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16. Abstract

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# COST-EFFECTIVENESS ANALYSIS OF TxDOT CNG FLEET CONVERSION

by

Mark A. Euritt
Dean B. Taylor
Hani Mahmassani

**Research Report Number 983-2**
**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

August 1992

## Summary

This report summarizes the results of a 30-year compressed natural gas (CNG) life-cycle cost analysis for 314 TxDOT fleet locations. Using the model documented in Research Report Number 983-1, introduction of natural gas vehicles into the TxDOT fleet will cost an estimated $47 million over the next 30 years, or an annual cost of about $5 million. This amounts to an additional $596 per vehicle per year, or about 4.9¢ more per vehicle mile travelled. Based on a number of sensitivity tests, TxDOT can minimize their costs by (1) implementing their CNG-vehicle program at locations with 30 or more 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 compressed natural gas (CNG). Based on an analysis of 30-year life-cycle costs, development of a natural gas vehicle (NGV) program for the Texas Department of Transportation (TxDOT) would cost about $47 million (in 1991 dollars). These costs include savings from lower-priced natural gas, infrastructure costs for a fast-fueling station, vehicle costs, and operating costs. The 30-year life-cycle costs translate into an average annual vehicle cost increase of $596, or about 4.9¢ more per vehicle mile of travel. Sensitivity analyses are performed on the discount rate, price of natural gas, 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 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, a specification, or regulation.

NOT INTENDED FOR CONSTRUCTION,
BIDDING, OR PERMIT PURPOSES

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*Research Supervisors*

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# SECTION 1: INTRODUCTION

## OVERVIEW

Texas, a state rich in natural gas, adopted alternative fuels legislation in 1989. Generally, the legislation requires 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 compressed natural gas (CNG) 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. Consequently, slow-fill is not included in the analysis. The model assumes continuous fast-filling of all near-empty vehicles on a daily basis. Moreover, social benefits, while important, are not incorporated into the model analysis. Importantly, however, if the net

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[1] Dean Taylor, Mark Euritt, and Hani Mahmassani, Documentation For CNG Fleet Conversion Cost-Effectiveness Model, Research Report 983-1, Center for Transportation Research, The University of Texas at Austin, December 1991.

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-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 CNG Fleet Conversion Cost-Effectiveness Model, provides detailed information on all aspects and assumptions of the model.)

1. Dedicated (and optimized) original equipment manufacturer (OEM) natural gas vehicles (NGVs) 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 NGV market, are as follows (figures are in 1991 dollars):

| | Automobiles | Light Trucks | Heavy-Duty Gasoline Trucks | Heavy-Duty Diesel Trucks |
|---|---|---|---|---|
| Conversion Costs: | | | | |
| Kit | $700 | $700 | $700 | $2,000 |
| Labor | $800 | $600 | $600 | $2,350 |
| Tank(s) | $450 | $900 | $2,000 | $2,000 |
| Total | $1,950 | $2,200 | $3,300 | $6,350 |
| OEM differential | $900 | $900 | $900 | $2,800 |

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 $200 and $500 increase in the salvage value of gasoline-converted and diesel-converted vehicles, respectively.

5. For gasoline dual-fuel vehicles, the fuel economy is assumed to be only 95 percent of what it is for a gasoline-only vehicle. For OEMs, the fuel economy is increased by 15 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. Tank recertification costs are $55/tank, including TxDOT labor. Tank recertification costs are discontinued as a separate cost for OEM vehicles.

7. Fuel prices: natural gas (NG) - $2.50/thousand cubic feet (mcf); gasoline $0.89/gallon; diesel $0.85/gallon. The fuel prices do not include federal fuel taxes.

8. Capital fueling infrastructure costs of: dispenser ($25,000); dryer ($10,000); compressor and storage sized to meet continuous fast-filling of all vehicles requiring fueling in a day; setup cost computed at 25 percent of the combined compressor, storage, and dispenser costs.[2]

[2] These dispenser and dryer costs may be too high for small fleet refueling stations. Sensitivity tests on these values are reviewed later in this report.

## SECTION 2: NPV 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**

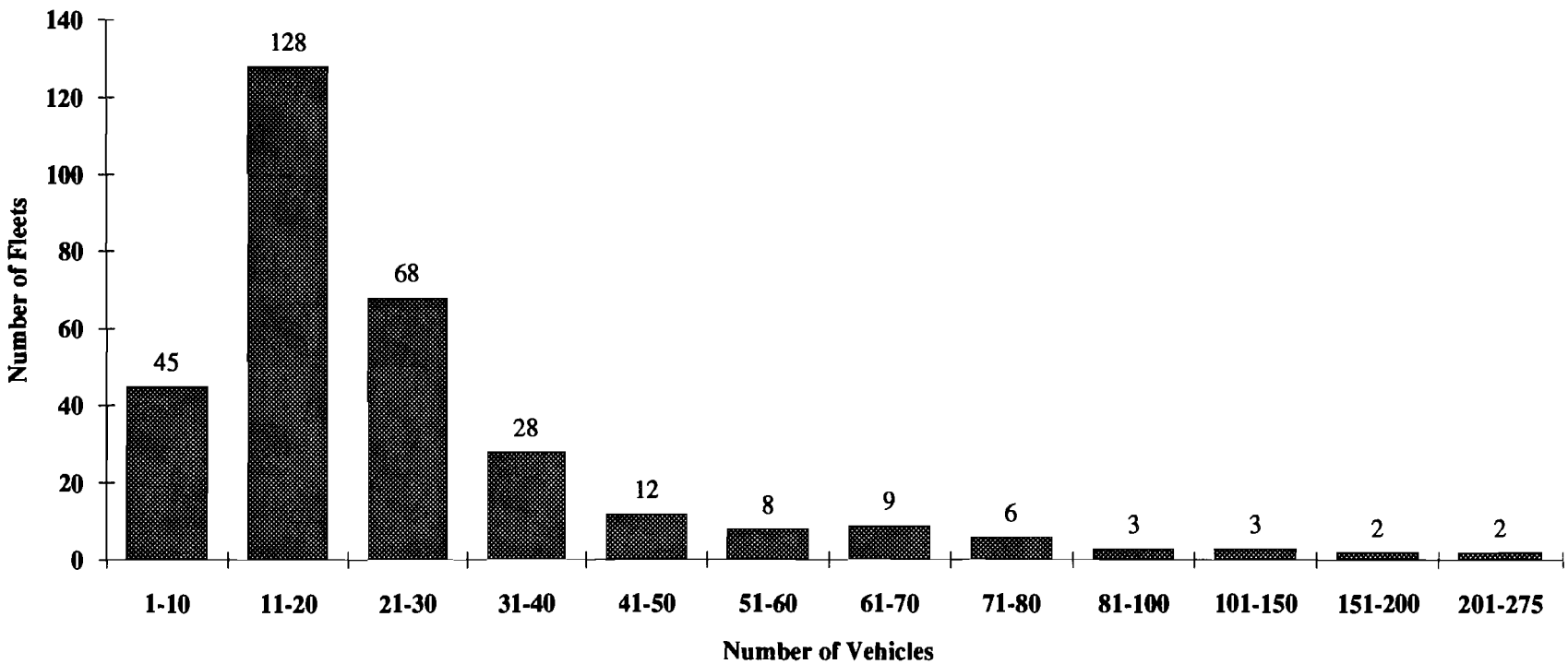


**Table 3**
**Summary Fleet Data for Sensitivity Analyses[a]**

| | 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 natural gas as a fuel versus gasoline and diesel are $42.3 million, however, there are an additional $89.3 million in costs. Overall, implementation of a natural gas fleet for TxDOT would cost $47.1 million over a 30-year period, or $5 million per year annualized. This amounts to an

average annual cost per vehicle increase of $596, or about an additional 4.9¢ 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 $-73,656 in District 29, Garza County, to a high of $-688,548 in District 29, Travis County. The overall distribution for all locations is shown in Figure 2. More than 72 percent of the locations have a 30-year NPV between $-100,000 to $-160,000.

**Table 4**
**Summary CNG NPV Analysis for 314 Locations**

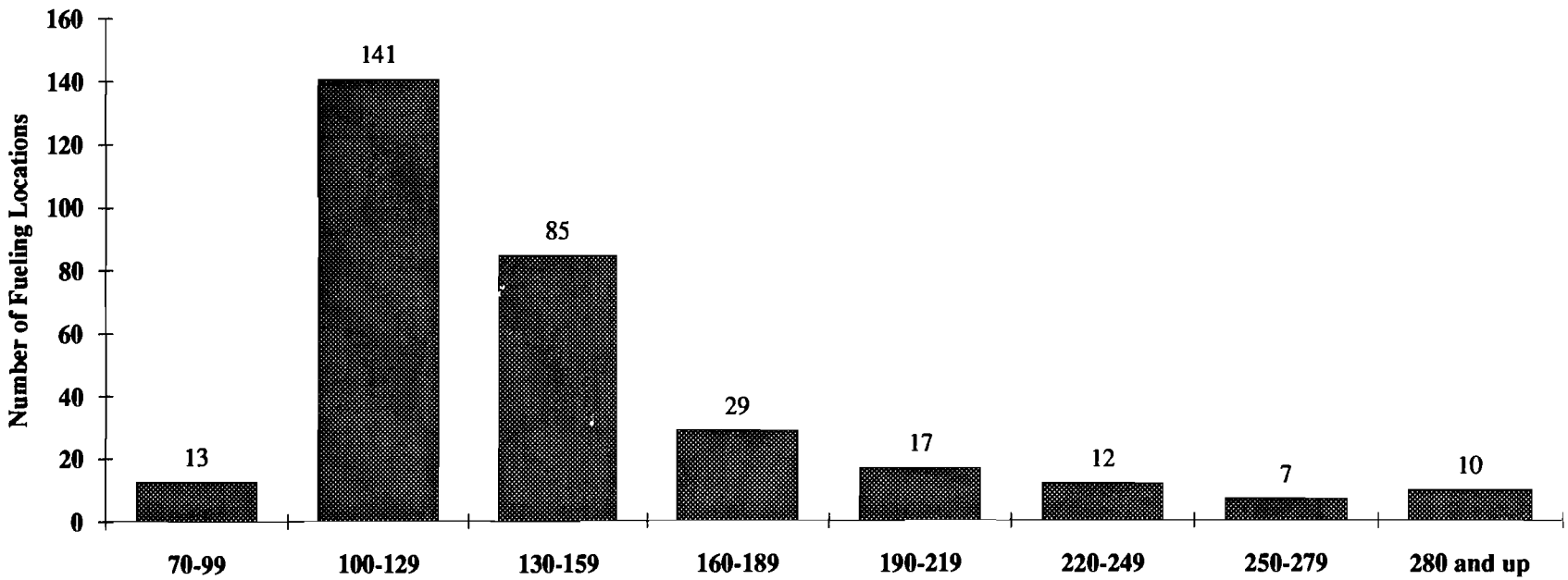
| | 30-Year NPV | % of Subtotal |
|---|---|---|
| Savings Differential: | | |
| Gasoline | $34,582,695 | 81.8 |
| Diesel | $7,702,222 | 18.2 |
| Subtotal | $42,284,918 | 100.0 |
| | | |
| Costs Differential: | | |
| Infrastructure | -$36,950,573 | 41.4 |
| Vehicle | -$26,424,427 | 29.6 |
| Operating | -$25,967,923 | 29.1 |
| Subtotal | -$89,342,924 | 100.0 |
| | | |
| TOTAL | $-47,058,006 | |

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 CNG 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 increase per vehicle ($-229). On the other hand, District 29, Garza County, while ranking first in NPV, ranks 314 on an annual cost increase per vehicle basis. The overall frequency distribution of the annual cost increase 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 increase per vehicle, as illustrated in Figure 4. The exponential relationship between fleet size and annual cost increase per vehicle can be empirically calibrated as follows:

$$y' = 973.31 \times .9899^{f}$$

where y' is the average annual cost increase 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**

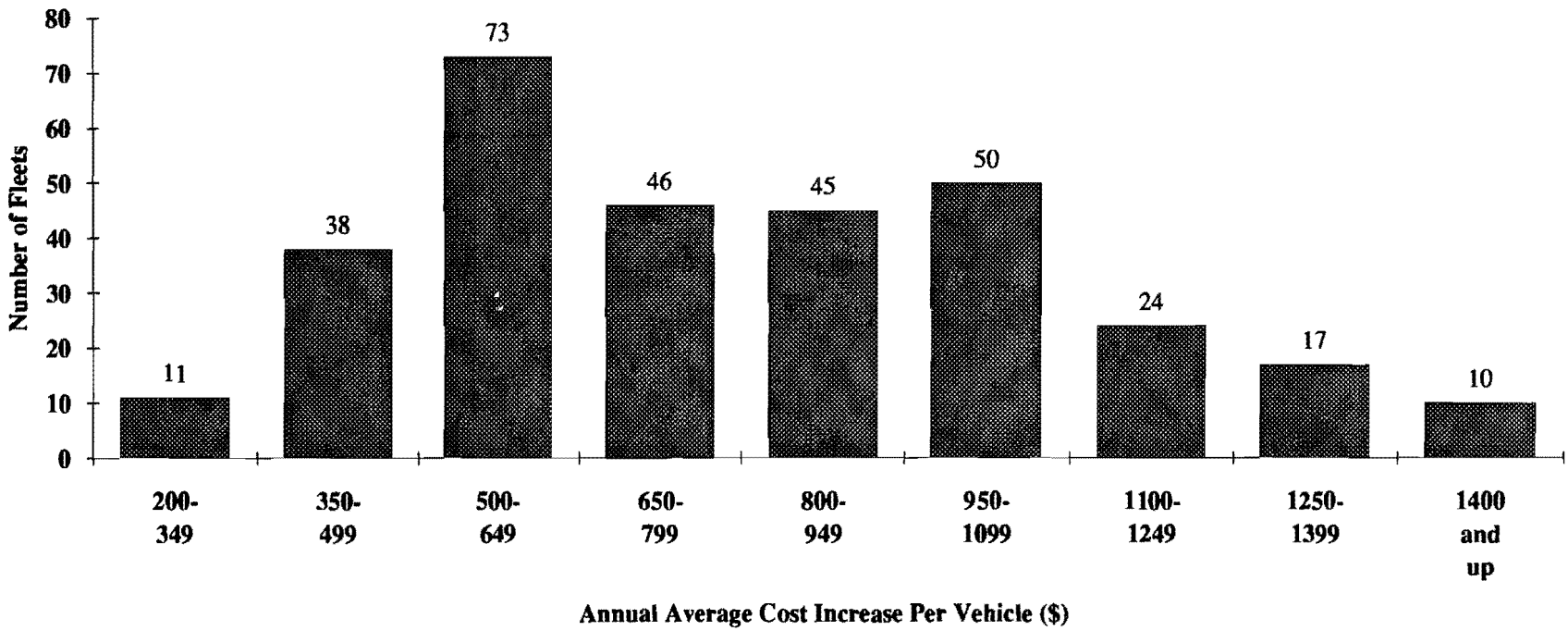
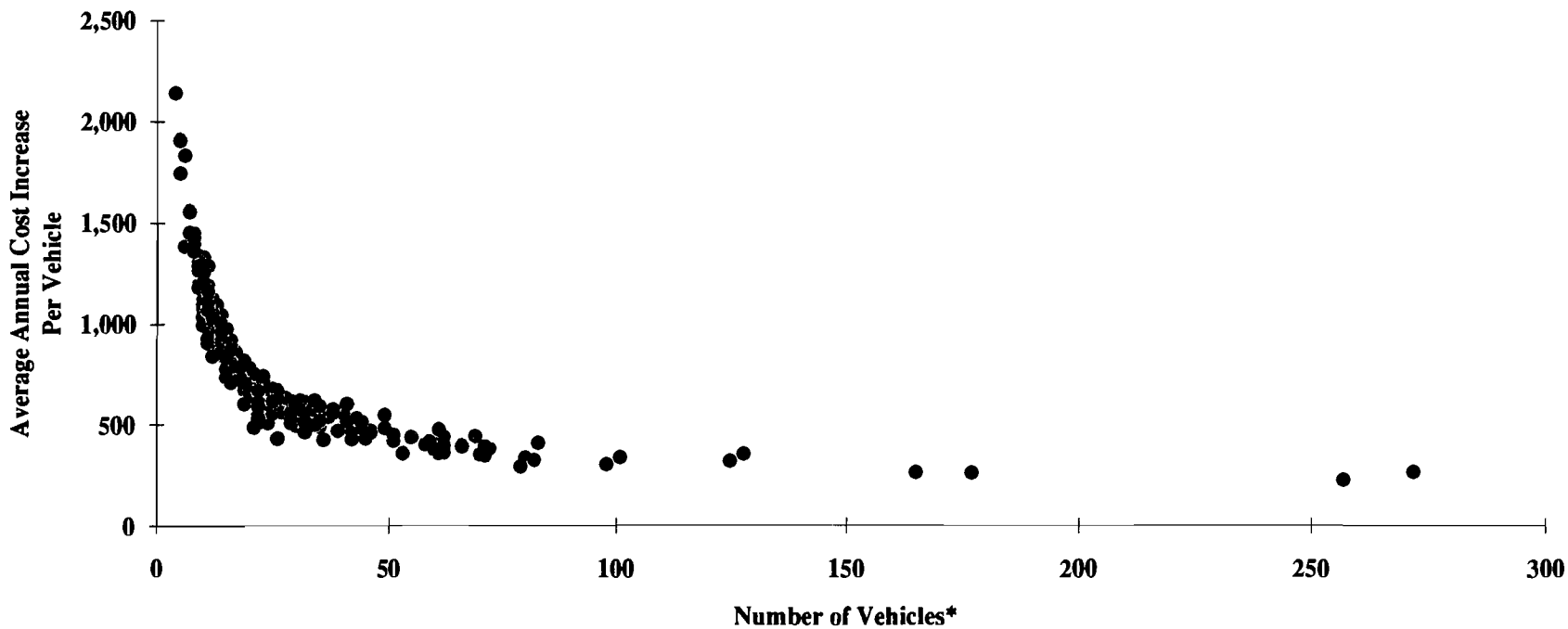


**Figure 4**
**Relationship of Fleet Size to Vehicle Cost**




*Includes only fleets of more than 3 vehicles

## SECTION 3: SENSITIVITY ANALYSES

The NPV model has a number of assumptions with varying affects on cost-effectiveness. Most of the assumptions do not substantially change the conclusions regarding cost-effectiveness of CNG 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 increase per vehicle and cost increase 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.[3]) Basically, infrastructure consists of the fill-station equipment 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 partly fixed, while vehicle and operating are variable, primarily dependent on the number of vehicles in the fleet and their annual mileage. The relatively high infrastructure costs for small fleets translates into very high annual vehicle cost increases and incremental costs per vehicle mile of travel. Consequently, fast-fill stations for these fleets are not recommended unless cheaper components become available in light of rapidly evolving market conditions. More attention should be paid to the larger fleets and/or other fueling strategies.

### DISCOUNT RATE

A ten percent discount rate is used for the analysis, although the model allows for any rate to be selected. Two other 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

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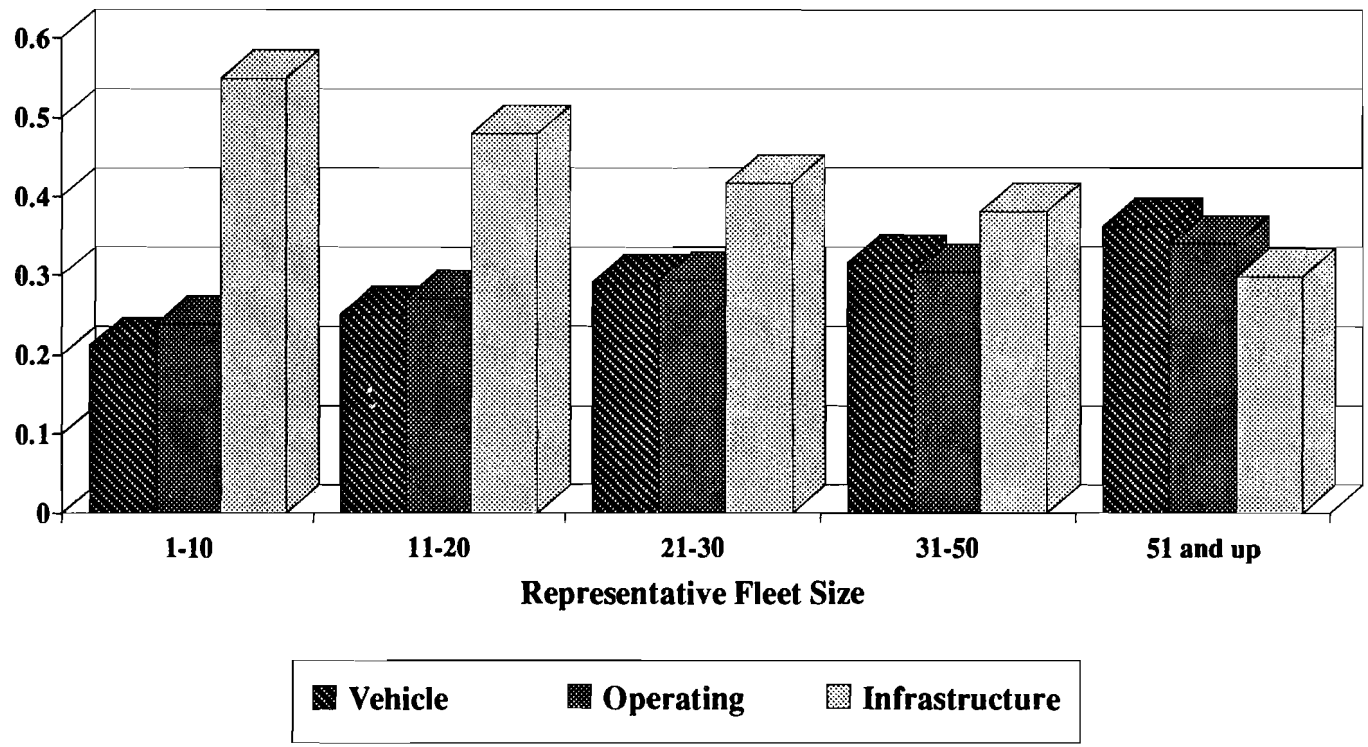
[3] Documentation For CNG Fleet Conversion Cost-Effectiveness Model, Research Report 983-1.

**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 | $32,193 | $62,402 | $113,695 | $159,615 | $346,548 |
| Automobiles | $6,069 | $6,586 | $9,395 | $12,829 | $54,998 |
| Light Trucks | $15,782 | $33,879 | $73,711 | $108,741 | $254,291 |
| Heavy-Duty Trucks | $10,342 | $21,936 | $30,588 | $38,045 | $37,259 |
| Diesel Price Difference | $18,346 | $22,327 | $25,183 | $34,468 | $35,568 |
| Maintenance | $0 | $0 | $0 | $0 | $0 |
| **Total Savings** | **$50,540** | **$84,729** | **$138,878** | **$194,083** | **$382,116** |
| COSTS | | | | | |
| **Infrastructure** | | | | | |
| Land | $0 | $0 | $0 | $0 | $0 |
| Station setup | -$15,880 | -$18,585 | -$22,556 | -$26,920 | -$39,499 |
| Compressor | -$21,193 | -$22,609 | -$24,666 | -$26,983 | -$34,169 |
| Storage Vessels | -$15,876 | -$24,915 | -$38,245 | -$52,759 | -$94,415 |
| Dispenser | -$24,857 | -$24,857 | -$24,857 | -$24,857 | -$24,857 |
| Dryer | -$9,943 | -$9,943 | -$9,943 | -$9,943 | -$9,943 |
| **Subtotal** | -$87,747 | -$100,908 | -$120,267 | -$141,462 | -$202,882 |
| **Vehicle** | | | | | |
| Conversion Kit | -$7,749 | -$12,504 | -$20,141 | -$27,960 | -$62,612 |
| Tanks | -$9,895 | -$16,853 | -$27,632 | -$38,639 | -$77,568 |
| Labor | -$11,026 | -$17,170 | -$26,966 | -$36,895 | -$85,118 |
| OEM | -$5,178 | -$6,199 | -$9,186 | -$13,853 | -$20,986 |
| **Subtotal** | -$33,848 | -$52,725 | -$83,925 | -$117,348 | -$246,284 |
| **Operating** | | | | | |
| Station Maintenance | -$5,650 | -$8,753 | -$13,359 | -$18,411 | -$33,913 |
| Cylinder Recert. | -$1,927 | -$3,666 | -$6,274 | -$8,326 | -$19,242 |
| Power | -$13,846 | -$17,473 | -$22,902 | -$28,825 | -$46,907 |
| Labor - fuel time loss | -$7,976 | -$11,756 | -$18,306 | -$25,457 | -$54,767 |
| NG Fuel Tax | -$8,809 | -$15,184 | -$23,857 | -$32,098 | -$76,292 |
| Additional Training | $0 | $0 | $0 | $0 | $0 |
| **Subtotal** | -$38,208 | -$56,831 | -$84,699 | -$113,117 | -$231,120 |
| **Total Costs** | **-$159,803** | **-$210,464** | **-$288,890** | **-$371,926** | **-$680,287** |
| | | | | | |
| **Savings - Cost** | **-$109,264** | **-$125,735** | **-$150,013** | **-$177,842** | **-$298,171** |
| **Annual Cost Increase per Vehicle** | -$1,288 | -$889 | -$612 | -$510 | -$359 |
| **Incremental Cost/mile** | ($0.0903) | ($0.0669) | ($0.0491) | ($0.0418) | ($0.0323) |

**Figure 5**
**Cost Component Distributions for Vehicle Fleets**



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. 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. The timing of costs and benefits also is the factor behind the unusual change in the net present value for the 11-20 fleet group. As the discount rate increases from zero to five percent, the net present value decreases, but as the discount rate increases from five percent to ten percent, the net present value increases slightly.

