNG vehicles represents one barrier to widespread implementation. As documented in Section 1.2 the Honda Civic GX is the only passenger vehicle available to consumers that operates fully on CNG. The cost of a new Honda CNG passenger vehicle is roughly $7,000 greater than an identically equipped alternative. Another option is to convert an existing vehicle. This cost ranges from $12,500 to $18,500 depending on the model and tank size. By using the current price spread between gasoline and CNG of $1.74[3] and assuming each passenger vehicle consumes 531[4] gallons per year the following table shows the payback periods for the various CNG options.

[3] U.S. Department of Energy, 2011. Clean Cities Alternative Fuel Price Report.
[4] US Department of Transportation Federal Highway Administration, Office of Highway Policy Information Highway Statistics Series. Annual Vehicle Distance Traveled in Miles and Related Data – 2010 by Highway Category and Vehicle Type

Figure 2.1.1 Payback Period for CNG Passenger Vehicles

	Honda	Conversion	Conversion
	Civic GX	(Low end)	(High end)
Incremental Cost	$7,000	$12,500	$18,500
Gallons Consumed/yr	531	531	531
Gas-CNG Price Difference	$1.74	$1.74	$1.74
Payback Period (yrs)	7.6	13.5	20.0

Source: Fishkind & Associates, Inc.

Prior to the application of any incentives the payback periods range from 7.6 years for the Honda GX to 20 years for the high end of the conversion option.

According to the DOE Report the incremental cost for a heavy duty truck is $76,100 when factoring in tax disadvantage related to the purchase price. By using the current price spread between diesel and CNG of $1.91[5] and assuming each vehicle consumes 11,706[6] gallons per year the following table shows the payback period for a CNG heavy duty truck.

Figure 2.1.2 Payback Period for CNG Heavy Duty Vehicles

	CNG
	HD Truck
Incremental Cost	$76,100
Gallons Consumed/yr	11,706
Diesel-CNG Price Difference	$1.91
Payback Period (yrs)	3.4

Source: Fishkind & Associates, Inc.

Due to the substantially higher fuel usage and a larger fuel price spread, heavy duty trucks are able to recoup the upfront cost of conversion in only 3.4 years.

[5] U.S. Department of Energy, 2011. Clean Cities Alternative Fuel Price Report.
[6] US Department of Transportation Federal Highway Administration, Office of Highway Policy Information Highway Statistics Series. Annual Vehicle Distance Traveled in Miles and Related Data – 2010 by Highway Category and Vehicle Type

2.2 Lack of Fueling Stations

As described in Section 1, the adoption of alternative fuel vehicles requires the simultaneous existence of fueling infrastructure. Currently, the low number of AFVs makes investment in fueling infrastructure infeasible. Studies have reviewed the relationship between AFVs and fueling stations on a global basis[7]. It was found that during the transition from initial market to mature market the number of alternative fuel stations needs to be a minimum of 10-20% the number of traditional gasoline stations. At this level consumers no longer view the availability of fueling stations as an obstacle. Secondly, the study found that a customer base of 1,000 vehicles per station represents the optimal balance between station profitability and consumer convenience.

The lack of alternative fueling infrastructure is a substantial impediment to the conversion of long haul trucks to CNG because they rely on fuel being consistently available along their route. As discussed in Section 1 this has been overcome in some areas by the development of strategic fueling networks.

2.3 Zoning and Permitting Issues

In some cases local ordinances and their interpretation by officials can present a barrier to CNG/LNG conversion, in particular to the development of fueling stations. Each municipality in Florida has its own set of zoning laws which create various zoning districts and impose design standards. Some jurisdictions may, for example, have limits to storage volumes or height restrictions. LNG fuel tanks have presented design challenges in the past because they range from 35-40' in height and are stored above ground unlike gasoline or diesel fuel which is stored below ground. Some cities such as Dallas, which has seen an increasing number of vehicles beginning to use alternative fuels, are establishing or amending zoning rules to provide clarity for CNG/LNG station applicants. For example, in Dallas they are proposing to allow LNG/CNG stations in industrial zoning districts but would require a special permit if located within 1,000 feet of a residential district or provided more than four pumps.

In 2003 the California Energy Commission put together a Liquefied Natural Gas Interagency Permitting Group. Its mission is to establish communication among the agencies involved in the permitting process of LNG facilities in California. The goals of the group as listed on the California Energy Commission website[8] are:

- Identify permitting responsibilities for various aspects of an LNG project;
- Identify potential resources available to the state that can be used to assist the lead and responsible agencies that review an LNG facility application;
- Establish a support network to ensure all affected agencies can operate efficiently and complete their work in a timely manner;
- Provide clear guidance to potential developers on the state's LNG permitting process;

[7] Yeh, Sonia, 2006. An empirical analysis on the adoption of alternative fuel vehicles: The case of natural gas vehicles.
[8] http://www.energy.ca.gov/lng/working_group.html

- Energy Commission to become an information resource on LNG - provide workshops to agencies or the public; maintain a website on LNG.

