Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
TX-93+983-4 Volume 1		

4. Title and Subtitle	5. Report Date
COST-EFFECTIVENESS ANALYSIS OF TxDOT LPG FLEET CONVERSION — VOLUME ONE	October 1992
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
Mark A. Euritt, Dean B. Taylor, and Hani Mahmassani	Research Report 983-4 / 1

9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
Center for Transportation Research The University of Texas at Austin Austin, Texas 78712-1075	11. Contract or Grant No. Research Study 3-4-90/2-983
	13. Type of Report and Period Covered Interim
12. Sponsoring Agency Name and Address Texas Department of Transportation (formerly SDHPT) Transportation Planning Division P. O. Box 5051 Austin, Texas 78763-5051	14. Sponsoring Agency Code

15. Supplementary Notes

Study conducted in cooperation with the Texas Department of Transportation
Research Study Title: "Conversion of the SDHPT Automotive Fleet to Alternative Fuels"

16. Abstract

Increased emphasis on energy efficiency and air quality has resulted in a number of state and federal initiatives examining the use of alternative fuels for motor vehicles. Texas' program for alternate fuels includes liquefied petroleum gas (LPG). Based on an analysis of 30-year life-cycle costs, development of a propane vehicle program for the Texas Department of Transportation (TxDOT) would cost about $24.3 million (in 1991 dollars). These costs include savings from lower-priced LPG and differentials between propane and gasoline/diesel in infrastructure costs for a fueling station, vehicle costs, and operating costs. The 30-year life-cycle costs translate into an average annual vehicle cost increase of $308, or about 2.5¢ more per vehicle mile of travel. Sensitivity analyses are performed on the discount rate, price of propane, maintenance savings, vehicle utilization, diesel vehicles, extended vehicle life, original equipment manufacturer (OEM) vehicles, and operating and infrastructure costs. The best results are obtained when not converting diesel vehicles, converting only large fleets, and extending the period the vehicle is kept in service. Combining these factors yields results that are most cost-effective for TxDOT.

17. Key Words	18. Distribution Statement
energy efficiency, air quality, motor vehicles, initiatives, alternative fuels, liquefied petroleum gas (LPG), life-cycle costs, propane vehicle program, converting, fleet, operating	No restrictions. This document is available to the public through the National Technical Information Service, Springfield, Virginia 22161.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	174	

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

COST-EFFECTIVENESS ANALYSIS OF TxDOT LPG FLEET CONVERSION

by

Mark A. Euritt
Dean B. Taylor
Hani Mahmassani

Research Report Number 983-4
Volume I

Research Project 3-4-90/2-983

Conversion of the SDHPT Automotive Fleet to Alternative Fuels

conducted for

Texas Department of Transportation

by the

CENTER FOR TRANSPORTATION RESEARCH
Bureau of Engineering Research
THE UNIVERSITY OF TEXAS AT AUSTIN

October 1992

Summary

This report summarizes the results of a 30-year liquefied petroleum gas (LPG), commonly known as propane, life-cycle cost analysis for 314 TxDOT fleet locations. Using the model documented in Research Report Number 983-3, introduction of propane vehicles into the TxDOT fleet will cost an estimated $24.3 million over the next 30 years, or an annual cost of about $2.6 million. This amounts to an additional $308 per vehicle per year or about 2.5¢ more per vehicle mile travelled. Based on a number of sensitivity tests, TxDOT can minimize their costs by 1) implementing their LPG-vehicle program at locations with the largest number of vehicles, 2) not converting diesel vehicles, and 3) holding the vehicles for a longer period of time, i.e., extend their service life.

Abstract

Increased emphasis on energy efficiency and air quality has resulted in a number of state and federal initiatives examining the use of alternative fuels for motor vehicles. Texas' program for alternate fuels includes liquefied petroleum gas (LPG). Based on an analysis of 30-year life-cycle costs, development of a propane vehicle program for the Texas Department of Transportation (TxDOT) would cost about $24.3 million (in 1991 dollars). These costs include savings from lower-priced LPG and differentials between propane and gasoline/diesel in infrastructure costs for a fueling station, vehicle costs, and operating costs. The 30-year life-cycle costs translate into an average annual vehicle cost increase of $308, or about 2.5¢ more per vehicle mile of travel. Sensitivity analyses are performed on the discount rate, price of propane, maintenance savings, vehicle utilization, diesel vehicles, extended vehicle life, original equipment manufacturer (OEM) vehicles, and operating and infrastructure costs. The best results are obtained when not converting diesel vehicles, converting only large fleets, and extending the period the vehicle is kept in service. Combining these factors yields results that are most cost-effective for TxDOT.

Implementation Statement

The purpose of this project is to evaluate the economic feasibility of alternative fuels for the Texas Department of Transportation (TxDOT). The life-cycle cost/benefit analysis model is the basic framework for this evaluation. The model will assist TxDOT in fulfilling the legal requirements of Senate Bill 740, whether through implementation of an alternative fuels program or through the processing of waivers where appropriate. This report provides the results of the propane model for 314 TxDOT fleet locations.

Disclaimer

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented within. The contents do not necessarily reflect the official views or policies of the Texas Department of Transportation (TxDOT). This report does not constitute a standard, specification, or regulation.

NOT INTENDED FOR CONSTRUCTION,
BIDDING OR PERMIT PURPOSES

Mark A. Euritt
Hani S. Mahmassani (Texas No. 57545)

Study Supervisors

TABLE OF CONTENTS

TABLE OF CONTENTS, continued

LIST OF TABLES

LIST OF FIGURES

SECTION 1: INTRODUCTION

OVERVIEW

Texas adopted alternative fuels legislation in 1989 requiring state agencies with more than 15 vehicles and school districts with more than 50 school buses to restrict new vehicle purchases to vehicles capable of operating on an alternative fuel. Initially, alternative fuels were defined as natural gas, propane, and electricity. In early 1992, the Texas Air Control Board added methanol to the list. The principal objective of the legislation was to stimulate the development of an alternate fuels market in Texas. Greater utilization of alternative fuels would assist the state in 1) improving air quality, 2) promoting economic development, particularly for the natural gas and propane industries, and 3) supporting national energy security objectives through reduced dependence on imported oil. An important component in the development and adoption of the legislation was the argument that utilization of alternate fuels would produce cost savings to state agencies. Accordingly, the legislation provides for a waiver if affected agencies demonstrate that either 1) the effort for operating an alternate-fueled fleet is more expensive than a gasoline or diesel fleet over its useful life, 2) alternate fuels are not available in sufficient supply, or 3) they are unable to acquire alternate-fueled vehicles or equipment necessary for their conversion.

This analysis focuses on the cost-effectiveness of liquefied petroleum gas (LPG) as an alternate fuel for the Texas Department of Transportation (TxDOT). The remainder of this section discusses the basic assumptions used in the Net Present Value (NPV) model. Details of the NPV cost-effectiveness model can be found in an earlier report.[1] The second section summarizes the results of the model for the TxDOT fleet locations. The third section consists of a number of sensitivity tests to important variables used in the model. The final section presents the general conclusions of the report.

BASIC ASSUMPTIONS

The NPV model used for this analysis was designed to provide a comparable level of service to the fleet manager and users as existing TxDOT gasoline/diesel fill stations. Social benefits, while important, are not incorporated into the model analysis. Importantly, however, if the net present value in the model is negative, this can be identified as the minimum value that social benefits must attain for the alternative to be cost-effective. This decision is highly debatable and will be left in the hands of policy-makers. Finally, clean-

---

[1] Dean Taylor, Mark Euritt, and Hani Mahmassani, *Documentation For Propane Fleet Conversion Cost-Effectiveness Model,* Research Report 983-3, Center for Transportation Research, The University of Texas at Austin, October 1992.

up costs and tank removal for existing gasoline stations are not included, since they are a sunk cost; these costs will be incurred by TxDOT regardless of any future fuel selected. But to the extent that future inspection and maintenance costs of tanks are identified they should be taken into account in a comparative analysis of fuels. This cost factor, however, is not included in the model.

Below are a few of the basic assumptions utilized in the model. (An earlier report, *Documentation for Propane Fleet Conversion Cost-Effectiveness Model*, provides detailed information on all aspects and assumptions of the model.) All cost figures and prices are in 1991 dollars.

1. Dedicated (and optimized) original equipment manufacturer (OEM) propane vehicles are available in year 11.

2. Diesel vehicle conversions begin in year 6. Additionally, all diesel conversions and OEM diesels are dedicated and not dual-fuel engines.

3. Vehicle conversion costs, based on a fairly mature market, are as follows (figures are in 1991 dollars):

	Automobiles	Light Trucks	Heavy-Duty Gasoline Trucks	Heavy-Duty Diesel Trucks
Conversion Costs:				
Kit	$700	$570	$570	$1,630
Labor	$570	$340	$340	$1,330
Tank(s)	$330	$280	$290	$365
Total	$1,600	$1,190	$1,200	$3,325
OEM differential	$400	$400	$450	$1,400

4. Conversion kits and tanks are transferred between vehicles at the labor costs shown above, when a converted vehicle is retired from the fleet. When replaced with an OEM, the kit and tanks remain on the retired vehicle with a $150 and $300 increase in the salvage value of gasoline-converted and diesel-converted vehicles, respectively.

5. For gasoline dual-fuel vehicles, the fuel economy is assumed equivalent to a gasoline-only vehicle. For OEMs, the fuel economy is increased by 10 percent. Diesel converted vehicles have only 74 percent of the economy of a comparable diesel-only vehicle. Finally, for dedicated OEM diesels the fuel economy is 80 percent of a diesel-only vehicle.

6. The price of gasoline is $.89/gallon and the price of diesel is $.85/gallon. These prices do not include federal taxes. The fuel price structure for propane is based on a variety of component costs, as shown below:

Costs	Small Volume Price/gallon	Large Volume Price/gallon
Refinery	$.36	$.36
Transportation	$.03	$.03
Supplier Markup	$.21	$.04
TOTAL	$.60	$.43

7. Capital fueling infrastructure costs are based on the size of the fuel purchase. For large purchases, the cost of the storage/dispenser unit is $57,000. For small purchases, the cost of the storage/dispenser unit is $10,000. Station setup costs are assumed to be 15 percent of the storage/dispenser costs for stations of either size.

8. Station maintenance costs are assumed $500/year for small volume propane stations and $1,500/year for large volume propane stations.

9. It is important to note that the information regarding diesel conversion to LPG is extremely limited. The model is based on the best available information. Importantly, there may be significant changes in technology over the next few years, which would require further calibration of the model.

SECTION 2: LPG VEHICLE SUMMARY ANALYSIS

TxDOT FLEET SUMMARY

There are 314 locations around the state that currently serve as fill-stations for the 8,377 vehicles used in this analysis. The vehicles are classified into four groups, as shown in Table 1. Autos and light trucks (pickup trucks) are gasoline-fueled vehicles, with the exception of a few diesels included in the light-truck group. The average fleet size is biased upwards because of the existence of several large fleets. More than 75 percent of the locations have 30 or fewer vehicles in their fleet, as shown graphically in Figure 1. Overall, 73 percent of the vehicles are in fleets with more than 20 vehicles.

Table 1
TxDOT Vehicle Distribution by Category

	Autos	Light Trucks	Heavy-Duty Gasoline	Heavy-Duty Diesel	Total
Number	1,041	4,251	735	2,350	8,377
Average No. per Location	3.3	13.5	2.3	7.5	26.6

While the locations are analyzed individually, representative fleets are used for the sensitivity analyses performed on important variables. Based on an analysis of the 314 fleets, five representative sizes were chosen and are illustrated in Table 2. The values for the variables from the representative fleets, shown in Table 3, are calculated from all the fleets of that particular size grouping. This data will be used as the base-line for the sensitivity analyses discussed later.

Table 2
Representative Fleet Groups

Fleet Group	Number of Vehicles	Percentage of Vehicles
1-10 vehicles	385	4.6
11-20 vehicles	1,847	22.0
21-30 vehicles	1,707	20.4
31-50 vehicles	1,480	17.7
51 or more vehicles	2,958	35.3
TOTAL	8,377	100.0

Figure 1
Fleet Size Distribution

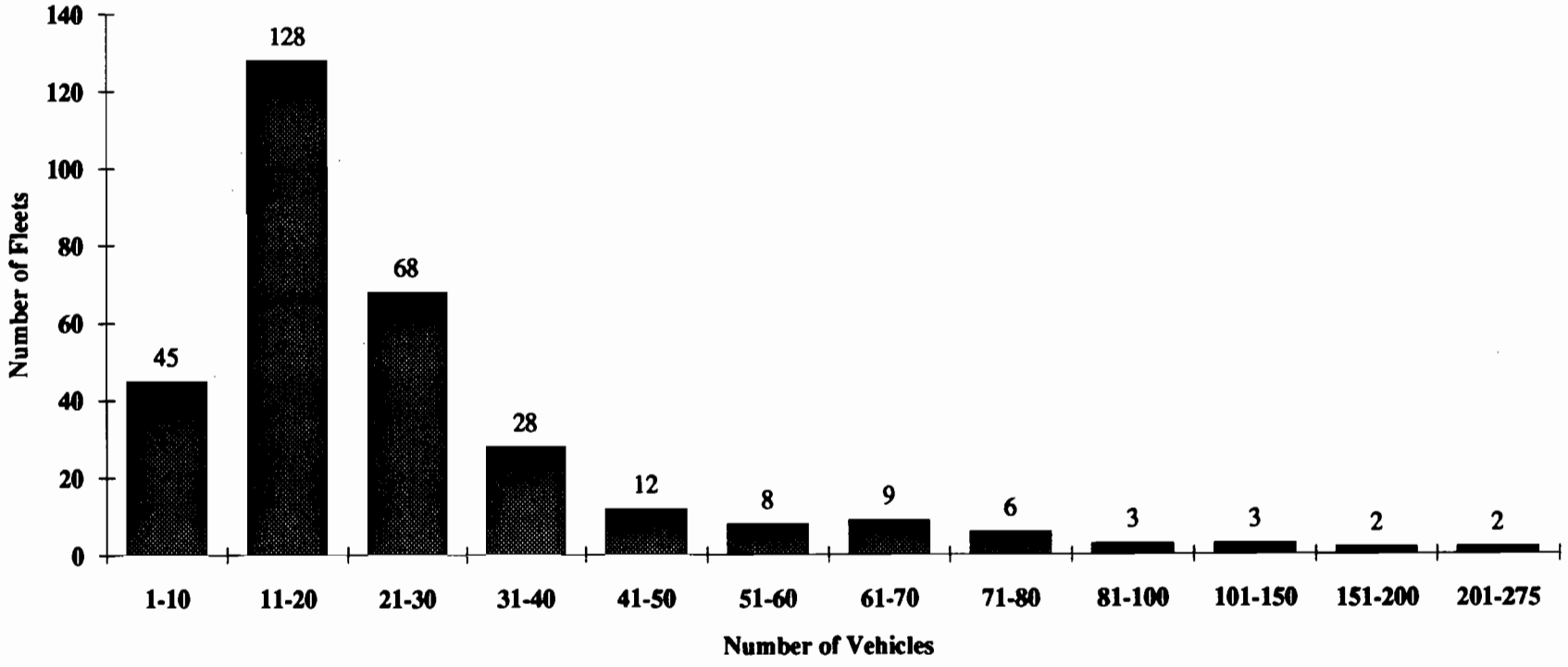


Table 3
Summary Fleet Data for Sensitivity Analyses[a]

	Autos	Light Trucks	Heavy-Duty Gasoline	Heavy-Duty Diesel	Total[b]
Fleet Group (1-10)					
Number of Vehicles	1	2	1	5	9
Annual Miles traveled	22,509	18,327	12,930	13,511	16,169
Annual Fuel Consumed	1,107	1,429	1,894	1,666	1,626
Annual Repair Costs	$989	$923	$1,490	$1,776	$1,437
Fleet Group (11-20)					
Number of Vehicles	1	5	2	7	15
Annual Miles traveled	22,861	16,093	12,365	12,206	14,274
Annual Fuel Consumed	1,203	1,235	2,028	1,448	1,425
Annual Repair Costs	$880	$753	$1,628	$1,592	$1,253
Fleet Group (21-30)					
Number of Vehicles	2	13	3	8	26
Annual Miles traveled	16,650	13,969	10,594	11,616	13,043
Annual Fuel Consumed	858	1,042	1,877	1,438	1,251
Annual Repair Costs	$628	$653	$1,659	$1,638	$1,072
Fleet Group (31-50)					
Number of Vehicles	3	20	4	10	37
Annual Miles traveled	15,000	13,295	9,492	12,248	12,773
Annual Fuel Consumed	782	998	1,725	1,561	1,209
Annual Repair Costs	$636	$623	$1,530	$1,597	$986
Fleet Group (51 or more)					
Number of Vehicles	19	54	4	11	88
Annual Miles traveled	11,171	11,575	10,024	11,077	11,361
Annual Fuel Consumed	537	869	1,737	1,476	907
Annual Repair Costs	$527	$675	$1,560	$1,790	$815

[a]All annual figures are per vehicle and annual fuel consumed is in gallons.
[b]Totals may not add up due to rounding.

30-YEAR LIFE-CYCLE ANALYSIS

The fleets stationed at the 314 TxDOT locations were evaluated by the NPV model. The basic input data included the number of vehicles of each type in the fleet, fuel consumption, and annual miles traveled. This data was provided to the research team from the TxDOT Equipment Operating System (EOS) data base. The results of the NPV analysis are summarized in Table 4. The savings associated with the use of propane as a fuel versus gasoline and diesel are nearly $11 million. Because of the fuel economy losses for a diesel to LPG conversion, the energy content differences between diesel and propane,

and the narrow price differential between the two fuels, there are actually losses instead of gains for diesel LPG conversions. This is discussed in more detail in the Section 3 discussion of diesel vehicles. Total costs for LPG fleet implementation equals $35.3 million. Overall, implementation of a propane fleet for TxDOT would cost $24.3 million over a 30-year period, or $2.6 million per year annualized. This amounts to an average annual cost per vehicle change of $308, or about an additional 2.5¢ per vehicle mile traveled. The model results for each location are reported in Volume II of this report.

A summary of the model results for each of the 314 locations is shown in Appendix A. The 30-year NPV costs range from a low of $-18,054 in District 29, Garza County, to a high of $-252,048 in District 29, Travis County. The overall distribution for all locations is shown in Figure 2. The distribution is quite normal with about 64 percent of the locations between $-54,001 and $-90,000.

Table 4
Summary LPG NPV Analysis for 314 Locations

	30-Year NPV	% of Subtotal
Savings Differential:		
Gasoline	$14,845,269	135.5
Diesel	$-3,888,207	-35.5
Subtotal	$10,957,062	100.0
Costs Differential:		
Infrastructure	$9,957,455	28.2
Vehicle	$14,052,724	39.9
Operating	$11,240,195	31.9
Subtotal	$35,250,375	100.0
TOTAL	$-24,293,312	

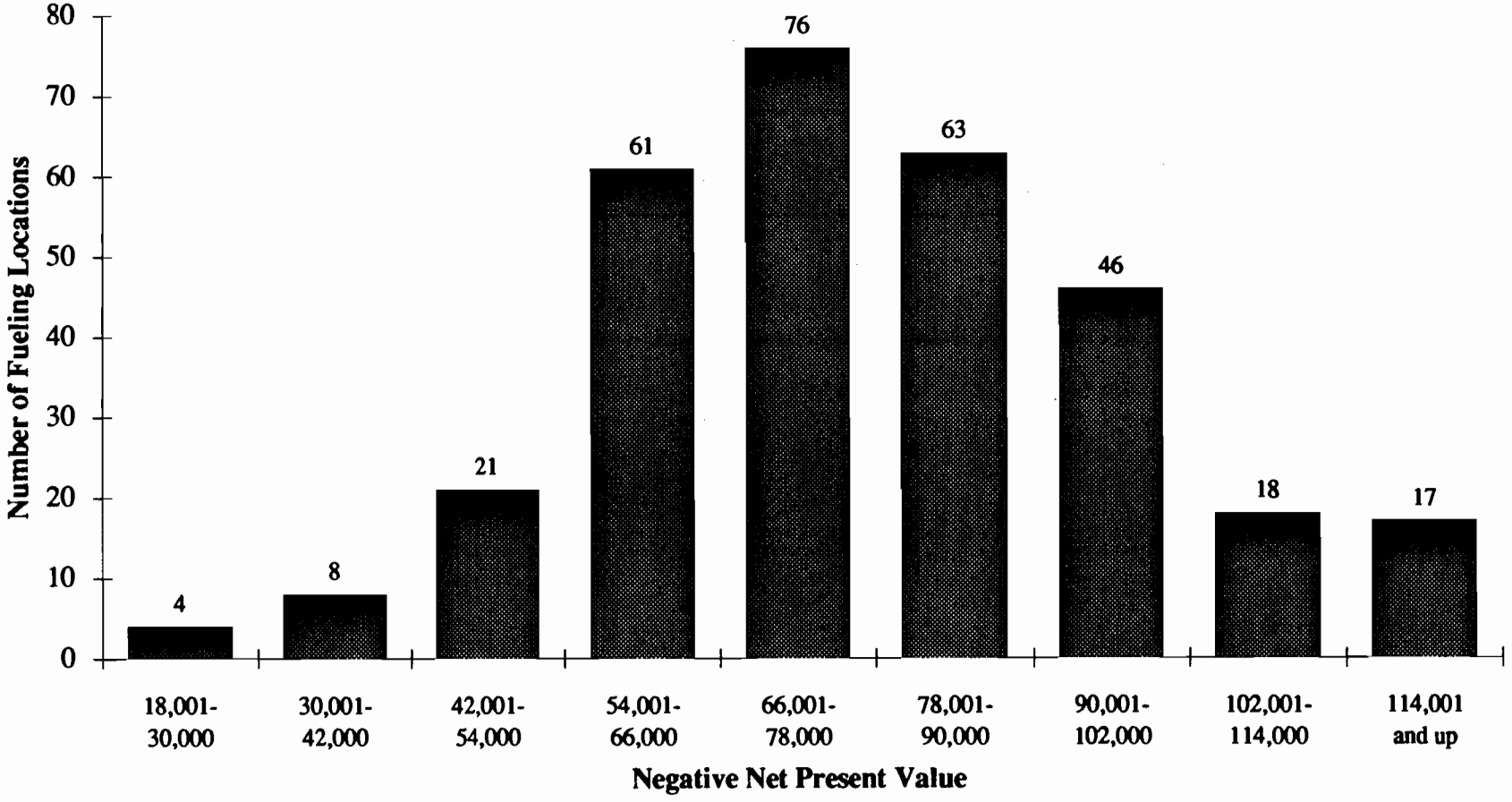
Because of the fixed fueling infrastructure costs required for all fleets, the net present value results are highly dependent on the number of vehicles in the fleet. On a cost per vehicle basis, the larger fleets are much cheaper to operate on propane than smaller fleets. The District 12, Houston District Office location with 257 vehicles ranks 313 in the 30-year NPV analysis, but ranks first in the lowest annual cost change per vehicle ($-229). On the other hand, District 29, Garza County, while ranking first in NPV, ranks 314 on an annual cost change per vehicle basis. The overall frequency distribution of the annual cost change per vehicle across the various fleets is shown in Figure 3. A closer analysis of the results, not surprisingly, suggests a high negative correlation between the number of

vehicles in a fleet and the average annual cost change per vehicle, as illustrated in Figure 4. The exponential relationship between fleet size and annual cost change per vehicle can be empirically calibrated as follows:

$$y' = 572.4 \times .9859^{f}$$

where y' is the average annual cost change per vehicle
and "f" is the fleet size.

Figure 2
Number of Locations by
30-Year Net Present Value*



* All locations have negative NPV's.

Figure 3
Number of Fleets by Annual Average Cost Increase Per Vehicle

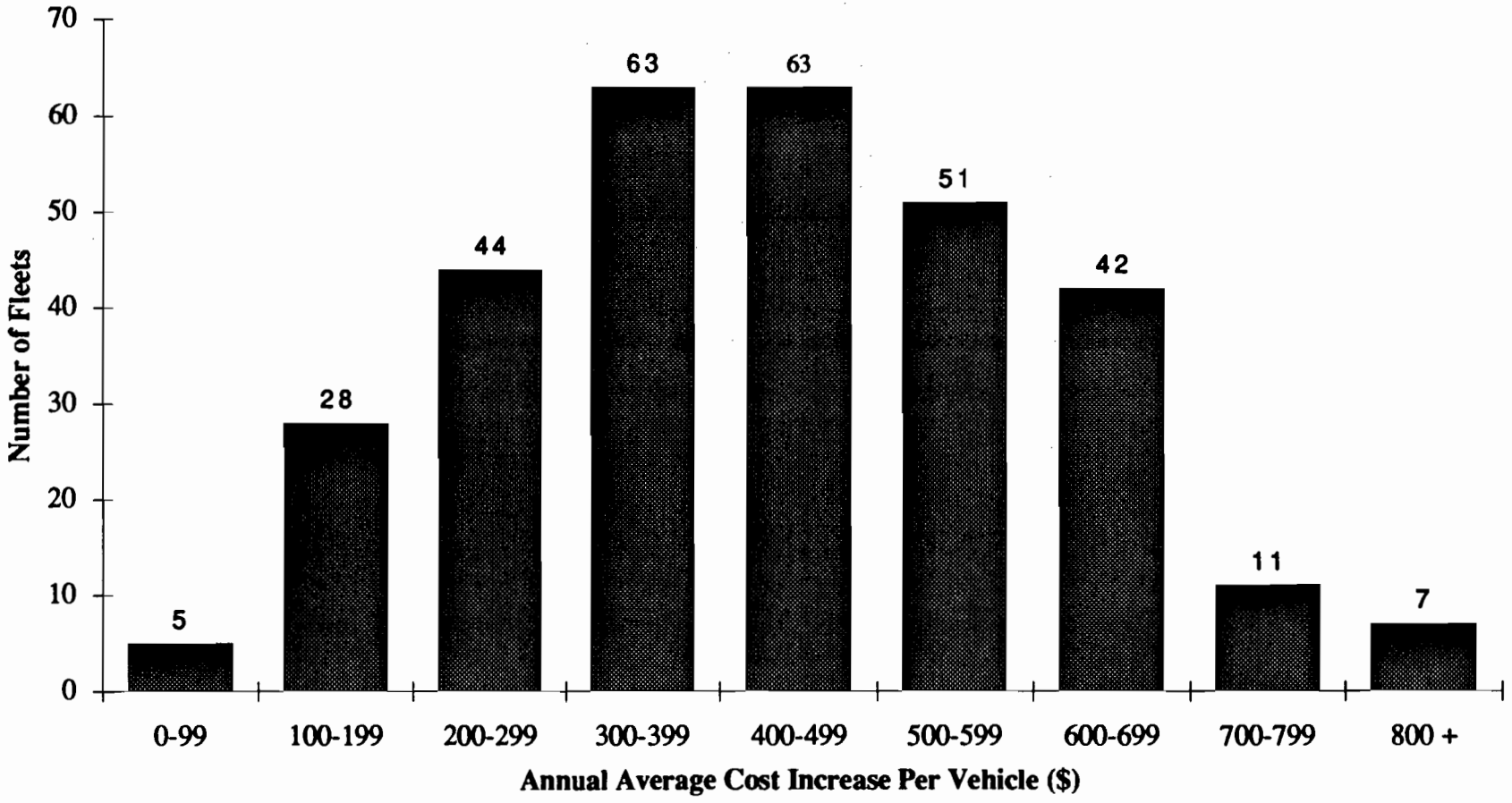
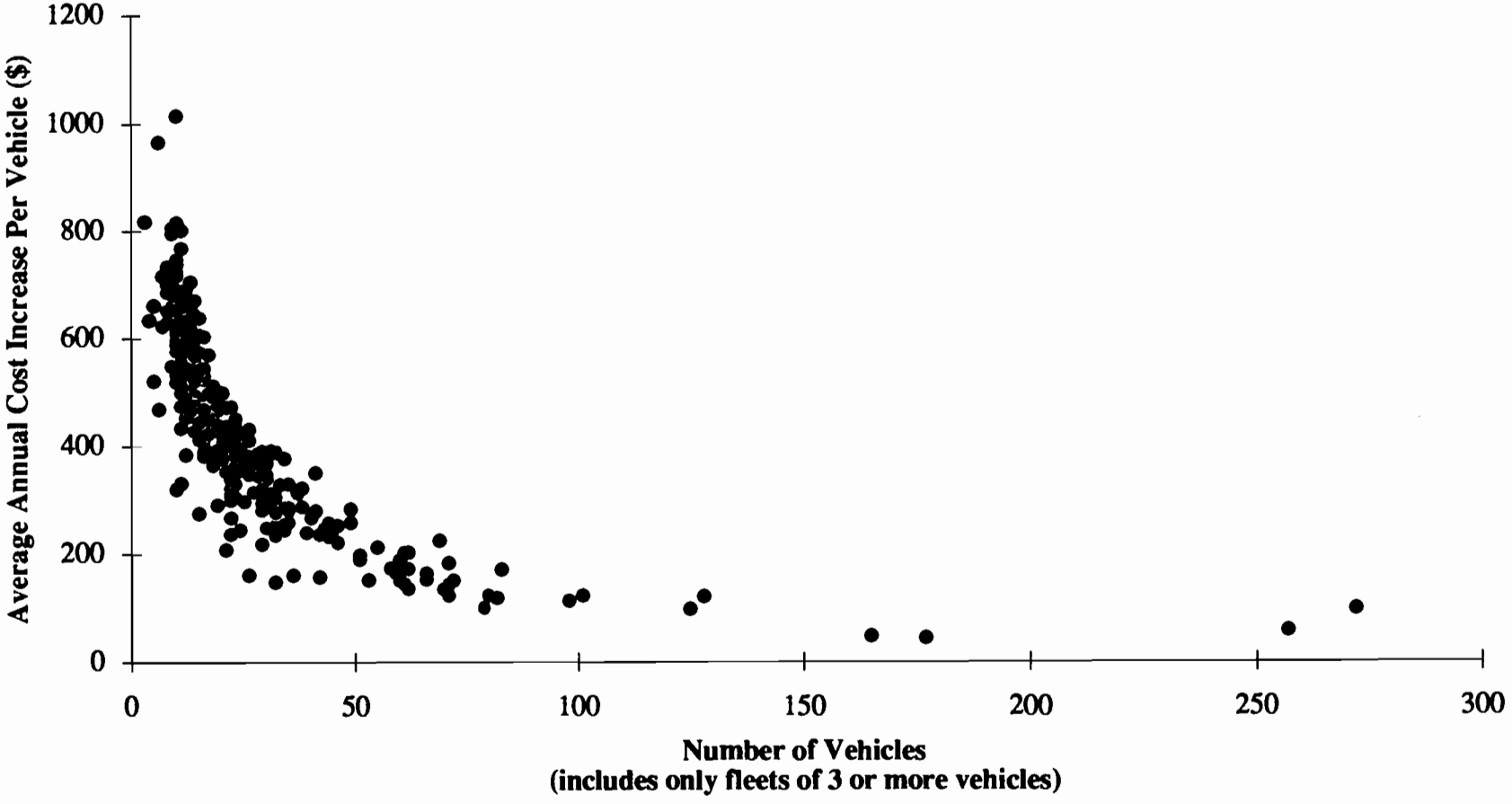


Figure 4
Relationship of Fleet Size to Vehicle Cost Increase



SECTION 3: SENSITIVITY ANALYSES

The NPV model incorporates a number of assumptions with varying affects on cost-effectiveness. Most of the assumptions do not substantially change the conclusions regarding cost-effectiveness of LPG operation. The remainder of this section will focus on several different areas of sensitivity investigated by the researchers. The representative fleets presented in Table 3 are used for the sensitivity analyses.

BASE CASE

Based on the information contained in Table 3, analyses were performed on the five representative TxDOT fleets using the same basic parameters and assumptions as for the 314 locations. The results for each of the five fleets are summarized in Table 5 and detailed in Appendix B. The results, as expected, are consistent with the results of the individual location analyses summarized in Appendix A. The net present value worsens as the fleet size increases, but the cost change per vehicle and cost change per vehicle-mile improves as the fleet size increases.

The model categorizes costs into three groups -- infrastructure, vehicle, and operating. (A detailed discussion of these costs is contained in an earlier report.[2]) Basically, infrastructure consists of the storage tanks, dispenser, and setup, vehicle costs are the conversion and/or OEM purchase costs, and operating costs reflect the operating elements for both the station and the vehicle. The importance of these cost components changes with the size of the fleet as shown in Figure 5. The infrastructure costs are based on either a small or large volume purchase of propane, while vehicle and operating costs are variable, primarily dependent on the number of vehicles in the fleet and their annual mileage. The cost components behave as expected, i.e., vehicle and operating costs vary directly with fleet size, and infrastructure costs vary inversely with fleet size, with one important note. The increase in infrastructure costs relative to other costs from the "11-20" fleet size to the "21-30" fleet size is due to the purchase of larger fueling equipment. The advantage to purchasing the larger fueling equipment is that it allows for the purchase of fuel at a discount -- 43¢/gallon for a large volume purchase versus 60¢/gallon for a small volume purchase. Enough fuel is consumed by the "21-30" fleet group that it is more cost-effective in the long run to purchase the larger and more expensive dispensing equipment. As the fleet size increases, once again the costs of the larger dispensing equipment become smaller relative to other costs.

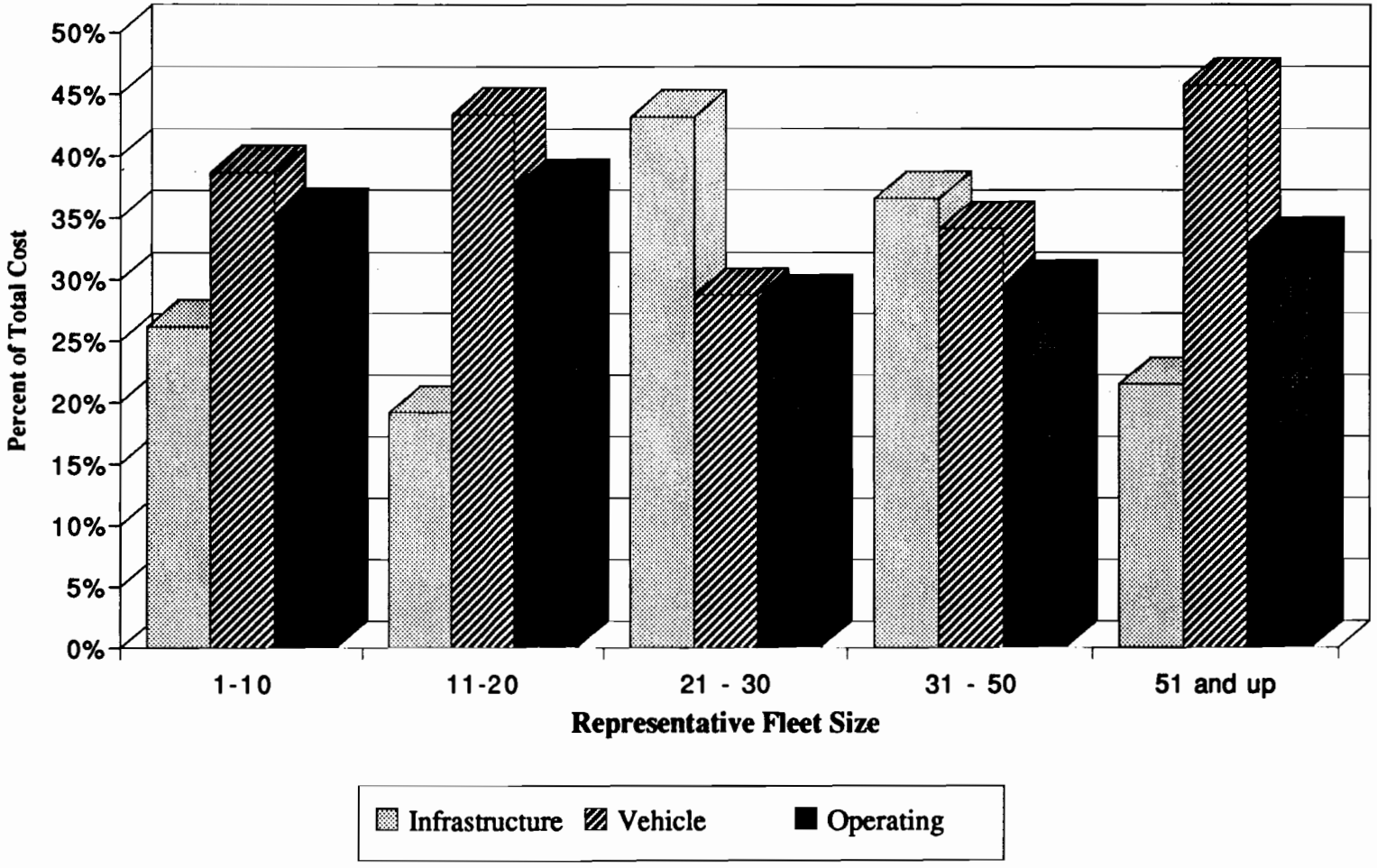
---

[2] *Documentation For Propane Fleet Conversion Cost-Effectiveness Model*, Research Report 983-3.