Overall, regardless of the discount rate selected, the net present value and the annual cost increase per vehicle is negative for all five fleet sizes.

**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 | 89,585 | 147,369 | 237,693 | 332,199 | 642,362 |
| Total Costs | -206,807 | -237,130 | -374,881 | -485,176 | -882,350 |
| 30-year NPV | -117,221 | -125,761 | -137,188 | -152,977 | -239,988 |
| Annual Cost Increase Per vehicle | -847 | -545 | -343 | -269 | -177 |

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

| | Fleet Size | | | | |
|---|---|---|---|---|---|
| | 1-10 | 11-20 | 21-30 | 31-50 | 51 & up |
| Total Savings | 189,005 | 306,174 | 487,226 | 680,582 | 1,296,568 |
| Total Costs | -307,773 | -402,329 | -556,632 | -725,014 | -1,321,677 |
| 30-year NPV | -118,769 | -96,155 | -69,406 | -44,432 | -25,110 |
| Annual Cost Increase per vehicle | -440 | -214 | -89 | -40 | -10 |

## FUEL PRICES

The major benefit of moving to natural gas as an alternative fuel is that it is historically less expensive on an energy basis than gasoline and diesel. A price of $2.50/mcf was

selected for the base case analysis. Initially, two alternate prices of $1.00/mcf and free natural gas were used. The results for the five fleets are summarized in Tables 8 and 9. (The detailed results can be found in Appendices E and F.)

**Table 8**
**Savings and NPV for $1.00/mcf Natural Gas**
**(figures in $)**

| | Fleet Size | | | | |
|---|---|---|---|---|---|
| | 1-10 | 11-20 | 21-30 | 31-50 | 51 & up |
| Gasoline Savings | 42,340 | 82,366 | 150,477 | 210,474 | 459,918 |
| Diesel Savings | 31,312 | 38,169 | 43,050 | 58,924 | 60,926 |
| Total Savings | 73,652 | 120,535 | 193,527 | 269,398 | 520,844 |
| Total Costs | -159,803 | -210,465 | -288,890 | -371,926 | -680,287 |
| 30-year NPV | -86,151 | -89,930 | -95,363 | -102,528 | -159,443 |
| Annual Cost Increase per vehicle | -1,015 | -636 | -389 | -294 | -192 |

**Table 9**
**Savings and NPV for Free Natural Gas**
**(figures in $)**

| | Fleet Size | | | | |
|---|---|---|---|---|---|
| | 1-10 | 11-20 | 21-30 | 31-50 | 51 & up |
| Gasoline Savings | 49,104 | 95,676 | 174,999 | 244,381 | 535,497 |
| Diesel Savings | 39,955 | 48,729 | 54,962 | 75,226 | 77,831 |
| Total Savings | 89,059 | 144,405 | 229,961 | 319,607 | 613,328 |
| Total Costs | -159,803 | -210,464 | -288,891 | -371,926 | -680,286 |
| 30-year NPV | -70,744 | -66,059 | -58,930 | -52,319 | -66,958 |
| Annual Cost Increase per vehicle | -834 | -467 | -240 | -150 | -81 |

Since the net present value results remained negative for all fleets with both scenarios, the break-even price for each of the fleets was estimated. This is summarized in Table 10 with detailed results shown in Appendix G. This represents a subsidy price that fleets must be paid to break-even, i.e., 30-year costs and benefits are equal. Again, the most favorable results are for the largest fleets.

**Table 10**
**NPV Break-even Price for Natural Gas**

| Fleet Group | Break-even Price ($/mcf) |
|---|---|
| 1-10 | -$4.59 |
| 11-20 | -$2.77 |
| 21-30 | -$1.62 |
| 31-50 | -$1.04 |
| 51 & up | -$0.72 |

Fuel price sensitivity was also investigated from the perspective of gasoline and diesel prices. Table 11 shows the break-even price for gasoline and diesel, assuming a natural gas price of $2.50/mcf and a constant 4¢/gallon price differential between gasoline and diesel. The detailed results are shown in Appendix H. The gasoline/diesel prices include state taxes but not federal taxes.

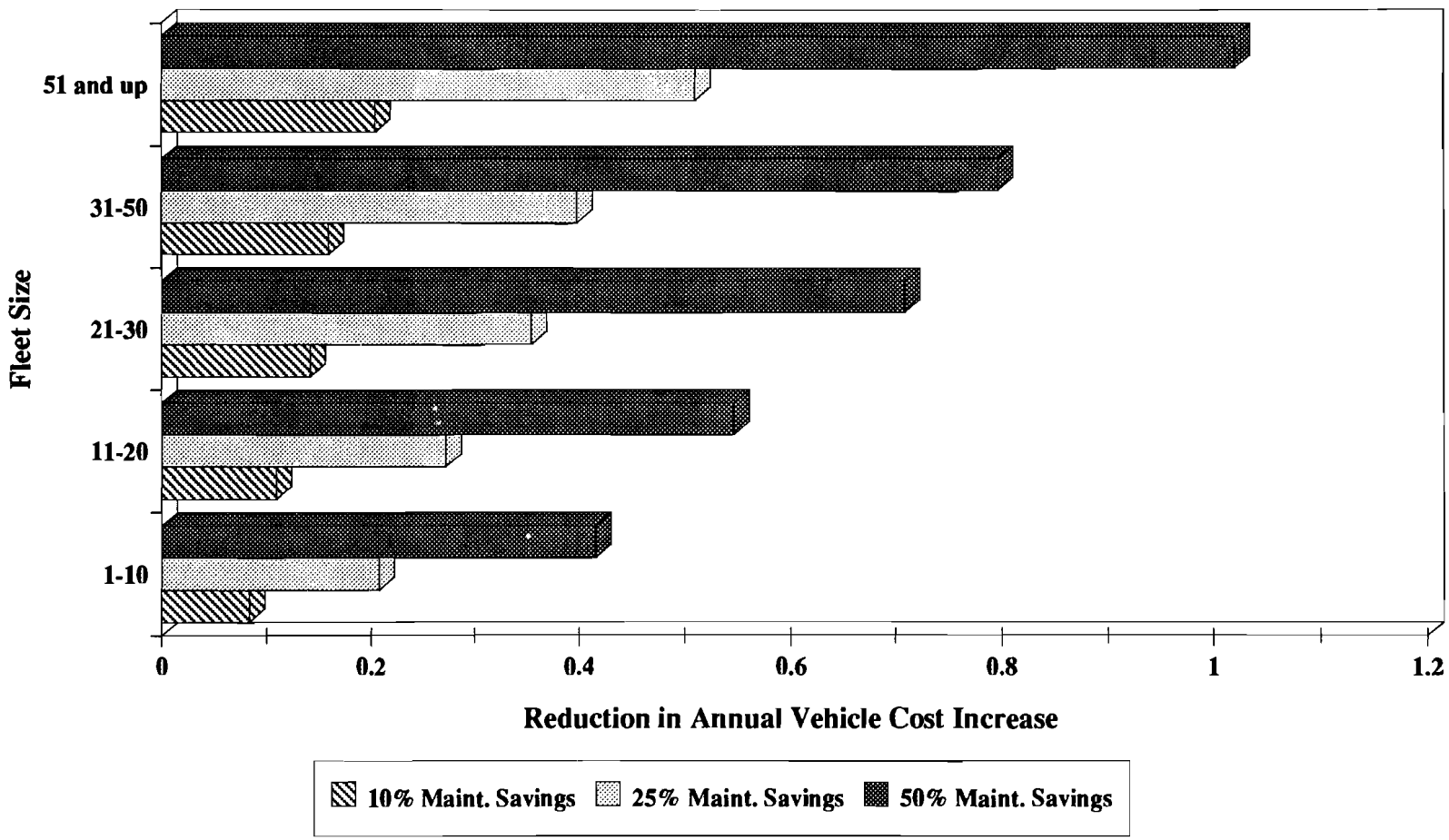
**Table 11**
**NPV Break-even Price for Gasoline and Diesel**

| Fleet Group | Gasoline ($/gallon) | Diesel ($/gallon) |
|---|---|---|
| 1-10 | 1.96 | 1.92 |
| 11-20 | 1.65 | 1.61 |
| 21-30 | 1.46 | 1.42 |
| 31-50 | 1.38 | 1.34 |
| 51 & up | 1.32 | 1.28 |

## MAINTENANCE SAVINGS

Anecdotal and theoretical (but not empirical) evidence suggests that there may be maintenance savings associated with natural gas 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 12. (Detailed summaries for each of the fleets and the three different maintenance savings groups are found in Appendices I, J, and K.) There must be significant maintenance savings to change the bottom line. However, maintenance savings do improve the results, particularly for larger fleets. As illustrated in Figure 6, as fleet size increases the effects of maintenance savings become more pronounced. For example, a 25 percent saving in maintenance costs for the smallest fleet would only yield a 21 percent reduction in the annual cost increase per vehicle, but would

**Figure 6**
**Effect of Maintenance Savings on Annual Cost Increase Per Vehicle**



result in a 51 percent reduction in the annual cost increase per vehicle for the largest fleet. Importantly, more empirical support is needed to accurately account for reductions in maintenance costs.

**Table 12**
**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 | -100,182 | -112,006 | -128,749 | -149,528 | -237,391 |
| Annual Cost Increase per vehicle | -1,181 | -792 | -525 | -429 | -286 |
| **25% Maint. Savings** | 22,705 | 34,323 | 53,160 | 70,787 | 151,951 |
| 30-year NPV | -86,559 | -91,413 | -96,853 | -107,056 | -146,220 |
| Annual Cost Increase per vehicle | -1,020 | -646 | -395 | -307 | -176 |
| **50% Maint. Savings** | 45,410 | 68,646 | 106,319 | 141,574 | 303,901 |
| 30-year NPV | -63,854 | -57,090 | -43,693 | -36,269 | +5,730 |
| Annual Cost Change per vehicle | -753 | -404 | -178 | -104 | +7 |

## 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 13 and detailed for each fleet group in Appendices L, M, and N. The net present values for the smallest fleet are counter intuitive, and are a result of the timing of cash flows and the change in the number of years the vehicle is kept. Gasoline vehicles are assumed to operate for 90,000 miles, diesel 150,000 miles. The ideal scenario is to replace a vehicle as close to the availability of OEM as possible, because of the beneficial effects of OEM vehicles, as described later. Generally, the increased mileage per vehicle generates greater benefit than cost, as reflected in Table 13. Because of the various factors influencing the net present value, i.e., timing of introduction of OEM vehicles, fuel price, etc., average miles traveled per vehicle may not be as significant as reported in previous research.[4]

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[4] Dean Taylor, Mark Euritt, and Hani Mahmassani, "Economic Evaluation of CNG Fleet Conversion and Operation," paper presented at the 71st Annual Meeting of the Transportation Research Board, Washington, D.C., January 1992.

**Table 13**
**Vehicle Miles of Travel and NPV**
**(figures in $)**

| | Fleet Size | | | | |
|---|---|---|---|---|---|
| | 1-10 | 11-20 | 21-30 | 31-50 | 51 & up |
| **25% Increase** | | | | | |
| Total Savings | 63,340 | 106,766 | 174,780 | 243,091 | 480,472 |
| Total Costs | -174,053 | -232,636 | -320,732 | -422,624 | -753,590 |
| 30-year NPV | -110,713 | -125,870 | -145,952 | -179,534 | -273,118 |
| Annual Cost Increase per vehicle | -1,305 | -890 | -595 | -515 | -329 |
| **50% Increase** | | | | | |
| Total Savings | 76,232 | 128,095 | 210,937 | 293,144 | 580,362 |
| Total Costs | -186,750 | -251,951 | -353,058 | -462,034 | -846,615 |
| 30-year NPV | -110,518 | -123,856 | -142,121 | -168,890 | -266,253 |
| Annual Cost Increase per vehicle | -1,303 | -876 | -580 | -484 | -321 |
| **100% Increase** | | | | | |
| Total Savings | 101,892 | 170,975 | 281,105 | 390,963 | 775,940 |
| Total Costs | -212,649 | -291,583 | -411,728 | -544,618 | -1,002,095 |
| 30-year NPV | -110,757 | -120,608 | -130,623 | -153,655 | -226,155 |
| Annual Cost Increase per vehicle | -1,305 | -853 | -533 | -441 | -273 |

## DIESEL VEHICLES

Converting diesel vehicles to natural gas is a much more complicated procedure than converting gasoline to natural gas. (During the model development, there was not a widely-accepted conversion kit available for diesel vehicles.) Additionally, because of the efficiencies of the diesel engine, there are important losses on fuel economy when converting from diesel to natural gas. Two analyses were performed on diesel vehicles to determine their effect on net present value. 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 natural gas along with the other gasoline vehicles. The results of these scenarios are shown in Table 14. (Appendices O and P show the detailed fleet results for the no-diesel and diesel-to-gasoline scenarios, respectively.) Conversion of diesel vehicles has a negative effect on the net present value. On an annual cost increase per vehicle basis, the costs for the removal of diesel vehicles improves for the three largest fleet groups, and decreases for the two smallest fleet groups, again because of the nature of fixed costs on a small number of vehicles. Not surprisingly, replacing diesel with gasoline (spark-ignition) vehicles before converting to CNG use decreases the annual

cost increase per vehicle. This is consistent with the results presented in Figure 4. Overall, converting diesel vehicles, as they currently exist, has a negative affect on cost-effectiveness. There is more to gain by converting gasoline vehicles than diesel vehicles.

**Table 14**
**Effects of Diesel on NPV**
**(figures in $)**

| | Fleet Size | | | | |
|---|---|---|---|---|---|
| | 1-10 | 11-20 | 21-30 | 31-50 | 51 & up |
| **No Diesel Vehicles** | | | | | |
| Total Savings | 32,193 | 62,402 | 113,695 | 159,615 | 346,548 |
| Total Costs | -110,135 | -146,233 | -216,175 | -277,452 | -580,652 |
| 30-year NPV | -77,941 | -83,831 | -102,480 | -117,837 | -234,104 |
| Annual Cost Increase per vehicle | -2,067 | -1,112 | -604 | -463 | -323 |
| **Diesel to Gasoline** | | | | | |
| Total Savings | 86,228 | 138,188 | 203,602 | 279,424 | 459,772 |
| Total Costs | -168,846 | -228,224 | -311,389 | -403,679 | -703,370 |
| 30-year NPV | -82,619 | -90,036 | -107,787 | -124,255 | -243,599 |
| Annual Cost Increase per vehicle | -974 | -637 | -440 | -356 | -294 |

## EXTENDED VEHICLE LIFE

Some natural gas proponents argue that because natural gas burns cleaner than gasoline and diesel, vehicles using natural gas should have a longer operating life. 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 15. (Appendices Q, R, and S contain detailed results from the model with the exception of the vehicle purchase adjustment which is shown only in Table 15.) In addition, the model results were adjusted to accommodate the differences in the number and timing of vehicle purchases. (The "Vehicle Purchase Adjustment" in Table 15 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 natural gas 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 75 percent increase in the 30-year net present value. Again, 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 NGVs over time will validate the overall effect of extended vehicle life.

**Table 15**
**Effects of Extending Vehicle Life on NPV**
**(figures in $)**

| | Fleet Size | | | | |
|---|---|---|---|---|---|
| | 1-10 | 11-20 | 21-30 | 31-50 | 51 & up |
| **10% Added Life** | | | | | |
| Savings | 50,381 | 84,416 | 139,058 | 193,212 | 381,874 |
| Vehicle Purchase Adjustment | 23,785 | 24,140 | 33,877 | 50,064 | 83,304 |
| Costs | -158,413 | -209,538 | -286,563 | -369,907 | -676,191 |
| 30-year NPV | -84,247 | -100,982 | -113,628 | -126,631 | -211,013 |
| Annual Cost Increase per vehicle | -993 | -714 | -464 | -363 | -254 |
| **25% Added Life** | | | | | |
| Savings | 50,194 | 84,819 | 138,569 | 192,526 | 388,236 |
| Vehicle Purchase Adjustment | 32,511 | 33,020 | 64,858 | 93,163 | 191,592 |
| Costs | -158,167 | -208,742 | -285,824 | -368,752 | -660,400 |
| 30-year NPV | -75,462 | -90,903 | -82,397 | -83,063 | -80,572 |
| Annual Cost Increase per vehicle | -889 | -643 | -336 | -238 | -97 |
| **50% Added Life** | | | | | |
| Savings | 50,155 | 84,322 | 139,745 | 193,943 | 385,639 |
| Vehicle Purchase Adjustment | 47,786 | 59,589 | 97,623 | 153,565 | 311,599 |
| Costs | -157,346 | -207,918 | -282,491 | -363,327 | -657,076 |
| 30-year NPV | -59,405 | -64,007 | -45,123 | -15,819 | +40,162 |
| Annual Cost Change per vehicle | -700 | -453 | -184 | -45 | +48 |

[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.

## 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 16 and detailed for each of the fleets in Appendices T and U. Improvements in the net present values for OEM are driven by three factors. First, and most significant, the OEM cost-differential is $900 for spark-ignition vehicles ($2,800 for diesel) compared to $1,950, $2,200, and $3,300 for gasoline-converted CNG automobiles, light trucks, and heavy-duty trucks, respectively ($6,350 for diesel).[6] For all fleet sizes, this OEM/conversion cost-differential accounts for at least 55 percent of the improvement in the NPV. The second factor relates to the improvement in fuel efficiency of an OEM vehicle versus a converted vehicle. The model incorporates a 5 percent reduction in fuel economy for converted gasoline vehicles versus a 15 percent improvement in fuel economy for an optimized OEM 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 lower infrastructure costs and operating costs, in addition to increased fuel savings. The final factor relates to recertification. The model assumes that recertification costs will be factored into vehicle inspection costs for OEM vehicles and that the current requirements for tank removal on converted vehicles will not be necessary. Consequently, OEMs have no incremental costs associated with cylinder recertification. This also translates into additional natural gas consumption which increases the savings differential, since the model assumes that converted vehicles must operate on gasoline during recertification of their pressurized storage vessels.

The results in Table 16 show that for smaller fleets, replacement of diesel vehicles with OEM vehicles reduces the annual cost increase per vehicle, but for larger fleets replacement of diesel vehicles increases the annual cost increase per vehicle. The larger fleets are more indicative of the effects of introducing OEM vehicles to replace diesels. The improvement in the annual cost increase per vehicle for the smaller fleets is driven by the fixed infrastructure costs. However, as fleet size increases, these fixed costs become less significant and variable costs become more important. Arguably (considering only fleet

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[6] The OEM price estimates are based on a mature market, which in the base case is estimated to occur at about year 11. Current OEM prices, based on a limited supply of vehicles, are much higher.

economics, and not air quality benefits, etc.), replacement of vehicles, regardless of fleet size, should focus on gasoline and not diesel vehicles. This strategy could change as improvements in natural gas engines are made for diesel vehicles.[7]

**Table 16**
**Effects of OEM on NPV**
**(figures in $)**

| | Fleet Size | | | | |
|---|---|---|---|---|---|
| | 1-10 | 11-20 | 21-30 | 31-50 | 51 & up |
| **Immediate OEM** | | | | | |
| Total Savings | 54,025 | 91,053 | 149,891 | 208,526 | 414,682 |
| Total Costs | -136,679 | -171,563 | -225,428 | -284,551 | -495,548 |
| 30-year NPV | -82,654 | -80,510 | -75,537 | -76,025 | -80,866 |
| Annual Cost Increase per vehicle | -974 | -569 | -308 | -218 | -97 |
| **No Diesel** | | | | | |
| Total Savings | 34,509 | 67,250 | 123,044 | 171,781 | 376,665 |
| Total Costs | -99,843 | -125,286 | -173,103 | -215,769 | -423,812 |
| 30-year NPV | -65,334 | -58,036 | -50,059 | -43,988 | -47,147 |
| Annual Cost Increase per vehicle | -1,733 | -770 | -295 | -173 | -65 |

## COMBINED EFFECTS

The next area of sensitivity examines the effects of combining some of the previous factors. 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 17 and summarized in Appendix V.

As noted previously in the discussion of diesel vehicles, fixed costs are the most significant costs affecting the annual cost increase per vehicle for the two smallest fleets. These fixed costs are significant enough that introduction of diesel vehicles improves the overall cost-effectiveness, which is not the case for the larger fleets. The same is true for the combined analysis. Unlike the larger fleets, introduction of diesel vehicles actually

[7] In recent years, a number of diesel-engine companies have accelerated research in the natural gas area.

reduces the annual cost increase per vehicle for the two smallest fleets: from $-1,323 to $-674 and from $-470 to $-390 for the 1-10 and 11-20 fleets, respectively. (Appendix W shows the model results for the combined affects including the conversion of diesel vehicles.)

**Table 17**
**Combined Effects on NPV***
**(figures in $)**

| | Fleet Size | | | | |
|---|---|---|---|---|---|
| | 1-10 | 11-20 | 21-30 | 31-50 | 51 & up |
| **Immediate OEM** | | | | | |
| Total Savings | 49,086 | 88,789 | 151,245 | 218,129 | 456,253 |
| Total Costs | -98,979 | -124,238 | -171,209 | -212,778 | -419,817 |
| 30-year NPV | -49,893 | -35,448 | -19,963 | +5,351 | +36,436 |
| Annual Cost Change per vehicle | -1,323 | -470 | -118 | +21 | +50 |

*10 percent extended life, OEM at year 1, 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.

Based on a literature review, our research found that station maintenance cost estimates range from 3¢ to 10¢ per gallon equivalent of CNG. The base case for the model assumes a maintenance cost of 4.5¢ per CNG gallon equivalent. Three cents per gallon equivalent is used in this sensitivity test.

With respect to power costs, the model assumes the maximum possible energy is used by the compressor, i.e., the motor draws full power whenever operating. The actual energy usage should be less, since the motor only draws full power when the back pressure of the storage vessels are near maximum. The base case rate of 6.3¢/kWh of electricity is reduced to 2¢/kWh for sensitivity purposes.

Cylinder recertification costs, while not significant relative to the other operating costs, do effect savings and other infrastructure costs. For sensitivity purposes, recertification requirements and costs of CNG pressure-vessels are eliminated.

Finally, in estimating the labor costs associated with additional refueling, $15/hour is used for the base case. The sensitivity tests use $7.50/hour. Likewise, two infrastructure cost items -- dispenser and dryer -- are reduced by 50 percent. The base case for the model assumes $25,000 and $10,000 for the dispenser and dryer, respectively.

The results of these changes to operating and infrastructure costs are summarized in Table 18 and presented in more detail for each of the fleets in Appendix X. Collectively, the changes in the operating and infrastructure cost assumptions reduce the average annual cost increase per vehicle by about one-third for each of the fleet groups. Importantly, from a cost-effective perspective, there are no changes in the conclusions for each of the fleet groups.