The group is currently inactive due to a slowdown in LNG applications but is able to reconvene at a later date if justified by permit activity.

3.0 PRELIMINARY PROGRAM TO OVERCOME CONSTRAINTS

This section provides the Consultant's review of current incentive programs for Florida and other states. Based on this review along with the research completed under Tasks 1 and 2, the Consultant has designed a preliminary program of incentives, permitting, and other components of a system to facilitate the conversion process and the development of the requisite fueling station infrastructure.

3.1 Current Incentives in Florida

Currently, the State of Florida has little in the way of monetary incentives for CNG conversion compared to other states. There are two incentives in place at the moment. They are:

Alternative Fuels Production Incentive[9]

The Innovation Incentive Program within the Florida Office of Tourism, Trade, and Economic Development provides resources for business projects that allow the state to compete effectively for high-value research and development, including alternative and renewable energy projects. To qualify, an alternative and renewable energy project must involve collaboration with an institution of higher education; provide the state a minimum full return on investment within a 20-year period; include matching funds from the applicant or other available sources; and be located in Florida. Additional criteria may apply. For the purpose of this incentive, alternative and renewable energy means electrical, mechanical, or thermal energy produced using one or more of the following energy sources: ethanol, cellulosic ethanol, biobutanol, biodiesel, biomass, biogas, hydrogen fuel cells, ocean energy, hydrogen, solar, hydro, wind, or geothermal. Incentive awards are subject to state funding availability.

High Occupancy Vehicle (HOV) Lane Exemption[10]

Drivers may operate Inherently Low Emission Vehicles (ILEV) and hybrid electric vehicles (HEV) in HOV lanes at any time, regardless of the number of passengers, provided that the vehicles are certified and labeled in accordance with federal regulations. All eligible ILEVs and HEVs must comply with the minimum fuel economy standards set forth in Title 23 of the U.S. Code, section 166(f)(3)(B). The vehicle must display a Florida Division of Motor Vehicles issued decal, which is renewed annually. Special fees may apply. Vehicles with decals may also use any HOV lane designated as a HOV toll lane without paying the toll. An HEV is defined as a motor vehicle that draws propulsion energy from onboard sources

[9] Reference Florida Statutes 288.1089
[10] U.S. Dept. of Energy

of stored energy comprised of both an internal combustion engine using combustible fuel and a rechargeable energy storage system and meets or exceeds the qualifying California standards for a Low Emission Vehicle. In addition, three-wheeled vehicles are considered ILEVs for the purposes of HOV lane exemption.

3.2 Incentive Programs in Other States

Other states have far more incentives in place which is driving the conversion numbers to CNG and LNG up significantly as noted in Section 1.0. For example, the table below shows some of those states and their related alternative fuel vehicle tax incentives as presented in the DOE Report:

Figure 3.2.1 Incentive Programs for Other States

State	Description	Link
Colorado	Alternative fuel vehicle (AFV) tax credit is available ranging from $1,947 to $13,779, depending on vehicle weight	http://www.afdc.energy.gov/afdc/progs/state_summary.php/CO
Georgia	AFV tax credit is available up to $2500	http://www.afdc.energy.gov/afdc/progs/state_summary.php/GA
Kansas	AFV tax credit is available ranging from $2,400 to $40,000, depending on vehicle weight	http://www.afdc.energy.gov/afdc/progs/state_summary.php/KS
Louisiana	AFV tax credit is available worth 20 percent of the cost of converting the vehicle	http://www.afdc.energy.gov/afdc/progs/state_summary.php/LA
Montana	AFV tax credit is available for 50 percent of the cost of converting the vehicle up to $1000, depending on the weight of the vehicle.	http://www.afdc.energy.gov/afdc/progs/state_summary.php/MT
Oklahoma	AFV tax credit is available for 50 percent of the cost of converting the vehicle and also for 10 percent of the vehicle cost up to $1,500	http://www.afdc.energy.gov/afdc/progs/state_summary.php/OK
Oregon	AFV tax credit is available in the amount of $750 for the cost of converting the vehicle.	http://www.afdc.energy.gov/afdc/progs/state_summary.php/OR
South Carolina	AFV tax credit is available worth 20 percent of the federal tax credit	http://www.afdc.energy.gov/afdc/progs/state_summary.php/SC
Utah	AFV tax credit is available for 50 percent of the cost of converting the vehicle up to $3,000	http://www.afdc.energy.gov/afdc/progs/state_summary.php/UT
Washington	AFV are exempt from sales tax	http://www.afdc.energy.gov/afdc/progs/state_summary.php/WA

Source: Issues Affecting Adoption of Natural Gas Fuel in Light and Heavy-Duty Vehicles, Table 2.8.