Table 5
Savings/Costs Summary of Base Cases

	Fleet Size 1-10	Fleet Size 11-20	Fleet Size 21 - 30	Fleet Size 31 - 50	Fleet Size 51 and up
SAVINGS					
Gasoline Price Difference	$5,550	$10,390	$62,994	$88,739	$191,560
Automobiles	$1,036	$1,124	$5,229	$7,140	$30,339
Light Trucks	$2,816	$5,781	$40,891	$60,324	$140,667
Heavy-Duty Trucks	$1,698	$3,485	$16,874	$21,275	$20,554
Diesel Price Difference	-$17,386	-$21,375	-$1,705	-$2,334	-$2,592
Maintenance	$0	$0	$0	$0	$0
Total Savings	**-$11,836**	**-$10,985**	**$61,289**	**$86,405**	**$188,968**
COSTS					
Infrastructure					
Land	$0	$0	$0	$0	$0
Station setup	-$1,598	-$1,598	-$8,746	-$8,746	-$8,746
Storage/Dispenser	-$10,366	-$10,366	-$56,672	-$56,672	-$56,672
Subtotal	-$11,964	-$11,964	-$65,418	-$65,418	-$65,418
Vehicle					
Conversion Kit	-$6,556	-$10,467	-$16,861	-$23,432	-$53,824
Tanks	-$2,210	-$3,752	-$6,818	-$9,810	-$24,816
Labor	-$6,482	-$9,962	-$15,626	-$21,427	-$51,294
OEM	-$2,443	-$2,904	-$4,239	-$6,391	-$9,457
Subtotal	-$17,691	-$27,085	-$43,545	-$61,060	-$139,391
Operating					
Station Maintenance	-$4,713	-$4,713	-$14,140	-$14,140	-$14,140
Labor - fuel time loss	-$2,589	-$3,551	-$4,703	-$6,363	-$9,671
Propane Fuel Tax	-$8,809	-$15,184	-$23,857	-$32,098	-$76,292
Additional Training	$0	$0	$0	$0	$0
Subtotal	-$16,112	-$23,448	-$42,700	-$52,601	-$100,104
Total Costs	**-$45,767**	**-$62,498**	**-$151,663**	**-$179,080**	**-$304,913**
Savings - Cost	**-$57,603**	**-$73,483**	**-$90,374**	**-$92,674**	**-$115,945**
Annual Cost Increase per Vehicle	-$679	-$520	-$369	-$266	-$140
Incremental Cost/mile	($0.0476)	($0.0391)	($0.0296)	($0.0218)	($0.0126)

Figure 5
Cost Component Distributions for Vehicle Fleets



DISCOUNT RATE

A ten percent discount rate is used in the base case analysis, although the model allows for any rate to be selected. Two additional rates -- five percent and zero -- were used for the five fleets to determine if the discount rate significantly affects the conclusions. Tables 6 and 7 summarize the results of a five percent and zero discount rate, respectively. (Appendix C and D show the savings and costs details for each of the fleets for the five percent and zero discount rate, respectively.) The effect of the discount rate is mixed. With respect to the three largest fleet groups, the net present value improves as the discount rate decreases, as expected. On the other hand, the net present value for the smallest fleet actually gets worse as the discount rate decreases and the net present value for the 11-20 fleet is mixed. This is a result of the timing of the benefits and costs. Annual costs exceed annual benefits for the small fleet; therefore, discounting reduces the cost for each period. Consequently, as the discount rate increases, the net present value, being negative, improves.

Table 6
5 Percent Discount Rate Effect on NPV
(figures in $)

	Fleet Size				
	1-10	11-20	21-30	31-50	51 & up
Total Savings	-23,002	55,714	102,590	144,831	314,903
Total Costs	-64,129	-153,012	-188,600	-226,418	-391,446
30-year NPV	-87,131	-97,297	-86,011	-81,587	-76,543
Annual Cost Change Per vehicle	-630	-422	-215	-143	-57

Table 7
Zero Discount Rate Effect on NPV
(figures in $)

	Fleet Size				
	1-10	11-20	21-30	31-50	51 & up
Total Savings	58,774	113,739	208,013	293,603	634,381
Total Costs	-169,915	-206,139	-264,293	-326,137	-583,949
30-year NPV	-111,141	-92,400	-56,280	-32,534	50,432
Annual Cost Change per vehicle	-412	-205	-72	-29	+19

The cost-effectiveness of a large volume purchase and the necessary higher cost infrastructure also changed as the discount rate decreased. At the 5 percent rate, it became more cost-effective for the 11-20 fleet to purchase the larger volume fueling equipment, and at the zero discount rate, it became more cost-effective for the 1-10 fleet to also purchase the large volume fueling equipment. The lower price of propane associated with the large volume purchase allows for the fuel price differential on the diesel vehicles to be positive. This is why the savings for the 1-10 fleet changes from -$23,002 in Table 6 to $58,774 in Table 7. Reducing the discount rate increases costs in later periods high enough to warrant the initial purchase of more expensive fueling equipment and the resulting gains from a lower priced fuel.

FUEL PRICES

The major benefit of moving to propane as an alternative fuel is that it is historically less expensive than gasoline and diesel. A price of $0.60/gallon for a small volume purchase and $0.43/gallon for a large volume purchase are used in the base case analysis. Sensitivity analyses were performed on the small volume purchase price of propane -- the least expensive infrastructure cost for any of the fleets -- to identify the break-even price of propane. The results are summarized in Table 8 and detailed in Appendix E.

Table 8
NPV Break-even Price for Propane
(small volume purchase)

Fleet Group	Break-even Price ($/gallon)
1-10	$0.258
11-20	$0.317
21-30	$0.360
31-50	$0.375
51 & up	$0.377

Given that the price of propane is sensitive to purchase volume, sensitivity analyses were performed on the price of gasoline and diesel. Table 9 presents the break-even price for gasoline and diesel, assuming base case prices for propane and a constant 4¢/gallon price difference between gasoline and diesel.[3] Details of the results are illustrated in Appendix F. Small volume and large volume purchases of propane for the break-even prices in table 9 are consistent with the base case, i.e., the two smaller fleets purchase small

[3] Like the base case, the price of gasoline and diesel includes state taxes. State vehicles are exempt from federal fuel taxes.

volume fueling equipment and pay $0.60/gallon for propane, while the three larger fleets purchase the larger fueling equipment and pay only $0.43/gallon for propane. Gasoline and diesel prices would have to increase about 60 percent for the smallest fleet and 20 percent for the largest fleet, with propane prices remaining constant, to break even. The other fleets fall within this range.

Table 9
NPV Break-even Price for Gasoline and Diesel

Fleet Group	Gasoline ($/gallon)	Diesel ($/gallon)
1-10	1.452	1.412
11-20	1.335	1.295
21-30	1.235	1.195
31-50	1.145	1.105
51 & up	1.057	1.017

MAINTENANCE SAVINGS

Anecdotal and theoretical (but not empirical) evidence suggests that there may be maintenance savings associated with propane vehicles relative to gasoline/diesel vehicles. The range in savings is most likely from 10 to 20 percent. However, because of a lack of empirical support, the base case does not assume any savings in maintenance costs. (The model includes a component for maintenance savings that can be specified as better evidence becomes available.) The effect of maintenance savings for the sensitivity tests presented here are based on the actual average maintenance costs for the existing fleets. Three different savings rates (10, 25 and 50 percent) were selected. The results of these analyses are summarized in Table 10. (Detailed summaries for each of the fleets and the three different maintenance savings groups are found in Appendices G, H, and I.) There must be significant maintenance savings to change the bottom-line. With a 50 percent reduction in maintenance costs, fleets with more than 20 vehicles become cost-effective. Importantly, more empirical support is needed to accurately account for reductions in maintenance costs.

VEHICLE UTILIZATION

The mileage estimates for each of the vehicle groups are based on current operations. If annual mileage were to increase, in most cases, there would be improvements in the net present value. Three different scenarios -- 25 percent increase, 50 percent increase, and 100 percent increase -- were constructed to illustrate the effect of vehicle miles of travel on the model output. The results are summarized in Table 11 and detailed for each fleet group in

Appendices J, K, and L. The NPV and annual cost change per vehicle for the 1-10 fleet decreases as average mileage per vehicle increases. This is due to diesel vehicles. Since 5

Table 10
Maintenance Savings Effect on NPV
(figures in $)

	Fleet Size				
	1-10	11-20	21-30	31-50	51 & up
10% Maint. Savings	9,082	13,729	21,264	28,315	60,780
30-year NPV	-48,521	-59,753	-69,111	-64,359	-55,165
Annual Cost Change per vehicle	-572	-423	-282	-185	-67
25% Maint. Savings	22,705	34,323	53,160	70,787	151,951
30-year NPV	-34,898	-39,160	-37,215	-21,887	+36,005
Annual Cost Change per vehicle	-411	-277	-152	-63	+43
50% Maint. Savings	45,410	68,646	106,319	141,574	303,901
30-year NPV	-12,193	-4,837	+15,945	+48,900	+187,956
Annual Cost Change per vehicle	-144	-34	+65	+140	+227

Table 11
Vehicle Miles of Travel and NPV
(figures in $)

	Fleet Size				
	1-10	11-20	21-30	31-50	51 & up
25% Increase					
Total Savings	-14,238	-12,266	77,857	108,856	239,099
Total Costs	-49,132	-67,774	-158,365	-193,860	-313,219
30-year NPV	-63,370	-80,040	-80,508	-85,004	-74,119
Annual Cost Change per vehicle	-747	-566	-328	-244	-89
50% Increase					
Total Savings	-16,638	51,109	94,831	132,190	290,335
Total Costs	-50,755	-133,189	-165,328	-198,436	-345,146
30-year NPV	-67,392	-82,081	-70,497	-66,245	-54,811
Annual Cost Change per vehicle	-794	-580	-288	-190	-66
100% Increase					
Total Savings	-21,316	68,695	126,732	176,892	390,045
Total Costs	-54,400	-138,331	-172,219	-210,156	-367,632
30-year NPV	-75,716	-69,636	-45,487	-33,265	+22,413
Annual Cost Change per vehicle	-892	-492	-186	-95	+27

of the 9 vehicles in the 1-10 fleet are diesel and there is a net loss per gallon of propane consumed versus diesel, increasing vehicle miles means reduced savings.

The change in NPV or annual cost change per vehicle for the 11-20 fleet size is different. The annual cost change per vehicle increases from the base case to 50 percent, but decreases thereafter. The reason for this behavior is a result of the increasing cost per vehicle for the small volume propane station and the decreasing cost per vehicle for the large volume propane station, as illustrated in Figure 6. Initially, it is more cost-effective for a small volume fill-station, however, as mileage increases, the cost per vehicle increases to a point where it becomes more economical to develop a large volume fill-station.

The NPVs and annual cost increases per vehicle for the three largest fleets behave as expected. All of them begin from a large volume purchase base case.

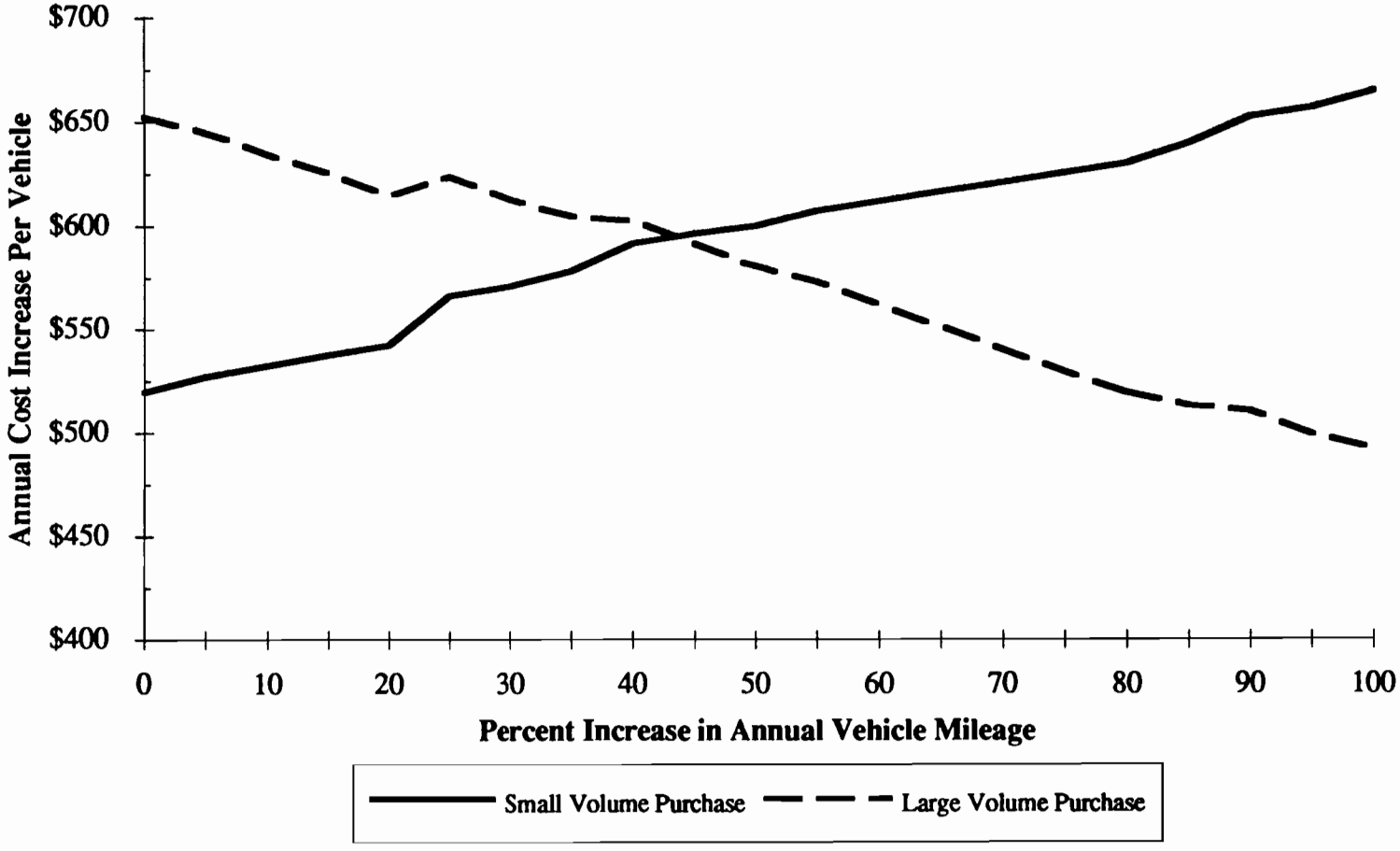
DIESEL VEHICLES

At the outset it is important to recognize that converting a diesel vehicle to propane is a much more complicated procedure than converting gasoline to propane. To date, very little research has occurred in this area, consequently it was difficult to construct model parameters based on widely-accepted practices. The base case scenarios demonstrate that converting diesel to propane will not yield any savings in fuel costs (see Appendix B). This is a consequence of fuel economy losses and the energy content differences of the two fuels. With respect to the former, the model assumes that converting a diesel engine to propane will result in a 26 percent decrease in fuel economy on an energy basis; an OEM diesel to propane vehicle will result in a 20 percent decrease. This is due to the fact that the compression engine is designed for diesel fuel, propane is more suitable to a spark-ignition engine.[4] The latter factor relates to the energy content differences of propane and diesel. Based on a extensive review of the industry, diesel is assumed to have 129,400 Btu per gallon. Similarly, propane is assumed to have 84,400 Btu per gallon. Therefore, it takes 1.53 gallons of propane to yield the same energy as 1 gallon of diesel. Translated into fuel costs, the 60¢/gallon price of a small volume purchase of propane is equivalent to 92¢/gallon of diesel. This diesel price equivalent is more expensive than the 85¢/gallon price the state actually pays for diesel, according to the model. The large volume purchase price of diesel, 43¢/gallon, translates into a 66¢/gallon of diesel equivalent; however, because of the drop in fuel efficiency (20 or 26 percent) the net effect is a negative value for fuel savings.

---

[4] The model assumes no change in fuel economy for the converted gasoline to propane vehicle and a 10 percent improvement in fuel economy for the OEM propane vehicle.

Figure 6
Relationship of Vehicle Miles to Annual Cost
(11-20 Fleet Size)



Given these factors, two scenarios were constructed. The first scenario removes diesel vehicles from the fleet analysis. The second scenario treats existing diesel vehicles like heavy-duty gasoline vehicles and converts them to propane along with the other gasoline vehicles. The results of these scenarios are shown in Table 12. (Appendices M and N show the detailed fleet results for the no-diesel and diesel to gasoline scenarios, respectively.) Conversion of diesel vehicles, obviously, has a negative effect on net present value. On a NPV and an annual cost change per vehicle basis, removal of diesel vehicles improves the results. Not surprisingly, replacing diesel with gasoline (spark-ignition) vehicles before converting to propane use decreases the annual cost change per vehicle for all fleets. This is consistent with the results presented in Figure 4. With respect to NPV, the results are consistent for the three largest fleets, i.e., NPV improves as more vehicles are introduced into the fleet. The decrease in NPV for the two smallest fleets is a result of their small volume purchase of propane. These fleets are not large enough to benefit from the declining costs associated with large volume purchases. This situation is very similar to the change in vehicle mileage illustrated previously in Figure 6. However, the annual cost change per vehicle does improve for all five fleet sizes. Overall, converting diesel vehicles, as they currently exist, has a negative affect on cost-effectiveness.

Table 12
Effects of Diesel on NPV
(figures in $)

	Fleet Size				
	1-10	11-20	21-30	31-50	51 & up
No Diesel Vehicles					
Total Savings	5,550	10,390	18,429	26,836	191,560
Total Costs	-28,973	-39,924	-63,023	-83,649	-269,533
30-year NPV	-23,423	-29,534	-44,594	-56,813	-77,972
Annual Cost Change per vehicle	-621	-392	-263	-223	-107
Diesel to Gasoline					
Total Savings	14,424	22,429	112,775	154,785	254,020
Total Costs	-44,117	-60,763	-149,855	-178,742	-301,897
30-year NPV	-29,693	-38,335	-37,080	-23,957	-47,877
Annual Cost Change per vehicle	-350	-271	-151	-69	-58

EXTENDED VEHICLE LIFE

Some propane proponents argue that because propane burns cleaner than gasoline and diesel, vehicles using propane should have longer operating lives. This argument relies on

the same basic princiles as reduced maintenance costs. Therefore, the two sensitivities probably cannot be combined in a joint sensitivity analysis. While not fully supported by operating data to date, the model can be adjusted to evaluate the impact of extending the life of vehicles. Three scenarios (10 percent, 25 percent, and 50 percent extended life) were analyzed with the model. The results are summarized in Table 13. (Appendices O, P, and Q contain detailed results from the model.) The model results were adjusted to accommodate the differences in the number and timing of vehicle purchases. (The "Vehicle Purchase Adjustment" in Table 13 is this variable.) For example, the "1-10" fleet group requires the purchase of one automobile every four years, or a total of 8 automobiles over the 30-year life-cycle. Extending the life by 50 percent, however, requires the purchase of one propane automobile every six years, or a total of 5 vehicles over the 30-year life-cycle. Each of the fleet size groups were adjusted to reflect the additional savings from fewer and later vehicle purchases.[5] The affect of extending vehicle life can be significant. For example, in the largest vehicle group a 25 percent increase in vehicle life results in a $206,610 improvement in the 30-year net present value. The annual price differential per vehicle changes from a cost of $140 to a savings of $109. These improvements may be somewhat offset by increased maintenance costs on components not affected by fuel-type (such as drive-train, brakes, transmission, etc.). Only close monitoring and evaluation of propane vehicles over time will validate the overall effect of extended vehicle life.

OEM VEHICLES

The base case analysis provides for the availability of OEM vehicles in year 11. Actual purchase of OEM vehicles is dependent on vehicle replacement for each fleet. Two scenarios were analyzed with respect to the introduction of OEMs. The first scenario assumes OEM vehicles are available at year 1 for spark-ignition (gasoline) vehicles and at year 6 for diesel vehicles. The second scenario converts only gasoline vehicles at year 1, i.e., there are no diesel conversions. The results of the two scenarios are summarized in Table 14 and detailed for each of the fleets in Appendices R and S. Improvements in the net present values for OEM are driven by three factors. First, and most significant, the OEM cost-differential is $400 for automobiles and light trucks, $450 for heavy-duty gasoline trucks, and $1,400 for diesel compared to $1,600, $1,190, $1,200, and $3,325 for

[5] The following vehicle prices were used, based on information provided by the Equipment and Procurement Division of TxDOT: automobiles - $10,500, light trucks - $11,000, medium-duty gasoline trucks - $23,000, and medium-duty diesel trucks - $25,000.

conversion of the same vehicles, respectively.[6] For all fleet sizes, this OEM/conversion cost-differential is the most important variable improving NPV. The second factor relates

Table 13
Effects of Extending Vehicle Life on NPV
(figures in $)

	Fleet Size				
	1-10	11-20	21-30	31-50	51 & up
10% Added Life					
Vehicle Purchase Adjustment	23,785	24,140	33,877	50,064	83,304
Total Savings	11,659	12,694	95,216	135,618	271,924
Costs	-44,881	-61,844	-150,565	-177,733	-303,064
30-year NPV	-33,223	-49,150	-55,349	-42,114	-31,140
Annual Cost Change per vehicle	-392	-348	-226	-121	-38
25% Added Life					
Vehicle Purchase Adjustment	32,511	33,020	64,858	93,163	191,592
Total Savings	20,088	21,920	125,574	177,848	385,718
Costs	-44,698	-61,503	-149,902	-176,750	-295,053
30-year NPV	-24,610	-39,583	-24,328	+1,097	+90,665
Annual Cost Change per vehicle	-290	-280	-99	+3	+109
50% Added Life					
Vehicle Purchase Adjustment	47,786	59,589	97,623	153,565	311,599
Total Savings	35,135	47,625	159,320	239,364	503,110
Costs	-44,240	-60,813	-148,360	-174,294	-292,940
30-year NPV	-9,106	-13,188	+10,960	+65,071	+210,169
Annual Cost Change per vehicle	-107	-93	+45	+187	+253

to the improvement in fuel efficiency of an OEM vehicle versus a converted vehicle. The model incorporates a 10 percent improvement in fuel economy for an optimized OEM vehicle replacing a gasoline vehicle. Similarly, the model uses a 26 percent reduction for converted diesels versus a 20 percent reduction for optimized OEMs replacing diesels. The improvements in fuel efficiency translate into increased fuel savings. The slight improvement in diesel fuel economy for the OEM vehicle yields a positive savings in fuel price differential for the large volume purchase of propane. Finally, the improvements in fuel economy for the OEM also reduce the labor costs associated with refueling.

[6] The OEM price estimates are based on a mature market, which in the base case is estimated to occur at about year 11.

As also shown in Table 14, while more beneficial, removal of diesel to propane OEMs does not change the bottom-line, i.e., negative to positive NPV, for any of the vehicle groups.

Table 14
Effects of OEM on NPV
(figures in $)

	Fleet Size				
	1-10	11-20	21-30	31-50	51 & up
Immediate OEM					
Total Savings	-5,658	-747	10,698	101,905	220,791
Total Costs	-35,959	-46,974	-63,204	-143,161	-217,512
30-year NPV	-41,616	-47,721	-52,506	-41,257	+3,279
Annual Cost Change per vehicle	-491	-337	-214	-118	+4
No Diesel					
Total Savings	8,439	16,445	30,088	42,006	218,418
Total Costs	-24,863	-32,345	-46,519	-59,119	-194,644
30-year NPV	-16,425	-15,900	-16,430	-17,113	+23,774
Annual Cost Change per vehicle	-436	-211	-97	-67	+33

COMBINED EFFECTS

Now that some of the individual effects of the model variables have been examined, it is possible to construct a scenario where multiple variables are adjusted. The three most logical factors to combine are extended vehicle life, replacement with OEM vehicles, and non-conversion of diesel vehicles. Although there is a strong case for including maintenance savings, it is unlikely that there would be net maintenance savings for a vehicle with an extended life. Traditionally, maintenance costs for vehicles increase exponentially over time. In fact, there may be a stronger case for arguing that total maintenance costs will increase if a vehicle is kept for a longer period of time. In this analysis, we assume that maintenance savings are offset by the increased life of the vehicle. The results of this combined analysis are shown in Table 15 and summarized for each of the fleets in Appendix T.

Accounting for the three variables has a pronounced effect on the cost-effectiveness of propane as an alternative fuel for fleets. All of the fleets except the smallest become cost-effective.

Another scenario combining the 10 percent extended life, no replacement of diesel vehicles, and reduced costs of conversions and OEM was constructed. The results are

illustrated in Table 16 and detailed in Appendix U. The cost reduction for the conversions and OEM purchases amounted to 35 percent per vehicle. Only the two largest vehicle groups become cost-effective, although there are significant improvements in cost-effectiveness for the other fleet sizes compared to the base cases. Interestingly, the cost reductions cause a shift to small volume propane purchases for all the fleets except the largest "51 & up" fleet.

Table 15
Combined Effects Scenario 1 on NPV*
(figures in $)

	Fleet Size				
	1-10	11-20	21-30	31-50	51 & up
Immediate OEM					
Total Savings	23,016	37,984	58,289	88,354	298,006
Total Costs	-24,484	-31,886	-45,687	-57,826	-192,905
30-year NPV	-1,468	+6,098	+12,603	+30,528	+105,101
Annual Cost Change per vehicle	-39	+81	+74	+120	+145

*10 percent extended life, OEM at year 1, and no replacement of diesel vehicles.

Table 16
Combined Effects Scenario 2 on NPV*
(figures in $)

	Fleet Size				
	1-10	11-20	21-30	31-50	51 & up
Immediate OEM					
Total Savings	19,976	31,623	47,034	72,236	270,962
Total Costs	-26,074	-34,927	-52,582	-68,206	-226,393
30-year NPV	-6,097	-3,304	-5,548	+4,031	+44,569
Annual Cost Change per vehicle	-162	-44	-33	+16	+61

*10 percent extended life, 35 percent reduction in vehicle conversion and OEM costs, and no replacement of diesel vehicles.

OPERATING AND INFRASTRUCTURE COSTS

The previous sensitivity tests focused, principally, on vehicle parameters; this final subsection examines some of the basic assumptions regarding operating and infrastructure costs. Taken individually, these various cost items are not significant. Therefore, several

of the cost items will be analyzed in combination to determine their collective effect on NPV.

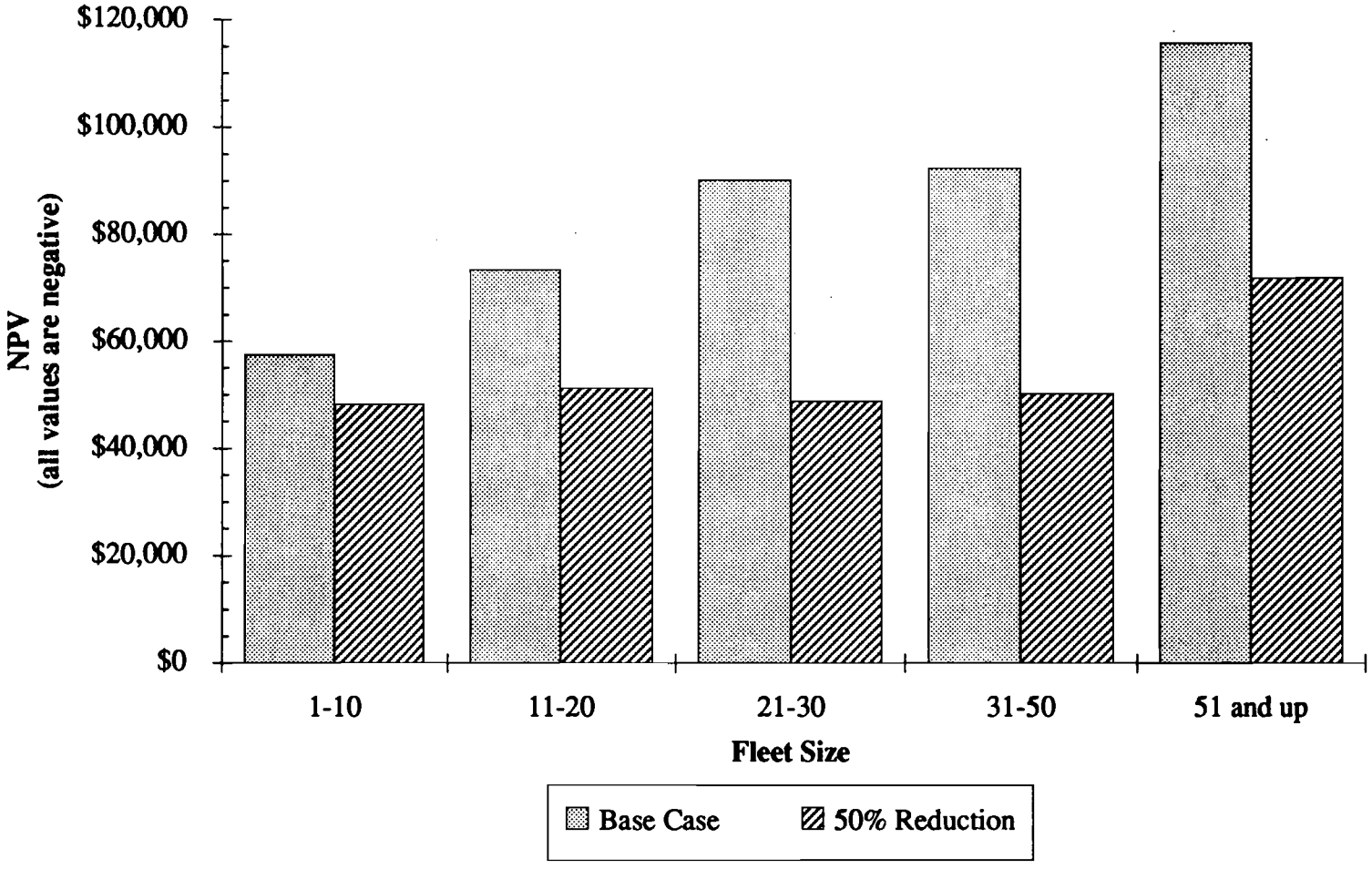
The three variables adjusted in this scenario are storage/dispenser capital costs, annual station maintenance costs, and the labor rate in the labor/fuel time loss calculation. Table 17 presents the base case values and the values used in this scenario, representing a 50 percent reduction.

Table 17
Operating and Infrastructure Cost Values

	Base Case	50% Reduction
Storage/dispenser		
Small Station	$10,000	$5,000
Large Station	$57,000	$28,500
Station Maintenance		
Small Station	$500	$250
Large Station	$1,500	$750
Labor rate ($/hour)	$15.00	$7.50

The effects of these changes on NPV are illustrated in Figure 7 and presented in more detail for each of the fleets in Appendix V. The most significant changes occur for the largest fleets. Not surprisingly, there is not a significant change for the smallest fleet, since the storage/dispenser and station maintenance costs are much less for a small volume station. The change in the 11-20 fleet is more principally because the lower costs of the large volume station switch this fleet from a small volume purchase to a large volume purchase, therefore, storage/dispenser and station maintenance costs take on more significance.

Figure 7
Infrastructure and Operating Costs Adjustment Scenario



SECTION 4: CONCLUSIONS

Based on the operating assumptions of the model, introduction of propane vehicles into the TxDOT fleet will cost an estimated $24.3 million over the next 30 years, or an annual cost of $2.6 million. Based on the sensitivity analyses, costs could be held to a minimum by focusing on conversion of the larger fleets, utilization of OEM vehicles whenever practicable, extending the service life of vehicles, and the delay of diesel conversions. TxDOT should continue to closely monitor its vehicles to determine the effects of propane on maintenance costs and resulting opportunities for holding the vehicles for a longer period of time. Extending the operating life of vehicles can have a pronounced effect on vehicle costs by reducing the number of vehicle purchases over time.

The sensitivity tests provide insight into the significance of various model parameters. Table 18 summarizes the results of all the sensitivity tests for each of the vehicle fleets according to average annual cost change per vehicle. Table 19 provides the same information but reports the results on the basis of cost increases per vehicle mile.

Assuming a more mature OEM market, i.e., LPG-vehicles for gasoline replacements cost only $400-$450 more per vehicle, a 10 percent extended life with no additional maintenance costs, and no diesel conversions, TxDOT could save about $665,059 annually. Given the limited availability of OEM vehicles, if TxDOT can negotiate a price reduction for conversions amounting to about 35 percent, then nominal savings of $66,562/year could be achieved.

Overall, the greatest savings or minimum costs can be accomplished by focusing on the largest fleets. While only 73 of the 314 fleets have more than 30 vehicles, the number of vehicles in these fleets account for more than 50 percent of total TxDOT vehicles (see Table 2 in Section 2). Introduction of propane vehicles should begin at locations with the largest number of gasoline vehicles and the whole fleet converted as soon as practicable in order to take full advantage of the fueling infrastructure capital costs.

Table 18
Summary of Sensitivity Analyses by Annual Average Cost Change Per Vehicle

Note: A negative value represents a cost increase and a positive value represents a savings.

	Fleet Size 1-10	Fleet Size 11-20	Fleet Size 21-30	Fleet Size 31-50	Fleet Size 51 or more
Base Case	-$678.94	-$519.67	-$368.72	-$265.70	-$139.77
Discount Rate					
0	-$411.63	-$205.33	-$72.15	-$29.31	+$19.10
5%	-$629.78	-$421.95	-$215.20	-$143.44	-$56.58
Break-even Prices*					
Propane	$0.26	$0.32	$0.36	$0.38	$0.38
Gasoline	$1.45	$1.33	$1.23	$1.14	$1.06
Diesel	$1.41	$1.29	$1.19	$1.10	$1.02
Maint. Savings					
10% Savings	-$571.89	-$422.57	-$281.97	-$184.52	-$66.50
25% Savings	-$411.33	-$276.94	-$151.83	-$62.75	+$43.40
50% Savings	-$143.71	-$34.21	+$65.06	+$140.20	+$226.57
Annual Miles					
25% Increase	-$746.92	-$566.04	-$328.47	-$243.71	-$89.35
50% Increase	-$794.33	-$580.47	-$287.63	-$189.93	-$66.07
100% Increase	-$892.43	-$492.46	-$185.59	-$95.37	+$27.02
Diesel					
No Diesel	-$621.16	-$391.62	-$262.81	-$223.21	-$107.42
Diesel to Gas	-$349.97	-$271.10	-$151.28	-$68.69	-$57.71
Extended Life**					
10% Increase	-$391.58	-$347.59	-$225.82	-$120.74	-$37.54
25% Increase	-$290.07	-$279.93	-$99.26	+$3.15	+$109.29
50% Increase	-$107.33	-$93.27	+$44.72	+$186.56	+$253.35
OEM***					
All vehicles	-$490.51	-$337.48	-$214.22	-$118.28	+$3.95
No diesel	-$435.58	-$210.83	-$96.83	-$67.23	+$32.75
Combination Analysis					
Scenario 1****	-$38.94	+$80.86	+$74.27	+$119.94	+$144.79
Scenario 2*****	-$161.70	-$43.81	-$32.69	+$15.84	+$61.40
Operating and Infrastructure Costs	-$569.82	-$363.71	-$199.90	-$144.68	-$86.89

* Represents break-even price per gallon.
Gasoline is at 89¢/gallon & diesel at 85¢/gallon for propane break-even point.
Propane is at $.60/gallon for small volume purchase and $.43/gallon for large volume purchase.