## Table 18
## Operating and Infrastructure Effects on NPV*

| | 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 | $32,942 | $63,965 | $116,719 | $163,550 | $356,333 |
| Automobiles | $6,212 | $6,741 | $9,616 | $13,130 | $56,601 |
| Light Trucks | $16,119 | $34,676 | $75,622 | $111,561 | $261,387 |
| Heavy-Duty Trucks | $10,611 | $22,548 | $31,480 | $38,859 | $38,345 |
| Diesel Price Difference | $18,272 | $22,221 | $25,063 | $34,303 | $35,397 |
| Maintenance | $0 | $0 | $0 | $0 | $0 |
| **Total Savings** | **$51,214** | **$86,186** | **$141,781** | **$197,854** | **$391,730** |
| **COSTS** | | | | | |
| **Infrastructure** | | | | | |
| Land | $0 | $0 | $0 | $0 | $0 |
| Station setup | ($12,645) | ($15,246) | ($19,047) | ($23,270) | ($35,264) |
| Compressor | ($21,145) | ($22,509) | ($24,486) | ($26,746) | ($33,532) |
| Storage Vessels | ($15,497) | ($24,184) | ($36,931) | ($50,958) | ($90,741) |
| Dispenser | ($12,428) | ($12,428) | ($12,428) | ($12,428) | ($12,428) |
| Dryer | ($4,971) | ($4,971) | ($4,971) | ($4,971) | ($4,971) |
| **Subtotal** | ($66,687) | ($79,339) | ($97,863) | ($118,374) | ($176,937) |
| **Vehicle** | | | | | |
| Conversion Kit | ($7,749) | ($12,504) | ($20,141) | ($27,960) | ($62,612) |
| Tanks | ($9,895) | ($16,853) | ($27,632) | ($38,639) | ($77,568) |
| Labor | ($11,026) | ($17,170) | ($26,966) | ($36,895) | ($85,118) |
| OEM | ($5,178) | ($6,199) | ($9,186) | ($13,853) | ($20,986) |
| **Subtotal** | ($33,848) | ($52,725) | ($83,925) | ($117,348) | ($246,284) |
| **Operating** | | | | | |
| Station Maintenance | ($3,718) | ($5,728) | ($8,693) | ($11,997) | ($21,904) |
| Cylinder Recert. | $0 | $0 | $0 | $0 | $0 |
| Power | ($4,380) | ($5,502) | ($7,164) | ($9,008) | ($14,520) |
| Labor - fuel time loss | ($3,839) | ($5,584) | ($8,577) | ($11,954) | ($25,304) |
| NG Fuel Tax | ($8,809) | ($15,184) | ($23,857) | ($32,098) | ($76,292) |
| Additional Training | $0 | $0 | $0 | $0 | $0 |
| **Subtotal** | ($20,745) | ($31,998) | ($48,291) | ($65,057) | ($138,021) |
| **Total Costs** | **($121,280)** | **($164,063)** | **($230,080)** | **($300,778)** | **($561,241)** |
| | | | | | |
| **Savings - Cost** | **($70,066)** | **($77,877)** | **($88,298)** | **($102,924)** | **($169,511)** |
| **Annual Cost Increase per Vehicle** | ($825.84) | ($550.74) | ($360.25) | ($295.09) | ($204.34) |
| **Incremental Cost/mile** | ($0.0579) | ($0.0415) | ($0.0289) | ($0.0242) | ($0.0184) |

* Sensitivity Assumptions: Station maintenance costs reduced from 4.5¢ to 3¢ per gallon equivalent of CNG.
Power costs reduced from 6.3¢/kWh to 2¢/kWh.
Labor rate reduced from $15/hour to $7.50/hour.
Dispenser costs reduced from $25,000 to $12,500.
Dryer costs reduced from $10,000 to $5,000.
Recertification requirements and costs are eliminated.

# SECTION 4: CONCLUSIONS

Based on the operating assumptions of the model, introduction of natural gas vehicles into the TxDOT fleet will cost an estimated $47 million over the next 30 years, or an annual cost of $5 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, and the delay of diesel conversions. TxDOT should continue to closely monitor its vehicles to determine the effects of natural gas 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 19 summarizes the results of all the sensitivity tests for each of the vehicle fleets according to average annual cost change per vehicle. Table 20 provides the same information but reports the results on the basis of cost change per vehicle mile. (In both of these tables, a negative number represents a cost increase and a positive number represents savings.)

By focusing on the larger fleets, i.e., fleets with more than 30 vehicles, TxDOT could potentially realize some cost savings, if the combined effects presented in the previous section hold true. Assuming a more mature OEM market, i.e., CNG-vehicles for gasoline replacements cost only $900 more per vehicle, a 10 percent extended life with no additional maintenance costs, and no diesel conversions, TxDOT could save about $180,000 annually. Moreover, this group of fleets account for about 53 percent of the vehicles listed previously in Table 2. Increasing the range to include vehicles in smaller fleets and/or diesel vehicles means that TxDOT will require additional outlays to support a CNG-vehicle program.

## Table 19
## Summary of Sensitivity Analyses by Annual Average Cost Change Per Vehicle

Note: A negative value indicates a cost increase and a positve value indicates 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** | -$1,287.84 | -$889.19 | -$612.05 | -$509.88 | -$359.43 |
| **Discount Rate** | | | | | |
| 0 | -$439.88 | -$213.68 | -$88.98 | -$40.03 | -$9.51 |
| 5% | -$847.27 | -$545.39 | -$343.24 | -$268.96 | -$177.40 |
| **N.G. Price** | | | | | |
| Free | -$833.83 | -$467.17 | -$240.43 | -$150.00 | -$80.71 |
| $1/mcf | -$1,015.44 | -$635.98 | -$389.08 | -$293.95 | -$192.20 |
| **Break-even Prices*** | | | | | |
| Natural Gas | -$4.59 | -$2.77 | -$1.62 | -$1.04 | -$0.72 |
| Gasoline | $1.96 | $1.65 | $1.46 | $1.38 | $1.32 |
| Diesel | $1.92 | $1.61 | $1.42 | $1.34 | $1.28 |
| **Maint. Savings** | | | | | |
| 10% Savings | -$1,180.80 | -$792.10 | -$525.29 | -$428.70 | -$286.16 |
| 25% Savings | -$1,020.23 | -$646.47 | -$395.16 | -$306.93 | -$176.26 |
| 50% Savings | -$752.61 | -$403.74 | -$178.27 | -$103.98 | $6.91 |
| **Annual Miles** | | | | | |
| 25% Increase | -$1,304.93 | -$890.15 | -$595.48 | -$514.72 | -$329.23 |
| 50% Increase | -$1,302.63 | -$875.91 | -$579.85 | -$484.21 | -$320.95 |
| 100% Increase | -$1,305.45 | -$852.93 | -$532.94 | -$440.53 | -$272.62 |
| **Diesel** | | | | | |
| No Diesel | -$2,066.99 | -$1,111.60 | -$603.95 | -$462.96 | -$322.51 |
| Diesel to Gas | -$973.79 | -$636.73 | -$439.77 | -$356.24 | -$293.64 |
| **Extended Life**** | | | | | |
| 10% Increase | -$992.98 | -$714.14 | -$463.60 | -$363.05 | -$254.36 |
| 25% Increase | -$889.44 | -$642.86 | -$336.18 | -$238.14 | -$97.13 |
| 50% Increase | -$700.18 | -$452.65 | -$184.10 | -$45.35 | $48.41 |
| **OEM***** | | | | | |
| All vehicles | -$974.21 | -$569.36 | -$308.19 | -$217.96 | -$97.48 |
| No diesel | -$1,732.66 | -$769.55 | -$295.01 | -$172.82 | -$64.95 |
| **Combination Analysis** | | | | | |
| All vehicles | -$673.69 | -$389.54 | -$160.11 | -$64.87 | $8.17 |
| No diesel | -$1,323.15 | -$470.04 | -$117.65 | $21.02 | $50.20 |
| **Operating and Infrastructure Costs** | -$825.84 | -$550.74 | -$360.25 | -$295.09 | -$204.34 |

* Represents break-even price per gallon or gallon-equivalent.
Gasoline is at 89¢/gallon & diesel at 85¢/gallon for natural gas break-even point.
Natural gas is at $2.50/mcf for gasoline and diesel break-even point.

** Includes adjustment for change in vehicle purchases.

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

## Table 20
## Summary of Sensitivity Analyses by Cost Change Per Vehicle Mile

Note: A negative value indicates a cost increase and a positve value indicates 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** | -$0.0903 | -$0.0669 | -$0.0491 | -$0.0418 | -$0.0323 |
| **Discount Rate** | | | | | |
| 0 | -$0.0308 | -$0.0161 | -$0.0071 | -$0.0033 | -$0.0009 |
| 5% | -$0.0594 | -$0.0411 | -$0.0275 | -$0.0221 | -$0.0159 |
| **N.G. Price** | | | | | |
| Free | -$0.0585 | -$0.0352 | -$0.0193 | -$0.0123 | -$0.0073 |
| $1/mcf | -$0.0712 | -$0.0479 | -$0.0312 | -$0.0241 | -$0.0173 |
| **Break-even Prices*** | | | | | |
| Natural Gas | -$4.59 | -$2.77 | -$1.62 | -$1.04 | -$0.72 |
| Gasoline | $1.96 | $1.65 | $1.46 | $1.38 | $1.32 |
| Diesel | $1.92 | $1.61 | $1.42 | $1.34 | $1.28 |
| **Maint. Savings** | | | | | |
| 10% Savings | -$0.0828 | -$0.0596 | -$0.0421 | -$0.0352 | -$0.0257 |
| 25% Savings | -$0.0715 | -$0.0487 | -$0.0317 | -$0.0252 | -$0.0158 |
| 50% Savings | -$0.0528 | -$0.0304 | -$0.0143 | -$0.0085 | $0.0006 |
| **Annual Miles** | | | | | |
| 25% Increase | -$0.0732 | -$0.0536 | -$0.0382 | -$0.0338 | -$0.0237 |
| 50% Increase | -$0.0609 | -$0.0440 | -$0.0310 | -$0.0265 | -$0.0192 |
| 100% Increase | -$0.0458 | -$0.0321 | -$0.0214 | -$0.0181 | -$0.0123 |
| **Diesel** | | | | | |
| No Diesel | -$0.1147 | -$0.0694 | -$0.0441 | -$0.0358 | -$0.0283 |
| Diesel to Gas | -$0.0628 | -$0.0447 | -$0.0337 | -$0.0280 | -$0.0259 |
| **Extended Life**** | | | | | |
| 10% Increase | -$0.0696 | -$0.0538 | -$0.0372 | -$0.0298 | -$0.0229 |
| 25% Increase | -$0.0623 | -$0.0484 | -$0.0270 | -$0.0195 | -$0.0087 |
| 50% Increase | -$0.0491 | -$0.0341 | -$0.0148 | -$0.0037 | $0.0044 |
| **OEM***** | | | | | |
| All vehicles | -$0.0683 | -$0.0429 | -$0.0247 | -$0.0179 | -$0.0088 |
| No diesel | -$0.0961 | -$0.0481 | -$0.0215 | -$0.0134 | -$0.0057 |
| **Combination Analysis** | | | | | |
| All vehicles | -$0.0472 | -$0.0293 | -$0.0128 | -$0.0053 | $0.0007 |
| No diesel | -$0.0734 | -$0.0294 | -$0.0086 | $0.0016 | $0.0044 |
| **Operating and Infrastructure Costs** | -$0.0579 | -$0.0415 | -$0.0289 | -$0.0242 | -$0.0184 |

* Represents break-even price per gallon or gallon-equivalent.
Gasoline is at 89¢/gallon & diesel at 85¢/gallon for natural gas break-even point.
Natural gas is at $2.50/mcf for gasoline and diesel break-even point.

** Includes adjustment for change in vehicle purchases.

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

## REFERENCES

Taylor, Dean, Mark Euritt, and Hani Mahmassani, Documentation For CNG Fleet Conversion Cost-Effectiveness Model, Research Report 983-1, Center for Transportation Research, The University of Texas at Austin, December 1991.

Taylor, Dean, Mark Euritt, and Hani Mahmassani, "Economic Evaluation of CNG Fleet Conversion and Operation," paper presented at the 71st Annual Meeting of the Transportation Research Board, Washington, D.C., January, 1992.

# APPENDIX A

# SUMMARY RESULTS OF NPV COST-EFFECTIVENESS MODEL BY DISTRICT

## Appendix A
## Summary Results of NPV Costs-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 | $181,810 | -$334,923 | -$153,113 | -$508 | -$0.043 |
| 1 | Clarksville | 19 | $144,983 | -$265,951 | -$120,968 | -$675 | -$0.048 |
| 1 | Cooper | 16 | $66,087 | -$190,194 | -$124,108 | -$823 | -$0.101 |
| 1 | Emory | 15 | $84,351 | -$199,402 | -$115,050 | -$814 | -$0.074 |
| 1 | Greenville | 36 | $243,327 | -$388,677 | -$145,350 | -$428 | -$0.036 |
| 1 | Mt. Vernon | 16 | $102,896 | -$215,354 | -$112,458 | -$746 | -$0.064 |
| 1 | Paris | 35 | $173,065 | -$335,637 | -$162,572 | -$493 | -$0.048 |
| 1 | Paris DO | 45 | $164,676 | -$348,135 | -$183,459 | -$432 | -$0.047 |
| 1 | Sherman | 42 | $272,025 | -$442,156 | -$170,132 | -$430 | -$0.033 |
| 1 | Sulpher Springs | 30 | $172,953 | -$313,687 | -$140,734 | -$498 | -$0.048 |
| 2 | Arlington | 30 | $181,108 | -$355,144 | -$174,036 | -$615 | -$0.049 |
| 2 | Cleburne | 29 | $135,298 | -$305,484 | -$170,187 | -$623 | -$0.055 |
| 2 | Decatur | 18 | $166,385 | -$301,435 | -$135,050 | -$796 | -$0.041 |
| 2 | Fort Worth DO | 177 | $853,944 | -$1,289,018 | -$435,074 | -$261 | -$0.019 |
| 2 | Fort Worth (SM) | 5 | $14,657 | -$104,566 | -$89,909 | -$1,907 | -$0.339 |
| 2 | Glen Rose | 16 | $73,357 | -$210,370 | -$137,013 | -$908 | -$0.081 |
| 2 | Gordon | 15 | $119,432 | -$250,931 | -$131,499 | -$930 | -$0.049 |
| 2 | Granbury | 14 | $88,573 | -$211,388 | -$122,816 | -$931 | -$0.071 |
| 2 | Jacksboro | 31 | $193,637 | -$354,682 | -$161,045 | -$551 | -$0.032 |
| 2 | Mineral Wells | 15 | $121,701 | -$247,207 | -$125,506 | -$888 | -$0.050 |
| 2 | S. Fort Worth | 30 | $134,080 | -$307,694 | -$173,615 | -$614 | -$0.065 |
| 2 | Saginaw | 28 | $179,911 | -$335,316 | -$155,404 | -$589 | -$0.049 |
| 2 | Stephenville | 28 | $127,023 | -$290,697 | -$163,673 | -$620 | -$0.051 |
| 2 | Weatherford | 34 | $202,120 | -$362,730 | -$160,610 | -$501 | -$0.040 |
| 3 | Archer City | 11 | $68,746 | -$181,592 | -$112,846 | -$1,088 | -$0.084 |
| 3 | Bowie | 23 | $71,277 | -$225,316 | -$154,039 | -$710 | -$0.081 |
| 3 | Electra | 10 | $81,890 | -$179,674 | -$97,784 | -$1,037 | -$0.072 |
| 3 | Gainesville | 24 | $179,058 | -$294,821 | -$115,763 | -$512 | -$0.037 |
| 3 | Graham | 16 | $74,032 | -$202,683 | -$128,651 | -$853 | -$0.072 |
| 3 | Henrietta | 13 | $86,690 | -$197,816 | -$111,126 | -$907 | -$0.071 |
| 3 | Nocona | 11 | $72,801 | -$196,564 | -$123,763 | -$1,194 | -$0.068 |
| 3 | Olney | 9 | $47,543 | -$157,812 | -$110,269 | -$1,300 | -$0.097 |
| 3 | Seymour | 10 | $46,969 | -$158,979 | -$112,010 | -$1,188 | -$0.099 |
| 3 | Throckmorton | 9 | $60,544 | -$170,191 | -$109,647 | -$1,292 | -$0.078 |
| 3 | Vernon | 17 | $81,091 | -$204,662 | -$123,571 | -$771 | -$0.072 |
| 3 | Wichita Falls | 18 | $107,866 | -$235,737 | -$127,870 | -$754 | -$0.071 |
| 3 | Wichita Falls DO | 62 | $325,315 | -$536,645 | -$211,330 | -$362 | -$0.028 |
| 4 | Borger | 18 | $88,038 | -$217,239 | -$129,201 | -$761 | -$0.069 |
| 4 | Canadian | 14 | $54,667 | -$183,678 | -$129,011 | -$978 | -$0.090 |
| 4 | Canyon | 24 | $108,980 | -$252,578 | -$143,598 | -$635 | -$0.068 |
| 4 | Channing | 11 | $68,006 | -$180,441 | -$112,434 | -$1,084 | -$0.078 |
| 4 | Claude | 10 | $52,408 | -$167,276 | -$114,869 | -$1,219 | -$0.099 |
| 4 | Dalhart | 20 | $123,254 | -$246,961 | -$123,707 | -$656 | -$0.047 |
| 4 | Dumas | 11 | $90,882 | -$201,986 | -$111,104 | -$1,071 | -$0.059 |
| 4 | Groom | 10 | $101,811 | -$227,484 | -$125,672 | -$1,333 | -$0.054 |
| 4 | Gruver | 10 | $46,214 | -$166,241 | -$120,027 | -$1,273 | -$0.103 |

## Appendix A
## Summary Results of NPV Costs-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 |
|---|---|---|---|---|---|---|---|
| 4 | Hereford | 10 | $48,165 | -$169,099 | -$120,934 | -$1,283 | -$0.087 |
| 4 | N. Amarillo | 55 | $245,647 | -$473,691 | -$228,044 | -$440 | -$0.042 |
| 4 | Pampa | 23 | $103,123 | -$249,387 | -$146,264 | -$675 | -$0.058 |
| 4 | Panhandle | 12 | $48,754 | -$171,645 | -$122,891 | -$1,086 | -$0.095 |
| 4 | Perryton | 14 | $65,822 | -$197,928 | -$132,106 | -$1,001 | -$0.086 |
| 4 | S. Amarillo | 30 | $159,900 | -$308,120 | -$148,220 | -$524 | -$0.046 |
| 4 | Stratford | 9 | $75,920 | -$177,186 | -$101,266 | -$1,194 | -$0.065 |
| 4 | Vega | 10 | $55,665 | -$162,877 | -$107,212 | -$1,137 | -$0.083 |
| 5 | Bovina | 80 | $349,858 | -$605,765 | -$255,907 | -$339 | -$0.032 |
| 5 | Brownfield | 19 | $138,628 | -$263,208 | -$124,580 | -$696 | -$0.038 |
| 5 | Dawson | 10 | $70,950 | -$175,670 | -$104,720 | -$1,111 | -$0.073 |
| 5 | Dimmitt | 12 | $77,859 | -$197,532 | -$119,673 | -$1,058 | -$0.063 |
| 5 | Floydada | 10 | $60,015 | -$174,932 | -$114,917 | -$1,219 | -$0.082 |
| 5 | Levelland | 11 | $72,036 | -$184,049 | -$112,014 | -$1,080 | -$0.075 |
| 5 | Littlefield | 19 | $133,928 | -$266,747 | -$132,819 | -$742 | -$0.036 |
| 5 | Lubbock DO | 98 | $372,727 | -$655,784 | -$283,057 | -$306 | -$0.033 |
| 5 | Lubbock LP289 | 40 | $266,305 | -$476,661 | -$210,356 | -$558 | -$0.038 |
| 5 | Lubbock US84 | 20 | $169,701 | -$298,478 | -$128,777 | -$683 | -$0.045 |
| 5 | Morton | 10 | $73,406 | -$190,594 | -$117,188 | -$1,243 | -$0.071 |
| 5 | Muleshoe | 11 | $78,001 | -$195,155 | -$117,154 | -$1,130 | -$0.060 |
| 5 | Plains | 9 | $56,603 | -$170,320 | -$113,717 | -$1,340 | -$0.088 |
| 5 | Plainview | 16 | $85,591 | -$224,797 | -$139,206 | -$923 | -$0.062 |
| 5 | Post | 11 | $68,640 | -$179,614 | -$110,974 | -$1,070 | -$0.086 |
| 5 | Ralls | 10 | $56,899 | -$165,691 | -$108,792 | -$1,154 | -$0.076 |
| 5 | Seminole | 10 | $68,456 | -$171,603 | -$103,147 | -$1,094 | -$0.077 |
| 5 | Tahoka | 10 | $88,175 | -$190,546 | -$102,371 | -$1,086 | -$0.067 |
| 5 | Tulia | 9 | $71,251 | -$182,683 | -$111,432 | -$1,313 | -$0.060 |
| 6 | Andrews | 22 | $115,450 | -$242,126 | -$126,676 | -$611 | -$0.050 |
| 6 | Balmorhea | 9 | $59,899 | -$167,112 | -$107,213 | -$1,264 | -$0.077 |
| 6 | Crane | 9 | $57,333 | -$157,683 | -$100,350 | -$1,183 | -$0.080 |
| 6 | Dermit | 11 | $57,911 | -$167,888 | -$109,977 | -$1,061 | -$0.079 |
| 6 | Fort Stockton | 22 | $137,065 | -$263,541 | $126,475 | -$610 | -$0.045 |
| 6 | Iraan | 9 | $44,365 | -$155,364 | -$111,000 | -$1,308 | -$0.097 |
| 6 | McCamey | 12 | $56,493 | -$175,654 | -$119,161 | -$1,053 | -$0.089 |
| 6 | Midland 1 | 11 | $49,775 | -$143,744 | -$93,970 | -$906 | -$0.072 |
| 6 | Midland 2 | 16 | $105,889 | -$222,365 | -$116,477 | -$772 | -$0.056 |
| 6 | Monahans | 11 | $71,141 | -$174,339 | -$103,198 | -$995 | -$0.066 |
| 6 | Odessa DO | 66 | $338,247 | -$585,692 | -$247,445 | -$398 | -$0.038 |
| 6 | Pecos | 20 | $114,711 | -$246,760 | -$132,049 | -$700 | -$0.050 |
| 6 | Sanderson | 10 | $65,158 | -$168,798 | -$103,640 | -$1,099 | -$0.063 |
| 6 | Stanton | 14 | $64,778 | -$187,959 | -$123,181 | -$933 | -$0.086 |
| 7 | Ballinger | 11 | $55,471 | -$188,980 | -$133,509 | -$1,288 | -$0.065 |
| 7 | Big Lake | 11 | $62,649 | -$181,618 | -$118,969 | -$1,147 | -$0.072 |
| 7 | Bracketville | 11 | $43,006 | -$149,330 | -$106,324 | -$1,025 | -$0.096 |
| 7 | Del Rio | 62 | $295,408 | -$552,846 | -$257,438 | -$440 | -$0.039 |
| 7 | Eden | 13 | $51,091 | -$182,349 | -$131,258 | -$1,071 | -$0.081 |