Many states have initiated further incentives to foster the development of CNG and LNG. They range from alternative fuel vehicle tax credits as noted above to subsidizing fuel purchases and the creation of alternative fuel filling stations.

3.3 Florida Preliminary Program

The primary economic incentive for consumer and commercial adoption of natural gas fueled vehicles is the potential savings in fuel cost relative to gasoline-fueled vehicles. On average, the cost of CNG at a retail filling station is about one-third less than gasoline. So the primary economic driver to entice consumers and commercial operations to convert to CNG would be to keep the cost of CNG down compared to gasoline. Also, excellent station redundancy increases consumer confidence to convert, which should be a cornerstone of a Florida overarching plan to massively expand the NGV market.

With those in mind, we recommend a combination of the following potential incentives be established in the state to further drive the development of an alternative fuel network within the state of Florida:

- In order to incentivize companies to purchase new CNG driven vehicles and/or convert existing fleet vehicles, the state should provide cash incentives that would go toward those purchases or conversions by implementing a tax on every gallon of CNG sold. Currently, diesel gas has a $0.20 per gallon tax where CNG does not other than the sticker fee. With that $0.20 advantage in mind, the Consultant suggests a $0.05 tax on a gallon of CNG. That would not only allow for a new or converted truck to pay for itself over time, it would also generate additional cash from the gallons used by exiting CNG vehicles in the marketplace to purchase additional trucks. See Addendum A for a complete analysis of the cash incentive program.

- To address the primary economic incentive of savings in fuel costs, the state should implement a corporate tax credit of $0.25 per gallon of CNG and LNG in order to create a further gap between the cost of gasoline and CNG/LNG. This will go a long way to induce commercial operations to convert their fleets to CNG/LNG.

- The Florida Public Service Commission should allow local distribution companies and utilities in the state to develop natural gas fueling stations and infrastructure from revenues generated from all residential and commercial users of natural gas (not just vehicle natural gas) through a standard rate mechanism. 728-billion cubic feet of natural gas is consumed annually in Florida according to the Florida Natural Gas Association. Currently there is a 2.5% gross receipts tax on utility services such as natural gas. At an average price of $10.55 per 1,000 cubic feet of natural gas and a consumption of 728-billion cubic feet of natural gas being consumed in the state annually, the potential tax receipts pool is $192,010,000. If 20% of that pool is targeted for the development of natural gas fueling stations and related infrastructure, then nearly $38.5-million would be available for development.

- The state should enlist Florida's Clean Cities Coalitions to become very active in recruiting fleets and seeking grant funding for the development of natural gas fueling stations and related infrastructure. There are 8 clean cities coalitions in Florida. They are:

    - Emerald Coast
    - Big Bend
    - Heart of Florida
    - North Florida
    - Space Coast
    - Sun Coast
    - Treasure Coast
    - Gold Coast

- The Florida Clean Cities Coalitions should be utilized as the clearing house in offering substantial monetary incentives in the form of competitive grants to purchase alternative-fueled vehicles. These grants are funded through a variety of creative programs including fees, emission reduction credits (ERCs), penalties, alternatives to ridesharing requirements, bonds and federal assistance. The grants can be used to convert existing vehicles to operate on alternative fuels; to purchase new bi-fuel, dual-fuel, hybrid, and dedicated alternative fuel vehicles; to install the necessary fueling infrastructure for alternative fuels; to perform research and development R&D) on new alternative fuel technologies; and to help defer the incremental costs of purchasing biofuels.

- The state could also provide a one-time tax credit covering 50% of the incremental cost of purchasing new, original equipment for AFV or converting a vehicle to operate on an alternative fuel. Another provision for a tax credit is for up to 75% of the cost of installing alternative-fuel infrastructure. A tax credit up to $2,500 should also be considered for up to 50% of the cost of installing a residential CNG fueling system. Furthermore, all of these tax credits should be carried forward for up to five years.

3.4 Review of Federal Tax Credits

Federal tax credits for alternative fuel vehicles and infrastructure have been very important financial drivers over the past several years and should not be overlooked when considering incentivizing the Florida market. They include:

- A $0.50 excise tax credit for each gallon of LNG or gasoline gallon equivalent of CNG.
- A vehicle-purchase tax credit of up to $32,000 for the largest and cleanest of natural gas engines;
- A refueling-equipment tax credit of up to $30,000 for large equipment and $1,000 for home refueling equipment. The American Recovery and Reinvestment Act of 2009 increase the value of this credit to $50,000 for large stations and $2,000 for home refueling devices.