** Includes adjustment for change in vehicle purchases.

*** Gasoline at year 1; diesel at year 6.

**** 10% extended life, OEM at year 1 for gasoline, no diesel conversions or OEMs.

***** Same as Scenario 1 except 35% reduction in conversion and OEM costs replaces OEMs at year 1

Table 19
Summary of Sensitivity Analyses by Cost Change Per Vehicle Mile

	Fleet Size 1-10	Fleet Size 11-20	Fleet Size 21-30	Fleet Size 31-50	Fleet Size 51 or more
Base Case	-$0.0476	-$0.0391	-$0.0296	-$0.0218	-$0.0126
Discount Rate					
0	-$0.0289	-$0.0155	-$0.0058	-$0.0024	+$0.0017
5%	-$0.0441	-$0.0318	-$0.0173	-$0.0118	-$0.0051
Break-even Prices*					
Propane	$0.26	$0.32	$0.36	$0.38	$0.38
Gasoline	$1.45	$1.33	$1.23	$1.14	$1.06
Diesel	$1.41	$1.29	$1.19	$1.10	$1.02
Maint. Savings					
10% Savings	-$0.0401	-$0.0318	-$0.0226	-$0.0151	-$0.0060
25% Savings	-$0.0288	-$0.0208	-$0.0122	-$0.0051	+$0.0039
50% Savings	-$0.0101	-$0.0026	+$0.0052	+$0.0115	+$0.0204
Annual Miles					
25% Increase	-$0.0419	-$0.0341	-$0.0211	-$0.0160	-$0.0064
50% Increase	-$0.0371	-$0.0291	-$0.0154	-$0.0104	-$0.0040
100% Increase	-$0.0313	-$0.0185	-$0.0074	-$0.0039	+$0.0012
Diesel					
No Diesel	-$0.0345	-$0.0245	-$0.0192	-$0.0173	-$0.0094
Diesel to Gas	-$0.0226	-$0.0190	-$0.0116	-$0.0054	-$0.0051
Extended Life**					
10% Increase	-$0.0274	-$0.0262	-$0.0181	-$0.0099	-$0.0034
25% Increase	-$0.0203	-$0.0211	-$0.0080	+$0.0003	+$0.0098
50% Increase	-$0.0075	-$0.0070	+$0.0036	+$0.0153	+$0.0228
OEM***					
All vehicles	-$0.0344	-$0.0254	-$0.0172	-$0.0097	+$0.0004
No diesel	-$0.0242	-$0.0132	-$0.0071	-$0.0052	+$0.0029
Combination Analysis					
Scenario 1****	-$0.0022	+$0.0051	+$0.0054	+$0.0093	+$0.0127
Scenario 2*****	-$0.0090	-$0.0027	-$0.0024	+$0.0012	+$0.0054
Operating and Infrastructure Costs	-$0.0399	-$0.0274	-$0.0160	-$0.0119	-$0.0078

* Represents break-even price per gallon.
Gasoline is at 89¢/gallon & diesel at 85¢/gallon for propane break-even point.
Propane is at $.60/gallon for small volume purchase and $.43/gallon for large volume purchase.

** Includes adjustment for change in vehicle purchases.

*** Gasoline at year 1; diesel at year 6.

**** 10% extended life, OEM at year 1 for gasoline, no diesel conversions or OEMs.

***** Same as Scenario 1 except 35% reduction in conversion and OEM costs replaces OEMs at year 1

REFERENCES

Taylor, Dean, Mark Euritt, and Hani Mahmassani, *Documentation For Propane Fleet Conversion Cost-Effectiveness Model*, Research Report 983-3, Center for Transportation Research, The University of Texas at Austin, October 1992.

APPENDIX A

SUMMARY RESULTS OF NPV COST-EFFECTIVENESS MODEL BY DISTRICT

Appendix A
Summary Results of NPV Cost-Effectiveness Model by District

District	Location	Number of Vehicles	30-Year Discounted Savings	30-Year Discounted Costs	30-Year Net Present Value	Incremental Average Annual Cost Per Vehicle	Incremental Cost Per Vehicle-Mile
1	Bonham	32	$86,992	($163,349)	($76,358)	($253.12)	($0.0214)
1	Clarksville	19	$69,116	($138,613)	($69,497)	($388.01)	($0.0274)
1	Cooper	16	($5,544)	($56,440)	($61,985)	($410.96)	($0.0506)
1	Emory	15	($1,798)	($57,201)	($59,000)	($417.24)	($0.0378)
1	Greenville	36	$119,071	($173,960)	($54,889)	($161.74)	($0.0136)
1	Mt.Vernon	16	$4,428	($62,028)	($57,599)	($381.88)	($0.0329)
1	Paris	35	$82,063	($167,342)	($85,280)	($258.47)	($0.0254)
1	Paris DO	45	$75,904	($180,649)	($104,745)	($246.92)	($0.0269)
1	Sherman	42	$131,374	($193,923)	($62,548)	($157.98)	($0.0122)
1	Sulpher Springs	30	$86,841	($157,119)	($70,277)	($248.50)	($0.0241)
2	Arlington	30	$68,071	($166,221)	($98,151)	($347.06)	($0.0278)
2	Cleburne	29	$51,823	($158,429)	($106,606)	($389.95)	($0.0347)
2	Decatur	18	$61,494	($145,063)	($83,569)	($492.50)	($0.0256)
2	Fort Worth (SM)	5	($2,685)	($28,474)	($31,159)	($661.07)	($0.1173)
2	Fort Worth DO	177	$452,330	($528,107)	($75,778)	($45.41)	($0.0034)
2	Glen Rose	16	($17,458)	($64,145)	($81,603)	($541.02)	($0.0482)
2	Gordon	15	$43,715	($133,963)	($90,247)	($638.23)	($0.0339)
2	Granbury	14	($15,951)	($60,448)	($76,399)	($578.88)	($0.0441)
2	Jacksboro	31	$88,408	($173,389)	($84,981)	($290.80)	($0.0171)
2	Mineral Wells	15	$46,309	($132,097)	($85,788)	($606.69)	($0.0339)
2	S. Fort Worth	30	$53,327	($159,453)	($106,126)	($375.26)	($0.0399)
2	Saginaw	28	$74,365	($158,007)	($83,642)	($316.88)	($0.0263)
2	Stephenville	28	$53,826	($155,632)	($101,805)	($385.69)	($0.0320)
2	Weatherford	34	$93,619	($172,050)	($78,431)	($244.70)	($0.0197)
3	Archer City	11	($9,558)	($52,079)	($61,637)	($594.40)	($0.0459)
3	Bowie	23	($19,850)	($72,922)	($92,773)	($427.88)	($0.0487)
3	Electra	10	($547)	($48,351)	($48,898)	($518.71)	($0.0358)
3	Gainesville	24	$91,953	($147,323)	($55,370)	($244.73)	($0.0176)
3	Graham	16	($10,988)	($62,149)	($73,137)	($484.89)	($0.0407)
3	Henrietta	13	($5,181)	($56,229)	($61,411)	($501.11)	($0.0394)
3	Nocona	11	($23,038)	($56,549)	($79,587)	($767.50)	($0.0438)
3	Olney	9	($14,309)	($45,031)	($59,341)	($699.43)	($0.0521)
3	Seymour	10	($9,421)	($46,793)	($56,214)	($596.31)	($0.0499)
3	Throckmorton	9	($13,401)	($48,224)	($61,624)	($726.34)	($0.0438)
3	Vernon	17	($8,048)	($60,279)	($68,327)	($426.36)	($0.0396)
3	Wichita Falls	18	($7,598)	($68,247)	($75,846)	($446.98)	($0.0421)
3	Wichita Falls DO	62	$163,142	($242,933)	($79,791)	($136.52)	($0.0106)
4	Borger	18	($6,785)	($65,611)	($72,396)	($426.65)	($0.0386)
4	Canadian	14	($14,682)	($55,857)	($70,539)	($534.48)	($0.0492)
4	Canyon	24	($7,533)	($77,628)	($85,161)	($376.41)	($0.0402)
4	Channing	11	($11,227)	($51,741)	($62,967)	($607.23)	($0.0435)
4	Claude	10	($12,719)	($49,016)	($61,735)	($654.88)	($0.0532)
4	Dalhart	20	$98	($73,036)	($72,937)	($386.86)	($0.0276)
4	Dumas	11	($11,693)	($55,695)	($67,388)	($649.87)	($0.0356)
4	Groom	10	$25,633	($121,318)	($95,685)	($1,015.01)	($0.0411)
4	Gruver	10	($22,139)	($48,182)	($70,320)	($745.95)	($0.0603)
4	Hereford	10	($19,868)	($49,786)	($69,655)	($738.89)	($0.0500)
4	N. Amarillo	55	$111,977	($222,454)	($110,478)	($213.08)	($0.0201)

Appendix A
Summary Results of NPV Cost-Effectiveness Model by District

		Number	30-Year	30-Year	30-Year	Incremental	Incremental
		of	Discounted	Discounted	Net Present	Average Annual	Cost Per
District	Location	Vehicles	Savings	Costs	Value	Cost Per Vehicle	Vehicle-Mile
4	Pampa	23	($6,648)	($80,972)	($87,620)	($404.12)	($0.0350)
4	Panhandle	12	($16,769)	($51,892)	($68,660)	($606.95)	($0.0528)
4	Perryton	14	($21,414)	($58,275)	($79,689)	($603.81)	($0.0516)
4	S. Amarillo	30	$77,553	($159,175)	($81,622)	($288.61)	($0.0255)
4	Stratford	9	($8,328)	($47,683)	($56,011)	($660.18)	($0.0362)
4	Vega	10	($5,230)	($46,501)	($51,731)	($548.76)	($0.0402)
5	Bovina	80	$179,336	($272,752)	($93,416)	($123.87)	($0.0117)
5	Brownfield	19	$63,620	($140,133)	($76,513)	($427.18)	($0.0232)
5	Dawson	10	($6,956)	($47,955)	($54,911)	($582.49)	($0.0385)
5	Dimmitt	12	($15,404)	($56,891)	($72,296)	($639.09)	($0.0379)
5	Floydada	10	($19,074)	($49,002)	($68,076)	($722.15)	($0.0487)
5	Levelland	11	($11,446)	($50,636)	($62,082)	($598.69)	($0.0418)
5	Littlefield	19	$58,349	($141,881)	($83,532)	($466.37)	($0.0229)
5	Lubbock DO	98	$200,294	($305,771)	($105,477)	($114.17)	($0.0121)
5	Lubbock LP 289	40	$103,419	($204,167)	($100,748)	($267.18)	($0.0183)
5	Lubbock US 84	20	$68,691	($142,202)	($73,511)	($389.90)	($0.0259)
5	Morton	10	($24,985)	($51,908)	($76,893)	($815.68)	($0.0467)
5	Muleshoe	11	($14,844)	($55,425)	($70,269)	($677.65)	($0.0361)
5	Plains	9	($21,743)	($46,591)	($68,334)	($805.42)	($0.0529)
5	Plainview	16	($22,497)	($68,546)	($91,043)	($603.61)	($0.0406)
5	Post	11	($11,835)	($48,887)	($60,722)	($585.58)	($0.0472)
5	Ralls	10	($6,741)	($47,591)	($54,332)	($576.35)	($0.0380)
5	Seminole	10	($3,760)	($47,632)	($51,392)	($545.17)	($0.0382)
5	Tahoka	10	($8,142)	($49,380)	($57,522)	($610.19)	($0.0378)
5	Tulia	9	($17,837)	($49,676)	($67,512)	($795.74)	($0.0361)
6	Andrews	22	$6,849	($73,586)	($66,737)	($321.79)	($0.0265)
6	Balmorhea	9	($11,711)	($46,400)	($58,111)	($684.93)	($0.0418)
6	Crane	9	($2,171)	($44,383)	($46,555)	($548.72)	($0.0371)
6	Dermit	11	($6,263)	($48,594)	($54,857)	($529.01)	($0.0394)
6	Fort Stockton	22	$3,973	($78,291)	($74,318)	($358.34)	($0.0266)
6	Iraan	9	($13,653)	($44,308)	($57,961)	($683.16)	($0.0508)
6	McCamey	12	($13,430)	($51,735)	($65,165)	($576.05)	($0.0489)
6	Midland 1	11	$7,907	($42,231)	($34,324)	($331.01)	($0.0262)
6	Midland 2	16	($2,459)	($63,728)	($66,187)	($438.82)	($0.0319)
6	Monahans	11	$202	($49,375)	($49,173)	($474.21)	($0.0314)
6	Odessa DO	66	$155,758	($251,914)	($96,156)	($154.55)	($0.0148)
6	Pecos	20	($3,833)	($75,427)	($79,261)	($420.40)	($0.0303)
6	Sanderson	10	($2,540)	($47,644)	($50,184)	($532.35)	($0.0306)
6	Stanton	14	($8,366)	($56,955)	($65,321)	($494.94)	($0.0457)
7	Ballinger	11	($25,311)	($57,745)	($83,056)	($800.96)	($0.0407)
7	Big Lake	11	($15,831)	($53,479)	($69,310)	($668.40)	($0.0417)
7	Brackettville	11	($1,158)	($43,666)	($44,824)	($432.27)	($0.0405)
7	Del Rio	62	$123,427	($242,634)	($119,207)	($203.96)	($0.0181)
7	Eden	13	($18,911)	($56,825)	($75,736)	($618.00)	($0.0469)
7	Junction	23	($1,682)	($77,005)	($78,687)	($362.92)	($0.0279)
7	Ozona	11	($9,142)	($50,036)	($59,178)	($570.69)	($0.0401)
7	Robert Lee	10	($13,650)	($48,118)	($61,768)	($655.23)	($0.0470)
7	Rocksprings	17	($5,408)	($67,336)	($72,744)	($453.92)	($0.0308)

Appendix A
Summary Results of NPV Cost-Effectiveness Model by District

District	Location	Number of Vehicles	30-Year Discounted Savings	30-Year Discounted Costs	30-Year Net Present Value	Incremental Average Annual Cost Per Vehicle	Incremental Cost Per Vehicle-Mile
7	San Angelo	31	$2,727	($94,392)	($91,665)	($313.67)	($0.0270)
7	San Angelo DO	30	$70,879	($166,807)	($95,928)	($339.20)	($0.0218)
7	Sonora	29	$73,980	($161,467)	($87,487)	($320.02)	($0.0226)
7	Sterling City	12	($21,022)	($57,208)	($78,231)	($691.56)	($0.0443)
8	Abilene	83	$172,746	($307,349)	($134,603)	($172.03)	($0.0146)
8	Abilene DO	42	$101,466	($195,246)	($93,780)	($236.86)	($0.0182)
8	Albany	8	($10,299)	($41,394)	($51,693)	($685.44)	($0.0564)
8	Anson	26	$55,896	($156,653)	($100,757)	($411.09)	($0.0312)
8	Aspermont	8	($10,753)	($42,048)	($52,801)	($700.14)	($0.0524)
8	Baird	12	($17,983)	($55,255)	($73,238)	($647.42)	($0.0413)
8	Big Spring	23	($10,634)	($79,836)	($90,470)	($417.26)	($0.0356)
8	Colorado City	17	($17,865)	($61,931)	($79,797)	($497.93)	($0.0528)
8	Gail	6	($14,971)	($39,586)	($54,556)	($964.55)	($0.0460)
8	Haskell	12	($11,763)	($52,828)	($64,591)	($570.98)	($0.0415)
8	Jayton	7	($9,012)	($38,248)	($47,260)	($716.18)	($0.0535)
8	Roby	11	($17,368)	($51,678)	($69,046)	($665.85)	($0.0500)
8	Snyder	23	($6,947)	($78,905)	($85,852)	($395.96)	($0.0338)
8	Sweetwater	14	($11,258)	($59,223)	($70,481)	($534.04)	($0.0379)
9	Belton	32	$1,658	($84,985)	($83,328)	($276.23)	($0.0356)
9	Gatesville	20	($5,950)	($70,253)	($76,203)	($404.18)	($0.0330)
9	Groesbeck	14	($25,115)	($63,357)	($88,472)	($670.36)	($0.0445)
9	Hamilton	14	($10,906)	($53,189)	($64,095)	($485.65)	($0.0533)
9	Hillsboro	32	$43,817	($161,190)	($117,372)	($389.09)	($0.0402)
9	Killeen	13	($16,406)	($53,956)	($70,361)	($574.14)	($0.0525)
9	Marlin	23	($6,249)	($77,718)	($83,968)	($387.27)	($0.0318)
9	Meridian	15	($11,947)	($55,945)	($67,892)	($480.13)	($0.0494)
9	Temple	16	($10,172)	($59,965)	($70,137)	($465.01)	($0.0431)
9	Waco DO	128	$260,661	($407,744)	($147,083)	($121.89)	($0.0108)
10	Athens	29	$69,821	($154,365)	($84,544)	($309.25)	($0.0263)
10	Canton	16	($13,748)	($65,269)	($79,017)	($523.88)	($0.0383)
10	Henderson	14	($13,876)	($59,794)	($73,670)	($558.20)	($0.0356)
10	Jacksonville	23	($3,872)	($78,950)	($82,822)	($381.99)	($0.0319)
10	Longview	34	$94,842	($176,598)	($81,757)	($255.08)	($0.0175)
10	Mineola	41	$84,183	($192,360)	($108,178)	($279.89)	($0.0214)
10	N. Tyler	35	$74,883	($169,637)	($94,754)	($287.18)	($0.0247)
10	Palestine	19	($6,598)	($72,162)	($78,760)	($439.73)	($0.0331)
10	Rusk	11	($10,913)	($51,444)	($62,357)	($601.35)	($0.0400)
10	S. Tyler	16	($7,878)	($63,040)	($70,918)	($470.18)	($0.0314)
10	Tyler DO	60	$139,449	($246,525)	($107,076)	($189.31)	($0.0155)
11	Bronson	13	($23,237)	($63,150)	($86,387)	($704.91)	($0.0410)
11	Center	14	$58,307	($129,579)	($71,272)	($540.04)	($0.0277)
11	Crockett	15	($18,412)	($62,562)	($80,974)	($572.64)	($0.0456)
11	Groveton	12	($11,861)	($55,858)	($67,718)	($598.63)	($0.0396)
11	Livingston	28	$67,034	($158,091)	($91,057)	($344.97)	($0.0259)
11	Lufkin	22	($11,578)	($78,592)	($90,170)	($434.78)	($0.0404)
11	Lufkin DO	58	$137,761	($233,005)	($95,244)	($174.20)	($0.0137)
11	Nacogdoches	27	$63,450	($156,921)	($93,471)	($367.23)	($0.0263)
11	San Augustine	20	($19,978)	($74,126)	($94,104)	($499.12)	($0.0385)

Appendix A
Summary Results of NPV Cost-Effectiveness Model by District

		Number	30-Year	30-Year	30-Year	Incremental	Incremental
		of	Discounted	Discounted	Net Present	Average Annual	Cost Per
District	Location	Vehicles	Savings	Costs	Value	Cost Per Vehicle	Vehicle-Mile
11	Shepherd	12	($18,109)	($58,499)	($76,608)	($677.21)	($0.0398)
12	Alvin	22	($15,242)	($82,818)	($98,060)	($472.83)	($0.0333)
12	Angleton	51	$115,758	($207,666)	($91,908)	($191.17)	($0.0167)
12	Baytown 1	5	$1,919	($26,488)	($24,569)	($521.25)	($0.0927)
12	Baytown 2	10	$2,055	($32,193)	($30,138)	($319.70)	($0.0933)
12	Conroe	49	$69,964	($200,892)	($130,928)	($283.44)	($0.0289)
12	E Houston	71	$166,285	($248,750)	($82,465)	($123.21)	($0.0113)
12	Galveston	6	$2,457	($33,432)	($30,974)	($469.39)	($0.0523)
12	Hempstead	25	$76,793	($162,706)	($85,913)	($364.54)	($0.0195)
12	Houston	15	$9,734	($48,566)	($38,832)	($274.62)	($0.0333)
12	Houston DO	257	$465,918	($605,312)	($139,394)	($57.54)	($0.0067)
12	Humble	72	$159,075	($262,310)	($103,234)	($152.10)	($0.0134)
12	La Marque	46	$83,767	($193,742)	($109,976)	($253.61)	($0.0242)
12	NW Houston 1	32	$19,014	($90,000)	($70,986)	($235.32)	($0.0229)
12	NW Houston 2	101	$199,316	($316,617)	($117,301)	($123.20)	($0.0121)
12	Rosenberg 1	34	$54,183	($175,064)	($120,881)	($377.15)	($0.0328)
12	Rosenberg 2	61	$127,854	($211,690)	($83,836)	($145.79)	($0.0147)
12	SE Houston	71	$117,525	($240,732)	($123,208)	($184.08)	($0.0209)
13	Bay City	21	($12,722)	($73,940)	($86,662)	($437.76)	($0.0410)
13	Bellville	19	($18,944)	($67,700)	($86,644)	($483.74)	($0.0457)
13	Columbus	31	$49,395	($163,672)	($114,277)	($391.05)	($0.0321)
13	Cuero	17	($18,784)	($72,633)	($91,417)	($570.44)	($0.0400)
13	Edna	14	($17,763)	($58,042)	($75,806)	($574.39)	($0.0495)
13	Gonzales	21	($15,702)	($77,877)	($93,579)	($472.70)	($0.0405)
13	Hallettsville	16	($15,577)	($64,466)	($80,042)	($530.68)	($0.0402)
13	La Grange	33	$65,932	($168,053)	($102,121)	($328.27)	($0.0269)
13	Port Lavaca	12	($2,534)	($48,652)	($51,187)	($452.49)	($0.0392)
13	Victoria	46	$107,166	($203,394)	($96,228)	($221.91)	($0.0181)
13	Wharton	30	$53,131	($161,601)	($108,470)	($383.55)	($0.0357)
13	Yoakum DO	62	$140,702	($242,134)	($101,432)	($173.55)	($0.0139)
14	Austin (183 South)	26	$61,311	($151,912)	($90,601)	($369.65)	($0.0296)
14	Austin DO	125	$282,696	($399,537)	($116,841)	($99.16)	($0.0085)
14	Austin East	15	($18,512)	($62,776)	($81,288)	($574.86)	($0.0418)
14	Austin North	18	($15,512)	($71,456)	($86,968)	($512.53)	($0.0370)
14	Austin West	37	$66,006	($175,232)	($109,226)	($313.15)	($0.0262)
14	Bastrop	26	$71,915	($156,980)	($85,066)	($347.07)	($0.0219)
14	Burnet	23	($7,430)	($79,825)	($87,254)	($402.43)	($0.0280)
14	Fredricksburg	17	($9,504)	($62,615)	($72,119)	($450.02)	($0.0385)
14	Georgetown	29	$54,609	($156,044)	($101,436)	($371.04)	($0.0296)
14	Giddings	13	($22,810)	($57,539)	($80,348)	($655.64)	($0.0503)
14	Johnson City	10	($15,561)	($49,460)	($65,022)	($689.75)	($0.0415)
14	Llano	10	($9,750)	($48,517)	($58,267)	($618.09)	($0.0390)
14	Lockhart	11	($15,066)	($51,061)	($66,127)	($637.70)	($0.0455)
14	Mason	11	($8,956)	($48,507)	($57,463)	($554.15)	($0.0466)
14	San Marcos	14	($15,330)	($56,277)	($71,607)	($542.57)	($0.0440)
14	Taylor	13	($15,159)	($55,436)	($70,595)	($576.05)	($0.0459)
15	Bandera	12	($2,228)	($53,235)	($55,463)	($490.29)	($0.0368)
15	Boerne	14	($4,668)	($57,141)	($61,809)	($468.33)	($0.0379)

Appendix A
Summary Results of NPV Cost-Effectiveness Model by District

District	Location	Number of Vehicles	30-Year Discounted Savings	30-Year Discounted Costs	30-Year Net Present Value	Incremental Average Annual Cost Per Vehicle	Incremental Cost Per Vehicle-Mile
15	Carrizo Springs	19	$14,062	($66,201)	($52,139)	($291.10)	($0.0246)
15	Cotulla	13	$745	($57,276)	($56,531)	($461.29)	($0.0297)
15	Devine	13	$521	($56,456)	($55,935)	($456.43)	($0.0293)
15	Eagle Pass	11	$2,849	($47,838)	($44,988)	($433.85)	($0.0331)
15	Floresville	26	$109,220	($148,862)	($39,641)	($161.74)	($0.0112)
15	Hondo	23	$6,007	($77,596)	($71,589)	($330.18)	($0.0285)
15	Kerrville	31	$71,638	($162,893)	($91,254)	($312.26)	($0.0273)
15	La Pryor	12	$11,182	($54,630)	($43,448)	($384.08)	($0.0249)
15	New Braunfels	32	$79,894	($164,052)	($84,159)	($278.98)	($0.0227)
15	Pearsall	23	$12,219	($78,259)	($66,040)	($304.59)	($0.0237)
15	Pleasanton	25	$60,200	($150,446)	($90,246)	($382.93)	($0.0288)
15	San Antonio DO	165	$432,357	($506,933)	($74,576)	($47.95)	($0.0036)
15	San Antonio MID	82	$163,174	($255,347)	($92,173)	($119.24)	($0.0140)
15	San Antonio NE	22	$84,494	($139,887)	($55,392)	($267.09)	($0.0218)
15	San Antonio NW	22	$88,691	($138,129)	($49,439)	($238.38)	($0.0207)
15	San Antonio SE	21	$92,175	($133,240)	($41,064)	($207.43)	($0.0182)
15	San Antonio SW	22	$91,920	($141,031)	($49,111)	($236.80)	($0.0189)
15	Seguin	31	$80,511	($163,854)	($83,343)	($285.19)	($0.0223)
15	Tilden	10	($6,371)	($49,089)	($55,460)	($588.31)	($0.0355)
15	Uvalde	20	$5,598	($76,562)	($70,965)	($376.39)	($0.0248)
16	Alice	21	$4,654	($74,332)	($69,678)	($351.97)	($0.0280)
16	Beeville	12	($12,815)	($52,569)	($65,385)	($578.00)	($0.0481)
16	Corpus Christi	22	$8,687	($78,818)	($70,130)	($338.15)	($0.0267)
16	Corpus Christi DO	71	$149,613	($246,231)	($96,618)	($144.35)	($0.0136)
16	Corpus Christi Port at Morgan	25	($13,186)	($74,611)	($87,797)	($372.54)	($0.0495)
16	George West	23	($12,591)	($81,713)	($94,303)	($434.94)	($0.0363)
16	Goliad	10	($11,656)	($50,364)	($62,020)	($657.90)	($0.0409)
16	Karnes City	27	$75,362	($155,548)	($80,186)	($315.04)	($0.0206)
16	Kingsville	14	($11,078)	($62,320)	($73,398)	($556.14)	($0.0351)
16	Port Aransas	3	$586	($23,703)	($23,117)	($817.42)	($0.0943)
16	Refugio	12	($4,017)	($51,042)	($55,059)	($486.72)	($0.0355)
16	Robstown	10	($14,342)	($49,685)	($64,027)	($679.19)	($0.0472)
16	Rockport	11	($10,351)	($50,825)	($61,176)	($589.96)	($0.0467)
16	Sinton	35	$86,229	($178,908)	($92,679)	($280.90)	($0.0209)
17	Brenham	24	($7,578)	($81,911)	($89,489)	($395.54)	($0.0317)
17	Bryan DO	59	$150,260	($243,326)	($93,067)	($167.33)	($0.0128)
17	Buffalo	24	$56,563	($152,682)	($96,118)	($424.84)	($0.0277)
17	Caldwell	14	($5,921)	($50,493)	($56,414)	($427.45)	($0.0481)
17	Cameron	16	($15,149)	($66,909)	($82,058)	($544.04)	($0.0348)
17	Fairfield	15	($15,255)	($59,666)	($74,920)	($529.83)	($0.0448)
17	Hearne	22	($8,874)	($74,186)	($83,060)	($400.50)	($0.0337)
17	Huntsville	22	($9,992)	($77,360)	($87,352)	($421.19)	($0.0310)
17	Madisonville	16	($7,847)	($62,118)	($69,964)	($463.86)	($0.0363)
17	Navasota	14	($23,075)	($61,894)	($84,968)	($643.81)	($0.0418)
18	Corsicana	38	$72,949	($188,520)	($115,570)	($322.62)	($0.0247)
18	Dallas Central	43	$108,820	($208,848)	($100,027)	($246.76)	($0.0170)
18	Dallas DO	70	$166,261	($255,747)	($89,486)	($135.61)	($0.0113)
18	Denton	61	$144,935	($261,330)	($116,395)	($202.41)	($0.0137)

Appendix A
Summary Results of NPV Cost-Effectiveness Model by District

District	Location	Number of Vehicles	30-Year Discounted Savings	30-Year Discounted Costs	30-Year Net Present Value	Incremental Average Annual Cost Per Vehicle	Incremental Cost Per Vehicle-Mile
18	Ennis	23	($17,525)	($80,081)	($97,606)	($450.17)	($0.0378)
18	Farmersville	35	$68,368	($177,014)	($108,646)	($329.29)	($0.0350)
18	Grand Prarie	28	$62,298	($160,702)	($98,403)	($372.80)	($0.0260)
18	Hutchins	44	$104,448	($201,040)	($96,592)	($232.87)	($0.0178)
18	Kaufman	41	$68,255	($203,759)	($135,504)	($350.59)	($0.0262)
18	Lewisville	49	$110,443	($230,122)	($119,680)	($259.09)	($0.0175)
18	McKinney	44	$88,535	($195,406)	($106,872)	($257.66)	($0.0270)
18	N. Dallas	66	$143,433	($246,161)	($102,728)	($165.11)	($0.0153)
18	Rockwall	26	$56,286	($149,883)	($93,598)	($381.88)	($0.0294)
18	Waxahachie	32	$79,119	($171,393)	($92,274)	($305.89)	($0.0225)
19	Atlanta DO	53	$137,151	($213,451)	($76,300)	($152.71)	($0.0120)
19	Carthage	25	$82,148	($152,269)	($70,121)	($297.53)	($0.0219)
19	Daingerfield	16	($6,311)	($64,488)	($70,799)	($469.40)	($0.0396)
19	Gilmer	22	$82,387	($144,522)	($62,134)	($299.60)	($0.0221)
19	Jefferson	15	($1,658)	($61,110)	($62,767)	($443.89)	($0.0358)
19	Linden	32	$141,371	($186,317)	($44,946)	($149.00)	($0.0090)
19	Marshall	29	$106,960	($166,759)	($59,799)	($218.74)	($0.0144)
19	Mt. Pleasant	29	$80,763	($157,501)	($76,738)	($280.70)	($0.0222)
19	New Boston	16	$7,611	($66,362)	($58,751)	($389.52)	($0.0269)
19	Texarkana	34	$68,701	($160,126)	($91,425)	($285.24)	($0.0301)
20	Anahuac	16	$3,071	($66,351)	($63,280)	($419.55)	($0.0281)
20	Beaumont	38	$85,270	($188,551)	($103,280)	($288.31)	($0.0248)
20	Beaumont DO	60	$146,438	($232,054)	($85,616)	($151.37)	($0.0116)
20	Cleveland	14	($16,952)	($58,705)	($75,657)	($573.26)	($0.0487)
20	Jasper	24	$945	($81,249)	($80,304)	($354.94)	($0.0284)
20	Kountze	19	($13,625)	($71,488)	($85,113)	($475.19)	($0.0387)
20	Liberty	26	($6,312)	($84,753)	($91,065)	($371.54)	($0.0324)
20	Newton	12	($13,833)	($57,824)	($71,658)	($633.45)	($0.0355)
20	Orange	32	$79,214	($162,769)	($83,555)	($276.98)	($0.0228)
20	Port Arthur	29	$62,340	($157,440)	($95,100)	($347.87)	($0.0298)
20	Woodville	14	($2,392)	($60,449)	($62,841)	($476.15)	($0.0332)
21	Brownsville	18	($1,924)	($64,356)	($66,280)	($390.60)	($0.0353)
21	Edcouch	14	($6,603)	($56,146)	($62,750)	($475.46)	($0.0378)
21	Falfurrias	13	($3,756)	($53,425)	($57,181)	($466.60)	($0.0372)
21	Freer	12	($7,033)	($54,732)	($61,766)	($546.00)	($0.0338)
21	Hebbronville	19	$1,622	($72,093)	($70,471)	($393.45)	($0.0291)
21	Laredo	29	($453)	($80,005)	($80,458)	($294.31)	($0.0380)
21	Mission	15	($2,118)	($56,131)	($58,249)	($411.93)	($0.0397)
21	Pharr	51	$129,164	($224,450)	($95,286)	($198.19)	($0.0150)
21	Pharr DO	39	$101,453	($189,795)	($88,343)	($240.29)	($0.0163)
21	Raymondville	22	$9,166	($72,487)	($63,320)	($305.32)	($0.0277)
21	Rio Grande City	16	($8,908)	($61,736)	($70,644)	($468.37)	($0.0427)
21	San Benito	22	$7,453	($71,795)	($64,342)	($310.25)	($0.0259)
23	Brackenridge	11	($11,522)	($53,025)	($64,547)	($622.46)	($0.0419)
23	Brady	12	($16,077)	($51,049)	($67,127)	($593.40)	($0.0551)
23	Brownwood DO	69	$114,100	($260,609)	($146,509)	($225.24)	($0.0215)
23	Coleman	14	($12,129)	($56,539)	($68,668)	($520.30)	($0.0438)
23	Comanche	19	($17,904)	($69,688)	($87,592)	($489.03)	($0.0448)

Appendix A
Summary Results of NPV Cost-Effectiveness Model by District

		Number	30-Year	30-Year	30-Year	Incremental	Incremental
		of	Discounted	Discounted	Net Present	Average Annual	Cost Per
District	Location	Vehicles	Savings	Costs	Value	Cost Per Vehicle	Vehicle-Mile
23	Eastland	26	$46,128	($151,759)	($105,631)	($430.97)	($0.0403)
23	Goldthwaite	7	($5,925)	($35,200)	($41,125)	($623.21)	($0.0638)
23	Lampasas	18	($868)	($60,928)	($61,796)	($364.18)	($0.0370)
23	San Saba	8	($8,131)	($39,361)	($47,491)	($629.73)	($0.0652)
24	Alpine	26	$72,039	($160,583)	($88,544)	($361.26)	($0.0214)
24	Canutillo	15	($16,126)	($60,242)	($76,368)	($540.07)	($0.0496)
24	Dell City	10	($16,862)	($50,771)	($67,633)	($717.45)	($0.0460)
24	El Paso DO	79	$170,187	($245,798)	($75,611)	($101.53)	($0.0106)
24	Fort Davis	9	($9,174)	($46,293)	($55,467)	($653.77)	($0.0400)
24	Marfa	11	($17,109)	($53,048)	($70,156)	($676.56)	($0.0412)
24	Sierra Blanca	11	($6,242)	($45,553)	($51,795)	($499.49)	($0.0541)
24	Van Horn	11	($6,419)	($46,413)	($52,832)	($509.49)	($0.0500)
24	Ysleta	15	($18,109)	($58,537)	($76,646)	($542.04)	($0.0524)
25	Childress	25	($5,843)	($80,455)	($86,298)	($366.18)	($0.0321)
25	Childress DO	30	$57,231	($161,024)	($103,792)	($367.01)	($0.0313)
25	Clarendon	14	($18,403)	($60,587)	($78,990)	($598.51)	($0.0451)
25	Dickens	8	($10,140)	($38,948)	($49,087)	($650.89)	($0.0638)
25	Matador	11	($16,639)	($51,619)	($68,258)	($658.25)	($0.0470)
25	Munday	17	($5,264)	($62,513)	($67,777)	($422.92)	($0.0388)
25	Paducah	8	($12,855)	($42,454)	($55,309)	($733.39)	($0.0439)
25	Quanah	14	($14,653)	($60,283)	($74,936)	($567.80)	($0.0395)
25	Shamrock	14	($12,082)	($57,274)	($69,355)	($525.51)	($0.0464)
25	Wellington	18	($9,949)	($73,436)	($83,386)	($491.42)	($0.0314)
29	Anderson	4	$1,244	($25,145)	($23,901)	($633.85)	($0.0740)
29	Garza	1	$101	($18,155)	($18,054)	($1,915.18)	($1.3984)
29	Travis	272	$489,498	($741,545)	($252,048)	($98.30)	($0.0095)