## Appendix A
## Summary Results of NPV Costs-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 | Junction | 23 | $116,082 | -$253,335 | -$136,533 | -$630 | -$0.048 |
| 7 | Ozona | 11 | $56,181 | -$170,907 | -$114,726 | -$1,106 | -$0.078 |
| 7 | Robert Lee | 10 | $59,482 | -$186,814 | -$127,332 | -$1,126 | -$0.086 |
| 7 | Rocksprings | 17 | $83,679 | -$214,886 | -$131,207 | -$819 | -$0.056 |
| 7 | San Angelo | 31 | $124,367 | -$284,651 | -$160,284 | -$548 | -$0.047 |
| 7 | San Angelo DO | 30 | $160,765 | -$324,394 | -$163,629 | -$579 | -$0.037 |
| 7 | Sonora | 29 | $157,186 | -$310,688 | -$153,502 | -$561 | -$0.040 |
| 7 | Sterling City | 12 | $70,888 | -$195,997 | -$125,109 | -$1,106 | -$0.071 |
| 8 | Abilene | 83 | $416,594 | -$739,667 | -$323,072 | -$413 | -$0.035 |
| 8 | Abilene DO | 42 | $234,210 | -$422,470 | -$188,260 | -$475 | -$0.037 |
| 8 | Albany | 8 | $26,406 | -$135,652 | -$109,246 | -$1,449 | -$0.119 |
| 8 | Anson | 26 | $136,651 | -$296,162 | -$159,510 | -$677 | -$0.052 |
| 8 | Aspermont | 8 | $40,276 | -$145,815 | -$105,539 | -$1,399 | -$0.105 |
| 8 | Baird | 12 | $76,880 | -$197,124 | -$120,243 | -$1,063 | -$0.068 |
| 8 | Big Spring | 23 | $103,768 | -$253,088 | -$149,319 | -$689 | -$0.059 |
| 8 | Colorado City | 17 | $60,306 | -$199,316 | -$139,010 | -$867 | -$0.092 |
| 8 | Gail | 6 | $39,108 | -$142,865 | -$103,758 | -$1,834 | -$0.087 |
| 8 | Haskell | 12 | $51,376 | -$172,701 | -$121,324 | -$1,072 | -$0.078 |
| 8 | Jayton | 7 | $29,555 | -$132,140 | -$102,585 | -$1,555 | -$0.116 |
| 8 | Roby | 11 | $47,093 | -$170,650 | -$123,556 | -$1,192 | -$0.090 |
| 8 | Snyder | 23 | $104,094 | -$250,194 | -$146,100 | -$674 | -$0.058 |
| 8 | Sweetwater | 14 | $84,333 | -$205,284 | -$120,951 | -$916 | -$0.065 |
| 9 | Belton | 32 | $99,803 | -$256,167 | -$156,364 | -$518 | -$0.067 |
| 9 | Gatesville | 20 | $85,272 | -$221,109 | -$135,837 | -$720 | -$0.059 |
| 9 | Groesbeck | 14 | $71,947 | -$210,053 | -$138,105 | -$1,046 | -$0.070 |
| 9 | Hamilton | 14 | $48,193 | -$174,347 | -$126,154 | -$956 | -$0.105 |
| 9 | Hillsboro | 32 | $120,615 | -$306,921 | -$186,306 | -$618 | -$0.064 |
| 9 | Killeen | 13 | $54,133 | -$180,157 | -$126,024 | -$1,028 | -$0.094 |
| 9 | Marlin | 23 | $103,829 | -$249,099 | -$145,269 | -$670 | -$0.055 |
| 9 | Meridian | 15 | $55,158 | -$183,874 | -$128,716 | -$910 | -$0.094 |
| 9 | Temple | 16 | $68,620 | -$198,214 | -$129,594 | -$859 | -$0.080 |
| 9 | Waco DO | 128 | $588,275 | -$1,018,019 | -$429,744 | -$356 | -$0.032 |
| 10 | Athens | 29 | $150,586 | -$297,742 | -$147,156 | -$538 | -$0.046 |
| 10 | Canton | 16 | $99,261 | -$226,840 | -$127,580 | -$846 | -$0.062 |
| 10 | Henderson | 14 | $76,861 | -$203,266 | -$126,406 | -$958 | -$0.061 |
| 10 | Jacksonville | 23 | $115,996 | -$255,196 | -$139,200 | -$642 | -$0.054 |
| 10 | Longview | 34 | $195,998 | -$355,700 | -$159,702 | -$498 | -$0.034 |
| 10 | Mineola | 41 | $201,582 | -$402,624 | -$201,042 | -$520 | -$0.040 |
| 10 | N. Tyler | 35 | $167,442 | -$338,259 | -$170,818 | -$518 | -$0.045 |
| 10 | Palestine | 19 | $109,432 | -$239,967 | -$130,535 | -$729 | -$0.055 |
| 10 | Rusk | 11 | $74,080 | -$184,760 | -$110,680 | -$1,067 | -$0.071 |
| 10 | S. Tyler | 16 | $99,705 | -$223,164 | -$123,459 | -$819 | -$0.055 |
| 10 | Tyler DO | 60 | $290,363 | -$520,625 | -$230,263 | -$407 | -$0.033 |
| 11 | Bronson | 13 | $95,193 | -$221,550 | -$126,356 | -$1,031 | -$0.060 |
| 11 | Center | 14 | $138,968 | -$250,256 | -$111,288 | -$843 | -$0.043 |
| 11 | Crockett | 15 | $84,859 | -$215,988 | -$131,128 | -$927 | -$0.074 |

## Appendix A
## Summary Results of NPV Costs-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 |
|---|---|---|---|---|---|---|---|
| 11 | Groveton | 12 | $89,819 | -$201,952 | -$112,133 | -$991 | -$0.066 |
| 11 | Livingston | 28 | $154,211 | -$308,334 | -$154,122 | -$584 | -$0.044 |
| 11 | Lufkin | 22 | $118,964 | -$265,090 | -$146,126 | -$705 | -$0.065 |
| 11 | Lufkin DO | 58 | $288,225 | -$508,302 | -$220,077 | -$403 | -$0.032 |
| 11 | Nacogdoches | 27 | $146,716 | -$303,472 | -$156,756 | -$616 | -$0.044 |
| 11 | San Augustine | 20 | $91,435 | -$239,249 | -$147,814 | -$784 | -$0.061 |
| 11 | Shepherd | 12 | $84,598 | -$206,531 | -$121,933 | -$1,078 | -$0.063 |
| 12 | Alvin | 22 | $113,744 | -$264,891 | -$151,147 | -$729 | -$0.051 |
| 12 | Angleton | 51 | $238,703 | -$441,202 | -$202,500 | -$421 | -$0.037 |
| 12 | Baytown 1 | 5 | $17,088 | -$99,371 | -$82,282 | -$1,746 | -$0.311 |
| 12 | Baytown 2 | 10 | $14,476 | -$108,435 | -$93,959 | -$997 | -$0.291 |
| 12 | Conroe | 49 | $157,744 | -$381,455 | -$223,711 | -$484 | -$0.049 |
| 12 | E. Houston | 71 | $306,901 | -$545,361 | -$238,460 | -$356 | -$0.033 |
| 12 | Galveston | 6 | $23,685 | -$115,040 | -$91,356 | -$1,384 | -$0.123 |
| 12 | Hempstead | 25 | $193,271 | -$347,896 | -$154,625 | -$656 | -$0.035 |
| 12 | Houston | 15 | $72,290 | -$176,755 | -$104,465 | -$739 | -$0.089 |
| 12 | Houston DO | 257 | $848,478 | -$1,403,848 | -$555,370 | -$229 | -$0.027 |
| 12 | Humble | 72 | $331,722 | -$591,771 | -$260,049 | -$383 | -$0.034 |
| 12 | La Marque | 46 | $178,298 | -$382,895 | -$204,597 | -$472 | -$0.045 |
| 12 | NW Houston 1 | 32 | $121,959 | -$264,384 | -$142,425 | -$472 | -$0.046 |
| 12 | NW Houston 2 | 101 | $388,303 | -$709,242 | -$320,939 | -$337 | -$0.033 |
| 12 | Rosenberg 1 | 34 | $159,955 | -$359,534 | -$199,579 | -$623 | -$0.054 |
| 12 | Rosenberg 2 | 61 | $253,376 | -$459,585 | -$206,209 | -$359 | -$0.036 |
| 12 | SE Houston | 71 | $222,451 | -$486,610 | -$264,159 | -$395 | -$0.045 |
| 13 | Bay City | 21 | $86,100 | -$235,026 | -$148,927 | -$752 | -$0.070 |
| 13 | Bellville | 19 | $70,779 | -$217,940 | -$147,161 | -$822 | -$0.078 |
| 13 | Columbus | 31 | $123,871 | -$306,126 | -$182,255 | -$624 | -$0.051 |
| 13 | Cuero | 17 | $105,863 | -$244,154 | -$138,290 | -$863 | -$0.061 |
| 13 | Edna | 14 | $70,164 | -$197,965 | -$127,801 | -$968 | -$0.084 |
| 13 | Gonzales | 21 | $98,005 | -$247,760 | -$149,755 | -$756 | -$0.065 |
| 13 | Hallettsville | 16 | $85,202 | -$216,335 | -$131,133 | -$869 | -$0.066 |
| 13 | La Grange | 33 | $159,668 | -$335,661 | -$175,993 | -$566 | -$0.046 |
| 13 | Port Lavaca | 12 | $60,570 | -$170,593 | -$110,023 | -$973 | -$0.084 |
| 13 | Victoria | 46 | $227,438 | -$426,216 | -$198,779 | -$458 | -$0.037 |
| 13 | Wharton | 30 | $136,311 | -$309,987 | -$173,676 | -$614 | -$0.057 |
| 13 | Yoakum DO | 62 | $301,311 | -$536,064 | -$234,753 | -$402 | -$0.032 |
| 14 | Austin (183 South) | 26 | $142,127 | -$291,111 | -$148,984 | -$608 | -$0.049 |
| 14 | Austin DO | 125 | $556,834 | -$935,886 | -$379,051 | -$322 | -$0.028 |
| 14 | Austin East | 15 | $77,094 | -$210,103 | -$133,009 | -$941 | -$0.068 |
| 14 | Austin North | 18 | $98,545 | -$238,051 | -$139,505 | -$822 | -$0.059 |
| 14 | Austin West | 37 | $151,875 | -$339,812 | -$187,937 | -$539 | -$0.045 |
| 14 | Bastrop | 26 | $148,750 | -$296,591 | -$147,841 | -$603 | -$0.038 |
| 14 | Burnet | 23 | $108,609 | -$254,766 | -$146,156 | -$674 | -$0.047 |
| 14 | Fredericksburg | 17 | $73,853 | -$206,186 | -$132,333 | -$826 | -$0.071 |
| 14 | Georgetown | 29 | $129,808 | -$294,818 | -$165,010 | -$604 | -$0.048 |
| 14 | Giddings | 13 | $54,273 | -$188,468 | -$134,195 | -$1,095 | -$0.084 |

## Appendix A
## Summary Results of NPV Costs-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 |
|---|---|---|---|---|---|---|---|
| 14 | Johnson CIty | 10 | $47,866 | -$167,081 | -$119,215 | -$1,265 | -$0.076 |
| 14 | Llano | 10 | $60,366 | -$169,865 | -$109,499 | -$1,162 | -$0.073 |
| 14 | Lockhart | 11 | $47,032 | -$168,577 | -$121,545 | -$1,172 | -$0.084 |
| 14 | Mason | 11 | $50,641 | -$164,980 | -$114,339 | -$1,103 | -$0.093 |
| 14 | San Marcos | 14 | $63,864 | -$190,241 | -$126,377 | -$958 | -$0.078 |
| 14 | Taylor | 13 | $52,432 | -$181,355 | -$128,923 | -$1,052 | -$0.084 |
| 15 | Bandera | 12 | $75,721 | -$185,223 | -$109,501 | -$968 | -$0.073 |
| 15 | Boerne | 14 | $85,132 | -$199,592 | -$114,460 | -$867 | -$0.070 |
| 15 | Carrizo Springs | 19 | $122,544 | -$230,670 | -$108,126 | -$604 | -$0.051 |
| 15 | Cotulla | 13 | $102,190 | -$207,859 | -$105,669 | -$862 | -$0.055 |
| 15 | Devine | 13 | $81,967 | -$193,363 | -$111,396 | -$909 | -$0.058 |
| 15 | Eagle Pass | 11 | $78,915 | -$175,292 | -$96,377 | -$929 | -$0.071 |
| 15 | Floresville | 26 | $204,029 | -$310,474 | -$106,445 | -$434 | -$0.030 |
| 15 | Hondo | 23 | $100,863 | -$237,870 | -$137,006 | -$632 | -$0.055 |
| 15 | Kerrville | 31 | $157,250 | -$316,988 | -$159,738 | -$547 | -$0.048 |
| 15 | La Pryor | 12 | $99,264 | -$194,392 | -$95,128 | -$841 | -$0.054 |
| 15 | New Braunfels | 32 | $158,164 | -$314,829 | -$156,664 | -$519 | -$0.042 |
| 15 | Pearsall | 23 | $140,661 | -$262,874 | -$122,213 | -$564 | -$0.044 |
| 15 | Pleasanton | 25 | $144,189 | -$292,829 | -$148,640 | -$631 | -$0.047 |
| 15 | San Antonio DO | 165 | $841,265 | -$1,258,205 | -$416,941 | -$268 | -$0.020 |
| 15 | San Antonio Mid | 82 | $307,565 | -$561,058 | -$253,493 | -$328 | -$0.039 |
| 15 | San Antonio NE | 22 | $157,032 | -$271,902 | -$114,870 | -$554 | -$0.045 |
| 15 | San Antonio NW | 22 | $170,157 | -$276,167 | -$106,010 | -$511 | -$0.044 |
| 15 | San Antonio SE | 21 | $168,790 | -$265,758 | -$96,968 | -$490 | -$0.043 |
| 15 | San Antonio SW | 22 | $172,681 | -$283,378 | -$110,697 | -$534 | -$0.043 |
| 15 | Seguin | 31 | $165,739 | -$320,470 | -$154,731 | -$529 | -$0.041 |
| 15 | Tilden | 10 | $71,427 | -$175,369 | -$103,942 | -$1,103 | -$0.067 |
| 15 | Uvalde | 20 | $117,212 | -$242,660 | -$125,448 | -$665 | -$0.044 |
| 16 | Alice | 21 | $114,276 | -$240,044 | -$125,768 | -$635 | -$0.051 |
| 16 | Beeville | 12 | $54,066 | -$174,500 | -$120,434 | -$1,065 | -$0.089 |
| 16 | Corpus Christi | 22 | $142,617 | -$269,345 | -$126,729 | -$611 | -$0.048 |
| 16 | C.Christi (Morgan) | 25 | $75,856 | -$236,497 | -$160,641 | -$682 | -$0.091 |
| 16 | Corpus Christi DO | 71 | $281,197 | -$513,578 | -$232,380 | -$347 | -$0.033 |
| 16 | George West | 23 | $98,846 | -$255,167 | -$156,321 | -$721 | -$0.060 |
| 16 | Goliad | 10 | $63,177 | -$175,908 | -$112,731 | -$1,196 | -$0.074 |
| 16 | Karnes City | 27 | $153,505 | -$297,000 | -$143,495 | -$564 | -$0.037 |
| 16 | Kingsville | 14 | $88,090 | -$212,690 | -$124,600 | -$944 | -$0.060 |
| 16 | Port Arkansas | 3 | $6,413 | -$87,054 | -$80,641 | -$2,851 | -$0.329 |
| 16 | Refugio | 12 | $75,548 | -$182,011 | -$106,463 | -$941 | -$0.069 |
| 16 | Robstown | 10 | $57,435 | -$171,777 | -$114,342 | -$1,213 | -$0.084 |
| 16 | Rockport | 11 | $65,570 | -$177,980 | -$112,411 | -$1,084 | -$0.086 |
| 16 | Sinton | 35 | $177,692 | -$349,705 | -$172,014 | -$521 | -$0.039 |
| 17 | Brenham | 24 | $125,775 | -$269,133 | -$143,359 | -$634 | -$0.051 |
| 17 | Bryan DO | 59 | $332,760 | -$565,964 | -$233,204 | -$419 | -$0.032 |
| 17 | Buffalo | 24 | $139,022 | -$292,307 | -$153,285 | -$678 | -$0.044 |
| 17 | Caldwell | 14 | $48,100 | -$166,254 | -$118,154 | -$895 | -$0.101 |

## Appendix A
## Summary Results of NPV Costs-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 |
|---|---|---|---|---|---|---|---|
| 17 | Cameron | 16 | $85,971 | -$220,232 | -$134,262 | -$890 | -$0.057 |
| 17 | Fairfield | 15 | $76,043 | -$202,697 | -$126,655 | -$896 | -$0.076 |
| 17 | Hearne | 22 | $110,184 | -$248,093 | -$137,910 | -$665 | -$0.056 |
| 17 | Huntsville | 22 | $118,306 | -$257,107 | -$138,802 | -$669 | -$0.049 |
| 17 | Madisonville | 16 | $92,162 | -$214,561 | -$122,399 | -$811 | -$0.064 |
| 17 | Navasota | 14 | $75,831 | -$208,874 | -$133,043 | -$1,008 | -$0.065 |
| 18 | Corsicana | 38 | $192,311 | -$399,348 | -$207,037 | -$578 | -$0.044 |
| 18 | Dallas Central | 43 | $297,789 | -$513,714 | -$215,925 | -$533 | -$0.037 |
| 18 | Dallas DO | 70 | $321,916 | -$555,820 | -$233,904 | -$354 | -$0.030 |
| 18 | Denton | 61 | $350,706 | -$625,671 | -$274,965 | -$478 | -$0.032 |
| 18 | Ennis | 23 | $98,922 | -$260,070 | -$161,148 | -$743 | -$0.062 |
| 18 | Farmersville | 35 | $195,736 | -$391,975 | -$196,240 | -$595 | -$0.063 |
| 18 | Grand Prairie | 28 | $147,058 | -$314,265 | -$167,207 | -$633 | -$0.044 |
| 18 | Hutchins | 44 | $227,955 | -$429,180 | -$201,224 | -$485 | -$0.037 |
| 18 | Kaufman | 41 | $196,363 | -$429,582 | -$233,218 | -$603 | -$0.045 |
| 18 | Lewisville | 49 | $289,594 | -$542,292 | -$252,698 | -$547 | -$0.037 |
| 18 | McKinney | 44 | $232,403 | -$446,282 | -$213,878 | -$516 | -$0.054 |
| 18 | North Dallas | 66 | $298,410 | -$542,309 | -$243,899 | -$392 | -$0.036 |
| 18 | Rockwall | 26 | $137,512 | -$297,422 | -$159,910 | -$652 | -$0.050 |
| 18 | Waxahachie | 32 | $176,934 | -$345,361 | -$168,427 | -$558 | -$0.041 |
| 19 | Atlanta DO | 53 | $247,524 | -$426,915 | -$179,391 | -$359 | -$0.028 |
| 19 | Carthage | 25 | $166,951 | -$298,056 | -$131,105 | -$556 | -$0.041 |
| 19 | Daingerfield | 16 | $98,261 | -$220,459 | -$122,198 | -$810 | -$0.068 |
| 19 | Gilmer | 22 | $177,092 | -$298,373 | -$121,281 | -$585 | -$0.043 |
| 19 | Jefferson | 15 | $114,828 | -$225,146 | -$110,318 | -$780 | -$0.063 |
| 19 | Linden | 32 | $315,778 | -$456,054 | -$140,275 | -$465 | -$0.028 |
| 19 | Marshall | 29 | $237,348 | -$377,140 | -$139,791 | -$511 | -$0.034 |
| 19 | Mt. Pleasant | 29 | $168,212 | -$314,019 | -$145,808 | -$533 | -$0.042 |
| 19 | New Boston | 16 | $134,924 | -$242,203 | -$107,279 | -$711 | -$0.049 |
| 19 | Texarkana | 34 | $146,093 | -$306,498 | -$160,405 | -$500 | -$0.053 |
| 20 | Anahuac | 16 | $132,059 | -$242,832 | -$110,773 | -$734 | -$0.049 |
| 20 | Beaumont | 38 | $207,022 | -$407,270 | -$200,248 | -$559 | -$0.048 |
| 20 | Beaumont DO | 60 | $284,111 | -$499,579 | -$215,468 | -$381 | -$0.029 |
| 20 | Cleveland | 14 | $55,256 | -$187,529 | -$132,274 | -$1,002 | -$0.085 |
| 20 | Jasper | 24 | $132,733 | -$269,689 | -$136,956 | -$605 | -$0.048 |
| 20 | Kountze | 19 | $102,897 | -$241,552 | -$138,655 | -$774 | -$0.063 |
| 20 | Liberty | 26 | $110,260 | -$265,617 | -$155,357 | -$634 | -$0.055 |
| 20 | Newton | 12 | $97,648 | -$212,832 | -$115,185 | -$1,018 | -$0.057 |
| 20 | Orange | 32 | $162,960 | -$318,794 | -$155,834 | -$517 | -$0.042 |
| 20 | Port Arthur | 29 | $136,124 | -$292,714 | -$156,590 | -$573 | -$0.049 |
| 20 | Woodville | 14 | $98,452 | -$212,855 | -$114,402 | -$867 | -$0.060 |
| 21 | Brownsville | 18 | $85,815 | -$212,738 | -$126,923 | -$748 | -$0.068 |
| 21 | Edcouch | 14 | $66,210 | -$187,196 | -$120,986 | -$917 | -$0.073 |
| 21 | Falfurrias | 13 | $57,144 | -$174,780 | -$117,635 | -$960 | -$0.077 |
| 21 | Freer | 12 | $57,813 | -$177,174 | -$119,360 | -$1,055 | -$0.065 |
| 21 | Hebbronville | 19 | $100,311 | -$227,660 | -$127,349 | -$711 | -$0.053 |

## Appendix A
## Summary Results of NPV Costs-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 |
|---|---|---|---|---|---|---|---|
| 21 | Laredo | 29 | $90,345 | -$244,686 | -$154,341 | -$565 | -$0.073 |
| 21 | Mission | 15 | $73,494 | -$191,291 | -$117,797 | -$833 | -$0.080 |
| 21 | Pharr | 51 | $286,822 | -$503,137 | -$216,315 | -$450 | -$0.034 |
| 21 | Pharr DO | 39 | $202,867 | -$376,223 | -$173,356 | -$472 | -$0.032 |
| 21 | Raymondville | 22 | $103,405 | -$230,806 | -$127,401 | -$614 | -$0.056 |
| 21 | Rio Grande City | 16 | $65,392 | -$197,391 | -$131,999 | -$875 | -$0.080 |
| 21 | San Benito | 22 | $110,954 | -$233,840 | -$122,886 | -$593 | -$0.049 |
| 23 | Brackenridge | 11 | $69,495 | -$183,369 | -$113,874 | -$1,098 | -$0.074 |
| 23 | Brady | 12 | $63,944 | -$181,013 | -$117,068 | -$1,035 | -$0.096 |
| 23 | Brownwood DO | 69 | $268,509 | -$558,359 | -$289,850 | -$446 | -$0.042 |
| 23 | Coleman | 14 | $66,930 | -$190,078 | -$123,148 | -$933 | -$0.078 |
| 23 | Comanche | 19 | $72,920 | -$218,736 | -$145,816 | -$814 | -$0.075 |
| 23 | Eastland | 26 | $125,619 | -$289,690 | -$164,071 | -$669 | -$0.063 |
| 23 | Goldhwaite | 7 | $33,336 | -$129,101 | -$95,766 | -$1,451 | -$0.148 |
| 23 | Lampasas | 18 | $71,737 | -$196,986 | -$125,249 | -$738 | -$0.075 |
| 23 | San Saba | 8 | $35,633 | -$138,233 | -$102,601 | -$1,360 | -$0.141 |
| 24 | Alpine | 26 | $165,411 | -$320,178 | -$154,767 | -$631 | -$0.037 |
| 24 | Canutillo | 15 | $72,978 | -$205,722 | -$132,744 | -$939 | -$0.086 |
| 24 | Dell City | 10 | $56,199 | -$174,635 | -$118,436 | -$1,256 | -$0.080 |
| 24 | El Paso DO | 79 | $319,582 | -$539,437 | -$219,855 | -$295 | -$0.031 |
| 24 | Fort Davis | 9 | $49,066 | -$158,481 | -$109,415 | -$1,290 | -$0.079 |
| 24 | Marfa | 11 | $65,569 | -$185,446 | -$119,877 | -$1,156 | -$0.070 |
| 24 | Sierra Blanca | 11 | $47,097 | -$159,120 | -$112,023 | -$1,080 | -$0.117 |
| 24 | Van Horn | 11 | $49,560 | -$160,326 | -$110,766 | -$1,068 | -$0.105 |
| 24 | Ysleta | 15 | $49,182 | -$187,473 | -$138,291 | -$978 | -$0.094 |
| 25 | Childress | 25 | $115,014 | -$261,115 | -$146,101 | -$620 | -$0.054 |
| 25 | Childress DO | 30 | $152,949 | -$322,725 | -$169,777 | -$600 | -$0.051 |
| 25 | Clarendon | 14 | $69,741 | -$200,806 | -$131,065 | -$993 | -$0.075 |
| 25 | Dickens | 8 | $30,127 | -$135,586 | -$105,460 | -$1,398 | -$0.137 |
| 25 | Matador | 11 | $55,252 | -$175,951 | -$120,699 | -$1,164 | -$0.083 |
| 25 | Munday | 17 | $70,406 | -$197,375 | -$126,969 | -$792 | -$0.073 |
| 25 | Paducah | 8 | $42,385 | -$150,021 | -$107,636 | -$1,427 | -$0.085 |
| 25 | Shamrock | 14 | $63,186 | -$190,108 | -$126,921 | -$962 | -$0.085 |
| 25 | Quanah | 14 | $79,775 | -$205,330 | -$125,555 | -$951 | -$0.066 |
| 25 | Wellington | 18 | $104,953 | -$238,715 | -$133,762 | -$788 | -$0.050 |
| 29 | Anderson County | 4 | $7,207 | -$87,819 | -$80,612 | -$2,138 | -$0.250 |
| 29 | Garza County | 1 | $723 | -$74,379 | -$73,656 | -$7,813 | -$5.705 |
| 29 | Travis County | 272 | $913,338 | -$1,601,887 | -$688,548 | -$269 | -$0.026 |