The $0.50 fuel-excise tax credit has been one of the most successful programs in terms of driving large deployments of natural gas trucks.

In addition, unlike grant funding, the value of a federal tax credit is not considered taxable income to a private entity. It is therefore equivalent to a cash rebate, or grant funding at 100% of the value.

When the Federal Tax Credits are combined, expedited payback periods of less than two years can be realized on the incremental investment required for a natural gas truck. After this payback period, the fuel-cost savings go directly to the bottom line of the fleet operator. Given that a typical refuse truck will be in operation for over 10 years, this fuel-cost savings becomes a very significant benefit to a fleet operator.

3.4 Planning and Permitting Incentives

As noted in Section 2.3, local ordinances and their interpretation by government officials present a barrier to the development of fueling stations. There are many zoning districts, zoning laws and design standards that prohibit the development of these stations. In order to better coordinate the planning and permitting process for fueling stations across the state and to make the process more consistent among local jurisdictions, we recommend the formation of an LNG/CNG Interagency Permitting Group mirrored after the group put together in California. This Group could be formed under the Florida Public Service Commission. This interagency group would have similar goals that were originally established by the California Group as noted below.

- Attempt to develop a common set of permitting and design standards for fueling stations that could be adopted by local jurisdictions.
- Identify areas within each jurisdiction's comprehensive plan where fueling stations would be most acceptable while maintaining ease of availability to the public and commercial users.
- Identify the permitting responsibilities for the various aspect of an LNG/CNG facility;
- Identify potential resources available to the state that can be used to assist the lead and responsible agencies that review a LNG/CNG facility application;
- Establish a support network to ensure all affected agencies can operate efficiently and complete their work in a timely manner;
- Provide clear guidance on the state's LNG/CNG permitting process to potential developers;
- Provide guidance on local jurisdictional LNG/CNG permitting processes to potential developers;
- Become an information resource on LNG/CNG, provide workshops to permitting agencies and/or the public, and develop and maintain an LNG/CNG website.

4.0 COSTS AND BENEFITS OF THE ALTERNATIVE FUEL NETWORK AND PRELIMINARY PROGRAM

This section provides a quantification of the costs and benefits to the state of Florida of the preliminary program. The focus will be on the economics without attempt to quantify the associated positive environmental benefits that would also flow from the conversion process.

4.1 Benefits of Preliminary Program

The economic benefits to the State of Florida from the program are in the form of local investment, employment, tax revenues, and the addition of cost savings into the economy.

Local Investment – Critical First Step

As calculated in Section 1 the cost to implement the plan ranges from $133.4-million to $222.4-million for the base case and aggressive scenario (for the vehicles and stations only). Although it is assumed a portion of these costs will be offset by some form of incentive or subsidy, this represents significant investment in an emerging clean technology for the State of Florida. Since this program provides the necessary base that will eventually stimulate more widespread conversion to CNG vehicles, it represents the critical first step towards what has the potential to be a very prosperous industry within the state.

Figure 4.1.1 Investment in Clean Energy for Florida

	Base Case	Aggressive Scenario
Investment ($)	$133,440,000	$222,400,000

Source: Fishkind & Associates, Inc.

Employment

Investment in an alternative fuel network for Florida will have a positive impact on employment for both the construction phase and for ongoing operations. Glastein, Neadross, and Associates, Inc (the author of the GNA Report) have developed a job calculator for the natural gas industry in response to a 2009 U.S. Department of Energy Clean Cities Program grant solicitation. The calculator is based on GNA's work with major national gas truck manufacturers to quantify the various categories of employment that flow from development of natural gas fuel networks. Figures from the GNA Report produced 1.6 construction and ongoing clean fuel technology jobs for every truck provided as part of an alternative fuel network. The clean fuel technology jobs are related to vehicles (production, training, service, and operation), stations (construction, maintenance, and ongoing operation), facilities (upgrades of maintenance facilities for CNG as required by code), and exploration and production (gas demand met by local production). Utilizing GNA's ratio of employees to trucks, the Florida alternative fuel network would create 1,152 clean energy jobs under the base case and 1,920 under the aggressive scenario.

Figure 4.1.2 Job Generation

	Base Case	Aggressive Scenario
Trucks	720	1,200
Stations	12	20
Jobs	1,152	1,920

Source: Fishkind & Associates, Inc. based on Glastein, Neadross, and Associates, Inc.