APPENDIX B

NPV COST-EFFECTIVENESS MODEL: BASE CASE

Fleet Size
1-10

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$5,550	-46.9%	$0.0082
Automobiles	$1,036	-8.8%	$0.0049
Light Trucks	$2,816	-23.8%	$0.0081
Heavy Duty Trucks	$1,698	-14.4%	$0.0139
Diesel Price Diff.	($17,386)	146.9%	($0.0328)
Maintenance	$0	0.0%	$0.0000
Total Savings	($11,836)	100.0%	($0.0098)
COSTS		**% of**	**Incremental**
Infrastructure		**Costs**	**Cost/Mile**
Land	$0	0.0%	$0.0000
Station setup	($1,598)	3.5%	($0.0013)
Storage/Dispenser	($10,366)	22.7%	($0.0086)
Subtotal	($11,964)	26.1%	($0.0099)
Vehicle			
Conversion Kit	($6,556)	14.3%	($0.0054)
Tanks	($2,210)	4.8%	($0.0018)
Labor	($6,482)	14.2%	($0.0054)
OEM	($2,443)	5.3%	($0.0020)
Subtotal	($17,691)	38.7%	($0.0146)
Operating			
Station Maint.	($4,713)	10.3%	($0.0039)
Labor - fuel time loss	($2,589)	5.7%	($0.0021)
Propane Fuel Tax	($8,809)	19.2%	($0.0073)
Additional training	$0	0.0%	$0.0000
Subtotal	($16,112)	35.2%	($0.0133)
Total Costs	($45,767)	100.0%	($0.0378)
Savings - Cost	($57,603)	N/A	($0.0476)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	20.3	22,509	$1,600	$400
Light Trucks	2	12.8	18,327	$1,190	$400
Heavy Duty Gasoline	1	6.8	12,930	$1,200	$450
Heavy Duty Diesel	5	8.1	13,511	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	9				

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($678.94)
Incremental Cost/mile	($0.0476)

Fleet Size
11-20

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$10,390	-94.6%	$0.0086
Automobiles	$1,124	-10.2%	$0.0052
Light Trucks	$5,781	-52.6%	$0.0076
Heavy Duty Trucks	$3,485	-31.7%	$0.0149
Diesel Price Diff.	($21,375)	194.6%	($0.0318)
Maintenance	$0	0.0%	$0.0000
Total Savings	($10,985)	100.0%	($0.0058)
COSTS		**% of**	**Incremental**
Infrastructure		**Costs**	**Cost/Mile**
Land	$0	0.0%	$0.0000
Station setup	($1,598)	2.6%	($0.0009)
Storage/Dispenser	($10,366)	16.6%	($0.0055)
Subtotal	($11,964)	19.1%	($0.0064)
Vehicle			
Conversion Kit	($10,467)	16.7%	($0.0056)
Tanks	($3,752)	6.0%	($0.0020)
Labor	($9,962)	15.9%	($0.0053)
OEM	($2,904)	4.6%	($0.0015)
Subtotal	($27,085)	43.3%	($0.0144)
Operating			
Station Maint.	($4,713)	7.5%	($0.0025)
Labor - fuel time loss	($3,551)	5.7%	($0.0019)
Propane Fuel Tax	($15,184)	24.3%	($0.0081)
Additional training	$0	0.0%	$0.0000
Subtotal	($23,448)	37.5%	($0.0125)
Total Costs	($62,498)	100.0%	($0.0333)
Savings - Cost	($73,483)	N/A	($0.0391)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	19.0	22,861	$1,600	$400
Light Trucks	5	13.0	16,093	$1,190	$400
Heavy Duty Gasoline	2	6.1	12,365	$1,200	$450
Heavy Duty Diesel	7	8.4	12,206	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	15				

DISCOUNT RATE	10.0%

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($519.67)
Incremental Cost/mile	($0.0391)

Fleet Size
21-30

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$62,994	102.8%	$0.0271
Automobiles	$5,229	8.5%	$0.0167
Light Trucks	$40,891	66.7%	$0.0239
Heavy Duty Trucks	$16,874	27.5%	$0.0563
Diesel Price Diff.	($1,705)	-2.8%	($0.0023)
Maintenance	$0	0.0%	$0.0000
Total Savings	$61,289	100.0%	$0.0201
COSTS		**% of**	**Incremental**
Infrastructure		**Costs**	**Cost/Mile**
Land	$0	0.0%	$0.0000
Station setup	($8,746)	5.8%	($0.0029)
Storage/Dispenser	($56,672)	37.4%	($0.0185)
Subtotal	($65,418)	43.1%	($0.0214)
Vehicle			
Conversion Kit	($16,861)	11.1%	($0.0055)
Tanks	($6,818)	4.5%	($0.0022)
Labor	($15,626)	10.3%	($0.0051)
OEM	($4,239)	2.8%	($0.0014)
Subtotal	($43,545)	28.7%	($0.0143)
Operating			
Station Maint.	($14,140)	9.3%	($0.0046)
Labor - fuel time loss	($4,703)	3.1%	($0.0015)
Propane Fuel Tax	($23,857)	15.7%	($0.0078)
Additional training	$0	0.0%	$0.0000
Subtotal	($42,700)	28.2%	($0.0140)
Total Costs	($151,663)	100.0%	($0.0496)
Savings - Cost	($90,374)	N/A	($0.0296)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	2	19.4	16,650	$1,600	$400
Light Trucks	13	13.4	13,969	$1,190	$400
Heavy Duty Gasoline	3	5.6	10,594	$1,200	$450
Heavy Duty Diesel	8	8.1	11,616	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	26				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($368.72)
Incremental Cost/mile	($0.0296)

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$88,739	102.7%	$0.0270
Automobiles	$7,140	8.3%	$0.0168
Light Trucks	$60,324	69.8%	$0.0241
Heavy Duty Trucks	$21,275	24.6%	$0.0594
Diesel Price Diff.	($2,334)	-2.7%	($0.0024)
Maintenance	$0	0.0%	$0.0000
Total Savings	$86,405	100.0%	$0.0203
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	4.9%	($0.0021)
Storage/Dispenser	($56,672)	31.6%	($0.0133)
Subtotal	($65,418)	36.5%	($0.0154)
Vehicle			
Conversion Kit	($23,432)	13.1%	($0.0055)
Tanks	($9,810)	5.5%	($0.0023)
Labor	($21,427)	12.0%	($0.0050)
OEM	($6,391)	3.6%	($0.0015)
Subtotal	($61,060)	34.1%	($0.0144)
Operating			
Station Maint.	($14,140)	7.9%	($0.0033)
Labor - fuel time loss	($6,363)	3.6%	($0.0015)
Propane Fuel Tax	($32,098)	17.9%	($0.0076)
Additional training	$0	0.0%	$0.0000
Subtotal	($52,601)	29.4%	($0.0124)
Total Costs	($179,080)	100.0%	($0.0421)
Savings - Cost	($92,674)	N/A	($0.0218)

Fleet Size
31-50

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	3	19.2	15,000	$1,600	$400
Light Trucks	20	13.3	13,295	$1,190	$400
Heavy Duty Gasoline	4	5.5	9,492	$1,200	$450
Heavy Duty Diesel	10	7.8	12,248	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	37				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($265.70)
Incremental Cost/mile	($0.0218)

Fleet Size
51 and up

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$191,560	101.4%	$0.0232
Automobiles	$30,339	16.1%	$0.0152
Light Trucks	$140,667	74.4%	$0.0239
Heavy Duty Trucks	$20,554	10.9%	$0.0544
Diesel Price Diff.	($2,592)	-1.4%	($0.0027)
Maintenance	$0	0.0%	$0.0000
Total Savings	$188,968	100.0%	$0.0205
COSTS		% of	Incremental
Infrastructure		Costs	Cost/Mile
Land	$0	0.0%	$0.0000
Station setup	($8,746)	2.9%	($0.0009)
Storage/Dispenser	($56,672)	18.6%	($0.0061)
Subtotal	($65,418)	21.5%	($0.0071)
Vehicle			
Conversion Kit	($53,824)	17.7%	($0.0058)
Tanks	($24,816)	8.1%	($0.0027)
Labor	($51,294)	16.8%	($0.0056)
OEM	($9,457)	3.1%	($0.0010)
Subtotal	($139,391)	45.7%	($0.0151)
Operating			
Station Maint.	($14,140)	4.6%	($0.0015)
Labor - fuel time loss	($9,671)	3.2%	($0.0010)
Propane Fuel Tax	($76,292)	25.0%	($0.0083)
Additional training	$0	0.0%	$0.0000
Subtotal	($100,104)	32.8%	($0.0108)
Total Costs	($304,913)	100.0%	($0.0330)
Savings - Cost	($115,945)	N/A	($0.0126)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	19	20.8	11,171	$1,600	$400
Light Trucks	54	13.3	11,575	$1,190	$400
Heavy Duty Gasoline	4	5.8	10,024	$1,200	$450
Heavy Duty Diesel	11	7.5	11,077	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	88				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($139.77)
Incremental Cost/mile	($0.0126)

APPENDIX C

NPV COST-EFFECTIVENESS MODEL: 5 PERCENT DISCOUNT RATE

Fleet Size
1-10

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$10,017	-43.5%	$0.0090
Automobiles	$1,873	-8.1%	$0.0054
Light Trucks	$5,078	-22.1%	$0.0090
Heavy Duty Trucks	$3,066	-13.3%	$0.0154
Diesel Price Diff.	($33,019)	143.5%	($0.0382)
Maintenance	$0	0.0%	$0.0000
Total Savings	($23,002)	100.0%	($0.0117)
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,706)	2.7%	($0.0009)
Storage/Dispenser	($10,217)	15.9%	($0.0052)
Subtotal	($11,924)	18.6%	($0.0060)
Vehicle			
Conversion Kit	($7,541)	11.8%	($0.0038)
Tanks	($2,542)	4.0%	($0.0013)
Labor	($8,104)	12.6%	($0.0041)
OEM	($5,902)	9.2%	($0.0030)
Subtotal	($24,089)	37.6%	($0.0122)
Operating			
Station Maint.	($7,686)	12.0%	($0.0039)
Labor - fuel time loss	($4,731)	7.4%	($0.0024)
Propane Fuel Tax	($15,699)	24.5%	($0.0080)
Additional training	$0	0.0%	$0.0000
Subtotal	($28,116)	43.8%	($0.0142)
Total Costs	($64,129)	100.0%	($0.0325)
Savings - Cost	($87,131)	N/A	($0.0441)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	20.3	22,509	$1,600	$400
Light Trucks	2	12.8	18,327	$1,190	$400
Heavy Duty Gasoline	1	6.8	12,930	$1,200	$450
Heavy Duty Diesel	5	8.1	13,511	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	9				

DISCOUNT RATE	5.0%

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($629.78)
Incremental Cost/mile	($0.0441)

Fleet Size
11-20

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$57,805	103.8%	$0.0294
Automobiles	$6,121	11.0%	$0.0174
Light Trucks	$31,485	56.5%	$0.0255
Heavy Duty Trucks	$20,199	36.3%	$0.0531
Diesel Price Diff.	($2,091)	-3.8%	($0.0019)
Maintenance	$0	0.0%	$0.0000
Total Savings	$55,714	100.0%	$0.0182
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,962)	5.9%	($0.0029)
Storage/Dispenser	($53,154)	34.7%	($0.0174)
Subtotal	($62,117)	40.6%	($0.0203)
Vehicle			
Conversion Kit	($11,765)	7.7%	($0.0038)
Tanks	($4,217)	2.8%	($0.0014)
Labor	($12,358)	8.1%	($0.0040)
OEM	($6,516)	4.3%	($0.0021)
Subtotal	($34,855)	22.8%	($0.0114)
Operating			
Station Maint.	($23,059)	15.1%	($0.0075)
Labor - fuel time loss	($6,354)	4.2%	($0.0021)
Propane Fuel Tax	($26,627)	17.4%	($0.0087)
Additional training	$0	0.0%	$0.0000
Subtotal	($56,039)	36.6%	($0.0183)
Total Costs	($153,012)	100.0%	($0.0500)
Savings - Cost	($97,297)	N/A	($0.0318)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	19.0	22,861	$1,600	$400
Light Trucks	5	13.0	16,093	$1,190	$400
Heavy Duty Gasoline	2	6.1	12,365	$1,200	$450
Heavy Duty Diesel	7	8.4	12,206	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	15				

DISCOUNT RATE	5.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($421.95)

Incremental Cost/mile	($0.0318)

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$104,948	102.3%	$0.0277
Automobiles	$8,732	8.5%	$0.0171
Light Trucks	$68,195	66.5%	$0.0244
Heavy Duty Trucks	$28,022	27.3%	$0.0574
Diesel Price Diff.	($2,358)	-2.3%	($0.0020)
Maintenance	$0	0.0%	$0.0000
Total Savings	$102,590	100.0%	$0.0206
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,962)	4.8%	($0.0018)
Storage/Dispenser	($53,154)	28.2%	($0.0107)
Subtotal	($62,117)	32.9%	($0.0125)
Vehicle			
Conversion Kit	($18,026)	9.6%	($0.0036)
Tanks	($7,349)	3.9%	($0.0015)
Labor	($18,948)	10.0%	($0.0038)
OEM	($9,883)	5.2%	($0.0020)
Subtotal	($54,206)	28.7%	($0.0109)
Operating			
Station Maint.	($23,059)	12.2%	($0.0046)
Labor - fuel time loss	($8,182)	4.3%	($0.0016)
Propane Fuel Tax	($41,038)	21.8%	($0.0082)
Additional training	$0	0.0%	$0.0000
Subtotal	($72,278)	38.3%	($0.0145)
Total Costs	($188,600)	100.0%	($0.0379)
Savings - Cost	($86,011)	N/A	($0.0173)

Fleet Size
21-30

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	2	19.4	16,650	$1,600	$400
Light Trucks	13	13.4	13,969	$1,190	$400
Heavy Duty Gasoline	3	5.6	10,594	$1,200	$450
Heavy Duty Diesel	8	8.1	11,616	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	26				

DISCOUNT RATE	5.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($215.20)

Incremental Cost/mile	($0.0173)

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$148,059	102.2%	$0.0276
Automobiles	$11,922	8.2%	$0.0172
Light Trucks	$100,604	69.5%	$0.0246
Heavy Duty Trucks	$35,532	24.5%	$0.0609
Diesel Price Diff.	($3,228)	-2.2%	($0.0021)
Maintenance	$0	0.0%	$0.0000
Total Savings	$144,831	100.0%	$0.0209
COSTS		% of	Incremental
Infrastructure		Costs	Cost/Mile
Land	$0	0.0%	$0.0000
Station setup	($8,962)	4.0%	($0.0013)
Storage/Dispenser	($53,154)	23.5%	($0.0077)
Subtotal	($62,117)	27.4%	($0.0090)
Vehicle			
Conversion Kit	($24,724)	10.9%	($0.0036)
Tanks	($10,474)	4.6%	($0.0015)
Labor	($25,612)	11.3%	($0.0037)
OEM	($14,392)	6.4%	($0.0021)
Subtotal	($75,201)	33.2%	($0.0108)
Operating			
Station Maint.	($23,059)	10.2%	($0.0033)
Labor - fuel time loss	($11,032)	4.9%	($0.0016)
Propane Fuel Tax	($55,009)	24.3%	($0.0079)
Additional training	$0	0.0%	$0.0000
Subtotal	($89,100)	39.4%	($0.0129)
Total Costs	($226,418)	100.0%	($0.0327)
Savings - Cost	($81,587)	N/A	($0.0118)

Fleet Size
31-50

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	3	19.2	15,000	$1,600	$400
Light Trucks	20	13.3	13,295	$1,190	$400
Heavy Duty Gasoline	4	5.5	9,492	$1,200	$450
Heavy Duty Diesel	10	7.8	12,248	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	37				

DISCOUNT RATE	5.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($143.44)
Incremental Cost/mile	($0.0118)

Fleet Size
51 and up

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$318,672	101.2%	$0.0236
Automobiles	$50,383	16.0%	$0.0154
Light Trucks	$234,156	74.4%	$0.0244
Heavy Duty Trucks	$34,133	10.8%	$0.0554
Diesel Price Diff.	($3,769)	-1.2%	($0.0024)
Maintenance	$0	0.0%	$0.0000
Total Savings	$314,903	100.0%	$0.0209
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,962)	2.3%	($0.0006)
Storage/Dispenser	($53,154)	13.6%	($0.0035)
Subtotal	($62,117)	15.9%	($0.0041)
Vehicle			
Conversion Kit	($53,597)	13.7%	($0.0036)
Tanks	($25,546)	6.5%	($0.0017)
Labor	($60,786)	15.5%	($0.0040)
OEM	($22,998)	5.9%	($0.0015)
Subtotal	($162,926)	41.6%	($0.0108)
Operating			
Station Maint.	($23,059)	5.9%	($0.0015)
Labor - fuel time loss	($16,000)	4.1%	($0.0011)
Propane Fuel Tax	($127,344)	32.5%	($0.0085)
Additional training	$0	0.0%	$0.0000
Subtotal	($166,403)	42.5%	($0.0111)
Total Costs	($391,446)	100.0%	($0.0260)
Savings - Cost	($76,543)	N/A	($0.0051)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	19	20.8	11,171	$1,600	$400
Light Trucks	54	13.3	11,575	$1,190	$400
Heavy Duty Gasoline	4	5.8	10,024	$1,200	$450
Heavy Duty Diesel	11	7.5	11,077	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	88				

DISCOUNT RATE	5.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($56.58)
Incremental Cost/mile	($0.0051)

APPENDIX D

NPV COST-EFFECTIVENESS MODEL: ZERO DISCOUNT RATE

Fleet Size
1-10

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$60,057	102.2%	$0.0278
Automobiles	$11,318	19.3%	$0.0168
Light Trucks	$29,532	50.2%	$0.0269
Heavy Duty Trucks	$19,208	32.7%	$0.0495
Diesel Price Diff.	($1,283)	-2.2%	($0.0008)
Maintenance	$0	0.0%	$0.0000
Total Savings	$58,774	100.0%	$0.0153
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($9,450)	5.6%	($0.0025)
Storage/Dispenser	($34,500)	20.3%	($0.0090)
Subtotal	($43,950)	25.9%	($0.0114)
Vehicle			
Conversion Kit	($8,460)	5.0%	($0.0022)
Tanks	($3,005)	1.8%	($0.0008)
Labor	($10,400)	6.1%	($0.0027)
OEM	($15,950)	9.4%	($0.0041)
Subtotal	($37,815)	22.3%	($0.0098)
Operating			
Station Maint.	($45,000)	26.5%	($0.0117)
Labor - fuel time loss	($10,030)	5.9%	($0.0026)
Propane Fuel Tax	($33,120)	19.5%	($0.0086)
Additional training	$0	0.0%	$0.0000
Subtotal	($88,150)	51.9%	($0.0229)
Total Costs	($169,915)	100.0%	($0.0441)
Savings - Cost	($111,141)	N/A	($0.0289)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	20.3	22,509	$1,600	$400
Light Trucks	2	12.8	18,327	$1,190	$400
Heavy Duty Gasoline	1	6.8	12,930	$1,200	$450
Heavy Duty Diesel	5	8.1	13,511	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	9				

DISCOUNT RATE	0.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($411.63)
Incremental Cost/mile	($0.0289)

Fleet Size
11-20

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$115,983	102.0%	$0.0302
Automobiles	$12,281	10.8%	$0.0179
Light Trucks	$63,178	55.5%	$0.0262
Heavy Duty Trucks	$40,524	35.6%	$0.0546
Diesel Price Diff.	($2,245)	-2.0%	($0.0011)
Maintenance	$0	0.0%	$0.0000
Total Savings	$113,739	100.0%	$0.0190
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($9,450)	4.6%	($0.0016)
Storage/Dispenser	($34,500)	16.7%	($0.0058)
Subtotal	($43,950)	21.3%	($0.0074)
Vehicle			
Conversion Kit	($12,800)	6.2%	($0.0021)
Tanks	($4,865)	2.4%	($0.0008)
Labor	($15,780)	7.7%	($0.0026)
OEM	($15,100)	7.3%	($0.0025)
Subtotal	($48,545)	23.5%	($0.0081)
Operating			
Station Maint.	($45,000)	21.8%	($0.0075)
Labor - fuel time loss	($13,204)	6.4%	($0.0022)
Propane Fuel Tax	($55,440)	26.9%	($0.0093)
Additional training	$0	0.0%	$0.0000
Subtotal	($113,644)	55.1%	($0.0190)
Total Costs	($206,139)	100.0%	($0.0345)
Savings - Cost	($92,400)	N/A	($0.0155)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	19.0	22,861	$1,600	$400
Light Trucks	5	13.0	16,093	$1,190	$400
Heavy Duty Gasoline	2	6.1	12,365	$1,200	$450
Heavy Duty Diesel	7	8.4	12,206	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	15				

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	0.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($205.33)

Incremental Cost/mile	($0.0155)

Fleet Size
21-30

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$210,545	101.2%	$0.0285
Automobiles	$17,521	8.4%	$0.0175
Light Trucks	$136,895	65.8%	$0.0251
Heavy Duty Trucks	$56,129	27.0%	$0.0589
Diesel Price Diff.	($2,532)	-1.2%	($0.0011)
Maintenance	$0	0.0%	$0.0000
Total Savings	$208,013	100.0%	$0.0214
COSTS		**% of**	**Incremental**
Infrastructure		**Costs**	**Cost/Mile**
Land	$0	0.0%	$0.0000
Station setup	($9,450)	3.6%	($0.0010)
Storage/Dispenser	($34,500)	13.1%	($0.0035)
Subtotal	($43,950)	16.6%	($0.0045)
Vehicle			
Conversion Kit	($18,460)	7.0%	($0.0019)
Tanks	($8,090)	3.1%	($0.0008)
Labor	($23,800)	9.0%	($0.0024)
OEM	($24,400)	9.2%	($0.0025)
Subtotal	($74,750)	28.3%	($0.0077)
Operating			
Station Maint.	($45,000)	17.0%	($0.0046)
Labor - fuel time loss	($16,533)	6.3%	($0.0017)
Propane Fuel Tax	($84,060)	31.8%	($0.0086)
Additional training	$0	0.0%	$0.0000
Subtotal	($145,593)	55.1%	($0.0150)
Total Costs	($264,293)	100.0%	($0.0272)
Savings - Cost	($56,280)	N/A	($0.0058)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	2	19.4	16,650	$1,600	$400
Light Trucks	13	13.4	13,969	$1,190	$400
Heavy Duty Gasoline	3	5.6	10,594	$1,200	$450
Heavy Duty Diesel	8	8.1	11,616	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	26				

DISCOUNT RATE	0.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($72.15)
Incremental Cost/mile	($0.0058)

Fleet Size
31-50

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$297,069	101.2%	$0.0284
Automobiles	$23,923	8.1%	$0.0177
Light Trucks	$201,953	68.8%	$0.0253
Heavy Duty Trucks	$71,193	24.2%	$0.0625
Diesel Price Diff.	($3,465)	-1.2%	($0.0011)
Maintenance	$0	0.0%	$0.0000
Total Savings	$293,603	100.0%	$0.0217
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($9,450)	2.9%	($0.0007)
Storage/Dispenser	($34,500)	10.6%	($0.0026)
Subtotal	($43,950)	13.5%	($0.0032)
Vehicle			
Conversion Kit	($25,030)	7.7%	($0.0019)
Tanks	($11,400)	3.5%	($0.0008)
Labor	($31,680)	9.7%	($0.0023)
OEM	($34,500)	10.6%	($0.0026)
Subtotal	($102,610)	31.5%	($0.0076)
Operating			
Station Maint.	($45,000)	13.8%	($0.0033)
Labor - fuel time loss	($22,257)	6.8%	($0.0016)
Propane Fuel Tax	($112,320)	34.4%	($0.0083)
Additional training	$0	0.0%	$0.0000
Subtotal	($179,577)	55.1%	($0.0133)
Total Costs	($326,137)	100.0%	($0.0241)
Savings - Cost	($32,534)	N/A	($0.0024)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	3	19.2	15,000	$1,600	$400
Light Trucks	20	13.3	13,295	$1,190	$400
Heavy Duty Gasoline	4	5.5	9,492	$1,200	$450
Heavy Duty Diesel	10	7.8	12,248	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	37				

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	0.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($29.31)

Incremental Cost/mile	($0.0024)

Fleet Size
51 and up

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$639,052	100.7%	$0.0243
Automobiles	$100,920	15.9%	$0.0158
Light Trucks	$469,761	74.1%	$0.0251
Heavy Duty Trucks	$68,371	10.8%	$0.0568
Diesel Price Diff.	($4,671)	-0.7%	($0.0015)
Maintenance	$0	0.0%	$0.0000
Total Savings	$634,381	100.0%	$0.0216
COSTS		% of	Incremental
Infrastructure		Costs	Cost/Mile
Land	$0	0.0%	$0.0000
Station setup	($9,450)	1.6%	($0.0003)
Storage/Dispenser	($34,500)	5.9%	($0.0012)
Subtotal	($43,950)	7.5%	($0.0015)
Vehicle			
Conversion Kit	($49,440)	8.5%	($0.0017)
Tanks	($26,565)	4.5%	($0.0009)
Labor	($75,730)	13.0%	($0.0026)
OEM	($58,700)	10.1%	($0.0020)
Subtotal	($210,435)	36.0%	($0.0072)
Operating			
Station Maint.	($45,000)	7.7%	($0.0015)
Labor - fuel time loss	($30,584)	5.2%	($0.0010)
Propane Fuel Tax	($253,980)	43.5%	($0.0086)
Additional training	$0	0.0%	$0.0000
Subtotal	($329,564)	56.4%	($0.0112)
Total Costs	($583,949)	100.0%	($0.0199)
Savings - Cost	$50,432	N/A	$0.0017

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	19	20.8	11,171	$1,600	$400
Light Trucks	54	13.3	11,575	$1,190	$400
Heavy Duty Gasoline	4	5.8	10,024	$1,200	$450
Heavy Duty Diesel	11	7.5	11,077	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	88				

DISCOUNT RATE	0.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Benefit/vehicle/year	$19.10
Incremental Benefit/mile	$0.0017

APPENDIX E

NPV COST-EFFECTIVENESS MODEL: PROPANE BREAK-EVEN PRICE

Fleet Size
1-10

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$30,473	66.6%	$0.0448
Automobiles	$5,747	12.6%	$0.0271
Light Trucks	$14,904	32.6%	$0.0431
Heavy Duty Trucks	$9,823	21.5%	$0.0806
Diesel Price Diff.	$15,294	33.4%	$0.0288
Maintenance	$0	0.0%	$0.0000
Total Savings	$45,767	100.0%	$0.0378
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	3.5%	($0.0013)
Storage/Dispenser	($10,366)	22.7%	($0.0086)
Subtotal	($11,964)	26.1%	($0.0099)
Vehicle			
Conversion Kit	($6,556)	14.3%	($0.0054)
Tanks	($2,210)	4.8%	($0.0018)
Labor	($6,482)	14.2%	($0.0054)
OEM	($2,443)	5.3%	($0.0020)
Subtotal	($17,691)	38.7%	($0.0146)
Operating			
Station Maint.	($4,713)	10.3%	($0.0039)
Labor - fuel time loss	($2,589)	5.7%	($0.0021)
Propane Fuel Tax	($8,809)	19.2%	($0.0073)
Additional training	$0	0.0%	$0.0000
Subtotal	($16,112)	35.2%	($0.0133)
Total Costs	($45,767)	100.0%	($0.0378)
Savings - Cost	$0	N/A	$0.0000

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	20.3	22,509	$1,600	$400
Light Trucks	2	12.8	18,327	$1,190	$400
Heavy Duty Gasoline	1	6.8	12,930	$1,200	$450
Heavy Duty Diesel	5	8.1	13,511	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	9				

DISCOUNT RATE	10.0%

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.258050
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Benefit/vehicle/year	$0.00
Incremental Benefit/mile	$0.0000

Fleet Size
11-20

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$50,798	81.3%	$0.0421
Automobiles	$5,356	8.6%	$0.0249
Light Trucks	$27,554	44.1%	$0.0363
Heavy Duty Trucks	$17,888	28.6%	$0.0767
Diesel Price Diff.	$11,700	18.7%	$0.0174
Maintenance	$0	0.0%	$0.0000
Total Savings	$62,498	100.0%	$0.0333
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	2.6%	($0.0009)
Storage/Dispenser	($10,366)	16.6%	($0.0055)
Subtotal	($11,964)	19.1%	($0.0064)
Vehicle			
Conversion Kit	($10,467)	16.7%	($0.0056)
Tanks	($3,752)	6.0%	($0.0020)
Labor	($9,962)	15.9%	($0.0053)
OEM	($2,904)	4.6%	($0.0015)
Subtotal	($27,085)	43.3%	($0.0144)
Operating			
Station Maint.	($4,713)	7.5%	($0.0025)
Labor - fuel time loss	($3,551)	5.7%	($0.0019)
Propane Fuel Tax	($15,184)	24.3%	($0.0081)
Additional training	$0	0.0%	$0.0000
Subtotal	($23,448)	37.5%	($0.0125)
Total Costs	($62,498)	100.0%	($0.0333)
Savings - Cost	$0	N/A	$0.0000

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	19.0	22,861	$1,600	$400
Light Trucks	5	13.0	16,093	$1,190	$400
Heavy Duty Gasoline	2	6.1	12,365	$1,200	$450
Heavy Duty Diesel	7	8.4	12,206	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	15				

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.316926
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Benefit/vehicle/year	$0.00
Incremental Benefit/mile	$0.0000

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$81,290	91.6%	$0.0350
Automobiles	$6,718	7.6%	$0.0214
Light Trucks	$52,708	59.4%	$0.0308
Heavy Duty Trucks	$21,863	24.6%	$0.0730
Diesel Price Diff.	$7,492	8.4%	$0.0103
Maintenance	$0	0.0%	$0.0000
Total Savings	$88,782	100.0%	$0.0291
COSTS		% of	Incremental
Infrastructure		Costs	Cost/Mile
Land	$0	0.0%	$0.0000
Station setup	($1,598)	1.8%	($0.0005)
Storage/Dispenser	($10,366)	11.7%	($0.0034)
Subtotal	($11,964)	13.5%	($0.0039)
Vehicle			
Conversion Kit	($16,861)	19.0%	($0.0055)
Tanks	($6,818)	7.7%	($0.0022)
Labor	($15,626)	17.6%	($0.0051)
OEM	($4,239)	4.8%	($0.0014)
Subtotal	($43,545)	49.0%	($0.0143)
Operating			
Station Maint.	($4,713)	5.3%	($0.0015)
Labor - fuel time loss	($4,703)	5.3%	($0.0015)
Propane Fuel Tax	($23,857)	26.9%	($0.0078)
Additional training	$0	0.0%	$0.0000
Subtotal	($33,273)	37.5%	($0.0109)
Total Costs	($88,782)	100.0%	($0.0291)
Savings - Cost	$0	N/A	$0.0000

Fleet Size
21-30

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	2	19.4	16,650	$1,600	$400
Light Trucks	13	13.4	13,969	$1,190	$400
Heavy Duty Gasoline	3	5.6	10,594	$1,200	$450
Heavy Duty Diesel	8	8.1	11,616	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	26				

DISCOUNT RATE	10.0%

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.360209
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	$0.00

Incremental Cost/mile	$0.0000

Fleet Size
31-50

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$108,663	93.5%	$0.0330
Automobiles	$8,734	7.5%	$0.0206
Light Trucks	$73,992	63.7%	$0.0295
Heavy Duty Trucks	$25,938	22.3%	$0.0725
Diesel Price Diff.	$7,535	6.5%	$0.0078
Maintenance	$0	0.0%	$0.0000
Total Savings	$116,199	100.0%	$0.0273
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	1.4%	($0.0004)
Storage/Dispenser	($10,366)	8.9%	($0.0024)
Subtotal	($11,964)	10.3%	($0.0028)
Vehicle			
Conversion Kit	($23,432)	20.2%	($0.0055)
Tanks	($9,810)	8.4%	($0.0023)
Labor	($21,427)	18.4%	($0.0050)
OEM	($6,391)	5.5%	($0.0015)
Subtotal	($61,060)	52.5%	($0.0144)
Operating			
Station Maint.	($4,713)	4.1%	($0.0011)
Labor - fuel time loss	($6,363)	5.5%	($0.0015)
Propane Fuel Tax	($32,098)	27.6%	($0.0076)
Additional training	$0	0.0%	$0.0000
Subtotal	($43,174)	37.2%	($0.0102)
Total Costs	($116,199)	100.0%	($0.0273)
Savings - Cost	$0	N/A	$0.0000

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	3	19.2	15,000	$1,600	$400
Light Trucks	20	13.3	13,295	$1,190	$400
Heavy Duty Gasoline	4	5.5	9,492	$1,200	$450
Heavy Duty Diesel	10	7.8	12,248	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	37				

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.3752839
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Benefit/vehicle/year	$0.00
Incremental Benefit/mile	$0.0000

Fleet Size
51 and up

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$234,625	96.9%	$0.0284
Automobiles	$37,212	15.4%	$0.0186
Light Trucks	$172,203	71.1%	$0.0292
Heavy Duty Trucks	$25,210	10.4%	$0.0667
Diesel Price Diff.	$7,407	3.1%	$0.0077
Maintenance	$0	0.0%	$0.0000
Total Savings	$242,032	100.0%	$0.0262
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	0.7%	($0.0002)
Storage/Dispenser	($10,366)	4.3%	($0.0011)
Subtotal	($11,964)	4.9%	($0.0013)
Vehicle			
Conversion Kit	($53,824)	22.2%	($0.0058)
Tanks	($24,816)	10.3%	($0.0027)
Labor	($51,294)	21.2%	($0.0056)
OEM	($9,457)	3.9%	($0.0010)
Subtotal	($139,391)	57.6%	($0.0151)
Operating			
Station Maint.	($4,713)	1.9%	($0.0005)
Labor - fuel time loss	($9,671)	4.0%	($0.0010)
Propane Fuel Tax	($76,292)	31.5%	($0.0083)
Additional training	$0	0.0%	$0.0000
Subtotal	($90,677)	37.5%	($0.0098)
Total Costs	($242,032)	100.0%	($0.0262)
Savings - Cost	$0	N/A	$0.0000

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	19	20.8	11,171	$1,600	$400
Light Trucks	54	13.3	11,575	$1,190	$400
Heavy Duty Gasoline	4	5.8	10,024	$1,200	$450
Heavy Duty Diesel	11	7.5	11,077	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	88				

DISCOUNT RATE	10.0%

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.376535
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	$0.00

Incremental Cost/mile	$0.0000

APPENDIX F

NPV COST-EFFECTIVENESS MODEL: GASOLINE AND DIESEL BREAK-EVEN PRICE

Fleet Size
1-10

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$36,706	80.2%	$0.0540
Automobiles	$6,917	15.1%	$0.0326
Light Trucks	$18,005	39.3%	$0.0521
Heavy Duty Trucks	$11,784	25.7%	$0.0967
Diesel Price Diff.	$9,062	19.8%	$0.0171
Maintenance	$0	0.0%	$0.0000
Total Savings	$45,767	100.0%	$0.0378
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	3.5%	($0.0013)
Storage/Dispenser	($10,366)	22.7%	($0.0086)
Subtotal	($11,964)	26.1%	($0.0099)
Vehicle			
Conversion Kit	($6,556)	14.3%	($0.0054)
Tanks	($2,210)	4.8%	($0.0018)
Labor	($6,482)	14.2%	($0.0054)
OEM	($2,443)	5.3%	($0.0020)
Subtotal	($17,691)	38.7%	($0.0146)
Operating			
Station Maint.	($4,713)	10.3%	($0.0039)
Labor - fuel time loss	($2,589)	5.7%	($0.0021)
Propane Fuel Tax	($8,809)	19.2%	($0.0073)
Additional training	$0	0.0%	$0.0000
Subtotal	($16,112)	35.2%	($0.0133)
Total Costs	($45,767)	100.0%	($0.0378)
Savings - Cost	$0	N/A	$0.0000

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	20.3	22,509	$1,600	$400
Light Trucks	2	12.8	18,327	$1,190	$400
Heavy Duty Gasoline	1	6.8	12,930	$1,200	$450
Heavy Duty Diesel	5	8.1	13,511	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	9				

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$1.452649
Diesel Price/gallon	$1.412649

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Benefit/vehicle/year	$0.00
Incremental Benefit/mile	$0.0000