# APPENDIX B

# NPV COST-EFFECTIVENESS MODEL: BASE CASE

## Fleet Size
## 1-10

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $32,193 | 63.7% | $0.0474 |
| Automobiles | $6,069 | 12.0% | $0.0286 |
| Light Trucks | $15,782 | 31.2% | $0.0457 |
| Heavy Duty Trucks | $10,342 | 20.5% | $0.0848 |
| Diesel Price Diff. | $18,346 | 36.3% | $0.0346 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $50,540 | 100.0% | $0.0418 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($15,880) | 9.9% | ($0.0131) |
| Compressor | ($21,193) | 13.3% | ($0.0175) |
| Storage Vessels | ($15,876) | 9.9% | ($0.0131) |
| Dispenser | ($24,857) | 15.6% | ($0.0205) |
| Dryer | ($9,943) | 6.2% | ($0.0082) |
| **Subtotal** | ($87,747) | 54.9% | ($0.0725) |
| **Vehicle** | | | |
| Conversion Kit | ($7,749) | 4.8% | ($0.0064) |
| Tanks | ($9,895) | 6.2% | ($0.0082) |
| Labor | ($11,026) | 6.9% | ($0.0091) |
| OEM | ($5,178) | 3.2% | ($0.0043) |
| **Subtotal** | ($33,848) | 21.2% | ($0.0280) |
| **Operating** | | | |
| Station Maint. | ($5,650) | 3.5% | ($0.0047) |
| Cylinder Recert. | ($1,927) | 1.2% | ($0.0016) |
| Power | ($13,846) | 8.7% | ($0.0114) |
| Labor - fuel time loss | ($7,976) | 5.0% | ($0.0066) |
| NG Fuel Tax | ($8,809) | 5.5% | ($0.0073) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($38,208) | 23.9% | ($0.0316) |
| **Total Costs** | ($159,803) | 100.0% | ($0.1320) |
| **Savings - Cost** | ($109,264) | N/A | ($0.0903) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 20.3 | 22,509 | $1,950 | $900 |
| Light Trucks | 2 | 12.8 | 18,327 | $2,200 | $900 |
| Heavy Duty Gasoline | 1 | 6.8 | 12,930 | $3,300 | $900 |
| Heavy Duty Diesel | 5 | 8.1 | 13,511 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 9 | | | | |
| Maintenance Savings | 0% | | Mileage Adj. | 0% | |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 2 |
| Year 1: Storage Size (scf) | 7,261 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($1,287.84) |
|---|---|

| Incremental Cost/mile | ($0.0903) |
|---|---|

**Fleet Size**
**11-20**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $62,402 | 73.6% | $0.0517 |
| Automobiles | $6,586 | 7.8% | $0.0306 |
| Light Trucks | $33,879 | 40.0% | $0.0447 |
| Heavy Duty Trucks | $21,936 | 25.9% | $0.0941 |
| Diesel Price Diff. | $22,327 | 26.4% | $0.0333 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $84,729 | 100.0% | $0.0451 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($18,585) | 8.8% | ($0.0099) |
| Compressor | ($22,609) | 10.7% | ($0.0120) |
| Storage Vessels | ($24,915) | 11.8% | ($0.0133) |
| Dispenser | ($24,857) | 11.8% | ($0.0132) |
| Dryer | ($9,943) | 4.7% | ($0.0053) |
| **Subtotal** | ($100,908) | 47.9% | ($0.0537) |
| **Vehicle** | | | |
| Conversion Kit | ($12,504) | 5.9% | ($0.0067) |
| Tanks | ($16,853) | 8.0% | ($0.0090) |
| Labor | ($17,170) | 8.2% | ($0.0091) |
| OEM | ($6,199) | 2.9% | ($0.0033) |
| **Subtotal** | ($52,725) | 25.1% | ($0.0281) |
| **Operating** | | | |
| Station Maint. | ($8,753) | 4.2% | ($0.0047) |
| Cylinder Recert. | ($3,666) | 1.7% | ($0.0020) |
| Power | ($17,473) | 8.3% | ($0.0093) |
| Labor - fuel time loss | ($11,756) | 5.6% | ($0.0063) |
| NG Fuel Tax | ($15,184) | 7.2% | ($0.0081) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($56,831) | 27.0% | ($0.0303) |
| **Total Costs** | ($210,464) | 100.0% | ($0.1120) |
| **Savings - Cost** | ($125,735) | N/A | ($0.0669) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 19.0 | 22,861 | $1,950 | $900 |
| Light Trucks | 5 | 13.0 | 16,093 | $2,200 | $900 |
| Heavy Duty Gasoline | 2 | 6.1 | 12,365 | $3,300 | $900 |
| Heavy Duty Diesel | 7 | 8.4 | 12,206 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 15 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 4 |
| Year 1: Storage Size (scf) | 14,092 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($889.19) |
|---|---|

| Incremental Cost/mile | ($0.0669) |
|---|---|

## Fleet Size
## 21-30

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $113,695 | 81.9% | $0.0489 |
| Automobiles | $9,395 | 6.8% | $0.0299 |
| Light Trucks | $73,711 | 53.1% | $0.0431 |
| Heavy Duty Trucks | $30,588 | 22.0% | $0.1021 |
| Diesel Price Diff. | $25,183 | 18.1% | $0.0345 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $138,878 | 100.0% | $0.0455 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($22,556) | 7.8% | ($0.0074) |
| Compressor | ($24,666) | 8.5% | ($0.0081) |
| Storage Vessels | ($38,245) | 13.2% | ($0.0125) |
| Dispenser | ($24,857) | 8.6% | ($0.0081) |
| Dryer | ($9,943) | 3.4% | ($0.0033) |
| **Subtotal** | ($120,267) | 41.6% | ($0.0394) |
| **Vehicle** | | | |
| Conversion Kit | ($20,141) | 7.0% | ($0.0066) |
| Tanks | ($27,632) | 9.6% | ($0.0090) |
| Labor | ($26,966) | 9.3% | ($0.0088) |
| OEM | ($9,186) | 3.2% | ($0.0030) |
| **Subtotal** | ($83,925) | 29.1% | ($0.0275) |
| **Operating** | | | |
| Station Maint. | ($13,359) | 4.6% | ($0.0044) |
| Cylinder Recert. | ($6,274) | 2.2% | ($0.0021) |
| Power | ($22,902) | 7.9% | ($0.0075) |
| Labor - fuel time loss | ($18,306) | 6.3% | ($0.0060) |
| NG Fuel Tax | ($23,857) | 8.3% | ($0.0078) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($84,699) | 29.3% | ($0.0277) |
| **Total Costs** | ($288,890) | 100.0% | ($0.0945) |
| **Savings - Cost** | ($150,013) | N/A | ($0.0491) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 2 | 19.4 | 16,650 | $1,950 | $900 |
| Light Trucks | 13 | 13.4 | 13,969 | $2,200 | $900 |
| Heavy Duty Gasoline | 3 | 5.6 | 10,594 | $3,300 | $900 |
| Heavy Duty Diesel | 8 | 8.1 | 11,616 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 26 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 7 |
| Year 1: Storage Size (scf) | 25,586 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($612.05) |
|---|---|

| Incremental Cost/mile | ($0.0491) |
|---|---|

**Fleet Size**
**31-50**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $159,615 | 82.2% | $0.0485 |
| Automobiles | $12,829 | 6.6% | $0.0302 |
| Light Trucks | $108,741 | 56.0% | $0.0434 |
| Heavy Duty Trucks | $38,045 | 19.6% | $0.1063 |
| Diesel Price Diff. | $34,468 | 17.8% | $0.0358 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $194,083 | 100.0% | $0.0457 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($26,920) | 7.2% | ($0.0063) |
| Compressor | ($26,983) | 7.3% | ($0.0063) |
| Storage Vessels | ($52,759) | 14.2% | ($0.0124) |
| Dispenser | ($24,857) | 6.7% | ($0.0058) |
| Dryer | ($9,943) | 2.7% | ($0.0023) |
| **Subtotal** | ($141,462) | 38.0% | ($0.0333) |
| **Vehicle** | | | |
| Conversion Kit | ($27,960) | 7.5% | ($0.0066) |
| Tanks | ($38,639) | 10.4% | ($0.0091) |
| Labor | ($36,895) | 9.9% | ($0.0087) |
| OEM | ($13,853) | 3.7% | ($0.0033) |
| **Subtotal** | ($117,348) | 31.6% | ($0.0276) |
| **Operating** | | | |
| Station Maint. | ($18,411) | 5.0% | ($0.0043) |
| Cylinder Recert. | ($8,326) | 2.2% | ($0.0020) |
| Power | ($28,825) | 7.8% | ($0.0068) |
| Labor - fuel time loss | ($25,457) | 6.8% | ($0.0060) |
| NG Fuel Tax | ($32,098) | 8.6% | ($0.0076) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($113,117) | 30.4% | ($0.0266) |
| **Total Costs** | ($371,926) | 100.0% | ($0.0875) |
| **Savings - Cost** | ($177,842) | N/A | ($0.0418) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 3 | 19.2 | 15,000 | $1,950 | $900 |
| Light Trucks | 20 | 13.3 | 13,295 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.5 | 9,492 | $3,300 | $900 |
| Heavy Duty Diesel | 10 | 7.8 | 12,248 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 37 | | | | |
| Maintenance Savings | 0% | | Mileage Adj. | 0% | |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 10 |
| Year 1: Storage Size (scf) | 35,472 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($509.88) |
|---|---|

| Incremental Cost/mile | ($0.0418) |
|---|---|

**Fleet Size**
**51 and up**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $346,548 | 90.7% | $0.0419 |
| Automobiles | $54,998 | 14.4% | $0.0275 |
| Light Trucks | $254,291 | 66.5% | $0.0432 |
| Heavy Duty Trucks | $37,259 | 9.8% | $0.0986 |
| Diesel Price Diff. | $35,568 | 9.3% | $0.0372 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $382,116 | 100.0% | $0.0414 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($39,499) | 5.8% | ($0.0043) |
| Compressor | ($34,169) | 5.0% | ($0.0037) |
| Storage Vessels | ($94,415) | 13.9% | ($0.0102) |
| Dispenser | ($24,857) | 3.7% | ($0.0027) |
| Dryer | ($9,943) | 1.5% | ($0.0011) |
| **Subtotal** | ($202,882) | 29.8% | ($0.0220) |
| **Vehicle** | | | |
| Conversion Kit | ($62,612) | 9.2% | ($0.0068) |
| Tanks | ($77,568) | 11.4% | ($0.0084) |
| Labor | ($85,118) | 12.5% | ($0.0092) |
| OEM | ($20,986) | 3.1% | ($0.0023) |
| **Subtotal** | ($246,284) | 36.2% | ($0.0267) |
| **Operating** | | | |
| Station Maint. | ($33,913) | 5.0% | ($0.0037) |
| Cylinder Recert. | ($19,242) | 2.8% | ($0.0021) |
| Power | ($46,907) | 6.9% | ($0.0051) |
| Labor - fuel time loss | ($54,767) | 8.1% | ($0.0059) |
| NG Fuel Tax | ($76,292) | 11.2% | ($0.0083) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($231,120) | 34.0% | ($0.0250) |
| **Total Costs** | ($680,287) | 100.0% | ($0.0737) |
| **Savings - Cost** | ($298,171) | N/A | ($0.0323) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 19 | 20.8 | 11,171 | $1,950 | $900 |
| Light Trucks | 54 | 13.3 | 11,575 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.8 | 10,024 | $3,300 | $900 |
| Heavy Duty Diesel | 11 | 7.5 | 11,077 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 88 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 22 |
| Year 1: Storage Size (scf) | 75,181 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($359.43) |
|---|---|

| Incremental Cost/mile | ($0.0323) |
|---|---|

# 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. | $53,262 | 59.5% | $0.0481 |
| Automobiles | $10,043 | 11.2% | $0.0290 |
| Light Trucks | $26,120 | 29.2% | $0.0464 |
| Heavy Duty Trucks | $17,099 | 19.1% | $0.0860 |
| Diesel Price Diff. | $36,324 | 40.5% | $0.0420 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $89,585 | 100.0% | $0.0454 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($17,827) | 8.6% | ($0.0090) |
| Compressor | ($24,875) | 12.0% | ($0.0126) |
| Storage Vessels | ($16,763) | 8.1% | ($0.0085) |
| Dispenser | ($24,422) | 11.8% | ($0.0124) |
| Dryer | ($9,769) | 4.7% | ($0.0049) |
| **Subtotal** | ($93,655) | 45.3% | ($0.0475) |
| **Vehicle** | | | |
| Conversion Kit | ($8,787) | 4.2% | ($0.0045) |
| Tanks | ($11,712) | 5.7% | ($0.0059) |
| Labor | ($13,812) | 6.7% | ($0.0070) |
| OEM | ($12,558) | 6.1% | ($0.0064) |
| **Subtotal** | ($46,869) | 22.7% | ($0.0237) |
| **Operating** | | | |
| Station Maint. | ($10,094) | 4.9% | ($0.0051) |
| Cylinder Recert. | ($3,030) | 1.5% | ($0.0015) |
| Power | ($23,530) | 11.4% | ($0.0119) |
| Labor - fuel time loss | ($13,931) | 6.7% | ($0.0071) |
| NG Fuel Tax | ($15,699) | 7.6% | ($0.0080) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($66,283) | 32.1% | ($0.0336) |
| **Total Costs** | ($206,807) | 100.0% | ($0.1048) |
| **Savings - Cost** | ($117,221) | N/A | ($0.0594) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 20.3 | 22,509 | $1,950 | $900 |
| Light Trucks | 2 | 12.8 | 18,327 | $2,200 | $900 |
| Heavy Duty Gasoline | 1 | 6.8 | 12,930 | $3,300 | $900 |
| Heavy Duty Diesel | 5 | 8.1 | 13,511 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 9 | | | | |
| Maintenance Savings | 0% | | Mileage Adj. | 0% | |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 5.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 2 |
| Year 1: Storage Size (scf) | 7,261 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($847.27) |
|---|---|

| Incremental Cost/mile | ($0.0594) |
|---|---|

# Fleet Size 11-20

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $103,179 | 70.0% | $0.0524 |
| Automobiles | $10,898 | 7.4% | $0.0310 |
| Light Trucks | $56,060 | 38.0% | $0.0453 |
| Heavy Duty Trucks | $36,222 | 24.6% | $0.0953 |
| Diesel Price Diff. | $44,190 | 30.0% | $0.0404 |
| Maintenance | $0 | 0.0% | $0.0000 |
| Total Savings | $147,369 | 100.0% | $0.0481 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($20,786) | 7.6% | ($0.0068) |
| Compressor | ($26,609) | 9.7% | ($0.0087) |
| Storage Vessels | ($25,475) | 9.3% | ($0.0083) |
| Dispenser | ($24,422) | 8.9% | ($0.0080) |
| Dryer | ($9,769) | 3.6% | ($0.0032) |
| **Subtotal** | ($107,060) | 39.2% | ($0.0350) |
| **Vehicle** | | | |
| Conversion Kit | ($13,851) | 5.1% | ($0.0045) |
| Tanks | ($19,397) | 7.1% | ($0.0063) |
| Labor | ($21,323) | 7.8% | ($0.0070) |
| OEM | ($13,991) | 5.1% | ($0.0046) |
| **Subtotal** | ($68,562) | 25.1% | ($0.0224) |
| **Operating** | | | |
| Station Maint. | ($15,284) | 5.6% | ($0.0050) |
| Cylinder Recert. | ($5,910) | 2.2% | ($0.0019) |
| Power | ($29,572) | 10.8% | ($0.0097) |
| Labor - fuel time loss | ($20,115) | 7.4% | ($0.0066) |
| NG Fuel Tax | ($26,627) | 9.7% | ($0.0087) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($97,507) | 35.7% | ($0.0318) |
| Total Costs | ($273,130) | 100.0% | ($0.0892) |
| Savings - Cost | ($125,761) | N/A | ($0.0411) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 19.0 | 22,861 | $1,950 | $900 |
| Light Trucks | 5 | 13.0 | 16,093 | $2,200 | $900 |
| Heavy Duty Gasoline | 2 | 6.1 | 12,365 | $3,300 | $900 |
| Heavy Duty Diesel | 7 | 8.4 | 12,206 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 15 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 5.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 4 |
| Year 1: Storage Size (scf) | 14,092 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($545.39) |
|---|---|

| Incremental Cost/mile | ($0.0411) |
|---|---|

## Fleet Size
## 21-30

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $187,851 | 79.0% | $0.0495 |
| Automobiles | $15,547 | 6.5% | $0.0304 |
| Light Trucks | $121,869 | 51.3% | $0.0437 |
| Heavy Duty Trucks | $50,435 | 21.2% | $0.1032 |
| Diesel Price Diff. | $49,841 | 21.0% | $0.0419 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $237,693 | 100.0% | $0.0477 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($24,973) | 6.7% | ($0.0050) |
| Compressor | ($29,016) | 7.7% | ($0.0058) |
| Storage Vessels | ($37,923) | 10.1% | ($0.0076) |
| Dispenser | ($24,422) | 6.5% | ($0.0049) |
| Dryer | ($9,769) | 2.6% | ($0.0020) |
| **Subtotal** | ($126,102) | 33.6% | ($0.0253) |
| **Vehicle** | | | |
| Conversion Kit | ($21,256) | 5.7% | ($0.0043) |
| Tanks | ($30,539) | 8.1% | ($0.0061) |
| Labor | ($32,750) | 8.7% | ($0.0066) |
| OEM | ($21,582) | 5.8% | ($0.0043) |
| **Subtotal** | ($106,128) | 28.3% | ($0.0213) |
| **Operating** | | | |
| Station Maint. | ($22,807) | 6.1% | ($0.0046) |
| Cylinder Recert. | ($9,827) | 2.6% | ($0.0020) |
| Power | ($38,459) | 10.3% | ($0.0077) |
| Labor - fuel time loss | ($30,520) | 8.1% | ($0.0061) |
| NG Fuel Tax | ($41,038) | 10.9% | ($0.0082) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($142,651) | 38.1% | ($0.0286) |
| **Total Costs** | ($374,881) | 100.0% | ($0.0752) |
| **Savings - Cost** | ($137,188) | N/A | ($0.0275) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 2 | 19.4 | 16,650 | $1,950 | $900 |
| Light Trucks | 13 | 13.4 | 13,969 | $2,200 | $900 |
| Heavy Duty Gasoline | 3 | 5.6 | 10,594 | $3,300 | $900 |
| Heavy Duty Diesel | 8 | 8.1 | 11,616 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 26 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 5.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 7 |
| Year 1: Storage Size (scf) | 25,586 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($343.24) |
|---|---|

| Incremental Cost/mile | ($0.0275) |
|---|---|

## Fleet Size
## 31-50

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $263,981 | 79.5% | $0.0492 |
| Automobiles | $21,228 | 6.4% | $0.0307 |
| Light Trucks | $179,787 | 54.1% | $0.0440 |
| Heavy Duty Trucks | $62,966 | 19.0% | $0.1079 |
| Diesel Price Diff. | $68,218 | 20.5% | $0.0435 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $332,199 | 100.0% | $0.0479 |
| **COSTS** | | **% of** | **Incremental** |
| **Infrastructure** | | **Costs** | **Cost/Mile** |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($29,849) | 6.2% | ($0.0043) |
| Compressor | ($31,867) | 6.6% | ($0.0046) |
| Storage Vessels | ($52,217) | 10.8% | ($0.0075) |
| Dispenser | ($24,422) | 5.0% | ($0.0035) |
| Dryer | ($9,769) | 2.0% | ($0.0014) |
| **Subtotal** | ($148,123) | 30.5% | ($0.0214) |
| **Vehicle** | | | |
| Conversion Kit | ($29,136) | 6.0% | ($0.0042) |
| Tanks | ($42,274) | 8.7% | ($0.0061) |
| Labor | ($44,164) | 9.1% | ($0.0064) |
| OEM | ($31,513) | 6.5% | ($0.0045) |
| **Subtotal** | ($147,086) | 30.3% | ($0.0212) |
| **Operating** | | | |
| Station Maint. | ($31,375) | 6.5% | ($0.0045) |
| Cylinder Recert. | ($12,750) | 2.6% | ($0.0018) |
| Power | ($48,534) | 10.0% | ($0.0070) |
| Labor - fuel time loss | ($42,298) | 8.7% | ($0.0061) |
| NG Fuel Tax | ($55,009) | 11.3% | ($0.0079) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($189,966) | 39.2% | ($0.0274) |
| **Total Costs** | ($485,176) | 100.0% | ($0.0700) |
| **Savings - Cost** | ($152,977) | N/A | ($0.0221) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 3 | 19.2 | 15,000 | $1,950 | $900 |
| Light Trucks | 20 | 13.3 | 13,295 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.5 | 9,492 | $3,300 | $900 |
| Heavy Duty Diesel | 10 | 7.8 | 12,248 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 37 | | | | |
| Maintenance Savings | 0% | | Mileage Adj. | 0% | |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 5.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 10 |
| Year 1: Storage Size (scf) | 35,472 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($268.96) |
|---|---|

| Incremental Cost/mile | ($0.0221) |
|---|---|

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**Fleet Size**
**51 and up**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $572,008 | 89.0% | $0.0424 |
| Automobiles | $90,683 | 14.1% | $0.0278 |
| Light Trucks | $419,891 | 65.4% | $0.0437 |
| Heavy Duty Trucks | $61,435 | 9.6% | $0.0997 |
| Diesel Price Diff. | $70,354 | 11.0% | $0.0451 |
| Maintenance | $0 | 0.0% | $0.0000 |
| Total Savings | $642,362 | 100.0% | $0.0427 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($42,819) | 4.9% | ($0.0028) |
| Compressor | ($40,336) | 4.6% | ($0.0027) |
| Storage Vessels | ($90,049) | 10.2% | ($0.0060) |
| Dispenser | ($24,422) | 2.8% | ($0.0016) |
| Dryer | ($9,769) | 1.1% | ($0.0006) |
| Subtotal | ($207,394) | 23.5% | ($0.0138) |
| **Vehicle** | | | |
| Conversion Kit | ($61,711) | 7.0% | ($0.0041) |
| Tanks | ($81,567) | 9.2% | ($0.0054) |
| Labor | ($100,980) | 11.4% | ($0.0067) |
| OEM | ($51,438) | 5.8% | ($0.0034) |
| Subtotal | ($295,696) | 33.5% | ($0.0196) |
| **Operating** | | | |
| Station Maint. | ($56,275) | 6.4% | ($0.0037) |
| Cylinder Recert. | ($29,740) | 3.4% | ($0.0020) |
| Power | ($77,428) | 8.8% | ($0.0051) |
| Labor - fuel time loss | ($88,474) | 10.0% | ($0.0059) |
| NG Fuel Tax | ($127,344) | 14.4% | ($0.0085) |
| Additional training | $0 | 0.0% | $0.0000 |
| Subtotal | ($379,260) | 43.0% | ($0.0252) |
| Total Costs | ($882,350) | 100.0% | ($0.0586) |
| Savings - Cost | ($239,988) | N/A | ($0.0159) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 19 | 20.8 | 11,171 | $1,950 | $900 |
| Light Trucks | 54 | 13.3 | 11,575 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.8 | 10,024 | $3,300 | $900 |
| Heavy Duty Diesel | 11 | 7.5 | 11,077 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 88 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 5.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 22 |
| Year 1: Storage Size (scf) | 75,181 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($177.40) |
|---|---|

| Incremental Cost/mile | ($0.0159) |
|---|---|

# 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. | $105,739 | 55.9% | $0.0489 |
| Automobiles | $19,944 | 10.6% | $0.0295 |
| Light Trucks | $51,829 | 27.4% | $0.0471 |
| Heavy Duty Trucks | $33,966 | 18.0% | $0.0876 |
| Diesel Price Diff. | $83,266 | 44.1% | $0.0493 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $189,005 | 100.0% | $0.0491 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($21,505) | 7.0% | ($0.0056) |
| Compressor | ($31,807) | 10.3% | ($0.0083) |
| Storage Vessels | ($11,800) | 3.8% | ($0.0031) |
| Dispenser | ($22,500) | 7.3% | ($0.0058) |
| Dryer | ($9,000) | 2.9% | ($0.0023) |
| **Subtotal** | ($96,611) | 31.4% | ($0.0251) |
| **Vehicle** | | | |
| Conversion Kit | ($9,500) | 3.1% | ($0.0025) |
| Tanks | ($14,250) | 4.6% | ($0.0037) |
| Labor | ($17,750) | 5.8% | ($0.0046) |
| OEM | ($34,200) | 11.1% | ($0.0089) |
| **Subtotal** | ($75,700) | 24.6% | ($0.0197) |
| **Operating** | | | |
| Station Maint. | ($21,224) | 6.9% | ($0.0055) |
| Cylinder Recert. | ($5,005) | 1.6% | ($0.0013) |
| Power | ($47,517) | 15.4% | ($0.0123) |
| Labor - fuel time loss | ($28,596) | 9.3% | ($0.0074) |
| NG Fuel Tax | ($33,120) | 10.8% | ($0.0086) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($135,462) | 44.0% | ($0.0352) |
| **Total Costs** | ($307,773) | 100.0% | ($0.0799) |
| **Savings - Cost** | ($118,769) | N/A | ($0.0308) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 20.3 | 22,509 | $1,950 | $900 |
| Light Trucks | 2 | 12.8 | 18,327 | $2,200 | $900 |
| Heavy Duty Gasoline | 1 | 6.8 | 12,930 | $3,300 | $900 |
| Heavy Duty Diesel | 5 | 8.1 | 13,511 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 9 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| | |
|---|---|
| DISCOUNT RATE | 0.0% |