In addition to direct jobs, there will also be indirect job opportunities that arise because of the investment made in the alternative fuel network. Furthermore, the alternative fuel network represents a starting point to stimulate future growth in CNG vehicles and as such, job growth on a direct and indirect basis will only accelerate as the network builds upon itself.

Tax Revenue

In addition to the local investment and employment benefits, implementation of the alternative fuel network will generate onetime tax revenues to the state from the sale of the vehicles and stations, and recurring revenues from annual decal purchases. The State of Florida currently has a decal fee of $375.90 per year for Class C vehicles that use alternative fuel[11]. Although the decal fee is the current form of taxation for CNG, it is likely to be replaced or supplemented if a widespread alternative fuel network were implemented. The table below shows tax revenue generated to the State of Florida under both network scenarios using the current tax environment.

Figure 4.1.3 Taxes Generated to State of Florida

	Annual	One Time	
		Vehicles	Stations
	Vehicles	Taxable ($)	Taxable ($)
Base Case	720	$109,440,000	$18,000,000
Aggressive Scenario	1200	$182,400,000	$30,000,000
Tax Rates	$375.90	6%	6%
Base Case Taxes	$270,648	$6,566,400	$1,080,000
Agg Scenario Taxes	$451,080	$10,944,000	$1,800,000

[11] Florida Department of Revenue, 2012 Alternative Fuel Use Permit Application, Renewal, and Decal Order Form

Source: Fishkind & Associates, Inc
Note: It is assumed each station is taxable on 75% of its total cost to reflect raw material cost

Under the base case, the alternative fuel network would generate a total of $7.7-million in one-time taxes from the sale of the vehicles and stations and $271-thousand annually in decal fee revenue. Under the aggressive scenario, the network would generate a total $12.7-million in one-time taxes from the sale of the vehicles and stations and $451-thousand annually in decal fee revenue.

Economic Impact of Fuel Cost Savings

In addition to the jobs created by the construction and ongoing operation of the network there will be economic impacts created by adding the savings on fuel back into the economy. The current spread between diesel fuel and CNG is $1.91 per gallon equivalent for the Lower Atlantic region of the U.S[12]. The cost savings per year for the base case and aggressive scenario are shown in the figure below assuming each heavy duty truck consumes 11,706 gallons of fuel per year[13].

Figure 4.1.4 Fuel Cost Savings per Year to End User

	Base Case	Aggressive Scenario
Trucks	720	1,200
Gallons/year	8,428,320	14,047,200
CNG-Diesel Price Difference	$1.91	$1.91
Savings/Year	$16,098,091	$26,830,152

Source: Fishkind & Associates, Inc. based on FHA and US DOE

End users stand to save a total of $16.1-million and $26.8-million per year in fuel expenditures under the base case and aggressive scenario respectively. It should be noted the analysis uses the current CNG-Diesel price difference of $1.91, which could be affected if the State were to implement an excise tax on CNG.

The economic impact of adding the cost savings above back into the economy is analyzed using RIMS II (Regional Input-Output Modeling System) as developed by the Bureau of Economic Analysis. The RIMS method utilizes I-O (Input-Output) tables, the distribution of the inputs purchased and the outputs sold, to analyze these economic effects. Since it is infeasible to estimate what portion of the cost savings would be added back into the economy as new goods and services, this analysis is based on the total amount of the savings to show what the potential could be.

[12] U.S. Department of Energy, 2011. Clean Cities Alternative Fuel Price Report.
[13] US Department of Transportation Federal Highway Administration, Office of Highway Policy Information Highway Statistics Series. Annual Vehicle Distance Traveled in Miles and Related Data – 2010 by Highway Category and Vehicle Type

The economic impacts take the form of:

- **Output** - value-added dollars and wage earnings spent and re-spent in the analysis area as a result of the savings;
- **Earnings** - wage earnings in the analysis area generated by employment associated directly and indirectly with the savings; and
- **Employment** - jobs created directly and indirectly in the analysis area as a result of the savings.

The analysis identifies both direct and indirect economic impacts created. Direct economic benefits are the result of people purchasing goods or services from a business. For example, a truck transportation business creates a direct impact on the economy. Indirect economic benefits are created by a 'ripple effect' through the economy. For example, as more truck transportation service is rendered the business must purchase more from wholesalers who in turn hire additional salespeople, clerical workers, etc. These employees in turn purchase additional goods and services in the local community, thus further indirectly impacting the economy.

The following table shows the economic impact to the State of Florida using RIMS II multipliers for the truck transportation industry.