Fleet Size
11-20

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$58,378	93.4%	$0.0484
Automobiles	$6,168	9.9%	$0.0286
Light Trucks	$31,730	50.8%	$0.0418
Heavy Duty Trucks	$20,480	32.8%	$0.0879
Diesel Price Diff.	$4,120	6.6%	$0.0061
Maintenance	$0	0.0%	$0.0000
Total Savings	$62,498	100.0%	$0.0333
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	2.6%	($0.0009)
Storage/Dispenser	($10,366)	16.6%	($0.0055)
Subtotal	($11,964)	19.1%	($0.0064)
Vehicle			
Conversion Kit	($10,467)	16.7%	($0.0056)
Tanks	($3,752)	6.0%	($0.0020)
Labor	($9,962)	15.9%	($0.0053)
OEM	($2,904)	4.6%	($0.0015)
Subtotal	($27,085)	43.3%	($0.0144)
Operating			
Station Maint.	($4,713)	7.5%	($0.0025)
Labor - fuel time loss	($3,551)	5.7%	($0.0019)
Propane Fuel Tax	($15,184)	24.3%	($0.0081)
Additional training	$0	0.0%	$0.0000
Subtotal	($23,448)	37.5%	($0.0125)
Total Costs	($62,498)	100.0%	($0.0333)
Savings - Cost	$0	N/A	$0.0000

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	19.0	22,861	$1,600	$400
Light Trucks	5	13.0	16,093	$1,190	$400
Heavy Duty Gasoline	2	6.1	12,365	$1,200	$450
Heavy Duty Diesel	7	8.4	12,206	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	15				

DISCOUNT RATE	10.0%

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$1.33471
Diesel Price/gallon	$1.29471

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Benefit/vehicle/year	$0.00
Incremental Benefit/mile	$0.0000

Fleet Size
21-30

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$131,073	86.4%	$0.0564
Automobiles	$10,809	7.1%	$0.0344
Light Trucks	$84,942	56.0%	$0.0496
Heavy Duty Trucks	$35,322	23.3%	$0.1179
Diesel Price Diff.	$20,591	13.6%	$0.0282
Maintenance	$0	0.0%	$0.0000
Total Savings	$151,663	100.0%	$0.0496
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	5.8%	($0.0029)
Storage/Dispenser	($56,672)	37.4%	($0.0185)
Subtotal	($65,418)	43.1%	($0.0214)
Vehicle			
Conversion Kit	($16,861)	11.1%	($0.0055)
Tanks	($6,818)	4.5%	($0.0022)
Labor	($15,626)	10.3%	($0.0051)
OEM	($4,239)	2.8%	($0.0014)
Subtotal	($43,545)	28.7%	($0.0143)
Operating			
Station Maint.	($14,140)	9.3%	($0.0046)
Labor - fuel time loss	($4,703)	3.1%	($0.0015)
Propane Fuel Tax	($23,857)	15.7%	($0.0078)
Additional training	$0	0.0%	$0.0000
Subtotal	($42,700)	28.2%	($0.0140)
Total Costs	($151,663)	100.0%	($0.0496)
Savings - Cost	$0	N/A	$0.0000

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	2	19.4	16,650	$1,600	$400
Light Trucks	13	13.4	13,969	$1,190	$400
Heavy Duty Gasoline	3	5.6	10,594	$1,200	$450
Heavy Duty Diesel	8	8.1	11,616	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	26				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$1.234813
Diesel Price/gallon	$1.194813

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Benefit/vehicle/year	$0.00
Incremental Benefit/mile	$0.0000

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$158,890	88.7%	$0.0483
Automobiles	$12,763	7.1%	$0.0301
Light Trucks	$108,289	60.5%	$0.0432
Heavy Duty Trucks	$37,837	21.1%	$0.1057
Diesel Price Diff.	$20,190	11.3%	$0.0210
Maintenance	$0	0.0%	$0.0000
Total Savings	$179,080	100.0%	$0.0421
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	4.9%	($0.0021)
Storage/Dispenser	($56,672)	31.6%	($0.0133)
Subtotal	($65,418)	36.5%	($0.0154)
Vehicle			
Conversion Kit	($23,432)	13.1%	($0.0055)
Tanks	($9,810)	5.5%	($0.0023)
Labor	($21,427)	12.0%	($0.0050)
OEM	($6,391)	3.6%	($0.0015)
Subtotal	($61,060)	34.1%	($0.0144)
Operating			
Station Maint.	($14,140)	7.9%	($0.0033)
Labor - fuel time loss	($6,363)	3.6%	($0.0015)
Propane Fuel Tax	($32,098)	17.9%	($0.0076)
Additional training	$0	0.0%	$0.0000
Subtotal	($52,601)	29.4%	($0.0124)
Total Costs	($179,080)	100.0%	($0.0421)
Savings - Cost	$0	N/A	$0.0000

Fleet Size
31-50

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	3	19.2	15,000	$1,600	$400
Light Trucks	20	13.3	13,295	$1,190	$400
Heavy Duty Gasoline	4	5.5	9,492	$1,200	$450
Heavy Duty Diesel	10	7.8	12,248	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	37				

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$1.144502
Diesel Price/gallon	$1.104502

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Benefit/vehicle/year	$0.00

Incremental Benefit/mile	$0.0000

Fleet Size
51 and up

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$292,251	95.8%	$0.0353
Automobiles	$46,365	15.2%	$0.0232
Light Trucks	$214,475	70.3%	$0.0364
Heavy Duty Trucks	$31,411	10.3%	$0.0831
Diesel Price Diff.	$12,663	4.2%	$0.0132
Maintenance	$0	0.0%	$0.0000
Total Savings	$304,913	100.0%	$0.0330
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	2.9%	($0.0009)
Storage/Dispenser	($56,672)	18.6%	($0.0061)
Subtotal	($65,418)	21.5%	($0.0071)
Vehicle			
Conversion Kit	($53,824)	17.7%	($0.0058)
Tanks	($24,816)	8.1%	($0.0027)
Labor	($51,294)	16.8%	($0.0056)
OEM	($9,457)	3.1%	($0.0010)
Subtotal	($139,391)	45.7%	($0.0151)
Operating			
Station Maint.	($14,140)	4.6%	($0.0015)
Labor - fuel time loss	($9,671)	3.2%	($0.0010)
Propane Fuel Tax	($76,292)	25.0%	($0.0083)
Additional training	$0	0.0%	$0.0000
Subtotal	($100,104)	32.8%	($0.0108)
Total Costs	($304,913)	100.0%	($0.0330)
Savings - Cost	$0	N/A	$0.0000

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	19	20.8	11,171	$1,600	$400
Light Trucks	54	13.3	11,575	$1,190	$400
Heavy Duty Gasoline	4	5.8	10,024	$1,200	$450
Heavy Duty Diesel	11	7.5	11,077	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	88				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$1.0565977
Diesel Price/gallon	$1.0165977

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Benefit/vehicle/year	$0.00
Incremental Benefit/mile	$0.0000

APPENDIX G

NPV COST-EFFECTIVENESS MODEL: 10 PERCENT MAINTENANCE SAVINGS

Fleet Size
1-10

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$5,550	-201.5%	$0.0082
Automobiles	$1,036	-37.6%	$0.0049
Light Trucks	$2,816	-102.3%	$0.0081
Heavy Duty Trucks	$1,698	-61.7%	$0.0139
Diesel Price Diff.	($17,386)	631.4%	($0.0328)
Maintenance	$9,082	-329.8%	$0.0075
Total Savings	($2,754)	100.0%	($0.0023)
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	3.5%	($0.0013)
Storage/Dispenser	($10,366)	22.7%	($0.0086)
Subtotal	($11,964)	26.1%	($0.0099)
Vehicle			
Conversion Kit	($6,556)	14.3%	($0.0054)
Tanks	($2,210)	4.8%	($0.0018)
Labor	($6,482)	14.2%	($0.0054)
OEM	($2,443)	5.3%	($0.0020)
Subtotal	($17,691)	38.7%	($0.0146)
Operating			
Station Maint.	($4,713)	10.3%	($0.0039)
Labor - fuel time loss	($2,589)	5.7%	($0.0021)
Propane Fuel Tax	($8,809)	19.2%	($0.0073)
Additional training	$0	0.0%	$0.0000
Subtotal	($16,112)	35.2%	($0.0133)
Total Costs	($45,767)	100.0%	($0.0378)
Savings - Cost	($48,521)	N/A	($0.0401)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	20.3	22,509	$1,600	$400
Light Trucks	2	12.8	18,327	$1,190	$400
Heavy Duty Gasoline	1	6.8	12,930	$1,200	$450
Heavy Duty Diesel	5	8.1	13,511	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	9				

DISCOUNT RATE	10.0%

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	10%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($571.89)
Incremental Cost/mile	($0.0401)

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$10,390	378.6%	$0.0086
Automobiles	$1,124	41.0%	$0.0052
Light Trucks	$5,781	210.7%	$0.0076
Heavy Duty Trucks	$3,485	127.0%	$0.0149
Diesel Price Diff.	($21,375)	-778.9%	($0.0318)
Maintenance	$13,729	500.3%	$0.0073
Total Savings	$2,744	100.0%	$0.0015
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	2.6%	($0.0009)
Storage/Dispenser	($10,366)	16.6%	($0.0055)
Subtotal	($11,964)	19.1%	($0.0064)
Vehicle			
Conversion Kit	($10,467)	16.7%	($0.0056)
Tanks	($3,752)	6.0%	($0.0020)
Labor	($9,962)	15.9%	($0.0053)
OEM	($2,904)	4.6%	($0.0015)
Subtotal	($27,085)	43.3%	($0.0144)
Operating			
Station Maint.	($4,713)	7.5%	($0.0025)
Labor - fuel time loss	($3,551)	5.7%	($0.0019)
Propane Fuel Tax	($15,184)	24.3%	($0.0081)
Additional training	$0	0.0%	$0.0000
Subtotal	($23,448)	37.5%	($0.0125)
Total Costs	($62,498)	100.0%	($0.0333)
Savings - Cost	($59,753)	N/A	($0.0318)

Fleet Size
11-20

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	19.0	22,861	$1,600	$400
Light Trucks	5	13.0	16,093	$1,190	$400
Heavy Duty Gasoline	2	6.1	12,365	$1,200	$450
Heavy Duty Diesel	7	8.4	12,206	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	15				

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	10%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($422.57)
Incremental Cost/mile	($0.0318)

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$62,994	76.3%	$0.0271
Automobiles	$5,229	6.3%	$0.0167
Light Trucks	$40,891	49.5%	$0.0239
Heavy Duty Trucks	$16,874	20.4%	$0.0563
Diesel Price Diff.	($1,705)	-2.1%	($0.0023)
Maintenance	$21,264	25.8%	$0.0070
Total Savings	$82,553	100.0%	$0.0270
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	5.8%	($0.0029)
Storage/Dispenser	($56,672)	37.4%	($0.0185)
Subtotal	($65,418)	43.1%	($0.0214)
Vehicle			
Conversion Kit	($16,861)	11.1%	($0.0055)
Tanks	($6,818)	4.5%	($0.0022)
Labor	($15,626)	10.3%	($0.0051)
OEM	($4,239)	2.8%	($0.0014)
Subtotal	($43,545)	28.7%	($0.0143)
Operating			
Station Maint.	($14,140)	9.3%	($0.0046)
Labor - fuel time loss	($4,703)	3.1%	($0.0015)
Propane Fuel Tax	($23,857)	15.7%	($0.0078)
Additional training	$0	0.0%	$0.0000
Subtotal	($42,700)	28.2%	($0.0140)
Total Costs	($151,663)	100.0%	($0.0496)
Savings - Cost	($69,111)	N/A	($0.0226)

Fleet Size
21-30

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	2	19.4	16,650	$1,600	$400
Light Trucks	13	13.4	13,969	$1,190	$400
Heavy Duty Gasoline	3	5.6	10,594	$1,200	$450
Heavy Duty Diesel	8	8.1	11,616	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	26				

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	10%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($281.97)

Incremental Cost/mile	($0.0226)

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$88,739	77.4%	$0.0270
Automobiles	$7,140	6.2%	$0.0168
Light Trucks	$60,324	52.6%	$0.0241
Heavy Duty Trucks	$21,275	18.5%	$0.0594
Diesel Price Diff.	($2,334)	-2.0%	($0.0024)
Maintenance	$28,315	24.7%	$0.0067
Total Savings	$114,720	100.0%	$0.0270
COSTS			
Infrastructure		% of Costs	Incremental Cost/Mile
Land	$0	0.0%	$0.0000
Station setup	($8,746)	4.9%	($0.0021)
Storage/Dispenser	($56,672)	31.6%	($0.0133)
Subtotal	($65,418)	36.5%	($0.0154)
Vehicle			
Conversion Kit	($23,432)	13.1%	($0.0055)
Tanks	($9,810)	5.5%	($0.0023)
Labor	($21,427)	12.0%	($0.0050)
OEM	($6,391)	3.6%	($0.0015)
Subtotal	($61,060)	34.1%	($0.0144)
Operating			
Station Maint.	($14,140)	7.9%	($0.0033)
Labor - fuel time loss	($6,363)	3.6%	($0.0015)
Propane Fuel Tax	($32,098)	17.9%	($0.0076)
Additional training	$0	0.0%	$0.0000
Subtotal	($52,601)	29.4%	($0.0124)
Total Costs	($179,080)	100.0%	($0.0421)
Savings - Cost	($64,359)	N/A	($0.0151)

Fleet Size
31-50

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	3	19.2	15,000	$1,600	$400
Light Trucks	20	13.3	13,295	$1,190	$400
Heavy Duty Gasoline	4	5.5	9,492	$1,200	$450
Heavy Duty Diesel	10	7.8	12,248	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	37				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	10%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($184.52)
Incremental Cost/mile	($0.0151)

Fleet Size
51 and up

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$191,560	76.7%	$0.0232
Automobiles	$30,339	12.1%	$0.0152
Light Trucks	$140,667	56.3%	$0.0239
Heavy Duty Trucks	$20,554	8.2%	$0.0544
Diesel Price Diff.	($2,592)	-1.0%	($0.0027)
Maintenance	$60,780	24.3%	$0.0066
Total Savings	$249,748	100.0%	$0.0271
COSTS		% of	Incremental
Infrastructure		Costs	Cost/Mile
Land	$0	0.0%	$0.0000
Station setup	($8,746)	2.9%	($0.0009)
Storage/Dispenser	($56,672)	18.6%	($0.0061)
Subtotal	($65,418)	21.5%	($0.0071)
Vehicle			
Conversion Kit	($53,824)	17.7%	($0.0058)
Tanks	($24,816)	8.1%	($0.0027)
Labor	($51,294)	16.8%	($0.0056)
OEM	($9,457)	3.1%	($0.0010)
Subtotal	($139,391)	45.7%	($0.0151)
Operating			
Station Maint.	($14,140)	4.6%	($0.0015)
Labor - fuel time loss	($9,671)	3.2%	($0.0010)
Propane Fuel Tax	($76,292)	25.0%	($0.0083)
Additional training	$0	0.0%	$0.0000
Subtotal	($100,104)	32.8%	($0.0108)
Total Costs	($304,913)	100.0%	($0.0330)
Savings - Cost	($55,165)	N/A	($0.0060)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	19	20.8	11,171	$1,600	$400
Light Trucks	54	13.3	11,575	$1,190	$400
Heavy Duty Gasoline	4	5.8	10,024	$1,200	$450
Heavy Duty Diesel	11	7.5	11,077	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	88				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	10%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($66.50)
Incremental Cost/mile	($0.0060)

APPENDIX H

NPV COST-EFFECTIVENESS MODEL: 25 PERCENT MAINTENANCE SAVINGS

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$5,550	51.1%	$0.0082
Automobiles	$1,036	9.5%	$0.0049
Light Trucks	$2,816	25.9%	$0.0081
Heavy Duty Trucks	$1,698	15.6%	$0.0139
Diesel Price Diff.	($17,386)	-160.0%	($0.0328)
Maintenance	$22,705	208.9%	$0.0188
Total Savings	$10,869	100.0%	$0.0090
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	3.5%	($0.0013)
Storage/Dispenser	($10,366)	22.7%	($0.0086)
Subtotal	($11,964)	26.1%	($0.0099)
Vehicle			
Conversion Kit	($6,556)	14.3%	($0.0054)
Tanks	($2,210)	4.8%	($0.0018)
Labor	($6,482)	14.2%	($0.0054)
OEM	($2,443)	5.3%	($0.0020)
Subtotal	($17,691)	38.7%	($0.0146)
Operating			
Station Maint.	($4,713)	10.3%	($0.0039)
Labor - fuel time loss	($2,589)	5.7%	($0.0021)
Propane Fuel Tax	($8,809)	19.2%	($0.0073)
Additional training	$0	0.0%	$0.0000
Subtotal	($16,112)	35.2%	($0.0133)
Total Costs	($45,767)	100.0%	($0.0378)
Savings - Cost	($34,898)	N/A	($0.0288)

Fleet Size
1-10

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	20.3	22,509	$1,600	$400
Light Trucks	2	12.8	18,327	$1,190	$400
Heavy Duty Gasoline	1	6.8	12,930	$1,200	$450
Heavy Duty Diesel	5	8.1	13,511	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	9				

DISCOUNT RATE	10.0%

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	25%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($411.33)
Incremental Cost/mile	($0.0288)

Fleet Size
11-20

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$10,390	44.5%	$0.0086
Automobiles	$1,124	4.8%	$0.0052
Light Trucks	$5,781	24.8%	$0.0076
Heavy Duty Trucks	$3,485	14.9%	$0.0149
Diesel Price Diff.	($21,375)	-91.6%	($0.0318)
Maintenance	$34,323	147.1%	$0.0183
Total Savings	$23,338	100.0%	$0.0124
COSTS		% of	Incremental
Infrastructure		Costs	Cost/Mile
Land	$0	0.0%	$0.0000
Station setup	($1,598)	2.6%	($0.0009)
Storage/Dispenser	($10,366)	16.6%	($0.0055)
Subtotal	($11,964)	19.1%	($0.0064)
Vehicle			
Conversion Kit	($10,467)	16.7%	($0.0056)
Tanks	($3,752)	6.0%	($0.0020)
Labor	($9,962)	15.9%	($0.0053)
OEM	($2,904)	4.6%	($0.0015)
Subtotal	($27,085)	43.3%	($0.0144)
Operating			
Station Maint.	($4,713)	7.5%	($0.0025)
Labor - fuel time loss	($3,551)	5.7%	($0.0019)
Propane Fuel Tax	($15,184)	24.3%	($0.0081)
Additional training	$0	0.0%	$0.0000
Subtotal	($23,448)	37.5%	($0.0125)
Total Costs	($62,498)	100.0%	($0.0333)
Savings - Cost	($39,160)	N/A	($0.0208)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	19.0	22,861	$1,600	$400
Light Trucks	5	13.0	16,093	$1,190	$400
Heavy Duty Gasoline	2	6.1	12,365	$1,200	$450
Heavy Duty Diesel	7	8.4	12,206	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	15				

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	25%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($276.94)

Incremental Cost/mile	($0.0208)

Fleet Size
21-30

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$62,994	55.0%	$0.0271
Automobiles	$5,229	4.6%	$0.0167
Light Trucks	$40,891	35.7%	$0.0239
Heavy Duty Trucks	$16,874	14.7%	$0.0563
Diesel Price Diff.	($1,705)	-1.5%	($0.0023)
Maintenance	$53,160	46.4%	$0.0174
Total Savings	$114,449	100.0%	$0.0375
COSTS		% of	Incremental
Infrastructure		Costs	Cost/Mile
Land	$0	0.0%	$0.0000
Station setup	($8,746)	5.8%	($0.0029)
Storage/Dispenser	($56,672)	37.4%	($0.0185)
Subtotal	($65,418)	43.1%	($0.0214)
Vehicle			
Conversion Kit	($16,861)	11.1%	($0.0055)
Tanks	($6,818)	4.5%	($0.0022)
Labor	($15,626)	10.3%	($0.0051)
OEM	($4,239)	2.8%	($0.0014)
Subtotal	($43,545)	28.7%	($0.0143)
Operating			
Station Maint.	($14,140)	9.3%	($0.0046)
Labor - fuel time loss	($4,703)	3.1%	($0.0015)
Propane Fuel Tax	($23,857)	15.7%	($0.0078)
Additional training	$0	0.0%	$0.0000
Subtotal	($42,700)	28.2%	($0.0140)
Total Costs	($151,663)	100.0%	($0.0496)
Savings - Cost	($37,215)	N/A	($0.0122)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	2	19.4	16,650	$1,600	$400
Light Trucks	13	13.4	13,969	$1,190	$400
Heavy Duty Gasoline	3	5.6	10,594	$1,200	$450
Heavy Duty Diesel	8	8.1	11,616	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	26				

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	25%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($151.83)

Incremental Cost/mile	($0.0122)

Fleet Size
31-50

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$88,739	56.5%	$0.0270
Automobiles	$7,140	4.5%	$0.0168
Light Trucks	$60,324	38.4%	$0.0241
Heavy Duty Trucks	$21,275	13.5%	$0.0594
Diesel Price Diff.	($2,334)	-1.5%	($0.0024)
Maintenance	$70,787	45.0%	$0.0167
Total Savings	$157,192	100.0%	$0.0370
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	4.9%	($0.0021)
Storage/Dispenser	($56,672)	31.6%	($0.0133)
Subtotal	($65,418)	36.5%	($0.0154)
Vehicle			
Conversion Kit	($23,432)	13.1%	($0.0055)
Tanks	($9,810)	5.5%	($0.0023)
Labor	($21,427)	12.0%	($0.0050)
OEM	($6,391)	3.6%	($0.0015)
Subtotal	($61,060)	34.1%	($0.0144)
Operating			
Station Maint.	($14,140)	7.9%	($0.0033)
Labor - fuel time loss	($6,363)	3.6%	($0.0015)
Propane Fuel Tax	($32,098)	17.9%	($0.0076)
Additional training	$0	0.0%	$0.0000
Subtotal	($52,601)	29.4%	($0.0124)
Total Costs	($179,080)	100.0%	($0.0421)
Savings - Cost	($21,887)	N/A	($0.0051)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	3	19.2	15,000	$1,600	$400
Light Trucks	20	13.3	13,295	$1,190	$400
Heavy Duty Gasoline	4	5.5	9,492	$1,200	$450
Heavy Duty Diesel	10	7.8	12,248	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	37				

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	25%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($62.75)

Incremental Cost/mile	($0.0051)

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$191,560	56.2%	$0.0232
Automobiles	$30,339	8.9%	$0.0152
Light Trucks	$140,667	41.3%	$0.0239
Heavy Duty Trucks	$20,554	6.0%	$0.0544
Diesel Price Diff.	($2,592)	-0.8%	($0.0027)
Maintenance	$151,951	44.6%	$0.0165
Total Savings	$340,919	100.0%	$0.0369
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	2.9%	($0.0009)
Storage/Dispenser	($56,672)	18.6%	($0.0061)
Subtotal	($65,418)	21.5%	($0.0071)
Vehicle			
Conversion Kit	($53,824)	17.7%	($0.0058)
Tanks	($24,816)	8.1%	($0.0027)
Labor	($51,294)	16.8%	($0.0056)
OEM	($9,457)	3.1%	($0.0010)
Subtotal	($139,391)	45.7%	($0.0151)
Operating			
Station Maint.	($14,140)	4.6%	($0.0015)
Labor - fuel time loss	($9,671)	3.2%	($0.0010)
Propane Fuel Tax	($76,292)	25.0%	($0.0083)
Additional training	$0	0.0%	$0.0000
Subtotal	($100,104)	32.8%	($0.0108)
Total Costs	($304,913)	100.0%	($0.0330)
Savings - Cost	$36,005	N/A	$0.0039

Fleet Size
51 and up

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	19	20.8	11,171	$1,600	$400
Light Trucks	54	13.3	11,575	$1,190	$400
Heavy Duty Gasoline	4	5.8	10,024	$1,200	$450
Heavy Duty Diesel	11	7.5	11,077	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	88				

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	25%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Benefit/vehicle/year	$43.40

Incremental Benefit/mile	$0.0039

APPENDIX I

NPV COST-EFFECTIVENESS MODEL: 50 PERCENT MAINTENANCE SAVINGS

Fleet Size
1-10

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$5,550	16.5%	$0.0082
Automobiles	$1,036	3.1%	$0.0049
Light Trucks	$2,816	8.4%	$0.0081
Heavy Duty Trucks	$1,698	5.1%	$0.0139
Diesel Price Diff.	($17,386)	-51.8%	($0.0328)
Maintenance	$45,410	135.3%	$0.0375
Total Savings	$33,574	100.0%	$0.0277
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	3.5%	($0.0013)
Storage/Dispenser	($10,366)	22.7%	($0.0086)
Subtotal	($11,964)	26.1%	($0.0099)
Vehicle			
Conversion Kit	($6,556)	14.3%	($0.0054)
Tanks	($2,210)	4.8%	($0.0018)
Labor	($6,482)	14.2%	($0.0054)
OEM	($2,443)	5.3%	($0.0020)
Subtotal	($17,691)	38.7%	($0.0146)
Operating			
Station Maint.	($4,713)	10.3%	($0.0039)
Labor - fuel time loss	($2,589)	5.7%	($0.0021)
Propane Fuel Tax	($8,809)	19.2%	($0.0073)
Additional training	$0	0.0%	$0.0000
Subtotal	($16,112)	35.2%	($0.0133)
Total Costs	($45,767)	100.0%	($0.0378)
Savings - Cost	($12,193)	N/A	($0.0101)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	20.3	22,509	$1,600	$400
Light Trucks	2	12.8	18,327	$1,190	$400
Heavy Duty Gasoline	1	6.8	12,930	$1,200	$450
Heavy Duty Diesel	5	8.1	13,511	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	9				

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	50%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($143.71)
Incremental Cost/mile	($0.0101)

Fleet Size
11-20

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$10,390	18.0%	$0.0086
Automobiles	$1,124	1.9%	$0.0052
Light Trucks	$5,781	10.0%	$0.0076
Heavy Duty Trucks	$3,485	6.0%	$0.0149
Diesel Price Diff.	($21,375)	-37.1%	($0.0318)
Maintenance	$68,646	119.1%	$0.0365
Total Savings	$57,661	100.0%	$0.0307
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	2.6%	($0.0009)
Storage/Dispenser	($10,366)	16.6%	($0.0055)
Subtotal	($11,964)	19.1%	($0.0064)
Vehicle			
Conversion Kit	($10,467)	16.7%	($0.0056)
Tanks	($3,752)	6.0%	($0.0020)
Labor	($9,962)	15.9%	($0.0053)
OEM	($2,904)	4.6%	($0.0015)
Subtotal	($27,085)	43.3%	($0.0144)
Operating			
Station Maint.	($4,713)	7.5%	($0.0025)
Labor - fuel time loss	($3,551)	5.7%	($0.0019)
Propane Fuel Tax	($15,184)	24.3%	($0.0081)
Additional training	$0	0.0%	$0.0000
Subtotal	($23,448)	37.5%	($0.0125)
Total Costs	($62,498)	100.0%	($0.0333)
Savings - Cost	($4,837)	N/A	($0.0026)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	19.0	22,861	$1,600	$400
Light Trucks	5	13.0	16,093	$1,190	$400
Heavy Duty Gasoline	2	6.1	12,365	$1,200	$450
Heavy Duty Diesel	7	8.4	12,206	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	15				

DISCOUNT RATE	10.0%

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	50%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($34.21)

Incremental Cost/mile	($0.0026)

Fleet Size
21-30

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$62,994	37.6%	$0.0271
Automobiles	$5,229	3.1%	$0.0167
Light Trucks	$40,891	24.4%	$0.0239
Heavy Duty Trucks	$16,874	10.1%	$0.0563
Diesel Price Diff.	($1,705)	-1.0%	($0.0023)
Maintenance	$106,319	63.4%	$0.0348
Total Savings	$167,608	100.0%	$0.0549
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	5.8%	($0.0029)
Storage/Dispenser	($56,672)	37.4%	($0.0185)
Subtotal	($65,418)	43.1%	($0.0214)
Vehicle			
Conversion Kit	($16,861)	11.1%	($0.0055)
Tanks	($6,818)	4.5%	($0.0022)
Labor	($15,626)	10.3%	($0.0051)
OEM	($4,239)	2.8%	($0.0014)
Subtotal	($43,545)	28.7%	($0.0143)
Operating			
Station Maint.	($14,140)	9.3%	($0.0046)
Labor - fuel time loss	($4,703)	3.1%	($0.0015)
Propane Fuel Tax	($23,857)	15.7%	($0.0078)
Additional training	$0	0.0%	$0.0000
Subtotal	($42,700)	28.2%	($0.0140)
Total Costs	($151,663)	100.0%	($0.0496)
Savings - Cost	$15,945	N/A	$0.0052

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	2	19.4	16,650	$1,600	$400
Light Trucks	13	13.4	13,969	$1,190	$400
Heavy Duty Gasoline	3	5.6	10,594	$1,200	$450
Heavy Duty Diesel	8	8.1	11,616	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	26				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	50%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Benefit/vehicle/year	$65.06
Incremental Benefit/mile	$0.0052

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$88,739	38.9%	$0.0270
Automobiles	$7,140	3.1%	$0.0168
Light Trucks	$60,324	26.5%	$0.0241
Heavy Duty Trucks	$21,275	9.3%	$0.0594
Diesel Price Diff.	($2,334)	-1.0%	($0.0024)
Maintenance	$141,574	62.1%	$0.0333
Total Savings	$227,979	100.0%	$0.0536
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	4.9%	($0.0021)
Storage/Dispenser	($56,672)	31.6%	($0.0133)
Subtotal	($65,418)	36.5%	($0.0154)
Vehicle			
Conversion Kit	($23,432)	13.1%	($0.0055)
Tanks	($9,810)	5.5%	($0.0023)
Labor	($21,427)	12.0%	($0.0050)
OEM	($6,391)	3.6%	($0.0015)
Subtotal	($61,060)	34.1%	($0.0144)
Operating			
Station Maint.	($14,140)	7.9%	($0.0033)
Labor - fuel time loss	($6,363)	3.6%	($0.0015)
Propane Fuel Tax	($32,098)	17.9%	($0.0076)
Additional training	$0	0.0%	$0.0000
Subtotal	($52,601)	29.4%	($0.0124)
Total Costs	($179,080)	100.0%	($0.0421)
Savings - Cost	$48,900	N/A	$0.0115

Fleet Size
31-50

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	3	19.2	15,000	$1,600	$400
Light Trucks	20	13.3	13,295	$1,190	$400
Heavy Duty Gasoline	4	5.5	9,492	$1,200	$450
Heavy Duty Diesel	10	7.8	12,248	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	37				

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	50%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Benefit/vehicle/year	$140.20
Incremental Benefit/mile	$0.0115

Fleet Size
51 and up

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$191,560	38.9%	$0.0232
Automobiles	$30,339	6.2%	$0.0152
Light Trucks	$140,667	28.5%	$0.0239
Heavy Duty Trucks	$20,554	4.2%	$0.0544
Diesel Price Diff.	($2,592)	-0.5%	($0.0027)
Maintenance	$303,901	61.7%	$0.0329
Total Savings	$492,869	100.0%	$0.0534
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	2.9%	($0.0009)
Storage/Dispenser	($56,672)	18.6%	($0.0061)
Subtotal	($65,418)	21.5%	($0.0071)
Vehicle			
Conversion Kit	($53,824)	17.7%	($0.0058)
Tanks	($24,816)	8.1%	($0.0027)
Labor	($51,294)	16.8%	($0.0056)
OEM	($9,457)	3.1%	($0.0010)
Subtotal	($139,391)	45.7%	($0.0151)
Operating			
Station Maint.	($14,140)	4.6%	($0.0015)
Labor - fuel time loss	($9,671)	3.2%	($0.0010)
Propane Fuel Tax	($76,292)	25.0%	($0.0083)
Additional training	$0	0.0%	$0.0000
Subtotal	($100,104)	32.8%	($0.0108)
Total Costs	($304,913)	100.0%	($0.0330)
Savings - Cost	$187,956	N/A	$0.0204

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	19	20.8	11,171	$1,600	$400
Light Trucks	54	13.3	11,575	$1,190	$400
Heavy Duty Gasoline	4	5.8	10,024	$1,200	$450
Heavy Duty Diesel	11	7.5	11,077	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	88				

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	50%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Benefit/vehicle/year	$226.57
Incremental Benefit/mile	$0.0204

APPENDIX J

NPV COST-EFFECTIVENESS MODEL: 25 PERCENT MILEAGE INCREASE

Fleet Size 1-10

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$6,858	-48.2%	$0.0081
Automobiles	$1,295	-9.1%	$0.0049
Light Trucks	$3,343	-23.5%	$0.0077
Heavy Duty Trucks	$2,220	-15.6%	$0.0146
Diesel Price Diff.	($21,096)	148.2%	($0.0318)
Maintenance	$0	0.0%	$0.0000
Total Savings	($14,238)	100.0%	($0.0094)
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	3.3%	($0.0011)
Storage/Dispenser	($10,366)	21.1%	($0.0069)
Subtotal	($11,964)	24.4%	($0.0079)
Vehicle			
Conversion Kit	($6,478)	13.2%	($0.0043)
Tanks	($2,210)	4.5%	($0.0015)
Labor	($6,824)	13.9%	($0.0045)
OEM	($3,132)	6.4%	($0.0021)
Subtotal	($18,644)	37.9%	($0.0123)
Operating			
Station Maint.	($4,713)	9.6%	($0.0031)
Labor - fuel time loss	($3,196)	6.5%	($0.0021)
Propane Fuel Tax	($10,614)	21.6%	($0.0070)
Additional training	$0	0.0%	$0.0000
Subtotal	($18,523)	37.7%	($0.0122)
Total Costs	($49,132)	100.0%	($0.0325)
Savings - Cost	($63,370)	N/A	($0.0419)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	20.3	28,136	$1,600	$400
Light Trucks	2	12.8	22,909	$1,190	$400
Heavy Duty Gasoline	1	6.8	16,163	$1,200	$450
Heavy Duty Diesel	5	8.1	16,889	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	9				

DISCOUNT RATE	10.0%

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	0%
Mileage Adj.	25%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($746.92)
Incremental Cost/mile	($0.0419)

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$13,747	-112.1%	$0.0091
Automobiles	$1,405	-11.5%	$0.0052
Light Trucks	$7,609	-62.0%	$0.0080
Heavy Duty Trucks	$4,733	-38.6%	$0.0162
Diesel Price Diff.	($26,013)	212.1%	($0.0310)
Maintenance	$0	0.0%	$0.0000
Total Savings	($12,266)	100.0%	($0.0052)
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	2.4%	($0.0007)
Storage/Dispenser	($10,366)	15.3%	($0.0044)
Subtotal	($11,964)	17.7%	($0.0051)
Vehicle			
Conversion Kit	($10,280)	15.2%	($0.0044)
Tanks	($3,752)	5.5%	($0.0016)
Labor	($10,109)	14.9%	($0.0043)
OEM	($4,671)	6.9%	($0.0020)
Subtotal	($28,813)	42.5%	($0.0123)
Operating			
Station Maint.	($4,713)	7.0%	($0.0020)
Labor - fuel time loss	($4,301)	6.3%	($0.0018)
Propane Fuel Tax	($17,982)	26.5%	($0.0077)
Additional training	$0	0.0%	$0.0000
Subtotal	($26,997)	39.8%	($0.0115)
Total Costs	($67,774)	100.0%	($0.0289)
Savings - Cost	($80,040)	N/A	($0.0341)

Fleet Size
11-20

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	19.0	28,576	$1,600	$400
Light Trucks	5	13.0	20,116	$1,190	$400
Heavy Duty Gasoline	2	6.1	15,456	$1,200	$450
Heavy Duty Diesel	7	8.4	15,258	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	15				

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	25%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($566.04)

Incremental Cost/mile	($0.0341)