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 2 |
| Year 1: Storage Size (scf) | 7,261 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($439.88) |
| Incremental Cost/mile | ($0.0308) |

# Fleet Size 11-20

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $204,889 | 66.9% | $0.0533 |
| Automobiles | $21,642 | 7.1% | $0.0316 |
| Light Trucks | $111,332 | 36.4% | $0.0461 |
| Heavy Duty Trucks | $71,914 | 23.5% | $0.0969 |
| Diesel Price Diff. | $101,285 | 33.1% | $0.0474 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $306,174 | 100.0% | $0.0512 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($24,888) | 6.2% | ($0.0042) |
| Compressor | ($34,112) | 8.5% | ($0.0057) |
| Storage Vessels | ($17,211) | 4.3% | ($0.0029) |
| Dispenser | ($22,500) | 5.6% | ($0.0038) |
| Dryer | ($9,000) | 2.2% | ($0.0015) |
| **Subtotal** | ($107,711) | 26.8% | ($0.0180) |
| **Vehicle** | | | |
| Conversion Kit | ($14,500) | 3.6% | ($0.0024) |
| Tanks | ($22,950) | 5.7% | ($0.0038) |
| Labor | ($27,250) | 6.8% | ($0.0046) |
| OEM | ($32,900) | 8.2% | ($0.0055) |
| **Subtotal** | ($97,600) | 24.3% | ($0.0163) |
| **Operating** | | | |
| Station Maint. | ($31,511) | 7.8% | ($0.0053) |
| Cylinder Recert. | ($10,175) | 2.5% | ($0.0017) |
| Power | ($59,417) | 14.8% | ($0.0099) |
| Labor - fuel time loss | ($40,474) | 10.1% | ($0.0068) |
| NG Fuel Tax | ($55,440) | 13.8% | ($0.0093) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($197,018) | 49.0% | ($0.0330) |
| **Total Costs** | ($402,329) | 100.0% | ($0.0673) |
| **Savings - Cost** | ($96,155) | N/A | ($0.0161) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 19.0 | 22,861 | $1,950 | $900 |
| Light Trucks | 5 | 13.0 | 16,093 | $2,200 | $900 |
| Heavy Duty Gasoline | 2 | 6.1 | 12,365 | $3,300 | $900 |
| Heavy Duty Diesel | 7 | 8.4 | 12,206 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 15 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 0.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 4 |
| Year 1: Storage Size (scf) | 14,092 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($213.68) |
|---|---|

| Incremental Cost/mile | ($0.0161) |
|---|---|

## Fleet Size 21-30

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $372,987 | 76.6% | $0.0504 |
| Automobiles | $30,874 | 6.3% | $0.0309 |
| Light Trucks | $242,077 | 49.7% | $0.0444 |
| Heavy Duty Trucks | $100,036 | 20.5% | $0.1049 |
| Diesel Price Diff. | $114,239 | 23.4% | $0.0492 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $487,226 | 100.0% | $0.0501 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($29,462) | 5.3% | ($0.0030) |
| Compressor | ($37,161) | 6.7% | ($0.0038) |
| Storage Vessels | ($24,564) | 4.4% | ($0.0025) |
| Dispenser | ($22,500) | 4.0% | ($0.0023) |
| Dryer | ($9,000) | 1.6% | ($0.0009) |
| **Subtotal** | ($122,687) | 22.0% | ($0.0126) |
| **Vehicle** | | | |
| Conversion Kit | ($21,000) | 3.8% | ($0.0022) |
| Tanks | ($34,600) | 6.2% | ($0.0036) |
| Labor | ($41,200) | 7.4% | ($0.0042) |
| OEM | ($54,100) | 9.7% | ($0.0056) |
| **Subtotal** | ($150,900) | 27.1% | ($0.0155) |
| **Operating** | | | |
| Station Maint. | ($46,083) | 8.3% | ($0.0047) |
| Cylinder Recert. | ($16,390) | 2.9% | ($0.0017) |
| Power | ($76,670) | 13.8% | ($0.0079) |
| Labor - fuel time loss | ($59,843) | 10.8% | ($0.0062) |
| NG Fuel Tax | ($84,060) | 15.1% | ($0.0086) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($283,046) | 50.8% | ($0.0291) |
| **Total Costs** | ($556,632) | 100.0% | ($0.0572) |
| **Savings - Cost** | ($69,406) | N/A | ($0.0071) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 2 | 19.4 | 16,650 | $1,950 | $900 |
| Light Trucks | 13 | 13.4 | 13,969 | $2,200 | $900 |
| Heavy Duty Gasoline | 3 | 5.6 | 10,594 | $3,300 | $900 |
| Heavy Duty Diesel | 8 | 8.1 | 11,616 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 26 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 0.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 7 |
| Year 1: Storage Size (scf) | 25,586 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($88.98) |
|---|---|

| Incremental Cost/mile | ($0.0071) |
|---|---|

**Fleet Size**
**31-50**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $524,223 | 77.0% | $0.0501 |
| Automobiles | $42,157 | 6.2% | $0.0312 |
| Light Trucks | $357,122 | 52.5% | $0.0448 |
| Heavy Duty Trucks | $124,944 | 18.4% | $0.1097 |
| Diesel Price Diff. | $156,359 | 23.0% | $0.0511 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $680,582 | 100.0% | $0.0503 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($35,157) | 4.8% | ($0.0026) |
| Compressor | ($40,940) | 5.6% | ($0.0030) |
| Storage Vessels | ($33,732) | 4.7% | ($0.0025) |
| Dispenser | ($22,500) | 3.1% | ($0.0017) |
| Dryer | ($9,000) | 1.2% | ($0.0007) |
| **Subtotal** | ($141,329) | 19.5% | ($0.0104) |
| **Vehicle** | | | |
| Conversion Kit | ($28,500) | 3.9% | ($0.0021) |
| Tanks | ($47,350) | 6.5% | ($0.0035) |
| Labor | ($54,700) | 7.5% | ($0.0040) |
| OEM | ($76,900) | 10.6% | ($0.0057) |
| **Subtotal** | ($207,450) | 28.6% | ($0.0153) |
| **Operating** | | | |
| Station Maint. | ($63,341) | 8.7% | ($0.0047) |
| Cylinder Recert. | ($20,735) | 2.9% | ($0.0015) |
| Power | ($97,070) | 13.4% | ($0.0072) |
| Labor - fuel time loss | ($82,769) | 11.4% | ($0.0061) |
| NG Fuel Tax | ($112,320) | 15.5% | ($0.0083) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($376,234) | 51.9% | ($0.0278) |
| **Total Costs** | ($725,014) | 100.0% | ($0.0536) |
| **Savings - Cost** | ($44,432) | N/A | ($0.0033) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 3 | 19.2 | 15,000 | $1,950 | $900 |
| Light Trucks | 20 | 13.3 | 13,295 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.5 | 9,492 | $3,300 | $900 |
| Heavy Duty Diesel | 10 | 7.8 | 12,248 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 37 | | | | |
| Maintenance Savings | 0% | | Mileage Adj. | 0% | |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 0.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 10 |
| Year 1: Storage Size (scf) | 35,472 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($40.03) |
|---|---|

| Incremental Cost/mile | ($0.0033) |
|---|---|

## Fleet Size
## 51 and up

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $1,135,368 | 87.6% | $0.0431 |
| Automobiles | $179,864 | 13.9% | $0.0282 |
| Light Trucks | $833,651 | 64.3% | $0.0445 |
| Heavy Duty Trucks | $121,853 | 9.4% | $0.1013 |
| Diesel Price Diff. | $161,200 | 12.4% | $0.0529 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $1,296,568 | 100.0% | $0.0441 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($49,027) | 3.7% | ($0.0017) |
| Compressor | ($51,888) | 3.9% | ($0.0018) |
| Storage Vessels | ($55,031) | 4.2% | ($0.0019) |
| Dispenser | ($22,500) | 1.7% | ($0.0008) |
| Dryer | ($9,000) | 0.7% | ($0.0003) |
| **Subtotal** | ($187,445) | 14.2% | ($0.0064) |
| **Vehicle** | | | |
| Conversion Kit | ($55,000) | 4.2% | ($0.0019) |
| Tanks | ($87,150) | 6.6% | ($0.0030) |
| Labor | ($125,850) | 9.5% | ($0.0043) |
| OEM | ($133,100) | 10.1% | ($0.0045) |
| **Subtotal** | ($401,100) | 30.3% | ($0.0137) |
| **Operating** | | | |
| Station Maint. | ($110,697) | 8.4% | ($0.0038) |
| Cylinder Recert. | ($49,005) | 3.7% | ($0.0017) |
| Power | ($151,569) | 11.5% | ($0.0052) |
| Labor - fuel time loss | ($167,881) | 12.7% | ($0.0057) |
| NG Fuel Tax | ($253,980) | 19.2% | ($0.0086) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($733,132) | 55.5% | ($0.0250) |
| **Total Costs** | ($1,321,677) | 100.0% | ($0.0450) |
| **Savings - Cost** | ($25,110) | N/A | ($0.0009) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 19 | 20.8 | 11,171 | $1,950 | $900 |
| Light Trucks | 54 | 13.3 | 11,575 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.8 | 10,024 | $3,300 | $900 |
| Heavy Duty Diesel | 11 | 7.5 | 11,077 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 88 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 0.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 22 |
| Year 1: Storage Size (scf) | 75,181 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($9.51) |
|---|---|

| Incremental Cost/mile | ($0.0009) |
|---|---|

# APPENDIX E

# NPV COST-EFFECTIVENESS MODEL: $1.00/MCF NATURAL GAS

# Fleet Size
# 1-10

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $42,340 | 57.5% | $0.0623 |
| Automobiles | $7,990 | 10.8% | $0.0377 |
| Light Trucks | $20,679 | 28.1% | $0.0598 |
| Heavy Duty Trucks | $13,670 | 18.6% | $0.1122 |
| Diesel Price Diff. | $31,312 | 42.5% | $0.0590 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $73,652 | 100.0% | $0.0609 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($15,880) | 9.9% | ($0.0131) |
| Compressor | ($21,193) | 13.3% | ($0.0175) |
| Storage Vessels | ($15,876) | 9.9% | ($0.0131) |
| Dispenser | ($24,857) | 15.6% | ($0.0205) |
| Dryer | ($9,943) | 6.2% | ($0.0082) |
| **Subtotal** | ($87,747) | 54.9% | ($0.0725) |
| **Vehicle** | | | |
| Conversion Kit | ($7,749) | 4.8% | ($0.0064) |
| Tanks | ($9,895) | 6.2% | ($0.0082) |
| Labor | ($11,026) | 6.9% | ($0.0091) |
| OEM | ($5,178) | 3.2% | ($0.0043) |
| **Subtotal** | ($33,848) | 21.2% | ($0.0280) |
| **Operating** | | | |
| Station Maint. | ($5,650) | 3.5% | ($0.0047) |
| Cylinder Recert. | ($1,927) | 1.2% | ($0.0016) |
| Power | ($13,846) | 8.7% | ($0.0114) |
| Labor - fuel time loss | ($7,976) | 5.0% | ($0.0066) |
| NG Fuel Tax | ($8,809) | 5.5% | ($0.0073) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($38,208) | 23.9% | ($0.0316) |
| **Total Costs** | ($159,803) | 100.0% | ($0.1320) |
| **Savings - Cost** | ($86,152) | N/A | ($0.0712) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 20.3 | 22,509 | $1,950 | $900 |
| Light Trucks | 2 | 12.8 | 18,327 | $2,200 | $900 |
| Heavy Duty Gasoline | 1 | 6.8 | 12,930 | $3,300 | $900 |
| Heavy Duty Diesel | 5 | 8.1 | 13,511 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 9 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $1.00 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.12 |
| NG price per diesel gallon equivalent | $0.14 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 2 |
| Year 1: Storage Size (scf) | 7,261 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($1,015.44) |
|---|---|

| Incremental Cost/mile | ($0.0712) |
|---|---|

## Fleet Size
## 11-20

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $82,366 | 68.3% | $0.0682 |
| Automobiles | $8,671 | 7.2% | $0.0402 |
| Light Trucks | $44,604 | 37.0% | $0.0588 |
| Heavy Duty Trucks | $29,091 | 24.1% | $0.1248 |
| Diesel Price Diff. | $38,169 | 31.7% | $0.0569 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $120,535 | 100.0% | $0.0642 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($18,585) | 8.8% | ($0.0099) |
| Compressor | ($22,609) | 10.7% | ($0.0120) |
| Storage Vessels | ($24,915) | 11.8% | ($0.0133) |
| Dispenser | ($24,857) | 11.8% | ($0.0132) |
| Dryer | ($9,943) | 4.7% | ($0.0053) |
| **Subtotal** | ($100,908) | 47.9% | ($0.0537) |
| **Vehicle** | | | |
| Conversion Kit | ($12,504) | 5.9% | ($0.0067) |
| Tanks | ($16,853) | 8.0% | ($0.0090) |
| Labor | ($17,170) | 8.2% | ($0.0091) |
| OEM | ($6,199) | 2.9% | ($0.0033) |
| **Subtotal** | ($52,725) | 25.1% | ($0.0281) |
| **Operating** | | | |
| Station Maint. | ($8,753) | 4.2% | ($0.0047) |
| Cylinder Recert. | ($3,666) | 1.7% | ($0.0020) |
| Power | ($17,473) | 8.3% | ($0.0093) |
| Labor - fuel time loss | ($11,756) | 5.6% | ($0.0063) |
| NG Fuel Tax | ($15,184) | 7.2% | ($0.0081) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($56,831) | 27.0% | ($0.0303) |
| **Total Costs** | ($210,464) | 100.0% | ($0.1120) |
| **Savings - Cost** | ($89,930) | N/A | ($0.0479) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 19.0 | 22,861 | $1,950 | $900 |
| Light Trucks | 5 | 13.0 | 16,093 | $2,200 | $900 |
| Heavy Duty Gasoline | 2 | 6.1 | 12,365 | $3,300 | $900 |
| Heavy Duty Diesel | 7 | 8.4 | 12,206 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 15 | | | | |
| Maintenance Savings | 0% | | Mileage Adj. | 0% | |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $1.00 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.12 |
| NG price per diesel gallon equivalent | $0.14 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 4 |
| Year 1: Storage Size (scf) | 14,092 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($635.98) |
|---|---|

| Incremental Cost/mile | ($0.0479) |
|---|---|

## Fleet Size
## 21-30

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $150,477 | 77.8% | $0.0647 |
| Automobiles | $12,370 | 6.4% | $0.0394 |
| Light Trucks | $97,431 | 50.3% | $0.0569 |
| Heavy Duty Trucks | $40,677 | 21.0% | $0.1358 |
| Diesel Price Diff. | $43,050 | 22.2% | $0.0590 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $193,527 | 100.0% | $0.0633 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($22,556) | 7.8% | ($0.0074) |
| Compressor | ($24,666) | 8.5% | ($0.0081) |
| Storage Vessels | ($38,245) | 13.2% | ($0.0125) |
| Dispenser | ($24,857) | 8.6% | ($0.0081) |
| Dryer | ($9,943) | 3.4% | ($0.0033) |
| **Subtotal** | ($120,267) | 41.6% | ($0.0394) |
| **Vehicle** | | | |
| Conversion Kit | ($20,141) | 7.0% | ($0.0066) |
| Tanks | ($27,632) | 9.6% | ($0.0090) |
| Labor | ($26,966) | 9.3% | ($0.0088) |
| OEM | ($9,186) | 3.2% | ($0.0030) |
| **Subtotal** | ($83,925) | 29.1% | ($0.0275) |
| **Operating** | | | |
| Station Maint. | ($13,359) | 4.6% | ($0.0044) |
| Cylinder Recert. | ($6,274) | 2.2% | ($0.0021) |
| Power | ($22,902) | 7.9% | ($0.0075) |
| Labor - fuel time loss | ($18,306) | 6.3% | ($0.0060) |
| NG Fuel Tax | ($23,857) | 8.3% | ($0.0078) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($84,699) | 29.3% | ($0.0277) |
| **Total Costs** | ($288,890) | 100.0% | ($0.0945) |
| **Savings - Cost** | ($95,363) | N/A | ($0.0312) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 2 | 19.4 | 16,650 | $1,950 | $900 |
| Light Trucks | 13 | 13.4 | 13,969 | $2,200 | $900 |
| Heavy Duty Gasoline | 3 | 5.6 | 10,594 | $3,300 | $900 |
| Heavy Duty Diesel | 8 | 8.1 | 11,616 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 26 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $1.00 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.12 |
| NG price per diesel gallon equivalent | $0.14 |

| | |
|---|---|
| DISCOUNT RATE | 10.0% |

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 7 |
| Year 1: Storage Size (scf) | 25,586 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($389.08) |
| Incremental Cost/mile | ($0.0312) |

**Fleet Size**
**31-50**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $210,474 | 78.1% | $0.0640 |
| Automobiles | $16,890 | 6.3% | $0.0398 |
| Light Trucks | $143,734 | 53.4% | $0.0573 |
| Heavy Duty Trucks | $49,851 | 18.5% | $0.1393 |
| Diesel Price Diff. | $58,923 | 21.9% | $0.0612 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $269,398 | 100.0% | $0.0634 |
| **COSTS** | | **% of** | **Incremental** |
| **Infrastructure** | | **Costs** | **Cost/Mile** |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($26,920) | 7.2% | ($0.0063) |
| Compressor | ($26,983) | 7.3% | ($0.0063) |
| Storage Vessels | ($52,759) | 14.2% | ($0.0124) |
| Dispenser | ($24,857) | 6.7% | ($0.0058) |
| Dryer | ($9,943) | 2.7% | ($0.0023) |
| **Subtotal** | ($141,462) | 38.0% | ($0.0333) |
| **Vehicle** | | | |
| Conversion Kit | ($27,960) | 7.5% | ($0.0066) |
| Tanks | ($38,639) | 10.4% | ($0.0091) |
| Labor | ($36,895) | 9.9% | ($0.0087) |
| OEM | ($13,853) | 3.7% | ($0.0033) |
| **Subtotal** | ($117,348) | 31.6% | ($0.0276) |
| **Operating** | | | |
| Station Maint. | ($18,411) | 5.0% | ($0.0043) |
| Cylinder Recert. | ($8,326) | 2.2% | ($0.0020) |
| Power | ($28,825) | 7.8% | ($0.0068) |
| Labor - fuel time loss | ($25,457) | 6.8% | ($0.0060) |
| NG Fuel Tax | ($32,098) | 8.6% | ($0.0076) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($113,117) | 30.4% | ($0.0266) |
| **Total Costs** | ($371,926) | 100.0% | ($0.0875) |
| **Savings - Cost** | ($102,528) | N/A | ($0.0241) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 3 | 19.2 | 15,000 | $1,950 | $900 |
| Light Trucks | 20 | 13.3 | 13,295 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.5 | 9,492 | $3,300 | $900 |
| Heavy Duty Diesel | 10 | 7.8 | 12,248 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 37 | | | | |
| Maintenance Savings | 0% | | Mileage Adj. | 0% | |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $1.00 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.12 |
| NG price per diesel gallon equivalent | $0.14 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 10 |
| Year 1: Storage Size (scf) | 35,472 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($293.95) |
|---|---|

| Incremental Cost/mile | ($0.0241) |
|---|---|

# Fleet Size
# 51 and up

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $459,918 | 88.3% | $0.0556 |
| Automobiles | $73,137 | 14.0% | $0.0366 |
| Light Trucks | $337,233 | 64.7% | $0.0572 |
| Heavy Duty Trucks | $49,548 | 9.5% | $0.1311 |
| Diesel Price Diff. | $60,926 | 11.7% | $0.0636 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $520,843 | 100.0% | $0.0564 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($39,499) | 5.8% | ($0.0043) |
| Compressor | ($34,169) | 5.0% | ($0.0037) |
| Storage Vessels | ($94,415) | 13.9% | ($0.0102) |
| Dispenser | ($24,857) | 3.7% | ($0.0027) |
| Dryer | ($9,943) | 1.5% | ($0.0011) |
| **Subtotal** | ($202,882) | 29.8% | ($0.0220) |
| **Vehicle** | | | |
| Conversion Kit | ($62,612) | 9.2% | ($0.0068) |
| Tanks | ($77,568) | 11.4% | ($0.0084) |
| Labor | ($85,118) | 12.5% | ($0.0092) |
| OEM | ($20,986) | 3.1% | ($0.0023) |
| **Subtotal** | ($246,284) | 36.2% | ($0.0267) |
| **Operating** | | | |
| Station Maint. | ($33,913) | 5.0% | ($0.0037) |
| Cylinder Recert. | ($19,242) | 2.8% | ($0.0021) |
| Power | ($46,907) | 6.9% | ($0.0051) |
| Labor - fuel time loss | ($54,767) | 8.1% | ($0.0059) |
| NG Fuel Tax | ($76,292) | 11.2% | ($0.0083) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($231,120) | 34.0% | ($0.0250) |
| **Total Costs** | ($680,287) | 100.0% | ($0.0737) |
| **Savings - Cost** | ($159,443) | N/A | ($0.0173) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 19 | 20.8 | 11,171 | $1,950 | $900 |
| Light Trucks | 54 | 13.3 | 11,575 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.8 | 10,024 | $3,300 | $900 |
| Heavy Duty Diesel | 11 | 7.5 | 11,077 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 88 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $1.00 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.12 |
| NG price per diesel gallon equivalent | $0.14 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 22 |
| Year 1: Storage Size (scf) | 75,181 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($192.20) |
|---|---|