Figure 4.1.5 Economic Impact of Cost Savings

RIMS II	Direct Impacts		Direct and Indirect Impacts		
	Employment (jobs)	Output (dollars)	Output (dollars)	Earnings (dollars)	Employment (jobs)
State of FL Economic Impacts					
Base Case	121	$16,098,091	$31,933,784	$9,056,786	259
Aggressive Scenario	202	$26,830,152	$53,222,973	$15,094,644	431

Source: Fishkind & Associates, Inc. based BEA

The table shows that the direct output of the cost savings is equal to the savings itself, because we are examining what the potential could be if it were all added back into the economy as new goods and services. In addition to the direct impacts, the savings has an indirect ripple effect on the entire state economy. Under the base case, the savings will be directly and indirectly responsible for generating $31.9-million in economic output throughout the state annually. Also, it will create $9.1-million in earnings and be responsible for 259 employees throughout the state. Under the aggressive scenario, $53.2-million in economic output will be generated annually along with $15.1-million in earnings and 431 employees.

Taking this analysis a step further, the Consultant took those annual figures and multiplied them out 20 years to match the cash incentive program mentioned previously in this report. In doing so, the Consultant calculated that the base case scenario would generate 5,173 jobs with an earnings of just over $181-million and an output of over $638-million. The aggressive scenario would generate 8,621 jobs with earnings just over $301-million and an output of over $1-billion. Figure 4.1.6 below shows those numbers.

Figure 4.1.6 Economic Impact of Cost Savings over 20 Years

RIMS II	Direct and Indirect Impacts		
Economic Impacts	Output (dollars)	Earnings (dollars)	Employment (jobs)
Base Case	$638,675,670	$181,135,722	5,173
Aggressive Scenario	$1,064,459,450	$301,892,870	8,621

Source: Fishkind & Associates, Inc. based BEA

Combining those economic impact jobs with the jobs generated in section 4.1, there is a potential for the base case scenario to generate 6,325 jobs over 20 years and the aggressive scenario to generate 10,541 jobs over 20 years. Again, the RIMS numbers are predicated on the cost savings dollars used in the RIMS analysis are constant over 20 years and assume that those dollars are all returned to the market as final goods and services for the trucking and transportation sector. The jobs numbers in section 4.1 are generated on a per truck and per station basis and not cost related so they are unrelated to the RIMS numbers therefore the Consultant combined them.

4.2 Costs of Preliminary Program

The costs of the preliminary program to the state are the loss of gas taxes revenues and the value of tax credits and subsidies required to implement the program.

Forgone Gas Tax Revenues

The fleets that make up the alternative fuel network represent vehicles that would otherwise use gasoline. The State of Florida taxes the sale of diesel fuel at 23.5 cents per gallon[14]. In order to calculate the loss of fuel tax revenue to the state we have assumed each heavy duty truck within the network consumes 11,706 gallons of fuel per year[15].

[14] 2012 Florida Tax Handbook.
[15] US Department of Transportation Federal Highway Administration, Office of Highway Policy Information Highway Statistics Series. Annual Vehicle Distance Traveled in Miles and Related Data – 2010 by Highway Category and Vehicle Type

Figure 4.2.1 Loss of Gas Tax Revenues

	Base Case	Aggressive Scenario
Trucks	720	1,200
Gallons/year	8,428,320	14,047,200
State Diesel Tax/gal	$0.235	$0.235
Loss of Diesel Tax/yr	$1,980,655	$3,301,092

Source: Fishkind & Associates, Inc.

If the alternative fuel network were implemented the state would forgo $2.0-million per year in fuel related taxes under the base case and $3.3-million per year under the aggressive scenario.

Tax Credits & Subsidies

Below the Consultant has quantified the value of the incentive programs proposed in Section 3.0.

Tax Credit of $0.25 per gasoline gallon equivalent of CNG

One potential incentive identified is a corporate tax credit of $0.25 per gallon of CNG and LNG. The table below shows the cost of this program based on the proposed alternative fuel network.

Figure 4.2.2 CNG Tax Credit per Gasoline Gallon Equivalent

	Base Case	Aggressive Scenario
Trucks	720	1,200
Gallons/yr	8,428,320	14,047,200
CNG Tax Credit/gge	$0.25	$0.25
Tax Credit ($)	$2,107,080	$3,511,800

Source: Fishkind & Associates, Inc.

The potential value of the credit would be $2.1-million for the Base Case and $3.5-million for the Aggressive Scenario.

Natural Gas Gross Receipts Tax

Another incentive option is for the Florida Public Service Commission to allow local distribution companies and utilities in the state to develop natural gas fueling stations and infrastructure from revenues generated from all residential and commercial users of natural gas (not just vehicle natural gas) through a standard rate mechanism. 728-billion cubic feet of natural gas is consumed annually in Florida according to the Florida Natural Gas Association. Currently there is a 2.5% gross receipts tax on utility services such as natural gas. At an average price of $10.55 per 1,000 cubic feet of natural gas and a consumption of 728-billion cubic feet of natural gas being consumed in the state annually, the potential tax receipts pool is $192,010,000. If 20% of that pool is targeted for the development of natural gas fueling stations and related infrastructure, then nearly $38.5-million would be available for development.