Fleet Size
21-30

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$79,627	102.3%	$0.0274
Automobiles	$6,613	8.5%	$0.0169
Light Trucks	$51,609	66.3%	$0.0241
Heavy Duty Trucks	$21,405	27.5%	$0.0572
Diesel Price Diff.	($1,770)	-2.3%	($0.0019)
Maintenance	$0	0.0%	$0.0000
Total Savings	$77,857	100.0%	$0.0204
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	5.5%	($0.0023)
Storage/Dispenser	($56,672)	35.8%	($0.0148)
Subtotal	($65,418)	41.3%	($0.0171)
Vehicle			
Conversion Kit	($16,628)	10.5%	($0.0044)
Tanks	($6,818)	4.3%	($0.0018)
Labor	($15,973)	10.1%	($0.0042)
OEM	($6,150)	3.9%	($0.0016)
Subtotal	($45,570)	28.8%	($0.0119)
Operating			
Station Maint.	($14,140)	8.9%	($0.0037)
Labor - fuel time loss	($5,703)	3.6%	($0.0015)
Propane Fuel Tax	($27,534)	17.4%	($0.0072)
Additional training	$0	0.0%	$0.0000
Subtotal	($47,377)	29.9%	($0.0124)
Total Costs	($158,365)	100.0%	($0.0415)
Savings - Cost	($80,508)	N/A	($0.0211)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	2	19.4	20,813	$1,600	$400
Light Trucks	13	13.4	17,461	$1,190	$400
Heavy Duty Gasoline	3	5.6	13,243	$1,200	$450
Heavy Duty Diesel	8	8.1	14,520	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	26				

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	25%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($328.47)

Incremental Cost/mile	($0.0211)

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$110,992	102.0%	$0.0270
Automobiles	$9,029	8.3%	$0.0170
Light Trucks	$76,135	69.9%	$0.0243
Heavy Duty Trucks	$25,828	23.7%	$0.0577
Diesel Price Diff.	($2,137)	-2.0%	($0.0018)
Maintenance	$0	0.0%	$0.0000
Total Savings	$108,856	100.0%	$0.0205
COSTS		**% of**	**Incremental**
Infrastructure		**Costs**	**Cost/Mile**
Land	$0	0.0%	$0.0000
Station setup	($8,746)	4.5%	($0.0016)
Storage/Dispenser	($56,672)	29.2%	($0.0107)
Subtotal	($65,418)	33.7%	($0.0123)
Vehicle			
Conversion Kit	($23,183)	12.0%	($0.0044)
Tanks	($9,810)	5.1%	($0.0018)
Labor	($22,409)	11.6%	($0.0042)
OEM	($8,794)	4.5%	($0.0017)
Subtotal	($64,196)	33.1%	($0.0121)
Operating			
Station Maint.	($14,140)	7.3%	($0.0027)
Labor - fuel time loss	($7,836)	4.0%	($0.0015)
Propane Fuel Tax	($42,270)	21.8%	($0.0080)
Additional training	$0	0.0%	$0.0000
Subtotal	($64,246)	33.1%	($0.0121)
Total Costs	($193,860)	100.0%	($0.0365)
Savings - Cost	($85,004)	N/A	($0.0160)

Fleet Size
31-50

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	3	19.2	18,750	$1,600	$400
Light Trucks	20	13.3	16,619	$1,190	$400
Heavy Duty Gasoline	4	5.5	11,865	$1,200	$450
Heavy Duty Diesel	10	7.8	15,310	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	37				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	25%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($243.71)

Incremental Cost/mile	($0.0160)

Fleet Size
51 and up

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$241,605	101.0%	$0.0234
Automobiles	$38,487	16.1%	$0.0154
Light Trucks	$177,253	74.1%	$0.0241
Heavy Duty Trucks	$25,865	10.8%	$0.0547
Diesel Price Diff.	($2,506)	-1.0%	($0.0021)
Maintenance	$0	0.0%	$0.0000
Total Savings	$239,099	100.0%	$0.0207
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	2.8%	($0.0008)
Storage/Dispenser	($56,672)	18.1%	($0.0049)
Subtotal	($65,418)	20.9%	($0.0057)
Vehicle			
Conversion Kit	($53,088)	16.9%	($0.0046)
Tanks	($24,816)	7.9%	($0.0022)
Labor	($53,002)	16.9%	($0.0046)
OEM	($14,802)	4.7%	($0.0013)
Subtotal	($145,709)	46.5%	($0.0126)
Operating			
Station Maint.	($14,140)	4.5%	($0.0012)
Labor - fuel time loss	($11,659)	3.7%	($0.0010)
Propane Fuel Tax	($76,292)	24.4%	($0.0066)
Additional training	$0	0.0%	$0.0000
Subtotal	($102,092)	32.6%	($0.0089)
Total Costs	($313,219)	100.0%	($0.0272)
Savings - Cost	($74,119)	N/A	($0.0064)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	19	20.8	13,964	$1,600	$400
Light Trucks	54	13.3	14,469	$1,190	$400
Heavy Duty Gasoline	4	5.8	12,530	$1,200	$450
Heavy Duty Diesel	11	7.5	13,846	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	88				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	25%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($89.35)
Incremental Cost/mile	($0.0064)

APPENDIX K

NPV COST-EFFECTIVENESS MODEL: 50 PERCENT MILEAGE INCREASE

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$8,370	-50.3%	$0.0082
Automobiles	$1,554	-9.3%	$0.0049
Light Trucks	$4,012	-24.1%	$0.0077
Heavy Duty Trucks	$2,805	-16.9%	$0.0153
Diesel Price Diff.	($25,008)	150.3%	($0.0314)
Maintenance	$0	0.0%	$0.0000
Total Savings	($16,638)	100.0%	($0.0092)
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	3.1%	($0.0009)
Storage/Dispenser	($10,366)	20.4%	($0.0057)
Subtotal	($11,964)	23.6%	($0.0066)
Vehicle			
Conversion Kit	($6,433)	12.7%	($0.0035)
Tanks	($2,210)	4.4%	($0.0012)
Labor	($7,148)	14.1%	($0.0039)
OEM	($3,876)	7.6%	($0.0021)
Subtotal	($19,667)	38.7%	($0.0108)
Operating			
Station Maint.	($4,713)	9.3%	($0.0026)
Labor - fuel time loss	($3,796)	7.5%	($0.0021)
Propane Fuel Tax	($10,614)	20.9%	($0.0058)
Additional training	$0	0.0%	$0.0000
Subtotal	($19,124)	37.7%	($0.0105)
Total Costs	($50,755)	100.0%	($0.0280)
Savings - Cost	($67,392)	N/A	($0.0371)

Fleet Size
1-10

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	20.3	33,764	$1,600	$400
Light Trucks	2	12.8	27,491	$1,190	$400
Heavy Duty Gasoline	1	6.8	19,395	$1,200	$450
Heavy Duty Diesel	5	8.1	20,267	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	9				

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	50%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($794.33)

Incremental Cost/mile	($0.0371)

Fleet Size
11-20

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$52,526	102.8%	$0.0290
Automobiles	$5,498	10.8%	$0.0170
Light Trucks	$28,285	55.3%	$0.0249
Heavy Duty Trucks	$18,742	36.7%	$0.0536
Diesel Price Diff.	($1,417)	-2.8%	($0.0014)
Maintenance	$0	0.0%	$0.0000
Total Savings	$51,109	100.0%	$0.0181
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	6.6%	($0.0031)
Storage/Dispenser	($56,672)	42.6%	($0.0201)
Subtotal	($65,418)	49.1%	($0.0232)
Vehicle			
Conversion Kit	($10,262)	7.7%	($0.0036)
Tanks	($3,752)	2.8%	($0.0013)
Labor	($11,267)	8.5%	($0.0040)
OEM	($5,210)	3.9%	($0.0018)
Subtotal	($30,492)	22.9%	($0.0108)
Operating			
Station Maint.	($14,140)	10.6%	($0.0050)
Labor - fuel time loss	($5,157)	3.9%	($0.0018)
Propane Fuel Tax	($17,982)	13.5%	($0.0064)
Additional training	$0	0.0%	$0.0000
Subtotal	($37,280)	28.0%	($0.0132)
Total Costs	($133,189)	100.0%	($0.0473)
Savings - Cost	($82,081)	N/A	($0.0291)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	19.0	34,292	$1,600	$400
Light Trucks	5	13.0	24,140	$1,190	$400
Heavy Duty Gasoline	2	6.1	18,548	$1,200	$450
Heavy Duty Diesel	7	8.4	18,309	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	15				

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	50%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($580.47)

Incremental Cost/mile	($0.0291)

Fleet Size
21-30

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$96,429	101.7%	$0.0276
Automobiles	$7,844	8.3%	$0.0167
Light Trucks	$62,649	66.1%	$0.0244
Heavy Duty Trucks	$25,935	27.3%	$0.0577
Diesel Price Diff.	($1,598)	-1.7%	($0.0015)
Maintenance	$0	0.0%	$0.0000
Total Savings	$94,831	100.0%	$0.0207
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	5.3%	($0.0019)
Storage/Dispenser	($56,672)	34.3%	($0.0124)
Subtotal	($65,418)	39.6%	($0.0143)
Vehicle			
Conversion Kit	($16,405)	9.9%	($0.0036)
Tanks	($6,818)	4.1%	($0.0015)
Labor	($16,796)	10.2%	($0.0037)
OEM	($8,044)	4.9%	($0.0018)
Subtotal	($48,063)	29.1%	($0.0105)
Operating			
Station Maint.	($14,140)	8.6%	($0.0031)
Labor - fuel time loss	($6,651)	4.0%	($0.0015)
Propane Fuel Tax	($31,055)	18.8%	($0.0068)
Additional training	$0	0.0%	$0.0000
Subtotal	($51,847)	31.4%	($0.0113)
Total Costs	($165,328)	100.0%	($0.0361)
Savings - Cost	($70,497)	N/A	($0.0154)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	2	19.4	24,975	$1,600	$400
Light Trucks	13	13.4	20,954	$1,190	$400
Heavy Duty Gasoline	3	5.6	15,891	$1,200	$450
Heavy Duty Diesel	8	8.1	17,424	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	26				

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	50%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($287.63)

Incremental Cost/mile	($0.0154)

Fleet Size
31-50

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$134,377	101.7%	$0.0272
Automobiles	$10,711	8.1%	$0.0168
Light Trucks	$92,423	69.9%	$0.0246
Heavy Duty Trucks	$31,244	23.6%	$0.0582
Diesel Price Diff.	($2,187)	-1.7%	($0.0015)
Maintenance	$0	0.0%	$0.0000
Total Savings	$132,190	100.0%	$0.0207
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	4.4%	($0.0014)
Storage/Dispenser	($56,672)	28.6%	($0.0089)
Subtotal	($65,418)	33.0%	($0.0103)
Vehicle			
Conversion Kit	($22,937)	11.6%	($0.0036)
Tanks	($9,810)	4.9%	($0.0015)
Labor	($23,637)	11.9%	($0.0037)
OEM	($11,044)	5.6%	($0.0017)
Subtotal	($67,429)	34.0%	($0.0106)
Operating			
Station Maint.	($14,140)	7.1%	($0.0022)
Labor - fuel time loss	($9,178)	4.6%	($0.0014)
Propane Fuel Tax	($42,270)	21.3%	($0.0066)
Additional training	$0	0.0%	$0.0000
Subtotal	($65,588)	33.1%	($0.0103)
Total Costs	($198,436)	100.0%	($0.0311)
Savings - Cost	($66,245)	N/A	($0.0104)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	3	19.2	22,500	$1,600	$400
Light Trucks	20	13.3	19,943	$1,190	$400
Heavy Duty Gasoline	4	5.5	14,238	$1,200	$450
Heavy Duty Diesel	10	7.8	18,372	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	37				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	50%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($189.93)
Incremental Cost/mile	($0.0104)

Fleet Size
51 and up

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$292,988	100.9%	$0.0236
Automobiles	$46,632	16.1%	$0.0155
Light Trucks	$214,764	74.0%	$0.0243
Heavy Duty Trucks	$31,592	10.9%	$0.0557
Diesel Price Diff.	($2,653)	-0.9%	($0.0018)
Maintenance	$0	0.0%	$0.0000
Total Savings	$290,335	100.0%	$0.0210
COSTS		% of	Incremental
Infrastructure		Costs	Cost/Mile
Land	$0	0.0%	$0.0000
Station setup	($8,746)	2.5%	($0.0006)
Storage/Dispenser	($56,672)	16.4%	($0.0041)
Subtotal	($65,418)	19.0%	($0.0047)
Vehicle			
Conversion Kit	($52,417)	15.2%	($0.0038)
Tanks	($24,816)	7.2%	($0.0018)
Labor	($54,485)	15.8%	($0.0039)
OEM	($18,676)	5.4%	($0.0013)
Subtotal	($150,395)	43.6%	($0.0109)
Operating			
Station Maint.	($14,140)	4.1%	($0.0010)
Labor - fuel time loss	($13,469)	3.9%	($0.0010)
Propane Fuel Tax	($101,723)	29.5%	($0.0073)
Additional training	$0	0.0%	$0.0000
Subtotal	($129,333)	37.5%	($0.0093)
Total Costs	($345,146)	100.0%	($0.0249)
Savings - Cost	($54,811)	N/A	($0.0040)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	19	20.8	16,757	$1,600	$400
Light Trucks	54	13.3	17,363	$1,190	$400
Heavy Duty Gasoline	4	5.8	15,036	$1,200	$450
Heavy Duty Diesel	11	7.5	16,616	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	88				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	50%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($66.07)
Incremental Cost/mile	($0.0040)

APPENDIX L

NPV COST-EFFECTIVENESS MODEL: 100 PERCENT MILEAGE INCREASE

Fleet Size
1-10

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$11,082	-52.0%	$0.0082
Automobiles	$2,181	-10.2%	$0.0051
Light Trucks	$5,349	-25.1%	$0.0077
Heavy Duty Trucks	$3,552	-16.7%	$0.0146
Diesel Price Diff.	($32,398)	152.0%	($0.0305)
Maintenance	$0	0.0%	$0.0000
Total Savings	($21,316)	100.0%	($0.0088)
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	2.9%	($0.0007)
Storage/Dispenser	($10,366)	19.1%	($0.0043)
Subtotal	($11,964)	22.0%	($0.0049)
Vehicle			
Conversion Kit	($6,350)	11.7%	($0.0026)
Tanks	($2,210)	4.1%	($0.0009)
Labor	($8,091)	14.9%	($0.0033)
OEM	($5,468)	10.1%	($0.0023)
Subtotal	($22,118)	40.7%	($0.0091)
Operating			
Station Maint.	($4,713)	8.7%	($0.0019)
Labor - fuel time loss	($4,990)	9.2%	($0.0021)
Propane Fuel Tax	($10,614)	19.5%	($0.0044)
Additional training	$0	0.0%	$0.0000
Subtotal	($20,318)	37.3%	($0.0084)
Total Costs	($54,400)	100.0%	($0.0225)
Savings - Cost	($75,716)	N/A	($0.0313)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	20.3	45,018	$1,600	$400
Light Trucks	2	12.8	36,654	$1,190	$400
Heavy Duty Gasoline	1	6.8	25,860	$1,200	$450
Heavy Duty Diesel	5	8.1	27,022	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	9				

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	100%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($892.43)

Incremental Cost/mile	($0.0313)

Fleet Size
11-20

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$69,832	101.7%	$0.0289
Automobiles	$7,416	10.8%	$0.0172
Light Trucks	$37,714	54.9%	$0.0249
Heavy Duty Trucks	$24,702	36.0%	$0.0530
Diesel Price Diff.	($1,137)	-1.7%	($0.0008)
Maintenance	$0	0.0%	$0.0000
Total Savings	$68,695	100.0%	$0.0183
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	6.3%	($0.0023)
Storage/Dispenser	($56,672)	41.0%	($0.0151)
Subtotal	($65,418)	47.3%	($0.0174)
Vehicle			
Conversion Kit	($10,166)	7.3%	($0.0027)
Tanks	($3,752)	2.7%	($0.0010)
Labor	($12,921)	9.3%	($0.0034)
OEM	($7,136)	5.2%	($0.0019)
Subtotal	($33,975)	24.6%	($0.0090)
Operating			
Station Maint.	($14,140)	10.2%	($0.0038)
Labor - fuel time loss	($6,816)	4.9%	($0.0018)
Propane Fuel Tax	($17,982)	13.0%	($0.0048)
Additional training	$0	0.0%	$0.0000
Subtotal	($38,938)	28.1%	($0.0104)
Total Costs	($138,331)	100.0%	($0.0368)
Savings - Cost	($69,636)	N/A	($0.0185)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	19.0	45,722	$1,600	$400
Light Trucks	5	13.0	32,186	$1,190	$400
Heavy Duty Gasoline	2	6.1	24,730	$1,200	$450
Heavy Duty Diesel	7	8.4	24,412	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	15				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	100%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($492.46)
Incremental Cost/mile	($0.0185)

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$128,014	101.0%	$0.0275
Automobiles	$10,459	8.3%	$0.0167
Light Trucks	$82,574	65.2%	$0.0241
Heavy Duty Trucks	$34,982	27.6%	$0.0584
Diesel Price Diff.	($1,283)	-1.0%	($0.0009)
Maintenance	$0	0.0%	$0.0000
Total Savings	$126,732	100.0%	$0.0207
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	5.1%	($0.0014)
Storage/Dispenser	($56,672)	32.9%	($0.0093)
Subtotal	($65,418)	38.0%	($0.0107)
Vehicle			
Conversion Kit	($16,376)	9.5%	($0.0027)
Tanks	($6,818)	4.0%	($0.0011)
Labor	($19,584)	11.4%	($0.0032)
OEM	($9,956)	5.8%	($0.0016)
Subtotal	($52,735)	30.6%	($0.0086)
Operating			
Station Maint.	($14,140)	8.2%	($0.0023)
Labor - fuel time loss	($8,870)	5.2%	($0.0015)
Propane Fuel Tax	($31,055)	18.0%	($0.0051)
Additional training	$0	0.0%	$0.0000
Subtotal	($54,066)	31.4%	($0.0088)
Total Costs	($172,219)	100.0%	($0.0282)
Savings - Cost	($45,487)	N/A	($0.0074)

Fleet Size
21-30

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	2	19.4	33,300	$1,600	$400
Light Trucks	13	13.4	27,938	$1,190	$400
Heavy Duty Gasoline	3	5.6	21,188	$1,200	$450
Heavy Duty Diesel	8	8.1	23,232	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	26				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	100%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($185.59)
Incremental Cost/mile	($0.0074)

Fleet Size
31-50

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$178,647	101.0%	$0.0272
Automobiles	$14,281	8.1%	$0.0168
Light Trucks	$121,816	68.9%	$0.0243
Heavy Duty Trucks	$42,551	24.1%	$0.0594
Diesel Price Diff.	($1,756)	-1.0%	($0.0009)
Maintenance	$0	0.0%	$0.0000
Total Savings	$176,892	100.0%	$0.0208
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	4.2%	($0.0010)
Storage/Dispenser	($56,672)	27.0%	($0.0067)
Subtotal	($65,418)	31.1%	($0.0077)
Vehicle			
Conversion Kit	($22,902)	10.9%	($0.0027)
Tanks	($9,810)	4.7%	($0.0012)
Labor	($27,956)	13.3%	($0.0033)
OEM	($13,639)	6.5%	($0.0016)
Subtotal	($74,308)	35.4%	($0.0087)
Operating			
Station Maint.	($14,140)	6.7%	($0.0017)
Labor - fuel time loss	($12,211)	5.8%	($0.0014)
Propane Fuel Tax	($44,080)	21.0%	($0.0052)
Additional training	$0	0.0%	$0.0000
Subtotal	($70,431)	33.5%	($0.0083)
Total Costs	($210,156)	100.0%	($0.0247)
Savings - Cost	($33,265)	N/A	($0.0039)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	3	19.2	30,000	$1,600	$400
Light Trucks	20	13.3	26,590	$1,190	$400
Heavy Duty Gasoline	4	5.5	18,984	$1,200	$450
Heavy Duty Diesel	10	7.8	24,496	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	37				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	100%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($95.37)
Incremental Cost/mile	($0.0039)

Fleet Size
51 and up

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$391,861	100.5%	$0.0237
Automobiles	$62,898	16.1%	$0.0157
Light Trucks	$286,353	73.4%	$0.0243
Heavy Duty Trucks	$42,611	10.9%	$0.0564
Diesel Price Diff.	($1,816)	-0.5%	($0.0009)
Maintenance	$0	0.0%	$0.0000
Total Savings	$390,045	100.0%	$0.0211
COSTS		% of	Incremental
Infrastructure		Costs	Cost/Mile
Land	$0	0.0%	$0.0000
Station setup	($8,746)	2.4%	($0.0005)
Storage/Dispenser	($56,672)	15.4%	($0.0031)
Subtotal	($65,418)	17.8%	($0.0035)
Vehicle			
Conversion Kit	($51,970)	14.1%	($0.0028)
Tanks	($24,816)	6.8%	($0.0013)
Labor	($64,876)	17.6%	($0.0035)
OEM	($27,114)	7.4%	($0.0015)
Subtotal	($168,776)	45.9%	($0.0091)
Operating			
Station Maint.	($14,140)	3.8%	($0.0008)
Labor - fuel time loss	($17,574)	4.8%	($0.0010)
Propane Fuel Tax	($101,723)	27.7%	($0.0055)
Additional training	$0	0.0%	$0.0000
Subtotal	($133,437)	36.3%	($0.0072)
Total Costs	($367,632)	100.0%	($0.0199)
Savings - Cost	$22,413	N/A	$0.0012

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	19	20.8	22,342	$1,600	$400
Light Trucks	54	13.3	23,150	$1,190	$400
Heavy Duty Gasoline	4	5.8	20,048	$1,200	$450
Heavy Duty Diesel	11	7.5	22,154	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	88				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	100%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Benefit/vehicle/year	$27.02
Incremental Benefit/mile	$0.0012

APPENDIX M

NPV COST-EFFECTIVENESS MODEL: NO DIESEL CONVERSIONS

Fleet Size
1-10

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$5,550	100.0%	$0.0082
Automobiles	$1,036	18.7%	$0.0049
Light Trucks	$2,816	50.7%	$0.0081
Heavy Duty Trucks	$1,698	30.6%	$0.0139
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$5,550	100.0%	$0.0082
COSTS		% of	Incremental
Infrastructure		Costs	Cost/Mile
Land	$0	0.0%	$0.0000
Station setup	($1,598)	5.5%	($0.0024)
Storage/Dispenser	($10,366)	35.8%	($0.0153)
Subtotal	($11,964)	41.3%	($0.0176)
Vehicle			
Conversion Kit	($2,225)	7.7%	($0.0033)
Tanks	($1,180)	4.1%	($0.0017)
Labor	($2,728)	9.4%	($0.0040)
OEM	($955)	3.3%	($0.0014)
Subtotal	($7,088)	24.5%	($0.0104)
Operating			
Station Maint.	($4,713)	16.3%	($0.0069)
Labor - fuel time loss	($456)	1.6%	($0.0007)
Propane Fuel Tax	($4,751)	16.4%	($0.0070)
Additional training	$0	0.0%	$0.0000
Subtotal	($9,920)	34.2%	($0.0146)
Total Costs	($28,973)	100.0%	($0.0426)
Savings - Cost	($23,423)	N/A	($0.0345)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	20.3	22,509	$1,600	$400
Light Trucks	2	12.8	18,327	$1,190	$400
Heavy Duty Gasoline	1	6.8	12,930	$1,200	$450
Heavy Duty Diesel	0	1.0	1	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	4				

DISCOUNT RATE	10.0%

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($621.16)

Incremental Cost/mile	($0.0345)

Fleet Size
11-20

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$10,390	100.0%	$0.0086
Automobiles	$1,124	10.8%	$0.0052
Light Trucks	$5,781	55.6%	$0.0076
Heavy Duty Trucks	$3,485	33.5%	$0.0149
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$10,390	100.0%	$0.0086
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	4.0%	($0.0013)
Storage/Dispenser	($10,366)	26.0%	($0.0086)
Subtotal	($11,964)	30.0%	($0.0099)
Vehicle			
Conversion Kit	($4,370)	10.9%	($0.0036)
Tanks	($2,310)	5.8%	($0.0019)
Labor	($4,706)	11.8%	($0.0039)
OEM	($1,422)	3.6%	($0.0012)
Subtotal	($12,809)	32.1%	($0.0106)
Operating			
Station Maint.	($4,713)	11.8%	($0.0039)
Labor - fuel time loss	($935)	2.3%	($0.0008)
Propane Fuel Tax	($9,502)	23.8%	($0.0079)
Additional training	$0	0.0%	$0.0000
Subtotal	($15,151)	37.9%	($0.0126)
Total Costs	($39,924)	100.0%	($0.0331)
Savings - Cost	($29,534)	N/A	($0.0245)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	19.0	22,861	$1,600	$400
Light Trucks	5	13.0	16,093	$1,190	$400
Heavy Duty Gasoline	2	6.1	12,365	$1,200	$450
Heavy Duty Diesel	0	1.0	1	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	8				

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($391.62)

Incremental Cost/mile	($0.0245)

Fleet Size
21-30

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$18,429	100.0%	$0.0079
Automobiles	$1,603	8.7%	$0.0051
Light Trucks	$12,105	65.7%	$0.0071
Heavy Duty Trucks	$4,720	25.6%	$0.0158
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$18,429	100.0%	$0.0079
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	2.5%	($0.0007)
Storage/Dispenser	($10,366)	16.4%	($0.0045)
Subtotal	($11,964)	19.0%	($0.0051)
Vehicle			
Conversion Kit	($9,893)	15.7%	($0.0043)
Tanks	($5,170)	8.2%	($0.0022)
Labor	($9,620)	15.3%	($0.0041)
OEM	($2,545)	4.0%	($0.0011)
Subtotal	($27,228)	43.2%	($0.0117)
Operating			
Station Maint.	($4,713)	7.5%	($0.0020)
Labor - fuel time loss	($1,752)	2.8%	($0.0008)
Propane Fuel Tax	($17,364)	27.6%	($0.0075)
Additional training	$0	0.0%	$0.0000
Subtotal	($23,830)	37.8%	($0.0102)
Total Costs	($63,023)	100.0%	($0.0271)
Savings - Cost	($44,594)	N/A	($0.0192)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	2	19.4	16,650	$1,600	$400
Light Trucks	13	13.4	13,969	$1,190	$400
Heavy Duty Gasoline	3	5.6	10,594	$1,200	$450
Heavy Duty Diesel	0	1.0	1	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	18				

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($262.81)

Incremental Cost/mile	($0.0192)

Fleet Size
31-50

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$26,836	100.0%	$0.0082
Automobiles	$2,189	8.2%	$0.0052
Light Trucks	$17,858	66.5%	$0.0071
Heavy Duty Trucks	$6,789	25.3%	$0.0190
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$26,836	100.0%	$0.0082
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	1.9%	($0.0005)
Storage/Dispenser	($10,366)	12.4%	($0.0032)
Subtotal	($11,964)	14.3%	($0.0036)
Vehicle			
Conversion Kit	($14,721)	17.6%	($0.0045)
Tanks	($7,750)	9.3%	($0.0024)
Labor	($13,920)	16.6%	($0.0042)
OEM	($4,274)	5.1%	($0.0013)
Subtotal	($40,665)	48.6%	($0.0124)
Operating			
Station Maint.	($4,713)	5.6%	($0.0014)
Labor - fuel time loss	($2,325)	2.8%	($0.0007)
Propane Fuel Tax	($23,982)	28.7%	($0.0073)
Additional training	$0	0.0%	$0.0000
Subtotal	($31,020)	37.1%	($0.0094)
Total Costs	($83,649)	100.0%	($0.0254)
Savings - Cost	($56,813)	N/A	($0.0173)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	3	19.2	15,000	$1,600	$400
Light Trucks	20	13.3	13,295	$1,190	$400
Heavy Duty Gasoline	4	5.5	9,492	$1,200	$450
Heavy Duty Diesel	0	1.0	1	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	27				

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($223.21)

Incremental Cost/mile	($0.0173)

Fleet Size
51 and up

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$191,560	100.0%	$0.0232
Automobiles	$30,339	15.8%	$0.0152
Light Trucks	$140,667	73.4%	$0.0239
Heavy Duty Trucks	$20,554	10.7%	$0.0544
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$191,560	100.0%	$0.0232
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	3.2%	($0.0011)
Storage/Dispenser	($56,672)	21.0%	($0.0069)
Subtotal	($65,418)	24.3%	($0.0079)
Vehicle			
Conversion Kit	($44,193)	16.4%	($0.0053)
Tanks	($22,550)	8.4%	($0.0027)
Labor	($43,036)	16.0%	($0.0052)
OEM	($7,357)	2.7%	($0.0009)
Subtotal	($117,136)	43.5%	($0.0142)
Operating			
Station Maint.	($14,140)	5.2%	($0.0017)
Labor - fuel time loss	($5,473)	2.0%	($0.0007)
Propane Fuel Tax	($67,365)	25.0%	($0.0081)
Additional training	$0	0.0%	$0.0000
Subtotal	($86,978)	32.3%	($0.0105)
Total Costs	($269,533)	100.0%	($0.0326)
Savings - Cost	($77,972)	N/A	($0.0094)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	19	20.8	11,171	$1,600	$400
Light Trucks	54	13.3	11,575	$1,190	$400
Heavy Duty Gasoline	4	5.8	10,024	$1,200	$450
Heavy Duty Diesel	0	1.0	1	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	77				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($107.42)
Incremental Cost/mile	($0.0094)

APPENDIX N

NPV COST-EFFECTIVENESS MODEL: DIESEL REPLACEMENT WITH GASOLINE TO LPG

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$14,424	100.0%	$0.0110
Automobiles	$1,036	7.2%	$0.0049
Light Trucks	$2,816	19.5%	$0.0081
Heavy Duty Trucks	$10,572	73.3%	$0.0139
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$14,424	100.0%	$0.0110
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	3.6%	($0.0012)
Storage/Dispenser	($10,366)	23.5%	($0.0079)
Subtotal	($11,964)	27.1%	($0.0091)
Vehicle			
Conversion Kit	($4,896)	11.1%	($0.0037)
Tanks	($2,630)	6.0%	($0.0020)
Labor	($5,221)	11.8%	($0.0040)
OEM	($1,790)	4.1%	($0.0014)
Subtotal	($14,537)	33.0%	($0.0110)
Operating			
Station Maint.	($4,713)	10.7%	($0.0036)
Labor - fuel time loss	($1,363)	3.1%	($0.0010)
Propane Fuel Tax	($11,539)	26.2%	($0.0088)
Additional training	$0	0.0%	$0.0000
Subtotal	($17,615)	39.9%	($0.0134)
Total Costs	($44,117)	100.0%	($0.0335)
Savings - Cost	($29,693)	N/A	($0.0226)

Fleet Size
1-10

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	20.3	22,509	$1,600	$400
Light Trucks	2	12.8	18,327	$1,190	$400
Heavy Duty Gasoline	6	6.8	13,414	$1,200	$450
Heavy Duty Diesel	0	1.0	1	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	9				

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($349.97)

Incremental Cost/mile	($0.0226)

Fleet Size
11-20

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$22,429	100.0%	$0.0111
Automobiles	$1,124	5.0%	$0.0052
Light Trucks	$5,781	25.8%	$0.0076
Heavy Duty Trucks	$15,524	69.2%	$0.0149
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$22,429	100.0%	$0.0111
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	2.6%	($0.0008)
Storage/Dispenser	($10,366)	17.1%	($0.0052)
Subtotal	($11,964)	19.7%	($0.0059)
Vehicle			
Conversion Kit	($8,152)	13.4%	($0.0041)
Tanks	($4,340)	7.1%	($0.0022)
Labor	($8,096)	13.3%	($0.0040)
OEM	($2,231)	3.7%	($0.0011)
Subtotal	($22,819)	37.6%	($0.0113)
Operating			
Station Maint.	($4,713)	7.8%	($0.0023)
Labor - fuel time loss	($2,262)	3.7%	($0.0011)
Propane Fuel Tax	($19,005)	31.3%	($0.0094)
Additional training	$0	0.0%	$0.0000
Subtotal	($25,980)	42.8%	($0.0129)
Total Costs	($60,763)	100.0%	($0.0302)
Savings - Cost	($38,335)	N/A	($0.0190)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	19.0	22,861	$1,600	$400
Light Trucks	5	13.0	16,093	$1,190	$400
Heavy Duty Gasoline	9	6.1	12,241	$1,200	$450
Heavy Duty Diesel	0	1.0	1	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	15				

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($271.10)
Incremental Cost/mile	($0.0190)

Fleet Size
21-30

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$112,775	100.0%	$0.0352
Automobiles	$5,229	4.6%	$0.0167
Light Trucks	$40,891	36.3%	$0.0239
Heavy Duty Trucks	$66,655	59.1%	$0.0567
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$112,775	100.0%	$0.0352
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	5.8%	($0.0027)
Storage/Dispenser	($56,672)	37.8%	($0.0177)
Subtotal	($65,418)	43.7%	($0.0204)
Vehicle			
Conversion Kit	($14,200)	9.5%	($0.0044)
Tanks	($7,490)	5.0%	($0.0023)
Labor	($13,533)	9.0%	($0.0042)
OEM	($3,541)	2.4%	($0.0011)
Subtotal	($38,764)	25.9%	($0.0121)
Operating			
Station Maint.	($14,140)	9.4%	($0.0044)
Labor - fuel time loss	($3,308)	2.2%	($0.0010)
Propane Fuel Tax	($28,224)	18.8%	($0.0088)
Additional training	$0	0.0%	$0.0000
Subtotal	($45,673)	30.5%	($0.0143)
Total Costs	($149,855)	100.0%	($0.0468)
Savings - Cost	($37,080)	N/A	($0.0116)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	2	19.4	16,650	$1,600	$400
Light Trucks	13	13.4	13,969	$1,190	$400
Heavy Duty Gasoline	11	5.6	11,337	$1,200	$450
Heavy Duty Diesel	0	1.0	1	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	26				

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($151.28)

Incremental Cost/mile	($0.0116)

Fleet Size
31-50

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$154,785	100.0%	$0.0348
Automobiles	$7,140	4.6%	$0.0168
Light Trucks	$60,324	39.0%	$0.0241
Heavy Duty Trucks	$87,321	56.4%	$0.0577
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$154,785	100.0%	$0.0348
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	4.9%	($0.0020)
Storage/Dispenser	($56,672)	31.7%	($0.0128)
Subtotal	($65,418)	36.6%	($0.0147)
Vehicle			
Conversion Kit	($20,216)	11.3%	($0.0045)
Tanks	($10,650)	6.0%	($0.0024)
Labor	($19,338)	10.8%	($0.0044)
OEM	($5,095)	2.9%	($0.0011)
Subtotal	($55,299)	30.9%	($0.0124)
Operating			
Station Maint.	($14,140)	7.9%	($0.0032)
Labor - fuel time loss	($4,517)	2.5%	($0.0010)
Propane Fuel Tax	($39,367)	22.0%	($0.0089)
Additional training	$0	0.0%	$0.0000
Subtotal	($58,024)	32.5%	($0.0131)
Total Costs	($178,742)	100.0%	($0.0402)
Savings - Cost	($23,957)	N/A	($0.0054)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	3	19.2	15,000	$1,600	$400
Light Trucks	20	13.3	13,295	$1,190	$400
Heavy Duty Gasoline	14	5.5	11,461	$1,200	$450
Heavy Duty Diesel	0	1.0	1	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	37				

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($68.69)

Incremental Cost/mile	($0.0054)

Fleet Size
51 and up

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$254,020	100.0%	$0.0270
Automobiles	$30,339	11.9%	$0.0152
Light Trucks	$140,667	55.4%	$0.0239
Heavy Duty Trucks	$83,014	32.7%	$0.0544
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$254,020	100.0%	$0.0270
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	2.9%	($0.0009)
Storage/Dispenser	($56,672)	18.8%	($0.0060)
Subtotal	($65,418)	21.7%	($0.0069)
Vehicle			
Conversion Kit	($50,194)	16.6%	($0.0053)
Tanks	($25,740)	8.5%	($0.0027)
Labor	($48,218)	16.0%	($0.0051)
OEM	($8,370)	2.8%	($0.0009)
Subtotal	($132,522)	43.9%	($0.0141)
Operating			
Station Maint.	($14,140)	4.7%	($0.0015)
Labor - fuel time loss	($7,519)	2.5%	($0.0008)
Propane Fuel Tax	($82,297)	27.3%	($0.0087)
Additional training	$0	0.0%	$0.0000
Subtotal	($103,957)	34.4%	($0.0110)
Total Costs	($301,897)	100.0%	($0.0320)
Savings - Cost	($47,877)	N/A	($0.0051)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	19	20.8	11,171	$1,600	$400
Light Trucks	54	13.3	11,575	$1,190	$400
Heavy Duty Gasoline	15	5.8	10,796	$1,200	$450
Heavy Duty Diesel	0	1.0	1	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	88				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($57.71)