| Incremental Cost/mile | ($0.0173) |
|---|---|

# APPENDIX F

# NPV COST-EFFECTIVENESS MODEL: FREE NATURAL GAS

# Fleet Size
# 1-10

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $49,104 | 55.1% | $0.0723 |
| Automobiles | $9,271 | 10.4% | $0.0437 |
| Light Trucks | $23,944 | 26.9% | $0.0693 |
| Heavy Duty Trucks | $15,889 | 17.8% | $0.1304 |
| Diesel Price Diff. | $39,955 | 44.9% | $0.0753 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $89,059 | 100.0% | $0.0736 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($15,880) | 9.9% | ($0.0131) |
| Compressor | ($21,193) | 13.3% | ($0.0175) |
| Storage Vessels | ($15,876) | 9.9% | ($0.0131) |
| Dispenser | ($24,857) | 15.6% | ($0.0205) |
| Dryer | ($9,943) | 6.2% | ($0.0082) |
| **Subtotal** | ($87,747) | 54.9% | ($0.0725) |
| **Vehicle** | | | |
| Conversion Kit | ($7,749) | 4.8% | ($0.0064) |
| Tanks | ($9,895) | 6.2% | ($0.0082) |
| Labor | ($11,026) | 6.9% | ($0.0091) |
| OEM | ($5,178) | 3.2% | ($0.0043) |
| **Subtotal** | ($33,848) | 21.2% | ($0.0280) |
| **Operating** | | | |
| Station Maint. | ($5,650) | 3.5% | ($0.0047) |
| Cylinder Recert. | ($1,927) | 1.2% | ($0.0016) |
| Power | ($13,846) | 8.7% | ($0.0114) |
| Labor - fuel time loss | ($7,976) | 5.0% | ($0.0066) |
| NG Fuel Tax | ($8,809) | 5.5% | ($0.0073) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($38,208) | 23.9% | ($0.0316) |
| **Total Costs** | ($159,803) | 100.0% | ($0.1320) |
| **Savings - Cost** | ($70,744) | N/A | ($0.0585) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 20.3 | 22,509 | $1,950 | $900 |
| Light Trucks | 2 | 12.8 | 18,327 | $2,200 | $900 |
| Heavy Duty Gasoline | 1 | 6.8 | 12,930 | $3,300 | $900 |
| Heavy Duty Diesel | 5 | 8.1 | 13,511 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 9 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $0.00 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.00 |
| NG price per diesel gallon equivalent | $0.00 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 2 |
| Year 1: Storage Size (scf) | 7,261 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($833.83) |
|---|---|

| Incremental Cost/mile | ($0.0585) |
|---|---|

## Fleet Size
## 11-20

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $95,676 | 66.3% | $0.0793 |
| Automobiles | $10,061 | 7.0% | $0.0467 |
| Light Trucks | $51,754 | 35.8% | $0.0682 |
| Heavy Duty Trucks | $33,861 | 23.4% | $0.1452 |
| Diesel Price Diff. | $48,729 | 33.7% | $0.0726 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $144,405 | 100.0% | $0.0769 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($18,585) | 8.8% | ($0.0099) |
| Compressor | ($22,609) | 10.7% | ($0.0120) |
| Storage Vessels | ($24,915) | 11.8% | ($0.0133) |
| Dispenser | ($24,857) | 11.8% | ($0.0132) |
| Dryer | ($9,943) | 4.7% | ($0.0053) |
| **Subtotal** | ($100,908) | 47.9% | ($0.0537) |
| **Vehicle** | | | |
| Conversion Kit | ($12,504) | 5.9% | ($0.0067) |
| Tanks | ($16,853) | 8.0% | ($0.0090) |
| Labor | ($17,170) | 8.2% | ($0.0091) |
| OEM | ($6,199) | 2.9% | ($0.0033) |
| **Subtotal** | ($52,725) | 25.1% | ($0.0281) |
| **Operating** | | | |
| Station Maint. | ($8,753) | 4.2% | ($0.0047) |
| Cylinder Recert. | ($3,666) | 1.7% | ($0.0020) |
| Power | ($17,473) | 8.3% | ($0.0093) |
| Labor - fuel time loss | ($11,756) | 5.6% | ($0.0063) |
| NG Fuel Tax | ($15,184) | 7.2% | ($0.0081) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($56,831) | 27.0% | ($0.0303) |
| **Total Costs** | ($210,464) | 100.0% | ($0.1120) |
| **Savings - Cost** | ($66,059) | N/A | ($0.0352) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 19.0 | 22,861 | $1,950 | $900 |
| Light Trucks | 5 | 13.0 | 16,093 | $2,200 | $900 |
| Heavy Duty Gasoline | 2 | 6.1 | 12,365 | $3,300 | $900 |
| Heavy Duty Diesel | 7 | 8.4 | 12,206 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 15 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $0.00 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.00 |
| NG price per diesel gallon equivalent | $0.00 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 4 |
| Year 1: Storage Size (scf) | 14,092 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($467.17) |
|---|---|

| Incremental Cost/mile | ($0.0352) |
|---|---|

# Fleet Size 21-30

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $174,999 | 76.1% | $0.0753 |
| Automobiles | $14,352 | 6.2% | $0.0457 |
| Light Trucks | $113,244 | 49.2% | $0.0662 |
| Heavy Duty Trucks | $47,402 | 20.6% | $0.1582 |
| Diesel Price Diff. | $54,962 | 23.9% | $0.0753 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $229,961 | 100.0% | $0.0753 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($22,556) | 7.8% | ($0.0074) |
| Compressor | ($24,666) | 8.5% | ($0.0081) |
| Storage Vessels | ($38,245) | 13.2% | ($0.0125) |
| Dispenser | ($24,857) | 8.6% | ($0.0081) |
| Dryer | ($9,943) | 3.4% | ($0.0033) |
| **Subtotal** | ($120,267) | 41.6% | ($0.0394) |
| **Vehicle** | | | |
| Conversion Kit | ($20,141) | 7.0% | ($0.0066) |
| Tanks | ($27,632) | 9.6% | ($0.0090) |
| Labor | ($26,966) | 9.3% | ($0.0088) |
| OEM | ($9,186) | 3.2% | ($0.0030) |
| **Subtotal** | ($83,925) | 29.1% | ($0.0275) |
| **Operating** | | | |
| Station Maint. | ($13,359) | 4.6% | ($0.0044) |
| Cylinder Recert. | ($6,274) | 2.2% | ($0.0021) |
| Power | ($22,902) | 7.9% | ($0.0075) |
| Labor - fuel time loss | ($18,306) | 6.3% | ($0.0060) |
| NG Fuel Tax | ($23,857) | 8.3% | ($0.0078) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($84,699) | 29.3% | ($0.0277) |
| **Total Costs** | ($288,890) | 100.0% | ($0.0945) |
| **Savings - Cost** | ($58,930) | N/A | ($0.0193) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 2 | 19.4 | 16,650 | $1,950 | $900 |
| Light Trucks | 13 | 13.4 | 13,969 | $2,200 | $900 |
| Heavy Duty Gasoline | 3 | 5.6 | 10,594 | $3,300 | $900 |
| Heavy Duty Diesel | 8 | 8.1 | 11,616 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 26 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $0.00 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.00 |
| NG price per diesel gallon equivalent | $0.00 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 7 |
| Year 1: Storage Size (scf) | 25,586 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($240.43) |
|---|---|

| Incremental Cost/mile | ($0.0193) |
|---|---|

# Fleet Size
# 31-50

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $244,381 | 76.5% | $0.0743 |
| Automobiles | $19,597 | 6.1% | $0.0462 |
| Light Trucks | $167,062 | 52.3% | $0.0666 |
| Heavy Duty Trucks | $57,721 | 18.1% | $0.1613 |
| Diesel Price Diff. | $75,226 | 23.5% | $0.0782 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $319,607 | 100.0% | $0.0752 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($26,920) | 7.2% | ($0.0063) |
| Compressor | ($26,983) | 7.3% | ($0.0063) |
| Storage Vessels | ($52,759) | 14.2% | ($0.0124) |
| Dispenser | ($24,857) | 6.7% | ($0.0058) |
| Dryer | ($9,943) | 2.7% | ($0.0023) |
| **Subtotal** | ($141,462) | 38.0% | ($0.0333) |
| **Vehicle** | | | |
| Conversion Kit | ($27,960) | 7.5% | ($0.0066) |
| Tanks | ($38,639) | 10.4% | ($0.0091) |
| Labor | ($36,895) | 9.9% | ($0.0087) |
| OEM | ($13,853) | 3.7% | ($0.0033) |
| **Subtotal** | ($117,348) | 31.6% | ($0.0276) |
| **Operating** | | | |
| Station Maint. | ($18,411) | 5.0% | ($0.0043) |
| Cylinder Recert. | ($8,326) | 2.2% | ($0.0020) |
| Power | ($28,825) | 7.8% | ($0.0068) |
| Labor - fuel time loss | ($25,457) | 6.8% | ($0.0060) |
| NG Fuel Tax | ($32,098) | 8.6% | ($0.0076) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($113,117) | 30.4% | ($0.0266) |
| **Total Costs** | ($371,926) | 100.0% | ($0.0875) |
| **Savings - Cost** | ($52,319) | N/A | ($0.0123) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 3 | 19.2 | 15,000 | $1,950 | $900 |
| Light Trucks | 20 | 13.3 | 13,295 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.5 | 9,492 | $3,300 | $900 |
| Heavy Duty Diesel | 10 | 7.8 | 12,248 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 37 | | | | |
| Maintenance Savings | 0% | | Mileage Adj. | 0% | |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $0.00 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.00 |
| NG price per diesel gallon equivalent | $0.00 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 10 |
| Year 1: Storage Size (scf) | 35,472 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($150.00) |
|---|---|

| Incremental Cost/mile | ($0.0123) |
|---|---|

**Fleet Size**
**51 and up**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $535,497 | 87.3% | $0.0647 |
| Automobiles | $85,229 | 13.9% | $0.0426 |
| Light Trucks | $392,528 | 64.0% | $0.0666 |
| Heavy Duty Trucks | $57,740 | 9.4% | $0.1528 |
| Diesel Price Diff. | $77,831 | 12.7% | $0.0813 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $613,328 | 100.0% | $0.0665 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($39,499) | 5.8% | ($0.0043) |
| Compressor | ($34,169) | 5.0% | ($0.0037) |
| Storage Vessels | ($94,415) | 13.9% | ($0.0102) |
| Dispenser | ($24,857) | 3.7% | ($0.0027) |
| Dryer | ($9,943) | 1.5% | ($0.0011) |
| **Subtotal** | ($202,882) | 29.8% | ($0.0220) |
| **Vehicle** | | | |
| Conversion Kit | ($62,612) | 9.2% | ($0.0068) |
| Tanks | ($77,568) | 11.4% | ($0.0084) |
| Labor | ($85,118) | 12.5% | ($0.0092) |
| OEM | ($20,986) | 3.1% | ($0.0023) |
| **Subtotal** | ($246,284) | 36.2% | ($0.0267) |
| **Operating** | | | |
| Station Maint. | ($33,913) | 5.0% | ($0.0037) |
| Cylinder Recert. | ($19,242) | 2.8% | ($0.0021) |
| Power | ($46,907) | 6.9% | ($0.0051) |
| Labor - fuel time loss | ($54,767) | 8.1% | ($0.0059) |
| NG Fuel Tax | ($76,292) | 11.2% | ($0.0083) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($231,120) | 34.0% | ($0.0250) |
| **Total Costs** | ($680,287) | 100.0% | ($0.0737) |
| **Savings - Cost** | ($66,958) | N/A | ($0.0073) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 19 | 20.8 | 11,171 | $1,950 | $900 |
| Light Trucks | 54 | 13.3 | 11,575 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.8 | 10,024 | $3,300 | $900 |
| Heavy Duty Diesel | 11 | 7.5 | 11,077 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 88 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $0.00 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.00 |
| NG price per diesel gallon equivalent | $0.00 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 22 |
| Year 1: Storage Size (scf) | 75,181 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($80.71) |
|---|---|

| Incremental Cost/mile | ($0.0073) |
|---|---|

# APPENDIX G

# NPV COST-EFFECTIVENESS MODEL: NATURAL GAS BREAK-EVEN PRICE

**Fleet Size**
**1-10**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $80,162 | 50.2% | $0.1180 |
| Automobiles | $15,152 | 9.5% | $0.0714 |
| Light Trucks | $38,934 | 24.4% | $0.1127 |
| Heavy Duty Trucks | $26,076 | 16.3% | $0.2139 |
| Diesel Price Diff. | $79,641 | 49.8% | $0.1501 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $159,803 | 100.0% | $0.1320 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($15,880) | 9.9% | ($0.0131) |
| Compressor | ($21,193) | 13.3% | ($0.0175) |
| Storage Vessels | ($15,876) | 9.9% | ($0.0131) |
| Dispenser | ($24,857) | 15.6% | ($0.0205) |
| Dryer | ($9,943) | 6.2% | ($0.0082) |
| **Subtotal** | ($87,747) | 54.9% | ($0.0725) |
| **Vehicle** | | | |
| Conversion Kit | ($7,749) | 4.8% | ($0.0064) |
| Tanks | ($9,895) | 6.2% | ($0.0082) |
| Labor | ($11,026) | 6.9% | ($0.0091) |
| OEM | ($5,178) | 3.2% | ($0.0043) |
| **Subtotal** | ($33,848) | 21.2% | ($0.0280) |
| **Operating** | | | |
| Station Maint. | ($5,650) | 3.5% | ($0.0047) |
| Cylinder Recert. | ($1,927) | 1.2% | ($0.0016) |
| Power | ($13,846) | 8.7% | ($0.0114) |
| Labor - fuel time loss | ($7,976) | 5.0% | ($0.0066) |
| NG Fuel Tax | ($8,809) | 5.5% | ($0.0073) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($38,208) | 23.9% | ($0.0316) |
| **Total Costs** | ($159,803) | 100.0% | ($0.1320) |
| **Savings - Cost** | $0 | N/A | $0.0000 |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 20.3 | 22,509 | $1,950 | $900 |
| Light Trucks | 2 | 12.8 | 18,327 | $2,200 | $900 |
| Heavy Duty Gasoline | 1 | 6.8 | 12,930 | $3,300 | $900 |
| Heavy Duty Diesel | 5 | 8.1 | 13,511 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 9 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | ($4.59) |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | ($0.56) |
| NG price per diesel gallon equivalent | ($0.64) |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 2 |
| Year 1: Storage Size (scf) | 7,261 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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**
**11-20**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $132,509 | 63.0% | $0.1098 |
| Automobiles | $13,907 | 6.6% | $0.0645 |
| Light Trucks | $71,541 | 34.0% | $0.0943 |
| Heavy Duty Trucks | $47,061 | 22.4% | $0.2019 |
| Diesel Price Diff. | $77,955 | 37.0% | $0.1161 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $210,464 | 100.0% | $0.1120 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($18,585) | 8.8% | ($0.0099) |
| Compressor | ($22,609) | 10.7% | ($0.0120) |
| Storage Vessels | ($24,915) | 11.8% | ($0.0133) |
| Dispenser | ($24,857) | 11.8% | ($0.0132) |
| Dryer | ($9,943) | 4.7% | ($0.0053) |
| **Subtotal** | ($100,908) | 47.9% | ($0.0537) |
| **Vehicle** | | | |
| Conversion Kit | ($12,504) | 5.9% | ($0.0067) |
| Tanks | ($16,853) | 8.0% | ($0.0090) |
| Labor | ($17,170) | 8.2% | ($0.0091) |
| OEM | ($6,199) | 2.9% | ($0.0033) |
| **Subtotal** | ($52,725) | 25.1% | ($0.0281) |
| **Operating** | | | |
| Station Maint. | ($8,753) | 4.2% | ($0.0047) |
| Cylinder Recert. | ($3,666) | 1.7% | ($0.0020) |
| Power | ($17,473) | 8.3% | ($0.0093) |
| Labor - fuel time loss | ($11,756) | 5.6% | ($0.0063) |
| NG Fuel Tax | ($15,184) | 7.2% | ($0.0081) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($56,831) | 27.0% | ($0.0303) |
| **Total Costs** | ($210,464) | 100.0% | ($0.1120) |
| **Savings - Cost** | $0 | N/A | $0.0000 |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 19.0 | 22,861 | $1,950 | $900 |
| Light Trucks | 5 | 13.0 | 16,093 | $2,200 | $900 |
| Heavy Duty Gasoline | 2 | 6.1 | 12,365 | $3,300 | $900 |
| Heavy Duty Diesel | 7 | 8.4 | 12,206 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 15 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | ($2.77) |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | ($0.34) |
| NG price per diesel gallon equivalent | ($0.39) |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 4 |
| Year 1: Storage Size (scf) | 14,092 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 21-30

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $214,662 | 74.3% | $0.0923 |
| Automobiles | $17,560 | 6.1% | $0.0559 |
| Light Trucks | $138,821 | 48.1% | $0.0811 |
| Heavy Duty Trucks | $58,281 | 20.2% | $0.1945 |
| Diesel Price Diff. | $74,228 | 25.7% | $0.1017 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $288,890 | 100.0% | $0.0945 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($22,556) | 7.8% | ($0.0074) |
| Compressor | ($24,666) | 8.5% | ($0.0081) |
| Storage Vessels | ($38,245) | 13.2% | ($0.0125) |
| Dispenser | ($24,857) | 8.6% | ($0.0081) |
| Dryer | ($9,943) | 3.4% | ($0.0033) |
| **Subtotal** | ($120,267) | 41.6% | ($0.0394) |
| **Vehicle** | | | |
| Conversion Kit | ($20,141) | 7.0% | ($0.0066) |
| Tanks | ($27,632) | 9.6% | ($0.0090) |
| Labor | ($26,966) | 9.3% | ($0.0088) |
| OEM | ($9,186) | 3.2% | ($0.0030) |
| **Subtotal** | ($83,925) | 29.1% | ($0.0275) |
| **Operating** | | | |
| Station Maint. | ($13,359) | 4.6% | ($0.0044) |
| Cylinder Recert. | ($6,274) | 2.2% | ($0.0021) |
| Power | ($22,902) | 7.9% | ($0.0075) |
| Labor - fuel time loss | ($18,306) | 6.3% | ($0.0060) |
| NG Fuel Tax | ($23,857) | 8.3% | ($0.0078) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($84,699) | 29.3% | ($0.0277) |
| **Total Costs** | ($288,890) | 100.0% | ($0.0945) |
| **Savings - Cost** | $0 | N/A | $0.0000 |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 2 | 19.4 | 16,650 | $1,950 | $900 |
| Light Trucks | 13 | 13.4 | 13,969 | $2,200 | $900 |
| Heavy Duty Gasoline | 3 | 5.6 | 10,594 | $3,300 | $900 |
| Heavy Duty Diesel | 8 | 8.1 | 11,616 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 26 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | ($1.62) |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | ($0.20) |
| NG price per diesel gallon equivalent | ($0.23) |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 7 |
| Year 1: Storage Size (scf) | 25,586 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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
# 31-50

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $279,711 | 75.2% | $0.0851 |
| Automobiles | $22,418 | 6.0% | $0.0528 |
| Light Trucks | $191,370 | 51.5% | $0.0763 |
| Heavy Duty Trucks | $65,923 | 17.7% | $0.1842 |
| Diesel Price Diff. | $92,215 | 24.8% | $0.0958 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $371,926 | 100.0% | $0.0875 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($26,920) | 7.2% | ($0.0063) |
| Compressor | ($26,983) | 7.3% | ($0.0063) |
| Storage Vessels | ($52,759) | 14.2% | ($0.0124) |
| Dispenser | ($24,857) | 6.7% | ($0.0058) |
| Dryer | ($9,943) | 2.7% | ($0.0023) |
| **Subtotal** | ($141,462) | 38.0% | ($0.0333) |
| **Vehicle** | | | |
| Conversion Kit | ($27,960) | 7.5% | ($0.0066) |
| Tanks | ($38,639) | 10.4% | ($0.0091) |
| Labor | ($36,895) | 9.9% | ($0.0087) |
| OEM | ($13,853) | 3.7% | ($0.0033) |
| **Subtotal** | ($117,348) | 31.6% | ($0.0276) |
| **Operating** | | | |
| Station Maint. | ($18,411) | 5.0% | ($0.0043) |
| Cylinder Recert. | ($8,326) | 2.2% | ($0.0020) |
| Power | ($28,825) | 7.8% | ($0.0068) |
| Labor - fuel time loss | ($25,457) | 6.8% | ($0.0060) |
| NG Fuel Tax | ($32,098) | 8.6% | ($0.0076) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($113,117) | 30.4% | ($0.0266) |
| **Total Costs** | ($371,926) | 100.0% | ($0.0875) |
| **Savings - Cost** | $0 | N/A | $0.0000 |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 3 | 19.2 | 15,000 | $1,950 | $900 |
| Light Trucks | 20 | 13.3 | 13,295 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.5 | 9,492 | $3,300 | $900 |
| Heavy Duty Diesel | 10 | 7.8 | 12,248 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 37 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | ($1.04) |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | ($0.13) |
| NG price per diesel gallon equivalent | ($0.14) |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 10 |
| Year 1: Storage Size (scf) | 35,472 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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. | $590,216 | 86.8% | $0.0714 |
| Automobiles | $93,984 | 13.8% | $0.0470 |
| Light Trucks | $432,560 | 63.6% | $0.0734 |
| Heavy Duty Trucks | $63,672 | 9.4% | $0.1685 |
| Diesel Price Diff. | $90,070 | 13.2% | $0.0941 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $680,287 | 100.0% | $0.0737 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($39,499) | 5.8% | ($0.0043) |
| Compressor | ($34,169) | 5.0% | ($0.0037) |
| Storage Vessels | ($94,415) | 13.9% | ($0.0102) |
| Dispenser | ($24,857) | 3.7% | ($0.0027) |
| Dryer | ($9,943) | 1.5% | ($0.0011) |
| **Subtotal** | ($202,882) | 29.8% | ($0.0220) |
| **Vehicle** | | | |
| Conversion Kit | ($62,612) | 9.2% | ($0.0068) |
| Tanks | ($77,568) | 11.4% | ($0.0084) |
| Labor | ($85,118) | 12.5% | ($0.0092) |
| OEM | ($20,986) | 3.1% | ($0.0023) |
| **Subtotal** | ($246,284) | 36.2% | ($0.0267) |
| **Operating** | | | |
| Station Maint. | ($33,913) | 5.0% | ($0.0037) |
| Cylinder Recert. | ($19,242) | 2.8% | ($0.0021) |
| Power | ($46,907) | 6.9% | ($0.0051) |
| Labor - fuel time loss | ($54,767) | 8.1% | ($0.0059) |
| NG Fuel Tax | ($76,292) | 11.2% | ($0.0083) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($231,120) | 34.0% | ($0.0250) |
| **Total Costs** | ($680,287) | 100.0% | ($0.0737) |
| **Savings - Cost** | $0 | N/A | $0.0000 |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 19 | 20.8 | 11,171 | $1,950 | $900 |
| Light Trucks | 54 | 13.3 | 11,575 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.8 | 10,024 | $3,300 | $900 |
| Heavy Duty Diesel | 11 | 7.5 | 11,077 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 88 | | | | |
| Maintenance Savings | 0% | | Mileage Adj. | 0% | |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | ($0.72) |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | ($0.09) |
| NG price per diesel gallon equivalent | ($0.10) |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 22 |
| Year 1: Storage Size (scf) | 75,181 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 H

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

## Gasoline/Diesel Break-even Price

**Fleet Size**
**1-10**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $91,192 | 57.1% | $0.1342 |
| Automobiles | $17,209 | 10.8% | $0.0811 |
| Light Trucks | $44,550 | 27.9% | $0.1289 |
| Heavy Duty Trucks | $29,433 | 18.4% | $0.2415 |
| Diesel Price Diff. | $68,611 | 42.9% | $0.1293 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $159,803 | 100.0% | $0.1320 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($15,880) | 9.9% | ($0.0131) |
| Compressor | ($21,193) | 13.3% | ($0.0175) |
| Storage Vessels | ($15,876) | 9.9% | ($0.0131) |
| Dispenser | ($24,857) | 15.6% | ($0.0205) |
| Dryer | ($9,943) | 6.2% | ($0.0082) |
| **Subtotal** | ($87,747) | 54.9% | ($0.0725) |
| **Vehicle** | | | |
| Conversion Kit | ($7,749) | 4.8% | ($0.0064) |
| Tanks | ($9,895) | 6.2% | ($0.0082) |
| Labor | ($11,026) | 6.9% | ($0.0091) |
| OEM | ($5,178) | 3.2% | ($0.0043) |
| **Subtotal** | ($33,848) | 21.2% | ($0.0280) |
| **Operating** | | | |
| Station Maint. | ($5,650) | 3.5% | ($0.0047) |
| Cylinder Recert. | ($1,927) | 1.2% | ($0.0016) |
| Power | ($13,846) | 8.7% | ($0.0114) |
| Labor - fuel time loss | ($7,976) | 5.0% | ($0.0066) |
| NG Fuel Tax | ($8,809) | 5.5% | ($0.0073) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($38,208) | 23.9% | ($0.0316) |
| **Total Costs** | ($159,803) | 100.0% | ($0.1320) |
| **Savings - Cost** | $0 | N/A | $0.0000 |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 20.3 | 22,509 | $1,950 | $900 |
| Light Trucks | 2 | 12.8 | 18,327 | $2,200 | $900 |
| Heavy Duty Gasoline | 1 | 6.8 | 12,930 | $3,300 | $900 |
| Heavy Duty Diesel | 5 | 8.1 | 13,511 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 9 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $1.9593300 |
| Diesel Price/gallon | $1.9193300 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 2 |
| Year 1: Storage Size (scf) | 7,261 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 |
|---|---|