One-Time Tax Credit

Another potential incentive is for the state to provide a one-time tax credit covering 50% of the incremental cost of purchasing new, original equipment for AFV or converting a vehicle to operate on an alternative fuel. Another provision for a tax credit is for up to 75% of the cost of installing alternative-fuel infrastructure. Furthermore, all of these tax credits should be carried forward for up to five years.

Figure 4.2.3 One-Time Tax Credit for CNG Vehicles and Stations

	Base Case	Aggressive Scenario
Incremental Truck Cost[16]	$45,792,000	$76,320,000
Tax Credit (%)	50%	50%
Tax Credit ($)	$22,896,000	$38,160,000
Total Station Cost	$24,000,000	$40,000,000
Tax Credit (%)	75%	75%
Tax Credit ($)	$18,000,000	$30,000,000
Total Tax Credit	$40,896,000	$68,160,000

Source: Fishkind & Associates, Inc.

The potential value of the credit would be $40.9-million for the Base Case and $68.2-million for the Aggressive Scenario.

[16] Based on incremental cost per CNG Heavy Duty truck of $63,600 from Figure 1.2.1.

Summary

The table below summarizes the total value of the preliminary programs discussed above.

Figure 4.2.4 Summary of Incentive Program Value

	Base Case	Aggressive Scenario
Fuel Tax Credit	$2,107,080	$3,511,800
Natural Gas Gross Receipts Tax	$38,500,000	$38,500,000
One-Time Tax Credit	$40,896,000	$68,160,000
Total	$81,503,080	$110,171,800

Source: Fishkind & Associates, Inc.

The total value of the potential programs is $81.5-million under the Base Case and $110.2-million under the Aggressive Scenario. The state may choose to implement a combination of one or more of the potential programs. It should be noted that the only net cost to the state would be the re-allocation of the natural gas gross receipts tax as the value of the tax credit programs are dependent upon the Base Case and Aggressive Scenarios being developed. If they are not developed the funds would not have flowed to the state in the first place.

ADDENDUM A – FLORIDA CASH INCENTIVE PROGRAM

In order to incentive companies to purchase new CNG driven vehicles and/or convert existing fleet vehicles, the state should provide cash incentives that would go toward those purchases or conversions by implementing a tax on every gallon of CNG sold. Currently, diesel gas has a $0.20 per gallon tax where CNG does not other than the sticker fee. With that $0.20 advantage in mind, the Consultant suggests a $0.05 tax on a gallon of CNG. That would not only allow for a new or converted truck to pay for itself over time, it would also generate additional cash from the gallons used by exiting CNG vehicles in the marketplace to purchase additional trucks.

The Consultant has used this $0.05 per gallon tax to calculate the payback time frame for paying out a cash incentive of $15,000 per heavy duty truck and $5,000 for a medium duty truck. The consultant's analysis assumed the base case scenario of 702 trucks – 144 heavy duty and 576 medium duty trucks being incentivized. Those trucks would come on line as the new stations are built over a 4-year time period. The analysis also takes into consideration the existing 1,992 CNG trucks in circulation in the state as shown in Table A-1 below.

TABLE A-1. Types of Existing CNG Vehicles in Florida

Type of Truck	Existing
Heavy Duty Trucks:	83
Medium Duty Trucks:	318
Light Duty Trucks:	1,591
Total Number of Trucks:	1,992

Source: U.S. Department of Energy, Alternative Fuels & Advanced Vehicles Data Center

The Consultant next considered the number of new CNG stations that would open by year. The Consultant referred to a California case study and a San Antonio case study to determine the number of stations that would open by year. Table A-2 shows the stations opening by year.

TABLE A-2. Base Case Number of New CNG Stations Opening in Florida by Year

	Year 1	Year 2	Year 3	Year 4	Total Stations
Base Case	2	3	4	3	12

Source: Fishkind & Associates, Inc.

Next, the Consultant took the total number of base case trucks and divided that number by the number of base case new CNG stations to determine the number of new trucks that would come into the market as stations open. Since the different size trucks have different mileage requirements, it was necessary to determine the number of heavy duty versus medium duty trucks per station as shown in Table A-3 below.

TABLE A-3. Base Case Number of New Trucks per New CNG Station

	Total Trucks	Heavy Duty	Medium Duty
Base Case	60	12	48

Source: Fishkind & Associates, Inc.