Incremental Cost/mile	($0.0051)

APPENDIX O

NPV COST-EFFECTIVENESS MODEL: 10 PERCENT VEHICLE LIFE EXTENSION

Vehicle Purchase Adjust	$23,785	204.0%	$0.0197
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$5,399	46.3%	$0.0079
Automobiles	$1,090	9.4%	$0.0051
Light Trucks	$2,675	22.9%	$0.0077
Heavy Duty Trucks	$1,634	14.0%	$0.0134
Diesel Price Diff.	($17,526)	-150.3%	($0.0330)
Maintenance	$0	0.0%	$0.0000
Total Savings	$11,659	100.0%	$0.0096
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	3.6%	($0.0013)
Storage/Dispenser	($10,366)	23.1%	($0.0086)
Subtotal	($11,964)	26.7%	($0.0099)
Vehicle			
Conversion Kit	($6,596)	14.7%	($0.0054)
Tanks	($2,210)	4.9%	($0.0018)
Labor	($6,159)	13.7%	($0.0051)
OEM	($1,813)	4.0%	($0.0015)
Subtotal	($16,778)	37.4%	($0.0139)
Operating			
Station Maint.	($4,713)	10.5%	($0.0039)
Labor - fuel time loss	($2,616)	5.8%	($0.0022)
Propane Fuel Tax	($8,809)	19.6%	($0.0073)
Additional training	$0	0.0%	$0.0000
Subtotal	($16,139)	36.0%	($0.0133)
Total Costs	($44,881)	100.0%	($0.0371)
Savings - Cost	($33,223)	N/A	($0.0274)

Fleet Size
1-10

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	20.3	22,509	$1,600	$400
Light Trucks	2	12.8	18,327	$1,190	$400
Heavy Duty Gasoline	1	6.8	12,930	$1,200	$450
Heavy Duty Diesel	5	8.1	13,511	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	9				

DISCOUNT RATE	10.0%

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	99,000
Light Trucks	99,000
Heavy Duty Gasoline	99,000
Heavy Duty Diesel	165,000

Cost/vehicle/year	($391.58)

Incremental Cost/mile	($0.0274)

Vehicle Purchase Adjust	$24,140	190.2%	$0.0129
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$10,084	79.4%	$0.0084
Automobiles	$1,183	9.3%	$0.0055
Light Trucks	$5,529	43.6%	$0.0073
Heavy Duty Trucks	$3,372	26.6%	$0.0145
Diesel Price Diff.	($21,530)	-169.6%	($0.0321)
Maintenance	$0	0.0%	$0.0000
Total Savings	$12,694	100.0%	$0.0068
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	2.6%	($0.0009)
Storage/Dispenser	($10,366)	16.8%	($0.0055)
Subtotal	($11,964)	19.3%	($0.0064)
Vehicle			
Conversion Kit	($10,537)	17.0%	($0.0056)
Tanks	($3,752)	6.1%	($0.0020)
Labor	($9,582)	15.5%	($0.0051)
OEM	($2,515)	4.1%	($0.0013)
Subtotal	($26,387)	42.7%	($0.0140)
Operating			
Station Maint.	($4,713)	7.6%	($0.0025)
Labor - fuel time loss	($3,596)	5.8%	($0.0019)
Propane Fuel Tax	($15,184)	24.6%	($0.0081)
Additional training	$0	0.0%	$0.0000
Subtotal	($23,493)	38.0%	($0.0125)
Total Costs	($61,844)	100.0%	($0.0329)
Savings - Cost	($49,150)	N/A	($0.0262)

Fleet Size
11-20

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	19.0	22,861	$1,600	$400
Light Trucks	5	13.0	16,093	$1,190	$400
Heavy Duty Gasoline	2	6.1	12,365	$1,200	$450
Heavy Duty Diesel	7	8.4	12,206	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	15				

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	99,000
Light Trucks	99,000
Heavy Duty Gasoline	99,000
Heavy Duty Diesel	165,000

Cost/vehicle/year	($347.59)

Incremental Cost/mile	($0.0262)

Vehicle Purchase Adjust	$33,877	35.6%	$0.0111
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$63,284	66.5%	$0.0272
Automobiles	$5,229	5.5%	$0.0167
Light Trucks	$40,563	42.6%	$0.0237
Heavy Duty Trucks	$17,491	18.4%	$0.0584
Diesel Price Diff.	($1,944)	-2.0%	($0.0027)
Maintenance	$0	0.0%	$0.0000
Total Savings	$95,216	100.0%	$0.0312
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	5.8%	($0.0029)
Storage/Dispenser	($56,672)	37.6%	($0.0185)
Subtotal	($65,418)	43.4%	($0.0214)
Vehicle			
Conversion Kit	($16,926)	11.2%	($0.0055)
Tanks	($6,818)	4.5%	($0.0022)
Labor	($15,046)	10.0%	($0.0049)
OEM	($3,662)	2.4%	($0.0012)
Subtotal	($42,452)	28.2%	($0.0139)
Operating			
Station Maint.	($14,140)	9.4%	($0.0046)
Labor - fuel time loss	($4,697)	3.1%	($0.0015)
Propane Fuel Tax	($23,857)	15.8%	($0.0078)
Additional training	$0	0.0%	$0.0000
Subtotal	($42,695)	28.4%	($0.0140)
Total Costs	($150,565)	100.0%	($0.0493)
Savings - Cost	($55,349)	N/A	($0.0181)

Fleet Size
21-30

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	2	19.4	16,650	$1,600	$400
Light Trucks	13	13.4	13,969	$1,190	$400
Heavy Duty Gasoline	3	5.6	10,594	$1,200	$450
Heavy Duty Diesel	8	8.1	11,616	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	26				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	99,000
Light Trucks	99,000
Heavy Duty Gasoline	99,000
Heavy Duty Diesel	165,000

Cost/vehicle/year	($225.82)

Incremental Cost/mile	($0.0181)

Vehicle Purchase Adjust	$50,064	36.9%	$0.0118
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$88,060	64.9%	$0.0268
Automobiles	$7,072	5.2%	$0.0167
Light Trucks	$59,841	44.1%	$0.0239
Heavy Duty Trucks	$21,147	15.6%	$0.0591
Diesel Price Diff.	($2,505)	-1.8%	($0.0026)
Maintenance	$0	0.0%	$0.0000
Total Savings	$135,618	100.0%	$0.0319
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	4.9%	($0.0021)
Storage/Dispenser	($56,672)	31.9%	($0.0133)
Subtotal	($65,418)	36.8%	($0.0154)
Vehicle			
Conversion Kit	($23,643)	13.3%	($0.0056)
Tanks	($9,810)	5.5%	($0.0023)
Labor	($21,059)	11.8%	($0.0050)
OEM	($5,075)	2.9%	($0.0012)
Subtotal	($59,587)	33.5%	($0.0140)
Operating			
Station Maint.	($14,140)	8.0%	($0.0033)
Labor - fuel time loss	($6,488)	3.7%	($0.0015)
Propane Fuel Tax	($32,098)	18.1%	($0.0076)
Additional training	$0	0.0%	$0.0000
Subtotal	($52,727)	29.7%	($0.0124)
Total Costs	($177,733)	100.0%	($0.0418)
Savings - Cost	($42,114)	N/A	($0.0099)

Fleet Size
31-50

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	3	19.2	15,000	$1,600	$400
Light Trucks	20	13.3	13,295	$1,190	$400
Heavy Duty Gasoline	4	5.5	9,492	$1,200	$450
Heavy Duty Diesel	10	7.8	12,248	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	37				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	99,000
Light Trucks	99,000
Heavy Duty Gasoline	99,000
Heavy Duty Diesel	165,000

Cost/vehicle/year	($120.74)
Incremental Cost/mile	($0.0099)

Vehicle Purchase Adjust.	$83,304	30.6%	$0.0090
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$191,374	70.4%	$0.0231
Automobiles	$30,339	11.2%	$0.0152
Light Trucks	$139,729	51.4%	$0.0237
Heavy Duty Trucks	$21,306	7.8%	$0.0564
Diesel Price Diff.	($2,754)	-1.0%	($0.0029)
Maintenance	$0	0.0%	$0.0000
Total Savings	$271,924	100.0%	$0.0295
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	2.9%	($0.0009)
Storage/Dispenser	($56,672)	18.7%	($0.0061)
Subtotal	($65,418)	21.6%	($0.0071)
Vehicle			
Conversion Kit	($54,034)	17.8%	($0.0059)
Tanks	($24,816)	8.2%	($0.0027)
Labor	($50,062)	16.5%	($0.0054)
OEM	($8,564)	2.8%	($0.0009)
Subtotal	($137,477)	45.4%	($0.0149)
Operating			
Station Maint.	($14,140)	4.7%	($0.0015)
Labor - fuel time loss	($9,736)	3.2%	($0.0011)
Propane Fuel Tax	($76,292)	25.2%	($0.0083)
Additional training	$0	0.0%	$0.0000
Subtotal	($100,169)	33.1%	($0.0109)
Total Costs	($303,064)	100.0%	($0.0328)
Savings - Cost	($31,140)	N/A	($0.0034)

Fleet Size
51 and up

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	19	20.8	11,171	$1,600	$400
Light Trucks	54	13.3	11,575	$1,190	$400
Heavy Duty Gasoline	4	5.8	10,024	$1,200	$450
Heavy Duty Diesel	11	7.5	11,077	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	88				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	99,000
Light Trucks	99,000
Heavy Duty Gasoline	99,000
Heavy Duty Diesel	165,000

Cost/vehicle/year	($37.54)
Incremental Cost/mile	($0.0034)

APPENDIX P

NPV COST-EFFECTIVENESS MODEL: 25 PERCENT VEHICLE LIFE EXTENSION

Vehicle Purchase Adjust	$32,511	161.8%	$0.0269
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$5,230	26.0%	$0.0077
Automobiles	$1,090	5.4%	$0.0051
Light Trucks	$2,558	12.7%	$0.0074
Heavy Duty Trucks	$1,581	7.9%	$0.0130
Diesel Price Diff.	($17,653)	-87.9%	($0.0333)
Maintenance	$0	0.0%	$0.0000
Total Savings	$20,088	100.0%	$0.0166
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	3.6%	($0.0013)
Storage/Dispenser	($10,366)	23.2%	($0.0086)
Subtotal	($11,964)	26.8%	($0.0099)
Vehicle			
Conversion Kit	($6,639)	14.9%	($0.0055)
Tanks	($2,210)	4.9%	($0.0018)
Labor	($6,114)	13.7%	($0.0051)
OEM	($1,604)	3.6%	($0.0013)
Subtotal	($16,566)	37.1%	($0.0137)
Operating			
Station Maint.	($4,713)	10.5%	($0.0039)
Labor - fuel time loss	($2,645)	5.9%	($0.0022)
Propane Fuel Tax	($8,809)	19.7%	($0.0073)
Additional training	$0	0.0%	$0.0000
Subtotal	($16,168)	36.2%	($0.0134)
Total Costs	($44,698)	100.0%	($0.0369)
Savings - Cost	($24,610)	N/A	($0.0203)

Fleet Size
1-10

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	20.3	22,509	$1,600	$400
Light Trucks	2	12.8	18,327	$1,190	$400
Heavy Duty Gasoline	1	6.8	12,930	$1,200	$450
Heavy Duty Diesel	5	8.1	13,511	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	9				

DISCOUNT RATE	10.0%

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	112,500
Light Trucks	112,500
Heavy Duty Gasoline	112,500
Heavy Duty Diesel	187,500

Cost/vehicle/year	($290.07)

Incremental Cost/mile	($0.0203)

Vehicle Purchase Adjust	$33,020	150.6%	$0.0176
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$10,699	48.8%	$0.0089
Automobiles	$1,183	5.4%	$0.0055
Light Trucks	$5,529	25.2%	$0.0073
Heavy Duty Trucks	$3,987	18.2%	$0.0171
Diesel Price Diff.	($21,799)	-99.4%	($0.0325)
Maintenance	$0	0.0%	$0.0000
Total Savings	$21,920	100.0%	$0.0117
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	2.6%	($0.0009)
Storage/Dispenser	($10,366)	16.9%	($0.0055)
Subtotal	($11,964)	19.5%	($0.0064)
Vehicle			
Conversion Kit	($10,535)	17.1%	($0.0056)
Tanks	($3,752)	6.1%	($0.0020)
Labor	($9,320)	15.2%	($0.0050)
OEM	($2,477)	4.0%	($0.0013)
Subtotal	($26,084)	42.4%	($0.0139)
Operating			
Station Maint.	($4,713)	7.7%	($0.0025)
Labor - fuel time loss	($3,558)	5.8%	($0.0019)
Propane Fuel Tax	($15,184)	24.7%	($0.0081)
Additional training	$0	0.0%	$0.0000
Subtotal	($23,455)	38.1%	($0.0125)
Total Costs	($61,503)	100.0%	($0.0327)
Savings - Cost	($39,583)	N/A	($0.0211)

Fleet Size
11-20

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	19.0	22,861	$1,600	$400
Light Trucks	5	13.0	16,093	$1,190	$400
Heavy Duty Gasoline	2	6.1	12,365	$1,200	$450
Heavy Duty Diesel	7	8.4	12,206	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	15				

DISCOUNT RATE	10.0%

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	112,500
Light Trucks	112,500
Heavy Duty Gasoline	112,500
Heavy Duty Diesel	187,500

Cost/vehicle/year	($279.93)

Incremental Cost/mile	($0.0211)

Vehicle Purchase Adjust	$64,858	51.6%	$0.0212
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$62,858	50.1%	$0.0270
Automobiles	$5,179	4.1%	$0.0165
Light Trucks	$40,293	32.1%	$0.0235
Heavy Duty Trucks	$17,386	13.8%	$0.0580
Diesel Price Diff.	($2,142)	-1.7%	($0.0029)
Maintenance	$0	0.0%	$0.0000
Total Savings	$125,574	100.0%	$0.0411
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	5.8%	($0.0029)
Storage/Dispenser	($56,672)	37.8%	($0.0185)
Subtotal	($65,418)	43.6%	($0.0214)
Vehicle			
Conversion Kit	($17,079)	11.4%	($0.0056)
Tanks	($6,818)	4.5%	($0.0022)
Labor	($14,822)	9.9%	($0.0049)
OEM	($2,981)	2.0%	($0.0010)
Subtotal	($41,700)	27.8%	($0.0136)
Operating			
Station Maint.	($14,140)	9.4%	($0.0046)
Labor - fuel time loss	($4,786)	3.2%	($0.0016)
Propane Fuel Tax	($23,857)	15.9%	($0.0078)
Additional training	$0	0.0%	$0.0000
Subtotal	($42,783)	28.5%	($0.0140)
Total Costs	($149,902)	100.0%	($0.0491)
Savings - Cost	($24,328)	N/A	($0.0080)

Fleet Size
21-30

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	2	19.4	16,650	$1,600	$400
Light Trucks	13	13.4	13,969	$1,190	$400
Heavy Duty Gasoline	3	5.6	10,594	$1,200	$450
Heavy Duty Diesel	8	8.1	11,616	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	26				

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	112,500
Light Trucks	112,500
Heavy Duty Gasoline	112,500
Heavy Duty Diesel	187,500

Cost/vehicle/year	($99.26)
Incremental Cost/mile	($0.0080)

Vehicle Purchase Adjust	$93,163	52.4%	$0.0219
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$87,488	49.2%	$0.0266
Automobiles	$7,015	3.9%	$0.0165
Light Trucks	$59,441	33.4%	$0.0237
Heavy Duty Trucks	$21,031	11.8%	$0.0588
Diesel Price Diff.	($2,803)	-1.6%	($0.0029)
Maintenance	$0	0.0%	$0.0000
Total Savings	$177,848	100.0%	$0.0418
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	4.9%	($0.0021)
Storage/Dispenser	($56,672)	32.1%	($0.0133)
Subtotal	($65,418)	37.0%	($0.0154)
Vehicle			
Conversion Kit	($23,859)	13.5%	($0.0056)
Tanks	($9,810)	5.6%	($0.0023)
Labor	($20,724)	11.7%	($0.0049)
OEM	($4,088)	2.3%	($0.0010)
Subtotal	($58,482)	33.1%	($0.0138)
Operating			
Station Maint.	($14,140)	8.0%	($0.0033)
Labor - fuel time loss	($6,611)	3.7%	($0.0016)
Propane Fuel Tax	($32,098)	18.2%	($0.0076)
Additional training	$0	0.0%	$0.0000
Subtotal	($52,850)	29.9%	($0.0124)
Total Costs	($176,750)	100.0%	($0.0416)
Savings - Cost	$1,097	N/A	$0.0003

Fleet Size
31-50

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	3	19.2	15,000	$1,600	$400
Light Trucks	20	13.3	13,295	$1,190	$400
Heavy Duty Gasoline	4	5.5	9,492	$1,200	$450
Heavy Duty Diesel	10	7.8	12,248	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	37				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	112,500
Light Trucks	112,500
Heavy Duty Gasoline	112,500
Heavy Duty Diesel	187,500

Benefit/vehicle/year	$3.15

Incremental Benefit/mile	$0.0003

Vehicle Purchase Adjust	$191,592	49.7%	$0.0208
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$197,159	51.1%	$0.0238
Automobiles	$31,260	8.1%	$0.0156
Light Trucks	$144,839	37.6%	$0.0246
Heavy Duty Trucks	$21,061	5.5%	$0.0557
Diesel Price Diff.	($3,034)	-0.8%	($0.0032)
Maintenance	$0	0.0%	$0.0000
Total Savings	$385,718	100.0%	$0.0418
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	3.0%	($0.0009)
Storage/Dispenser	($56,672)	19.2%	($0.0061)
Subtotal	($65,418)	22.2%	($0.0071)
Vehicle			
Conversion Kit	($52,192)	17.7%	($0.0057)
Tanks	($24,816)	8.4%	($0.0027)
Labor	($38,808)	13.2%	($0.0042)
OEM	($14,558)	4.9%	($0.0016)
Subtotal	($130,374)	44.2%	($0.0141)
Operating			
Station Maint.	($14,140)	4.8%	($0.0015)
Labor - fuel time loss	($8,827)	3.0%	($0.0010)
Propane Fuel Tax	($76,292)	25.9%	($0.0083)
Additional training	$0	0.0%	$0.0000
Subtotal	($99,260)	33.6%	($0.0108)
Total Costs	($295,053)	100.0%	($0.0320)
Savings - Cost	$90,665	N/A	$0.0098

Fleet Size
51 and up

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	19	20.8	11,171	$1,600	$400
Light Trucks	54	13.3	11,575	$1,190	$400
Heavy Duty Gasoline	4	5.8	10,024	$1,200	$450
Heavy Duty Diesel	11	7.5	11,077	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	88				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	112,500
Light Trucks	112,500
Heavy Duty Gasoline	112,500
Heavy Duty Diesel	187,500

Benefit/vehicle/year	$109.29
Incremental Benefit/mile	$0.0098

APPENDIX Q

NPV COST-EFFECTIVENESS MODEL: 50 PERCENT VEHICLE LIFE EXTENSION

Vehicle Purchase Adjust	$47,786	136.0%	$0.0395
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$5,318	15.1%	$0.0078
Automobiles	$1,036	2.9%	$0.0049
Light Trucks	$2,461	7.0%	$0.0071
Heavy Duty Trucks	$1,821	5.2%	$0.0149
Diesel Price Diff.	($17,969)	-51.1%	($0.0339)
Maintenance	$0	0.0%	$0.0000
Total Savings	$35,135	100.0%	$0.0290
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	3.6%	($0.0013)
Storage/Dispenser	($10,366)	23.4%	($0.0086)
Subtotal	($11,964)	27.0%	($0.0099)
Vehicle			
Conversion Kit	($6,692)	15.1%	($0.0055)
Tanks	($2,210)	5.0%	($0.0018)
Labor	($5,925)	13.4%	($0.0049)
OEM	($1,262)	2.9%	($0.0010)
Subtotal	($16,089)	36.4%	($0.0133)
Operating			
Station Maint.	($4,713)	10.7%	($0.0039)
Labor - fuel time loss	($2,665)	6.0%	($0.0022)
Propane Fuel Tax	($8,809)	19.9%	($0.0073)
Additional training	$0	0.0%	$0.0000
Subtotal	($16,187)	36.6%	($0.0134)
Total Costs	($44,240)	100.0%	($0.0366)
Savings - Cost	($9,106)	N/A	($0.0075)

Fleet Size
1-10

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	20.3	22,509	$1,600	$400
Light Trucks	2	12.8	18,327	$1,190	$400
Heavy Duty Gasoline	1	6.8	12,930	$1,200	$450
Heavy Duty Diesel	5	8.1	13,511	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	9				

DISCOUNT RATE	10.0%

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	135,000
Light Trucks	135,000
Heavy Duty Gasoline	135,000
Heavy Duty Diesel	225,000

Cost/vehicle/year	($107.33)

Incremental Cost/mile	($0.0075)

Vehicle Purchase Adjust	$59,589	125.1%	$0.0317
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$10,154	21.3%	$0.0084
Automobiles	$1,124	2.4%	$0.0052
Light Trucks	$5,148	10.8%	$0.0068
Heavy Duty Trucks	$3,882	8.2%	$0.0167
Diesel Price Diff.	($22,117)	-46.4%	($0.0330)
Maintenance	$0	0.0%	$0.0000
Total Savings	$47,625	100.0%	$0.0254
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	2.6%	($0.0009)
Storage/Dispenser	($10,366)	17.0%	($0.0055)
Subtotal	($11,964)	19.7%	($0.0064)
Vehicle			
Conversion Kit	($10,675)	17.6%	($0.0057)
Tanks	($3,752)	6.2%	($0.0020)
Labor	($9,153)	15.1%	($0.0049)
OEM	($1,727)	2.8%	($0.0009)
Subtotal	($25,307)	41.6%	($0.0135)
Operating			
Station Maint.	($4,713)	7.8%	($0.0025)
Labor - fuel time loss	($3,645)	6.0%	($0.0019)
Propane Fuel Tax	($15,184)	25.0%	($0.0081)
Additional training	$0	0.0%	$0.0000
Subtotal	($23,542)	38.7%	($0.0125)
Total Costs	($60,813)	100.0%	($0.0324)
Savings - Cost	($13,188)	N/A	($0.0070)

Fleet Size
11-20

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	19.0	22,861	$1,600	$400
Light Trucks	5	13.0	16,093	$1,190	$400
Heavy Duty Gasoline	2	6.1	12,365	$1,200	$450
Heavy Duty Diesel	7	8.4	12,206	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	15				

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	135,000
Light Trucks	135,000
Heavy Duty Gasoline	135,000
Heavy Duty Diesel	225,000

Cost/vehicle/year	($93.27)
Incremental Cost/mile	($0.0070)

Vehicle Purchase Adjust	$97,623	61.3%	$0.0320
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$64,073	40.2%	$0.0276
Automobiles	$5,103	3.2%	$0.0163
Light Trucks	$41,766	26.2%	$0.0244
Heavy Duty Trucks	$17,203	10.8%	$0.0574
Diesel Price Diff.	($2,376)	-1.5%	($0.0033)
Maintenance	$0	0.0%	$0.0000
Total Savings	$159,320	100.0%	$0.0521
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	5.9%	($0.0029)
Storage/Dispenser	($56,672)	38.2%	($0.0185)
Subtotal	($65,418)	44.1%	($0.0214)
Vehicle			
Conversion Kit	($16,828)	11.3%	($0.0055)
Tanks	($6,818)	4.6%	($0.0022)
Labor	($13,026)	8.8%	($0.0043)
OEM	($3,657)	2.5%	($0.0012)
Subtotal	($40,329)	27.2%	($0.0132)
Operating			
Station Maint.	($14,140)	9.5%	($0.0046)
Labor - fuel time loss	($4,615)	3.1%	($0.0015)
Propane Fuel Tax	($23,857)	16.1%	($0.0078)
Additional training	$0	0.0%	$0.0000
Subtotal	($42,613)	28.7%	($0.0139)
Total Costs	($148,360)	100.0%	($0.0486)
Savings - Cost	$10,960	N/A	$0.0036

Fleet Size
21-30

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	2	19.4	16,650	$1,600	$400
Light Trucks	13	13.4	13,969	$1,190	$400
Heavy Duty Gasoline	3	5.6	10,594	$1,200	$450
Heavy Duty Diesel	8	8.1	11,616	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	26				

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	135,000
Light Trucks	135,000
Heavy Duty Gasoline	135,000
Heavy Duty Diesel	225,000

Benefit/vehicle/year	$44.72
Incremental Benefit/mile	$0.0036

Vehicle Purchase Adjust	$153,565	64.2%	$0.0361
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$88,955	37.2%	$0.0270
Automobiles	$6,968	2.9%	$0.0164
Light Trucks	$61,245	25.6%	$0.0244
Heavy Duty Trucks	$20,742	8.7%	$0.0580
Diesel Price Diff.	($3,156)	-1.3%	($0.0033)
Maintenance	$0	0.0%	$0.0000
Total Savings	$239,364	100.0%	$0.0563
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	5.0%	($0.0021)
Storage/Dispenser	($56,672)	32.5%	($0.0133)
Subtotal	($65,418)	37.5%	($0.0154)
Vehicle			
Conversion Kit	($23,544)	13.5%	($0.0055)
Tanks	($9,810)	5.6%	($0.0023)
Labor	($18,037)	10.3%	($0.0042)
OEM	($4,835)	2.8%	($0.0011)
Subtotal	($56,226)	32.3%	($0.0132)
Operating			
Station Maint.	($14,140)	8.1%	($0.0033)
Labor - fuel time loss	($6,411)	3.7%	($0.0015)
Propane Fuel Tax	($32,098)	18.4%	($0.0076)
Additional training	$0	0.0%	$0.0000
Subtotal	($52,649)	30.2%	($0.0124)
Total Costs	($174,294)	100.0%	($0.0410)
Savings - Cost	$65,071	N/A	$0.0153

Fleet Size
31-50

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	3	19.2	15,000	$1,600	$400
Light Trucks	20	13.3	13,295	$1,190	$400
Heavy Duty Gasoline	4	5.5	9,492	$1,200	$450
Heavy Duty Diesel	10	7.8	12,248	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	37				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	135,000
Light Trucks	135,000
Heavy Duty Gasoline	135,000
Heavy Duty Diesel	225,000

Benefit/vehicle/year	$186.56
Incremental Benefit/mile	$0.0153

Vehicle Purchase Adjust	$311,599	61.9%	$0.0338
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$194,967	38.8%	$0.0236
Automobiles	$30,932	6.1%	$0.0155
Light Trucks	$143,176	28.5%	$0.0243
Heavy Duty Trucks	$20,859	4.1%	$0.0552
Diesel Price Diff.	($3,456)	-0.7%	($0.0036)
Maintenance	$0	0.0%	$0.0000
Total Savings	$503,110	100.0%	$0.0545
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	3.0%	($0.0009)
Storage/Dispenser	($56,672)	19.3%	($0.0061)
Subtotal	($65,418)	22.3%	($0.0071)
Vehicle			
Conversion Kit	($52,989)	18.1%	($0.0057)
Tanks	($24,816)	8.5%	($0.0027)
Labor	($38,808)	13.2%	($0.0042)
OEM	($11,251)	3.8%	($0.0012)
Subtotal	($127,865)	43.6%	($0.0139)
Operating			
Station Maint.	($14,140)	4.8%	($0.0015)
Labor - fuel time loss	($9,224)	3.1%	($0.0010)
Propane Fuel Tax	($76,292)	26.0%	($0.0083)
Additional training	$0	0.0%	$0.0000
Subtotal	($99,657)	34.0%	($0.0108)
Total Costs	($292,940)	100.0%	($0.0317)
Savings - Cost	$210,169	N/A	$0.0228

Fleet Size
51 and up

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	19	20.8	11,171	$1,600	$400
Light Trucks	54	13.3	11,575	$1,190	$400
Heavy Duty Gasoline	4	5.8	10,024	$1,200	$450
Heavy Duty Diesel	11	7.5	11,077	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	88				

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	135,000
Light Trucks	135,000
Heavy Duty Gasoline	135,000
Heavy Duty Diesel	225,000

Benefit/vehicle/year	$253.35

Incremental Benefit/mile	$0.0228

APPENDIX R

NPV COST-EFFECTIVENESS MODEL: OEM VEHICLES

Immediate OEM

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$8,439	-149.2%	$0.0124
Automobiles	$1,593	-28.2%	$0.0075
Light Trucks	$4,114	-72.7%	$0.0119
Heavy Duty Trucks	$2,732	-48.3%	$0.0224
Diesel Price Diff.	($14,096)	249.2%	($0.0266)
Maintenance	$0	0.0%	$0.0000
Total Savings	($5,658)	100.0%	($0.0047)
COSTS		% of	Incremental
Infrastructure		Costs	Cost/Mile
Land	$0	0.0%	$0.0000
Station setup	($1,598)	4.4%	($0.0013)
Storage/Dispenser	($10,366)	28.8%	($0.0086)
Subtotal	($11,964)	33.3%	($0.0099)
Vehicle			
Conversion Kit	$0	0.0%	$0.0000
Tanks	$0	0.0%	$0.0000
Labor	$0	0.0%	$0.0000
OEM	($8,467)	23.5%	($0.0070)
Subtotal	($8,467)	23.5%	($0.0070)
Operating			
Station Maint.	($4,713)	13.1%	($0.0039)
Labor - fuel time loss	($2,005)	5.6%	($0.0017)
Propane Fuel Tax	($8,809)	24.5%	($0.0073)
Additional training	$0	0.0%	$0.0000
Subtotal	($15,527)	43.2%	($0.0128)
Total Costs	($35,959)	100.0%	($0.0297)
Savings - Cost	($41,616)	N/A	($0.0344)

Fleet Size
1-10

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	20.3	22,509	$1,600	$400
Light Trucks	2	12.8	18,327	$1,190	$400
Heavy Duty Gasoline	1	6.8	12,930	$1,200	$450
Heavy Duty Diesel	5	8.1	13,511	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	9				

DISCOUNT RATE	10.0%

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 1.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($490.51)
Incremental Cost/mile	($0.0344)

Immediate OEM

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$16,445	-2201.5%	$0.0136
Automobiles	$1,729	-231.4%	$0.0080
Light Trucks	$8,892	-1190.4%	$0.0117
Heavy Duty Trucks	$5,824	-779.7%	$0.0250
Diesel Price Diff.	($17,192)	2301.5%	($0.0256)
Maintenance	$0	0.0%	$0.0000
Total Savings	($747)	100.0%	($0.0004)
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	3.4%	($0.0009)
Storage/Dispenser	($10,366)	22.1%	($0.0055)
Subtotal	($11,964)	25.5%	($0.0064)
Vehicle			
Conversion Kit	$0	0.0%	$0.0000
Tanks	$0	0.0%	$0.0000
Labor	$0	0.0%	$0.0000
OEM	($12,559)	26.7%	($0.0067)
Subtotal	($12,559)	26.7%	($0.0067)
Operating			
Station Maint.	($4,713)	10.0%	($0.0025)
Labor - fuel time loss	($2,553)	5.4%	($0.0014)
Propane Fuel Tax	($15,184)	32.3%	($0.0081)
Additional training	$0	0.0%	$0.0000
Subtotal	($22,450)	47.8%	($0.0120)
Total Costs	($46,974)	100.0%	($0.0250)
Savings - Cost	($47,721)	N/A	($0.0254)

Fleet Size
11-20

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	19.0	22,861	$1,600	$400
Light Trucks	5	13.0	16,093	$1,190	$400
Heavy Duty Gasoline	2	6.1	12,365	$1,200	$450
Heavy Duty Diesel	7	8.4	12,206	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	15				

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 1.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($337.48)
Incremental Cost/mile	($0.0254)

Immediate OEM

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$30,088	281.3%	$0.0129
Automobiles	$2,466	23.1%	$0.0079
Light Trucks	$19,469	182.0%	$0.0114
Heavy Duty Trucks	$8,153	76.2%	$0.0272
Diesel Price Diff.	($19,391)	-181.3%	($0.0266)
Maintenance	$0	0.0%	$0.0000
Total Savings	$10,698	100.0%	$0.0035
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	2.5%	($0.0005)
Storage/Dispenser	($10,366)	16.4%	($0.0034)
Subtotal	($11,964)	18.9%	($0.0039)
Vehicle			
Conversion Kit	$0	0.0%	$0.0000
Tanks	$0	0.0%	$0.0000
Labor	$0	0.0%	$0.0000
OEM	($19,633)	31.1%	($0.0064)
Subtotal	($19,633)	31.1%	($0.0064)
Operating			
Station Maint.	($4,713)	7.5%	($0.0015)
Labor - fuel time loss	($3,036)	4.8%	($0.0010)
Propane Fuel Tax	($23,857)	37.7%	($0.0078)
Additional training	$0	0.0%	$0.0000
Subtotal	($31,607)	50.0%	($0.0103)
Total Costs	($63,204)	100.0%	($0.0207)
Savings - Cost	($52,506)	N/A	($0.0172)

Fleet Size
21-30

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	2	19.4	16,650	$1,600	$400
Light Trucks	13	13.4	13,969	$1,190	$400
Heavy Duty Gasoline	3	5.6	10,594	$1,200	$450
Heavy Duty Diesel	8	8.1	11,616	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	26				

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 1.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($214.22)
Incremental Cost/mile	($0.0172)

Immediate OEM

Fleet Size
31-50

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$99,611	97.7%	$0.0303
Automobiles	$7,985	7.8%	$0.0188
Light Trucks	$68,109	66.8%	$0.0272
Heavy Duty Trucks	$23,518	23.1%	$0.0657
Diesel Price Diff.	$2,294	2.3%	$0.0024
Maintenance	$0	0.0%	$0.0000
Total Savings	$101,905	100.0%	$0.0240
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	6.1%	($0.0021)
Storage/Dispenser	($56,672)	39.6%	($0.0133)
Subtotal	($65,418)	45.7%	($0.0154)
Vehicle			
Conversion Kit	$0	0.0%	$0.0000
Tanks	$0	0.0%	$0.0000
Labor	$0	0.0%	$0.0000
OEM	($27,358)	19.1%	($0.0064)
Subtotal	($27,358)	19.1%	($0.0064)
Operating			
Station Maint.	($14,140)	9.9%	($0.0033)
Labor - fuel time loss	($4,147)	2.9%	($0.0010)
Propane Fuel Tax	($32,098)	22.4%	($0.0076)
Additional training	$0	0.0%	$0.0000
Subtotal	($50,385)	35.2%	($0.0119)
Total Costs	($143,161)	100.0%	($0.0337)
Savings - Cost	($41,257)	N/A	($0.0097)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	3	19.2	15,000	$1,600	$400
Light Trucks	20	13.3	13,295	$1,190	$400
Heavy Duty Gasoline	4	5.5	9,492	$1,200	$450
Heavy Duty Diesel	10	7.8	12,248	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	37				

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 1.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($118.28)
Incremental Cost/mile	($0.0097)

Immediate OEM

Fleet Size
51 and up

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$218,418	98.9%	$0.0264
Automobiles	$34,763	15.7%	$0.0174
Light Trucks	$160,104	72.5%	$0.0272
Heavy Duty Trucks	$23,551	10.7%	$0.0623
Diesel Price Diff.	$2,373	1.1%	$0.0025
Maintenance	$0	0.0%	$0.0000
Total Savings	$220,791	100.0%	$0.0239
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	4.0%	($0.0009)
Storage/Dispenser	($56,672)	26.1%	($0.0061)
Subtotal	($65,418)	30.1%	($0.0071)
Vehicle			
Conversion Kit	$0	0.0%	$0.0000
Tanks	$0	0.0%	$0.0000
Labor	$0	0.0%	$0.0000
OEM	($56,822)	26.1%	($0.0062)
Subtotal	($56,822)	26.1%	($0.0062)
Operating			
Station Maint.	($14,140)	6.5%	($0.0015)
Labor - fuel time loss	($4,839)	2.2%	($0.0005)
Propane Fuel Tax	($76,292)	35.1%	($0.0083)
Additional training	$0	0.0%	$0.0000
Subtotal	($95,271)	43.8%	($0.0103)
Total Costs	($217,512)	100.0%	($0.0236)
Savings - Cost	$3,279	N/A	$0.0004

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	19	20.8	11,171	$1,600	$400
Light Trucks	54	13.3	11,575	$1,190	$400
Heavy Duty Gasoline	4	5.8	10,024	$1,200	$450
Heavy Duty Diesel	11	7.5	11,077	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	88				

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 1.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Benefit/vehicle/year	$3.95
Incremental Benefit/mile	$0.0004

APPENDIX S

NPV COST-EFFECTIVENESS MODEL: OEM VEHICLES, EXCLUDING DIESEL

Immediate OEM

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$8,439	100.0%	$0.0124
Automobiles	$1,593	18.9%	$0.0075
Light Trucks	$4,114	48.8%	$0.0119
Heavy Duty Trucks	$2,732	32.4%	$0.0224
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$8,439	100.0%	$0.0124
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	6.4%	($0.0024)
Storage/Dispenser	($10,366)	41.7%	($0.0153)
Subtotal	($11,964)	48.1%	($0.0176)
Vehicle			
Conversion Kit	$0	0.0%	$0.0000
Tanks	$0	0.0%	$0.0000
Labor	$0	0.0%	$0.0000
OEM	($3,297)	13.3%	($0.0049)
Subtotal	($3,297)	13.3%	($0.0049)
Operating			
Station Maint.	($4,713)	19.0%	($0.0069)
Labor - fuel time loss	($137)	0.6%	($0.0002)
Propane Fuel Tax	($4,751)	19.1%	($0.0070)
Additional training	$0	0.0%	$0.0000
Subtotal	($9,602)	38.6%	($0.0141)
Total Costs	($24,863)	100.0%	($0.0366)
Savings - Cost	($16,425)	N/A	($0.0242)

Fleet Size
1-10

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	20.3	22,509	$1,600	$400
Light Trucks	2	12.8	18,327	$1,190	$400
Heavy Duty Gasoline	1	6.8	12,930	$1,200	$450
Heavy Duty Diesel	0	8.1	13,511	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	4				

DISCOUNT RATE	10.0%

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 1.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($435.58)
Incremental Cost/mile	($0.0242)

Immediate OEM

Fleet Size
11-20

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$16,445	100.0%	$0.0136
Automobiles	$1,729	10.5%	$0.0080
Light Trucks	$8,892	54.1%	$0.0117
Heavy Duty Trucks	$5,824	35.4%	$0.0250
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$16,445	100.0%	$0.0136
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	4.9%	($0.0013)
Storage/Dispenser	($10,366)	32.0%	($0.0086)
Subtotal	($11,964)	37.0%	($0.0099)
Vehicle			
Conversion Kit	$0	0.0%	$0.0000
Tanks	$0	0.0%	$0.0000
Labor	$0	0.0%	$0.0000
OEM	($5,889)	18.2%	($0.0049)
Subtotal	($5,889)	18.2%	($0.0049)
Operating			
Station Maint.	($4,713)	14.6%	($0.0039)
Labor - fuel time loss	($276)	0.9%	($0.0002)
Propane Fuel Tax	($9,502)	29.4%	($0.0079)
Additional training	$0	0.0%	$0.0000
Subtotal	($14,491)	44.8%	($0.0120)
Total Costs	($32,345)	100.0%	($0.0268)
Savings - Cost	($15,900)	N/A	($0.0132)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	19.0	22,861	$1,600	$400
Light Trucks	5	13.0	16,093	$1,190	$400
Heavy Duty Gasoline	2	6.1	12,365	$1,200	$450
Heavy Duty Diesel	0	8.4	12,206	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	8				

DISCOUNT RATE	10.0%

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 1.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($210.83)
Incremental Cost/mile	($0.0132)

Immediate OEM

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$30,088	100.0%	$0.0129
Automobiles	$2,466	8.2%	$0.0079
Light Trucks	$19,469	64.7%	$0.0114
Heavy Duty Trucks	$8,153	27.1%	$0.0272
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$30,088	100.0%	$0.0129
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	3.4%	($0.0007)
Storage/Dispenser	($10,366)	22.3%	($0.0045)
Subtotal	($11,964)	25.7%	($0.0051)
Vehicle			
Conversion Kit	$0	0.0%	$0.0000
Tanks	$0	0.0%	$0.0000
Labor	$0	0.0%	$0.0000
OEM	($12,009)	25.8%	($0.0052)
Subtotal	($12,009)	25.8%	($0.0052)
Operating			
Station Maint.	($4,713)	10.1%	($0.0020)
Labor - fuel time loss	($467)	1.0%	($0.0002)
Propane Fuel Tax	($17,364)	37.3%	($0.0075)
Additional training	$0	0.0%	$0.0000
Subtotal	($22,545)	48.5%	($0.0097)
Total Costs	($46,519)	100.0%	($0.0200)
Savings - Cost	($16,430)	N/A	($0.0071)

Fleet Size
21-30

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	2	19.4	16,650	$1,600	$400
Light Trucks	13	13.4	13,969	$1,190	$400
Heavy Duty Gasoline	3	5.6	10,594	$1,200	$450
Heavy Duty Diesel	0	8.1	11,616	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	18				

DISCOUNT RATE	10.0%

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 1.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($96.83)

Incremental Cost/mile	($0.0071)

Immediate OEM

Fleet Size
31-50

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$42,006	100.0%	$0.0128
Automobiles	$3,367	8.0%	$0.0079
Light Trucks	$28,722	68.4%	$0.0115
Heavy Duty Trucks	$9,917	23.6%	$0.0277
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$42,006	100.0%	$0.0128
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	2.7%	($0.0005)
Storage/Dispenser	($10,366)	17.5%	($0.0032)
Subtotal	($11,964)	20.2%	($0.0036)
Vehicle			
Conversion Kit	$0	0.0%	$0.0000
Tanks	$0	0.0%	$0.0000
Labor	$0	0.0%	$0.0000
OEM	($17,829)	30.2%	($0.0054)
Subtotal	($17,829)	30.2%	($0.0054)
Operating			
Station Maint.	($4,713)	8.0%	($0.0014)
Labor - fuel time loss	($630)	1.1%	($0.0002)
Propane Fuel Tax	($23,982)	40.6%	($0.0073)
Additional training	$0	0.0%	$0.0000
Subtotal	($29,326)	49.6%	($0.0089)
Total Costs	($59,119)	100.0%	($0.0180)
Savings - Cost	($17,113)	N/A	($0.0052)

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	3	19.2	15,000	$1,600	$400
Light Trucks	20	13.3	13,295	$1,190	$400
Heavy Duty Gasoline	4	5.5	9,492	$1,200	$450
Heavy Duty Diesel	0	7.8	12,248	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	27				

DISCOUNT RATE	10.0%

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 1.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($67.23)
Incremental Cost/mile	($0.0052)

Immediate OEM

Fleet Size
51 and up

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$218,418	100.0%	$0.0264
Automobiles	$34,763	15.9%	$0.0174
Light Trucks	$160,104	73.3%	$0.0272
Heavy Duty Trucks	$23,551	10.8%	$0.0623
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$218,418	100.0%	$0.0264
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	4.5%	($0.0011)
Storage/Dispenser	($56,672)	29.1%	($0.0069)
Subtotal	($65,418)	33.6%	($0.0079)
Vehicle			
Conversion Kit	$0	0.0%	$0.0000
Tanks	$0	0.0%	$0.0000
Labor	$0	0.0%	$0.0000
OEM	($46,520)	23.9%	($0.0056)
Subtotal	($46,520)	23.9%	($0.0056)
Operating			
Station Maint.	($14,140)	7.3%	($0.0017)
Labor - fuel time loss	($1,200)	0.6%	($0.0001)
Propane Fuel Tax	($67,365)	34.6%	($0.0081)
Additional training	$0	0.0%	$0.0000
Subtotal	($82,705)	42.5%	($0.0100)
Total Costs	($194,644)	100.0%	($0.0235)
Savings - Cost	$23,774	N/A	$0.0029

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	19	20.8	11,171	$1,600	$400
Light Trucks	54	13.3	11,575	$1,190	$400
Heavy Duty Gasoline	4	5.8	10,024	$1,200	$450
Heavy Duty Diesel	0	7.5	11,077	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	77				

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 1.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Benefit/vehicle/year	$32.75
Incremental Benefit/mile	$0.0029

APPENDIX T

NPV COST-EFFECTIVENESS MODEL: COMBINATION ANALYSIS SCENARIO 1

Combination Analysis

Vehicle Purchase Adjust.	$14,577	63.3%	$0.0214
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$8,439	36.7%	$0.0124
Automobiles	$1,593	6.9%	$0.0075
Light Trucks	$4,114	17.9%	$0.0119
Heavy Duty Trucks	$2,732	11.9%	$0.0224
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$23,016	100.0%	$0.0339
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	6.5%	($0.0024)
Storage/Dispenser	($10,366)	42.3%	($0.0153)
Subtotal	($11,964)	48.9%	($0.0176)
Vehicle			
Conversion Kit	$0	0.0%	$0.0000
Tanks	$0	0.0%	$0.0000
Labor	$0	0.0%	$0.0000
OEM	($2,918)	11.9%	($0.0043)
Subtotal	($2,918)	11.9%	($0.0043)
Operating			
Station Maint.	($4,713)	19.3%	($0.0069)
Labor - fuel time loss	($137)	0.6%	($0.0002)
Propane Fuel Tax	($4,751)	19.4%	($0.0070)
Additional training	$0	0.0%	$0.0000
Subtotal	($9,602)	39.2%	($0.0141)
Total Costs	($24,484)	100.0%	($0.0360)
Savings - Cost	($1,468)	N/A	($0.0022)

Fleet Size
1-10

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	20.3	22,509	$1,600	$400
Light Trucks	2	12.8	18,327	$1,190	$400
Heavy Duty Gasoline	1	6.8	12,930	$1,200	$450
Heavy Duty Diesel	0	8.1	13,511	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	4				

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 1.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	99,000
Light Trucks	99,000
Heavy Duty Gasoline	99,000
Heavy Duty Diesel	165,000

Cost/vehicle/year	($38.94)
Incremental Cost/mile	($0.0022)

Combination Analysis

Vehicle Purchase Adjust.	$21,539	56.7%	$0.0178
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$16,445	43.3%	$0.0136
Automobiles	$1,729	4.6%	$0.0080
Light Trucks	$8,892	23.4%	$0.0117
Heavy Duty Trucks	$5,824	15.3%	$0.0250
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$37,984	100.0%	$0.0315
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	5.0%	($0.0013)
Storage/Dispenser	($10,366)	32.5%	($0.0086)
Subtotal	($11,964)	37.5%	($0.0099)
Vehicle			
Conversion Kit	$0	0.0%	$0.0000
Tanks	$0	0.0%	$0.0000
Labor	$0	0.0%	$0.0000
OEM	($5,430)	17.0%	($0.0045)
Subtotal	($5,430)	17.0%	($0.0045)
Operating			
Station Maint.	($4,713)	14.8%	($0.0039)
Labor - fuel time loss	($276)	0.9%	($0.0002)
Propane Fuel Tax	($9,502)	29.8%	($0.0079)
Additional training	$0	0.0%	$0.0000
Subtotal	($14,491)	45.4%	($0.0120)
Total Costs	($31,886)	100.0%	($0.0264)
Savings - Cost	$6,098	N/A	$0.0051

Fleet Size
11-20

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	19.0	22,861	$1,600	$400
Light Trucks	5	13.0	16,093	$1,190	$400
Heavy Duty Gasoline	2	6.1	12,365	$1,200	$450
Heavy Duty Diesel	0	8.4	12,206	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	8				

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 1.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	99,000
Light Trucks	99,000
Heavy Duty Gasoline	99,000
Heavy Duty Diesel	165,000

Benefit/vehicle/year	$80.86
Incremental Benefit/mile	$0.0051

Combination Analysis

Vehicle Purchase Adjust.	$28,201	48.4%	$0.0121
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$30,088	51.6%	$0.0129
Automobiles	$2,466	4.2%	$0.0079
Light Trucks	$19,469	33.4%	$0.0114
Heavy Duty Trucks	$8,153	14.0%	$0.0272
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$58,289	100.0%	$0.0251
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	3.5%	($0.0007)
Storage/Dispenser	($10,366)	22.7%	($0.0045)
Subtotal	($11,964)	26.2%	($0.0051)
Vehicle			
Conversion Kit	$0	0.0%	$0.0000
Tanks	$0	0.0%	$0.0000
Labor	$0	0.0%	$0.0000
OEM	($11,177)	24.5%	($0.0048)
Subtotal	($11,177)	24.5%	($0.0048)
Operating			
Station Maint.	($4,713)	10.3%	($0.0020)
Labor - fuel time loss	($467)	1.0%	($0.0002)
Propane Fuel Tax	($17,364)	38.0%	($0.0075)
Additional training	$0	0.0%	$0.0000
Subtotal	($22,545)	49.3%	($0.0097)
Total Costs	($45,687)	100.0%	($0.0196)
Savings - Cost	$12,603	N/A	$0.0054

Fleet Size
21-30

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	2	19.4	16,650	$1,600	$400
Light Trucks	13	13.4	13,969	$1,190	$400
Heavy Duty Gasoline	3	5.6	10,594	$1,200	$450
Heavy Duty Diesel	0	8.1	11,616	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	18				

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 1.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	99,000
Light Trucks	99,000
Heavy Duty Gasoline	99,000
Heavy Duty Diesel	165,000

Benefit/vehicle/year	$74.27
Incremental Benefit/mile	$0.0054

Combination Analysis

Vehicle Purchase Adjust.	$46,348	52.5%	$0.0141
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$42,006	47.5%	$0.0128
Automobiles	$3,367	3.8%	$0.0079
Light Trucks	$28,722	32.5%	$0.0115
Heavy Duty Trucks	$9,917	11.2%	$0.0277
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$88,354	100.0%	$0.0269
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	2.8%	($0.0005)
Storage/Dispenser	($10,366)	17.9%	($0.0032)
Subtotal	($11,964)	20.7%	($0.0036)
Vehicle			
Conversion Kit	$0	0.0%	$0.0000
Tanks	$0	0.0%	$0.0000
Labor	$0	0.0%	$0.0000
OEM	($16,536)	28.6%	($0.0050)
Subtotal	($16,536)	28.6%	($0.0050)
Operating			
Station Maint.	($4,713)	8.2%	($0.0014)
Labor - fuel time loss	($630)	1.1%	($0.0002)
Propane Fuel Tax	($23,982)	41.5%	($0.0073)
Additional training	$0	0.0%	$0.0000
Subtotal	($29,326)	50.7%	($0.0089)
Total Costs	($57,826)	100.0%	($0.0176)
Savings - Cost	$30,528	N/A	$0.0093

Fleet Size
31-50

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	3	19.2	15,000	$1,600	$400
Light Trucks	20	13.3	13,295	$1,190	$400
Heavy Duty Gasoline	4	5.5	9,492	$1,200	$450
Heavy Duty Diesel	0	7.8	12,248	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	27				

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 1.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	99,000
Light Trucks	99,000
Heavy Duty Gasoline	99,000
Heavy Duty Diesel	165,000

Benefit/vehicle/year	$119.94
Incremental Benefit/mile	$0.0093

Combination Analysis

Vehicle Purchase Adjust.	$79,588	26.7%	$0.0096
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$218,418	73.3%	$0.0264
Automobiles	$34,763	11.7%	$0.0174
Light Trucks	$160,104	53.7%	$0.0272
Heavy Duty Trucks	$23,551	7.9%	$0.0623
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$298,006	100.0%	$0.0360
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	4.5%	($0.0011)
Storage/Dispenser	($56,672)	29.4%	($0.0069)
Subtotal	($65,418)	33.9%	($0.0079)
Vehicle			
Conversion Kit	$0	0.0%	$0.0000
Tanks	$0	0.0%	$0.0000
Labor	$0	0.0%	$0.0000
OEM	($44,781)	23.2%	($0.0054)
Subtotal	($44,781)	23.2%	($0.0054)
Operating			
Station Maint.	($14,140)	7.3%	($0.0017)
Labor - fuel time loss	($1,200)	0.6%	($0.0001)
Propane Fuel Tax	($67,365)	34.9%	($0.0081)
Additional training	$0	0.0%	$0.0000
Subtotal	($82,705)	42.9%	($0.0100)
Total Costs	($192,905)	100.0%	($0.0233)
Savings - Cost	$105,101	N/A	$0.0127

Fleet Size
51 and up

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	19	20.8	11,171	$1,600	$400
Light Trucks	54	13.3	11,575	$1,190	$400
Heavy Duty Gasoline	4	5.8	10,024	$1,200	$450
Heavy Duty Diesel	0	7.5	11,077	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	77				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 1.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	99,000
Light Trucks	99,000
Heavy Duty Gasoline	99,000
Heavy Duty Diesel	165,000

Benefit/vehicle/year	$144.79
Incremental Benefit/mile	$0.0127

APPENDIX U

NPV COST-EFFECTIVENESS MODEL: COMBINATION ANALYSIS SCENARIO 2

Combination Analysis

(10% Extended Life, No diesel, 35% Vehicle Cost Reduction)

Vehicle Purchase Adjust.	$14,577	73.0%	$0.0214
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$5,399	27.0%	$0.0079
Automobiles	$1,090	5.5%	$0.0051
Light Trucks	$2,675	13.4%	$0.0077
Heavy Duty Trucks	$1,634	8.2%	$0.0134
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$19,976	100.0%	$0.0294
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	6.1%	($0.0024)
Storage/Dispenser	($10,366)	39.8%	($0.0153)
Subtotal	($11,964)	45.9%	($0.0176)
Vehicle			
Conversion Kit	($1,397)	5.4%	($0.0021)
Tanks	($767)	2.9%	($0.0011)
Labor	($1,563)	6.0%	($0.0023)
OEM	($446)	1.7%	($0.0007)
Subtotal	($4,174)	16.0%	($0.0061)
Operating			
Station Maint.	($4,713)	18.1%	($0.0069)
Labor - fuel time loss	($471)	1.8%	($0.0007)
Propane Fuel Tax	($4,751)	18.2%	($0.0070)
Additional training	$0	0.0%	$0.0000
Subtotal	($9,936)	38.1%	($0.0146)
Total Costs	($26,074)	100.0%	($0.0384)
Savings - Cost	($6,097)	N/A	($0.0090)

Fleet Size
1-10

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	20.3	22,509	$1,040	$260
Light Trucks	2	12.8	18,327	$774	$260
Heavy Duty Gasoline	1	6.8	12,930	$780	$293
Heavy Duty Diesel	0	1.0	1	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	4				

DISCOUNT RATE	10.0%

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:
   - Automobiles 99,000
   - Light Trucks 99,000
   - Heavy Duty Gasoline 99,000
   - Heavy Duty Diesel 165,000

Cost/vehicle/year	($161.70)
Incremental Cost/mile	($0.0090)

Combination Analysis

(10% Extended Life, No diesel, 35% Vehicle Cost Reduction)

Vehicle Purchase Adjust.	$21,539	68.1%	$0.0178
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$10,084	31.9%	$0.0084
Automobiles	$1,183	3.7%	$0.0055
Light Trucks	$5,529	17.5%	$0.0073
Heavy Duty Trucks	$3,372	10.7%	$0.0145
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$31,623	100.0%	$0.0262
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	4.6%	($0.0013)
Storage/Dispenser	($10,366)	29.7%	($0.0086)
Subtotal	($11,964)	34.3%	($0.0099)
Vehicle			
Conversion Kit	($2,767)	7.9%	($0.0023)
Tanks	($1,502)	4.3%	($0.0012)
Labor	($2,813)	8.1%	($0.0023)
OEM	($697)	2.0%	($0.0006)
Subtotal	($7,779)	22.3%	($0.0064)
Operating			
Station Maint.	($4,713)	13.5%	($0.0039)
Labor - fuel time loss	($968)	2.8%	($0.0008)
Propane Fuel Tax	($9,502)	27.2%	($0.0079)
Additional training	$0	0.0%	$0.0000
Subtotal	($15,184)	43.5%	($0.0126)
Total Costs	($34,927)	100.0%	($0.0289)
Savings - Cost	($3,304)	N/A	($0.0027)

Fleet Size
11-20

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	19.0	22,861	$1,040	$260
Light Trucks	5	13.0	16,093	$774	$260
Heavy Duty Gasoline	2	6.1	12,365	$780	$293
Heavy Duty Diesel	0	1.0	1	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	8				

DISCOUNT RATE	10.0%

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	99,000
Light Trucks	99,000
Heavy Duty Gasoline	99,000
Heavy Duty Diesel	165,000

Cost/vehicle/year	($43.81)
Incremental Cost/mile	($0.0027)

Combination Analysis

(10% Extended Life, No diesel, 35% Vehicle Cost Reduction)

Vehicle Purchase Adjust.	$28,201	60.0%	$0.0121
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$18,833	40.0%	$0.0081
Automobiles	$1,603	3.4%	$0.0051
Light Trucks	$11,648	24.8%	$0.0068
Heavy Duty Trucks	$5,581	11.9%	$0.0186
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$47,034	100.0%	$0.0202
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	3.0%	($0.0007)
Storage/Dispenser	($10,366)	19.7%	($0.0045)
Subtotal	($11,964)	22.8%	($0.0051)
Vehicle			
Conversion Kit	($6,208)	11.8%	($0.0027)
Tanks	($3,361)	6.4%	($0.0014)
Labor	($5,876)	11.2%	($0.0025)
OEM	($1,376)	2.6%	($0.0006)
Subtotal	($16,819)	32.0%	($0.0072)
Operating			
Station Maint.	($4,713)	9.0%	($0.0020)
Labor - fuel time loss	($1,720)	3.3%	($0.0007)
Propane Fuel Tax	($17,364)	33.0%	($0.0075)
Additional training	$0	0.0%	$0.0000
Subtotal	($23,798)	45.3%	($0.0102)
Total Costs	($52,582)	100.0%	($0.0226)
Savings - Cost	($5,548)	N/A	($0.0024)

Fleet Size
21-30

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	2	19.4	16,650	$1,040	$260
Light Trucks	13	13.4	13,969	$774	$260
Heavy Duty Gasoline	3	5.6	10,594	$780	$293
Heavy Duty Diesel	0	1.0	1	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	18				

DISCOUNT RATE	10.0%

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	99,000
Light Trucks	99,000
Heavy Duty Gasoline	99,000
Heavy Duty Diesel	165,000

Cost/vehicle/year	($32.69)
Incremental Cost/mile	($0.0024)

Combination Analysis

(10% Extended Life, No diesel, 35% Vehicle Cost Reduction)

Vehicle Purchase Adjust.	$46,348	64.2%	$0.0141
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$25,888	35.8%	$0.0079
Automobiles	$2,094	2.9%	$0.0049
Light Trucks	$17,184	23.8%	$0.0069
Heavy Duty Trucks	$6,610	9.2%	$0.0185
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$72,236	100.0%	$0.0220
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($1,598)	2.3%	($0.0005)
Storage/Dispenser	($10,366)	15.2%	($0.0032)
Subtotal	($11,964)	17.5%	($0.0036)
Vehicle			
Conversion Kit	($9,365)	13.7%	($0.0028)
Tanks	($5,038)	7.4%	($0.0015)
Labor	($8,809)	12.9%	($0.0027)
OEM	($1,904)	2.8%	($0.0006)
Subtotal	($25,115)	36.8%	($0.0076)
Operating			
Station Maint.	($4,713)	6.9%	($0.0014)
Labor - fuel time loss	($2,431)	3.6%	($0.0007)
Propane Fuel Tax	($23,982)	35.2%	($0.0073)
Additional training	$0	0.0%	$0.0000
Subtotal	($31,126)	45.6%	($0.0095)
Total Costs	($68,206)	100.0%	($0.0207)
Savings - Cost	$4,031	N/A	$0.0012

Fleet Size
31-50

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	3	19.2	15,000	$1,040	$260
Light Trucks	20	13.3	13,295	$774	$260
Heavy Duty Gasoline	4	5.5	9,492	$780	$293
Heavy Duty Diesel	0	1.0	1	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	27				

DISCOUNT RATE	10.0%

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	99,000
Light Trucks	99,000
Heavy Duty Gasoline	99,000
Heavy Duty Diesel	165,000

Benefit/vehicle/year	$15.84
Incremental Benefit/mile	$0.0012

Combination Analysis

(10% Extended Life, No diesel, 35% Vehicle Cost Reduction)

Vehicle Purchase Adjust.	$79,588	29.4%	$0.0096
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$191,374	70.6%	$0.0231
Automobiles	$30,339	11.2%	$0.0152
Light Trucks	$139,729	51.6%	$0.0237
Heavy Duty Trucks	$21,306	7.9%	$0.0564
Diesel Price Diff.	$0	0.0%	$0.0000
Maintenance	$0	0.0%	$0.0000
Total Savings	$270,962	100.0%	$0.0328
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	3.9%	($0.0011)
Storage/Dispenser	($56,672)	25.0%	($0.0069)
Subtotal	($65,418)	28.9%	($0.0079)
Vehicle			
Conversion Kit	($28,133)	12.4%	($0.0034)
Tanks	($14,658)	6.5%	($0.0018)
Labor	($27,173)	12.0%	($0.0033)
OEM	($3,986)	1.8%	($0.0005)
Subtotal	($73,950)	32.7%	($0.0089)
Operating			
Station Maint.	($14,140)	6.2%	($0.0017)
Labor - fuel time loss	($5,520)	2.4%	($0.0007)
Propane Fuel Tax	($67,365)	29.8%	($0.0081)
Additional training	$0	0.0%	$0.0000
Subtotal	($87,025)	38.4%	($0.0105)
Total Costs	($226,393)	100.0%	($0.0274)
Savings - Cost	$44,569	N/A	$0.0054

Fleet Size
51 and up

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	19	20.8	11,171	$1,040	$260
Light Trucks	54	13.3	11,575	$774	$260
Heavy Duty Gasoline	4	5.8	10,024	$780	$293
Heavy Duty Diesel	0	1.0	1	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	77				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	99,000
Light Trucks	99,000
Heavy Duty Gasoline	99,000
Heavy Duty Diesel	165,000

Benefit/vehicle/year	$61.40
Incremental Benefit/mile	$0.0054

APPENDIX V

NPV COST-EFFECTIVENESS MODEL: OPERATING AND INFRASTRUCTURE COSTS

Vehicle Purchase Adjust.		0.0%	$0.0000
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$5,550	-46.9%	$0.0082
Automobiles	$1,036	-8.8%	$0.0049
Light Trucks	$2,816	-23.8%	$0.0081
Heavy Duty Trucks	$1,698	-14.4%	$0.0139
Diesel Price Diff.	($17,386)	146.9%	($0.0328)
Maintenance	$0	0.0%	$0.0000
Total Savings	($11,836)	100.0%	($0.0098)
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($848)	2.3%	($0.0007)
Storage/Dispenser	($5,510)	15.1%	($0.0046)
Subtotal	($6,358)	17.4%	($0.0053)
Vehicle			
Conversion Kit	($6,556)	18.0%	($0.0054)
Tanks	($2,210)	6.1%	($0.0018)
Labor	($6,482)	17.8%	($0.0054)
OEM	($2,443)	6.7%	($0.0020)
Subtotal	($17,691)	48.5%	($0.0146)
Operating			
Station Maint.	($2,357)	6.5%	($0.0019)
Labor - fuel time loss	($1,295)	3.5%	($0.0011)
Propane Fuel Tax	($8,809)	24.1%	($0.0073)
Additional training	$0	0.0%	$0.0000
Subtotal	($12,460)	34.1%	($0.0103)
Total Costs	($36,509)	100.0%	($0.0302)
Savings - Cost	($48,345)	N/A	($0.0399)

Fleet Size
1-10

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	20.3	22,509	$1,600	$400
Light Trucks	2	12.8	18,327	$1,190	$400
Heavy Duty Gasoline	1	6.8	12,930	$1,200	$450
Heavy Duty Diesel	5	8.1	13,511	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	9				

FUEL PRICES	
Small Volume	
Propane Price/gallon	$0.60
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$7.50

STATION DESIGN	
Storage tank water volume (gal)	2,000
Number of dispenser hoses	1

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($569.82)

Incremental Cost/mile	($0.0399)

Vehicle Purchase Adjust.		0.0%	$0.0000
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$34,657	104.6%	$0.0287
Automobiles	$3,666	11.1%	$0.0170
Light Trucks	$18,857	56.9%	$0.0249
Heavy Duty Trucks	$12,135	36.6%	$0.0521
Diesel Price Diff.	($1,512)	-4.6%	($0.0023)
Maintenance	$0	0.0%	$0.0000
Total Savings	$33,145	100.0%	$0.0176
COSTS		**% of**	**Incremental**
Infrastructure		**Costs**	**Cost/Mile**
Land	$0	0.0%	$0.0000
Station setup	($4,471)	5.3%	($0.0024)
Storage/Dispenser	($28,989)	34.3%	($0.0154)
Subtotal	($33,460)	39.6%	($0.0178)
Vehicle			
Conversion Kit	($10,467)	12.4%	($0.0056)
Tanks	($3,752)	4.4%	($0.0020)
Labor	($9,962)	11.8%	($0.0053)
OEM	($2,904)	3.4%	($0.0015)
Subtotal	($27,085)	32.0%	($0.0144)
Operating			
Station Maint.	($7,070)	8.4%	($0.0038)
Labor - fuel time loss	($1,776)	2.1%	($0.0009)
Propane Fuel Tax	($15,184)	18.0%	($0.0081)
Additional training	$0	0.0%	$0.0000
Subtotal	($24,029)	28.4%	($0.0128)
Total Costs	($84,575)	100.0%	($0.0450)
Savings - Cost	($51,429)	N/A	($0.0274)

Fleet Size
11-20

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	1	19.0	22,861	$1,600	$400
Light Trucks	5	13.0	16,093	$1,190	$400
Heavy Duty Gasoline	2	6.1	12,365	$1,200	$450
Heavy Duty Diesel	7	8.4	12,206	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	15				

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$7.50

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($363.71)

Incremental Cost/mile	($0.0274)

Vehicle Purchase Adjust.		0.0%	$0.0000
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$62,994	102.8%	$0.0271
Automobiles	$5,229	8.5%	$0.0167
Light Trucks	$40,891	66.7%	$0.0239
Heavy Duty Trucks	$16,874	27.5%	$0.0563
Diesel Price Diff.	($1,705)	-2.8%	($0.0023)
Maintenance	$0	0.0%	$0.0000
Total Savings	$61,289	100.0%	$0.0201
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($4,471)	4.1%	($0.0015)
Storage/Dispenser	($28,989)	26.3%	($0.0095)
Subtotal	($33,460)	30.3%	($0.0110)
Vehicle			
Conversion Kit	($16,861)	15.3%	($0.0055)
Tanks	($6,818)	6.2%	($0.0022)
Labor	($15,626)	14.2%	($0.0051)
OEM	($4,239)	3.8%	($0.0014)
Subtotal	($43,545)	39.5%	($0.0143)
Operating			
Station Maint.	($7,070)	6.4%	($0.0023)
Labor - fuel time loss	($2,351)	2.1%	($0.0008)
Propane Fuel Tax	($23,857)	21.6%	($0.0078)
Additional training	$0	0.0%	$0.0000
Subtotal	($33,279)	30.2%	($0.0109)
Total Costs	($110,283)	100.0%	($0.0361)
Savings - Cost	($48,995)	N/A	($0.0160)

Fleet Size
21-30

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	2	19.4	16,650	$1,600	$400
Light Trucks	13	13.4	13,969	$1,190	$400
Heavy Duty Gasoline	3	5.6	10,594	$1,200	$450
Heavy Duty Diesel	8	8.1	11,616	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	26				

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

Maintenance Savings	0%
Mileage Adj.	0%

DISCOUNT RATE	10.0%

OTHER FACTORS	
Labor Cost ($/hr)	$7.50

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($199.90)

Incremental Cost/mile	($0.0160)

Vehicle Purchase Adjust.		0.0%	$0.0000
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$88,739	102.7%	$0.0270
Automobiles	$7,140	8.3%	$0.0168
Light Trucks	$60,324	69.8%	$0.0241
Heavy Duty Trucks	$21,275	24.6%	$0.0594
Diesel Price Diff.	($2,334)	-2.7%	($0.0024)
Maintenance	$0	0.0%	$0.0000
Total Savings	$86,405	100.0%	$0.0203
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($4,471)	3.3%	($0.0011)
Storage/Dispenser	($28,989)	21.2%	($0.0068)
Subtotal	($33,460)	24.4%	($0.0079)
Vehicle			
Conversion Kit	($23,432)	17.1%	($0.0055)
Tanks	($9,810)	7.2%	($0.0023)
Labor	($21,427)	15.7%	($0.0050)
OEM	($6,391)	4.7%	($0.0015)
Subtotal	($61,060)	44.6%	($0.0144)
Operating			
Station Maint.	($7,070)	5.2%	($0.0017)
Labor - fuel time loss	($3,181)	2.3%	($0.0007)
Propane Fuel Tax	($32,098)	23.5%	($0.0076)
Additional training	$0	0.0%	$0.0000
Subtotal	($42,350)	30.9%	($0.0100)
Total Costs	($136,870)	100.0%	($0.0322)
Savings - Cost	($50,464)	N/A	($0.0119)

Fleet Size
31-50

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	3	19.2	15,000	$1,600	$400
Light Trucks	20	13.3	13,295	$1,190	$400
Heavy Duty Gasoline	4	5.5	9,492	$1,200	$450
Heavy Duty Diesel	10	7.8	12,248	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	37				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$7.50

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:
   - Automobiles 90,000
   - Light Trucks 90,000
   - Heavy Duty Gasoline 90,000
   - Heavy Duty Diesel 150,000

Cost/vehicle/year	($144.68)

Incremental Cost/mile	($0.0119)

Vehicle Purchase Adjust.		0.0%	$0.0000
SAVINGS	**30 year NPV**	**% of Savings**	**Incremental Savings/Mile**
Gasoline Price Diff.	$191,560	101.4%	$0.0232
Automobiles	$30,339	16.1%	$0.0152
Light Trucks	$140,667	74.4%	$0.0239
Heavy Duty Trucks	$20,554	10.9%	$0.0544
Diesel Price Diff.	($2,592)	-1.4%	($0.0027)
Maintenance	$0	0.0%	$0.0000
Total Savings	$188,968	100.0%	$0.0205
COSTS		**% of Costs**	**Incremental Cost/Mile**
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($4,471)	1.7%	($0.0005)
Storage/Dispenser	($28,989)	11.1%	($0.0031)
Subtotal	($33,460)	12.8%	($0.0036)
Vehicle			
Conversion Kit	($53,824)	20.6%	($0.0058)
Tanks	($24,816)	9.5%	($0.0027)
Labor	($51,294)	19.6%	($0.0056)
OEM	($9,457)	3.6%	($0.0010)
Subtotal	($139,391)	53.4%	($0.0151)
Operating			
Station Maint.	($7,070)	2.7%	($0.0008)
Labor - fuel time loss	($4,835)	1.9%	($0.0005)
Propane Fuel Tax	($76,292)	29.2%	($0.0083)
Additional training	$0	0.0%	$0.0000
Subtotal	($88,198)	33.8%	($0.0096)
Total Costs	($261,049)	100.0%	($0.0283)
Savings - Cost	($72,081)	N/A	($0.0078)

Fleet Size
51 and up

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	19	20.8	11,171	$1,600	$400
Light Trucks	54	13.3	11,575	$1,190	$400
Heavy Duty Gasoline	4	5.8	10,024	$1,200	$450
Heavy Duty Diesel	11	7.5	11,077	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	88				

DISCOUNT RATE	10.0%

FUEL PRICES	
Large Volume	
Propane Price/gallon	$0.43
Gasoline Price/gallon	$0.89
Diesel Price/gallon	$0.85

OTHER FACTORS	
Labor Cost ($/hr)	$7.50

STATION DESIGN	
Storage tank water volume (gal)	14,400
Number of dispenser hoses	2

Maintenance Savings	0%
Mileage Adj.	0%

MAJOR ASSUMPTIONS

1. OEM vehicles are available at the beginning of year 11.
2. Diesel conversions are assumed available at the beginning of year 6.
3. Vehicles are sold off at the end of the year when they reach the following mileage totals:

Automobiles	90,000
Light Trucks	90,000
Heavy Duty Gasoline	90,000
Heavy Duty Diesel	150,000

Cost/vehicle/year	($86.89)

Incremental Cost/mile	($0.0078)