The next calculation is to take the existing CNG trucks in the state and add the new trucks as the new stations open. Table A-4 shows how that was calculated.

TABLE A-4. Base Case Number of Existing and New CNG Vehicles Added by Year

Type of Truck	Existing	1	2	3	4	5
Heavy Duty Trucks:	83	107	143	191	227	227
Medium Duty Trucks:	318	414	558	750	894	894
Light Duty Trucks:	1,591	1,591	1,591	1,591	1,591	1,591
Total Number of Trucks:	1,992	2,112	2,292	2,532	2,712	2,712

Source: Fishkind & Associates, Inc

The Consultant next calculated what the annual taxes generated would be from the existing CNG vehicles in Florida as shown in Table A-5 below.

TABLE A-5. Number of Existing Vehicles and Their Tax Generation Potential

	Heavy Duty	Medium Duty	Light Duty	Grand Total
Number	83	318	1,591	1,992
Gallons Per Year Per Vehicle	11,706	1,834	453	
Total Gallons Per Year	971,631	583,271	721,380	
Taxes Per Gallon	$0.05	$0.05	$0.05	
Annual Taxes Generated	$48,581.56	$29,163.57	$36,069.00	$113,814.13
Taxes Per Vehicle	$585.32	$91.71	$22.67	

Source: U.S. Department of Energy, Alternative Fuels & Advanced Vehicles Data Center &
U.S. Department of Transportation, 2010 Highway Statistics

Table A-6 below shows the assumptions used to generate the payback period.

TABLE A-6. Assumptions for Calculating State Cash Incentive Payback

CNG Tax Rate Per Gallon:	$0.05
Heavy Duty Truck Cash Incentive:	$15,000.00
Medium Duty Truck Cash Incentive:	$5,000.00
Interest Rate:	0.00%

Source: Fishkind & Associates, Inc

Finally, the Consultant calculated the payback period at a $0.05 tax per gallon rate. It would take 20 years to pay back the state for the cash incentive on 720 trucks as shown in Table A-7.

TABLE A-7. Florida Cash Incentive Payback Table

	1	2	3	4	5
Loans for New Trucks:	$840,000	$1,260,000	$1,680,000	$1,260,000	$0
Amount of CNG Tax:	$136,666	$170,944	$216,647	$250,925	$250,925
Net Gain/(-Loss):	-$703,334	-$1,089,056	-$1,463,353	-$1,009,075	$250,925
Cumulative Variance:	-$703,334	-$1,792,391	-$3,255,743	-$4,264,819	-$4,013,894
Interest Rate:	0.00%	0.00%	0.00%	0.00%	0.00%
Revised Cumulative Variance:	-$703,334	-$1,792,391	-$3,255,743	-$4,264,819	-$4,013,894

Source: Fishkind & Associates, Inc

	6	7	8	9	10
Loans for New Trucks:	$0	$0	$0	$0	$0
Amount of CNG Tax:	$250,925	$250,925	$250,925	$250,925	$250,925
Net Gain/(-Loss):	$250,925	$250,925	$250,925	$250,925	$250,925
Cumulative Variance:	-$3,762,969	-$3,512,044	-$3,261,120	-$3,010,195	-$2,759,270
Interest Rate:	0.00%	0.00%	0.00%	0.00%	0.00%
Revised Cumulative Variance:	-$3,762,969	-$3,512,044	-$3,261,120	-$3,010,195	-$2,759,270

Source: Fishkind & Associates, Inc

	11	12	13	14	15
Loans for New Trucks:	$0	$0	$0	$0	$0
Amount of CNG Tax:	$250,925	$250,925	$250,925	$250,925	$250,925
Net Gain/(-Loss):	$250,925	$250,925	$250,925	$250,925	$250,925
Cumulative Variance:	-$2,508,345	-$2,257,420	-$2,006,496	-$1,755,571	-$1,504,646
Interest Rate:	0.00%	0.00%	0.00%	0.00%	0.00%
Revised Cumulative Variance:	-$2,508,345	-$2,257,420	-$2,006,496	-$1,755,571	-$1,504,646

Source: Fishkind & Associates, Inc

	16	17	18	19	20	21
Loans for New Trucks:	$0	$0	$0	$0	$0	$0
Amount of CNG Tax:	$250,925	$250,925	$250,925	$250,925	$250,925	$250,925
Net Gain/(-Loss):	$250,925	$250,925	$250,925	$250,925	$250,925	$250,925
Cumulative Variance:	-$1,253,721	-$1,002,796	-$751,872	-$500,947	-$250,022	$903
Interest Rate:	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Revised Cumulative Variance:	-$1,253,721	-$1,002,796	-$751,872	-$500,947	-$250,022	$903

Source: Fishkind & Associates, Inc.