## Gasoline/Diesel Break-even Price

**Fleet Size**
**11-20**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $144,405 | 68.6% | $0.1196 |
| Automobiles | $15,209 | 7.2% | $0.0706 |
| Light Trucks | $78,238 | 37.2% | $0.1031 |
| Heavy Duty Trucks | $50,959 | 24.2% | $0.2186 |
| Diesel Price Diff. | $66,059 | 31.4% | $0.0984 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $210,464 | 100.0% | $0.1120 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($18,585) | 8.8% | ($0.0099) |
| Compressor | ($22,609) | 10.7% | ($0.0120) |
| Storage Vessels | ($24,915) | 11.8% | ($0.0133) |
| Dispenser | ($24,857) | 11.8% | ($0.0132) |
| Dryer | ($9,943) | 4.7% | ($0.0053) |
| **Subtotal** | ($100,908) | 47.9% | ($0.0537) |
| **Vehicle** | | | |
| Conversion Kit | ($12,504) | 5.9% | ($0.0067) |
| Tanks | ($16,853) | 8.0% | ($0.0090) |
| Labor | ($17,170) | 8.2% | ($0.0091) |
| OEM | ($6,199) | 2.9% | ($0.0033) |
| **Subtotal** | ($52,725) | 25.1% | ($0.0281) |
| **Operating** | | | |
| Station Maint. | ($8,753) | 4.2% | ($0.0047) |
| Cylinder Recert. | ($3,666) | 1.7% | ($0.0020) |
| Power | ($17,473) | 8.3% | ($0.0093) |
| Labor - fuel time loss | ($11,756) | 5.6% | ($0.0063) |
| NG Fuel Tax | ($15,184) | 7.2% | ($0.0081) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($56,831) | 27.0% | ($0.0303) |
| **Total Costs** | ($210,464) | 100.0% | ($0.1120) |
| **Savings - Cost** | $0 | N/A | $0.0000 |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 19.0 | 22,861 | $1,950 | $900 |
| Light Trucks | 5 | 13.0 | 16,093 | $2,200 | $900 |
| Heavy Duty Gasoline | 2 | 6.1 | 12,365 | $3,300 | $900 |
| Heavy Duty Diesel | 7 | 8.4 | 12,206 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 15 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $1.6528200 |
| Diesel Price/gallon | $1.6128200 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 4 |
| Year 1: Storage Size (scf) | 14,092 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 |
|---|---|

## Gasoline/Diesel Break-even Price

**Fleet Size**
**21-30**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $226,583 | 78.4% | $0.0974 |
| Automobiles | $18,654 | 6.5% | $0.0594 |
| Light Trucks | $146,763 | 50.8% | $0.0857 |
| Heavy Duty Trucks | $61,167 | 21.2% | $0.2042 |
| Diesel Price Diff. | $62,307 | 21.6% | $0.0853 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $288,890 | 100.0% | $0.0945 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($22,556) | 7.8% | ($0.0074) |
| Compressor | ($24,666) | 8.5% | ($0.0081) |
| Storage Vessels | ($38,245) | 13.2% | ($0.0125) |
| Dispenser | ($24,857) | 8.6% | ($0.0081) |
| Dryer | ($9,943) | 3.4% | ($0.0033) |
| **Subtotal** | ($120,267) | 41.6% | ($0.0394) |
| **Vehicle** | | | |
| Conversion Kit | ($20,141) | 7.0% | ($0.0066) |
| Tanks | ($27,632) | 9.6% | ($0.0090) |
| Labor | ($26,966) | 9.3% | ($0.0088) |
| OEM | ($9,186) | 3.2% | ($0.0030) |
| **Subtotal** | ($83,925) | 29.1% | ($0.0275) |
| **Operating** | | | |
| Station Maint. | ($13,359) | 4.6% | ($0.0044) |
| Cylinder Recert. | ($6,274) | 2.2% | ($0.0021) |
| Power | ($22,902) | 7.9% | ($0.0075) |
| Labor - fuel time loss | ($18,306) | 6.3% | ($0.0060) |
| NG Fuel Tax | ($23,857) | 8.3% | ($0.0078) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($84,699) | 29.3% | ($0.0277) |
| **Total Costs** | ($288,890) | 100.0% | ($0.0945) |
| **Savings - Cost** | $0 | N/A | $0.0000 |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 2 | 19.4 | 16,650 | $1,950 | $900 |
| Light Trucks | 13 | 13.4 | 13,969 | $2,200 | $900 |
| Heavy Duty Gasoline | 3 | 5.6 | 10,594 | $3,300 | $900 |
| Heavy Duty Diesel | 8 | 8.1 | 11,616 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 26 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $1.4641250 |
| Diesel Price/gallon | $1.4241250 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 7 |
| Year 1: Storage Size (scf) | 25,586 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 |
|---|---|

## Gasoline/Diesel Break-even Price

**Fleet Size**
**31-50**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $294,109 | 79.1% | $0.0894 |
| Automobiles | $23,614 | 6.3% | $0.0557 |
| Light Trucks | $200,683 | 54.0% | $0.0801 |
| Heavy Duty Trucks | $69,812 | 18.8% | $0.1950 |
| Diesel Price Diff. | $77,817 | 20.9% | $0.0809 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $371,926 | 100.0% | $0.0875 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($26,920) | 7.2% | ($0.0063) |
| Compressor | ($26,983) | 7.3% | ($0.0063) |
| Storage Vessels | ($52,759) | 14.2% | ($0.0124) |
| Dispenser | ($24,857) | 6.7% | ($0.0058) |
| Dryer | ($9,943) | 2.7% | ($0.0023) |
| **Subtotal** | ($141,462) | 38.0% | ($0.0333) |
| **Vehicle** | | | |
| Conversion Kit | ($27,960) | 7.5% | ($0.0066) |
| Tanks | ($38,639) | 10.4% | ($0.0091) |
| Labor | ($36,895) | 9.9% | ($0.0087) |
| OEM | ($13,853) | 3.7% | ($0.0033) |
| **Subtotal** | ($117,348) | 31.6% | ($0.0276) |
| **Operating** | | | |
| Station Maint. | ($18,411) | 5.0% | ($0.0043) |
| Cylinder Recert. | ($8,326) | 2.2% | ($0.0020) |
| Power | ($28,825) | 7.8% | ($0.0068) |
| Labor - fuel time loss | ($25,457) | 6.8% | ($0.0060) |
| NG Fuel Tax | ($32,098) | 8.6% | ($0.0076) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($113,117) | 30.4% | ($0.0266) |
| **Total Costs** | ($371,926) | 100.0% | ($0.0875) |
| **Savings - Cost** | $0 | N/A | $0.0000 |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 3 | 19.2 | 15,000 | $1,950 | $900 |
| Light Trucks | 20 | 13.3 | 13,295 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.5 | 9,492 | $3,300 | $900 |
| Heavy Duty Diesel | 10 | 7.8 | 12,248 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 37 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $1.3798080 |
| Diesel Price/gallon | $1.3398080 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 10 |
| Year 1: Storage Size (scf) | 35,472 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 |
|---|---|

## Gasoline/Diesel Break-even Price

**Fleet Size**
**51 and up**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $605,336 | 89.0% | $0.0732 |
| Automobiles | $96,186 | 14.1% | $0.0481 |
| Light Trucks | $443,986 | 65.3% | $0.0754 |
| Heavy Duty Trucks | $65,163 | 9.6% | $0.1724 |
| Diesel Price Diff. | $74,951 | 11.0% | $0.0783 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $680,287 | 100.0% | $0.0737 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($39,499) | 5.8% | ($0.0043) |
| Compressor | ($34,169) | 5.0% | ($0.0037) |
| Storage Vessels | ($94,415) | 13.9% | ($0.0102) |
| Dispenser | ($24,857) | 3.7% | ($0.0027) |
| Dryer | ($9,943) | 1.5% | ($0.0011) |
| **Subtotal** | ($202,882) | 29.8% | ($0.0220) |
| **Vehicle** | | | |
| Conversion Kit | ($62,612) | 9.2% | ($0.0068) |
| Tanks | ($77,568) | 11.4% | ($0.0084) |
| Labor | ($85,118) | 12.5% | ($0.0092) |
| OEM | ($20,986) | 3.1% | ($0.0023) |
| **Subtotal** | ($246,284) | 36.2% | ($0.0267) |
| **Operating** | | | |
| Station Maint. | ($33,913) | 5.0% | ($0.0037) |
| Cylinder Recert. | ($19,242) | 2.8% | ($0.0021) |
| Power | ($46,907) | 6.9% | ($0.0051) |
| Labor - fuel time loss | ($54,767) | 8.1% | ($0.0059) |
| NG Fuel Tax | ($76,292) | 11.2% | ($0.0083) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($231,120) | 34.0% | ($0.0250) |
| **Total Costs** | ($680,287) | 100.0% | ($0.0737) |
| **Savings - Cost** | $0 | N/A | $0.0000 |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 19 | 20.8 | 11,171 | $1,950 | $900 |
| Light Trucks | 54 | 13.3 | 11,575 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.8 | 10,024 | $3,300 | $900 |
| Heavy Duty Diesel | 11 | 7.5 | 11,077 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 88 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $1.3201070 |
| Diesel Price/gallon | $1.2801070 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 22 |
| Year 1: Storage Size (scf) | 75,181 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 I

# NPV COST-EFFECTIVENESS MODEL: 10 PERCENT MAINTENANCE SAVINGS

## Fleet Size
## 1-10

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $32,193 | 54.0% | $0.0474 |
| Automobiles | $6,069 | 10.2% | $0.0286 |
| Light Trucks | $15,782 | 26.5% | $0.0457 |
| Heavy Duty Trucks | $10,342 | 17.3% | $0.0848 |
| Diesel Price Diff. | $18,346 | 30.8% | $0.0346 |
| Maintenance | $9,082 | 15.2% | $0.0075 |
| **Total Savings** | $59,622 | 100.0% | $0.0493 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($15,880) | 9.9% | ($0.0131) |
| Compressor | ($21,193) | 13.3% | ($0.0175) |
| Storage Vessels | ($15,876) | 9.9% | ($0.0131) |
| Dispenser | ($24,857) | 15.6% | ($0.0205) |
| Dryer | ($9,943) | 6.2% | ($0.0082) |
| **Subtotal** | ($87,747) | 54.9% | ($0.0725) |
| **Vehicle** | | | |
| Conversion Kit | ($7,749) | 4.8% | ($0.0064) |
| Tanks | ($9,895) | 6.2% | ($0.0082) |
| Labor | ($11,026) | 6.9% | ($0.0091) |
| OEM | ($5,178) | 3.2% | ($0.0043) |
| **Subtotal** | ($33,848) | 21.2% | ($0.0280) |
| **Operating** | | | |
| Station Maint. | ($5,650) | 3.5% | ($0.0047) |
| Cylinder Recert. | ($1,927) | 1.2% | ($0.0016) |
| Power | ($13,846) | 8.7% | ($0.0114) |
| Labor - fuel time loss | ($7,976) | 5.0% | ($0.0066) |
| NG Fuel Tax | ($8,809) | 5.5% | ($0.0073) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($38,208) | 23.9% | ($0.0316) |
| **Total Costs** | ($159,803) | 100.0% | ($0.1320) |
| **Savings - Cost** | ($100,182) | N/A | ($0.0828) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 20.3 | 22,509 | $1,950 | $900 |
| Light Trucks | 2 | 12.8 | 18,327 | $2,200 | $900 |
| Heavy Duty Gasoline | 1 | 6.8 | 12,930 | $3,300 | $900 |
| Heavy Duty Diesel | 5 | 8.1 | 13,511 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 9 | | | | |

| | |
|---|---|
| Maintenance Savings | 10% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 2 |
| Year 1: Storage Size (scf) | 7,261 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($1,180.80) |
|---|---|

| Incremental Cost/mile | ($0.0828) |
|---|---|

# Fleet Size
# 11-20

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $62,402 | 63.4% | $0.0517 |
| Automobiles | $6,586 | 6.7% | $0.0306 |
| Light Trucks | $33,879 | 34.4% | $0.0447 |
| Heavy Duty Trucks | $21,936 | 22.3% | $0.0941 |
| Diesel Price Diff. | $22,327 | 22.7% | $0.0333 |
| Maintenance | $13,729 | 13.9% | $0.0073 |
| **Total Savings** | $98,458 | 100.0% | $0.0524 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($18,585) | 8.8% | ($0.0099) |
| Compressor | ($22,609) | 10.7% | ($0.0120) |
| Storage Vessels | ($24,915) | 11.8% | ($0.0133) |
| Dispenser | ($24,857) | 11.8% | ($0.0132) |
| Dryer | ($9,943) | 4.7% | ($0.0053) |
| **Subtotal** | ($100,908) | 47.9% | ($0.0537) |
| **Vehicle** | | | |
| Conversion Kit | ($12,504) | 5.9% | ($0.0067) |
| Tanks | ($16,853) | 8.0% | ($0.0090) |
| Labor | ($17,170) | 8.2% | ($0.0091) |
| OEM | ($6,199) | 2.9% | ($0.0033) |
| **Subtotal** | ($52,725) | 25.1% | ($0.0281) |
| **Operating** | | | |
| Station Maint. | ($8,753) | 4.2% | ($0.0047) |
| Cylinder Recert. | ($3,666) | 1.7% | ($0.0020) |
| Power | ($17,473) | 8.3% | ($0.0093) |
| Labor - fuel time loss | ($11,756) | 5.6% | ($0.0063) |
| NG Fuel Tax | ($15,184) | 7.2% | ($0.0081) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($56,831) | 27.0% | ($0.0303) |
| **Total Costs** | ($210,464) | 100.0% | ($0.1120) |
| **Savings - Cost** | ($112,006) | N/A | ($0.0596) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 19.0 | 22,861 | $1,950 | $900 |
| Light Trucks | 5 | 13.0 | 16,093 | $2,200 | $900 |
| Heavy Duty Gasoline | 2 | 6.1 | 12,365 | $3,300 | $900 |
| Heavy Duty Diesel | 7 | 8.4 | 12,206 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 15 | | | | |

| | |
|---|---|
| Maintenance Savings | 10% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 4 |
| Year 1: Storage Size (scf) | 14,092 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($792.10) |
|---|---|

| Incremental Cost/mile | ($0.0596) |
|---|---|

# Fleet Size 21-30

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $113,695 | 71.0% | $0.0489 |
| Automobiles | $9,395 | 5.9% | $0.0299 |
| Light Trucks | $73,711 | 46.0% | $0.0431 |
| Heavy Duty Trucks | $30,588 | 19.1% | $0.1021 |
| Diesel Price Diff. | $25,183 | 15.7% | $0.0345 |
| Maintenance | $21,264 | 13.3% | $0.0070 |
| **Total Savings** | $160,142 | 100.0% | $0.0524 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($22,556) | 7.8% | ($0.0074) |
| Compressor | ($24,666) | 8.5% | ($0.0081) |
| Storage Vessels | ($38,245) | 13.2% | ($0.0125) |
| Dispenser | ($24,857) | 8.6% | ($0.0081) |
| Dryer | ($9,943) | 3.4% | ($0.0033) |
| **Subtotal** | ($120,267) | 41.6% | ($0.0394) |
| **Vehicle** | | | |
| Conversion Kit | ($20,141) | 7.0% | ($0.0066) |
| Tanks | ($27,632) | 9.6% | ($0.0090) |
| Labor | ($26,966) | 9.3% | ($0.0088) |
| OEM | ($9,186) | 3.2% | ($0.0030) |
| **Subtotal** | ($83,925) | 29.1% | ($0.0275) |
| **Operating** | | | |
| Station Maint. | ($13,359) | 4.6% | ($0.0044) |
| Cylinder Recert. | ($6,274) | 2.2% | ($0.0021) |
| Power | ($22,902) | 7.9% | ($0.0075) |
| Labor - fuel time loss | ($18,306) | 6.3% | ($0.0060) |
| NG Fuel Tax | ($23,857) | 8.3% | ($0.0078) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($84,699) | 29.3% | ($0.0277) |
| **Total Costs** | ($288,890) | 100.0% | ($0.0945) |
| **Savings - Cost** | ($128,749) | N/A | ($0.0421) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 2 | 19.4 | 16,650 | $1,950 | $900 |
| Light Trucks | 13 | 13.4 | 13,969 | $2,200 | $900 |
| Heavy Duty Gasoline | 3 | 5.6 | 10,594 | $3,300 | $900 |
| Heavy Duty Diesel | 8 | 8.1 | 11,616 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 26 | | | | |

| | |
|---|---|
| Maintenance Savings | 10% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| | |
|---|---|
| **DISCOUNT RATE** | 10.0% |

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 7 |
| Year 1: Storage Size (scf) | 25,586 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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** | ($525.29) |
| **Incremental Cost/mile** | ($0.0421) |

**Fleet Size**
**31-50**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $159,615 | 71.8% | $0.0485 |
| Automobiles | $12,829 | 5.8% | $0.0302 |
| Light Trucks | $108,741 | 48.9% | $0.0434 |
| Heavy Duty Trucks | $38,045 | 17.1% | $0.1063 |
| Diesel Price Diff. | $34,468 | 15.5% | $0.0358 |
| Maintenance | $28,315 | 12.7% | $0.0067 |
| **Total Savings** | $222,398 | 100.0% | $0.0523 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($26,920) | 7.2% | ($0.0063) |
| Compressor | ($26,983) | 7.3% | ($0.0063) |
| Storage Vessels | ($52,759) | 14.2% | ($0.0124) |
| Dispenser | ($24,857) | 6.7% | ($0.0058) |
| Dryer | ($9,943) | 2.7% | ($0.0023) |
| **Subtotal** | ($141,462) | 38.0% | ($0.0333) |
| **Vehicle** | | | |
| Conversion Kit | ($27,960) | 7.5% | ($0.0066) |
| Tanks | ($38,639) | 10.4% | ($0.0091) |
| Labor | ($36,895) | 9.9% | ($0.0087) |
| OEM | ($13,853) | 3.7% | ($0.0033) |
| **Subtotal** | ($117,348) | 31.6% | ($0.0276) |
| **Operating** | | | |
| Station Maint. | ($18,411) | 5.0% | ($0.0043) |
| Cylinder Recert. | ($8,326) | 2.2% | ($0.0020) |
| Power | ($28,825) | 7.8% | ($0.0068) |
| Labor - fuel time loss | ($25,457) | 6.8% | ($0.0060) |
| NG Fuel Tax | ($32,098) | 8.6% | ($0.0076) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($113,117) | 30.4% | ($0.0266) |
| **Total Costs** | ($371,926) | 100.0% | ($0.0875) |
| **Savings - Cost** | ($149,528) | N/A | ($0.0352) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 3 | 19.2 | 15,000 | $1,950 | $900 |
| Light Trucks | 20 | 13.3 | 13,295 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.5 | 9,492 | $3,300 | $900 |
| Heavy Duty Diesel | 10 | 7.8 | 12,248 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 37 | | | | |

| | |
|---|---|
| Maintenance Savings | 10% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 10 |
| Year 1: Storage Size (scf) | 35,472 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($428.70) |
|---|---|

| Incremental Cost/mile | ($0.0352) |
|---|---|

**Fleet Size**
**51 and up**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $346,548 | 78.2% | $0.0419 |
| Automobiles | $54,998 | 12.4% | $0.0275 |
| Light Trucks | $254,291 | 57.4% | $0.0432 |
| Heavy Duty Trucks | $37,259 | 8.4% | $0.0986 |
| Diesel Price Diff. | $35,568 | 8.0% | $0.0372 |
| Maintenance | $60,780 | 13.7% | $0.0066 |
| **Total Savings** | $442,896 | 100.0% | $0.0480 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($39,499) | 5.8% | ($0.0043) |
| Compressor | ($34,169) | 5.0% | ($0.0037) |
| Storage Vessels | ($94,415) | 13.9% | ($0.0102) |
| Dispenser | ($24,857) | 3.7% | ($0.0027) |
| Dryer | ($9,943) | 1.5% | ($0.0011) |
| **Subtotal** | ($202,882) | 29.8% | ($0.0220) |
| **Vehicle** | | | |
| Conversion Kit | ($62,612) | 9.2% | ($0.0068) |
| Tanks | ($77,568) | 11.4% | ($0.0084) |
| Labor | ($85,118) | 12.5% | ($0.0092) |
| OEM | ($20,986) | 3.1% | ($0.0023) |
| **Subtotal** | ($246,284) | 36.2% | ($0.0267) |
| **Operating** | | | |
| Station Maint. | ($33,913) | 5.0% | ($0.0037) |
| Cylinder Recert. | ($19,242) | 2.8% | ($0.0021) |
| Power | ($46,907) | 6.9% | ($0.0051) |
| Labor - fuel time loss | ($54,767) | 8.1% | ($0.0059) |
| NG Fuel Tax | ($76,292) | 11.2% | ($0.0083) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($231,120) | 34.0% | ($0.0250) |
| **Total Costs** | ($680,287) | 100.0% | ($0.0737) |
| **Savings - Cost** | ($237,391) | N/A | ($0.0257) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 19 | 20.8 | 11,171 | $1,950 | $900 |
| Light Trucks | 54 | 13.3 | 11,575 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.8 | 10,024 | $3,300 | $900 |
| Heavy Duty Diesel | 11 | 7.5 | 11,077 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 88 | | | | |

| | |
|---|---|
| Maintenance Savings | 10% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 22 |
| Year 1: Storage Size (scf) | 75,181 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($286.16) |
|---|---|

| Incremental Cost/mile | ($0.0257) |
|---|---|

# APPENDIX J

# NPV COST-EFFECTIVENESS MODEL: 25 PERCENT MAINTENANCE SAVINGS

# Fleet Size 1-10

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $32,193 | 44.0% | $0.0474 |
| Automobiles | $6,069 | 8.3% | $0.0286 |
| Light Trucks | $15,782 | 21.5% | $0.0457 |
| Heavy Duty Trucks | $10,342 | 14.1% | $0.0848 |
| Diesel Price Diff. | $18,346 | 25.0% | $0.0346 |
| Maintenance | $22,705 | 31.0% | $0.0188 |
| **Total Savings** | $73,245 | 100.0% | $0.0605 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($15,880) | 9.9% | ($0.0131) |
| Compressor | ($21,193) | 13.3% | ($0.0175) |
| Storage Vessels | ($15,876) | 9.9% | ($0.0131) |
| Dispenser | ($24,857) | 15.6% | ($0.0205) |
| Dryer | ($9,943) | 6.2% | ($0.0082) |
| **Subtotal** | ($87,747) | 54.9% | ($0.0725) |
| **Vehicle** | | | |
| Conversion Kit | ($7,749) | 4.8% | ($0.0064) |
| Tanks | ($9,895) | 6.2% | ($0.0082) |
| Labor | ($11,026) | 6.9% | ($0.0091) |
| OEM | ($5,178) | 3.2% | ($0.0043) |
| **Subtotal** | ($33,848) | 21.2% | ($0.0280) |
| **Operating** | | | |
| Station Maint. | ($5,650) | 3.5% | ($0.0047) |
| Cylinder Recert. | ($1,927) | 1.2% | ($0.0016) |
| Power | ($13,846) | 8.7% | ($0.0114) |
| Labor - fuel time loss | ($7,976) | 5.0% | ($0.0066) |
| NG Fuel Tax | ($8,809) | 5.5% | ($0.0073) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($38,208) | 23.9% | ($0.0316) |
| **Total Costs** | ($159,803) | 100.0% | ($0.1320) |
| **Savings - Cost** | ($86,559) | N/A | ($0.0715) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 20.3 | 22,509 | $1,950 | $900 |
| Light Trucks | 2 | 12.8 | 18,327 | $2,200 | $900 |
| Heavy Duty Gasoline | 1 | 6.8 | 12,930 | $3,300 | $900 |
| Heavy Duty Diesel | 5 | 8.1 | 13,511 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 9 | | | | |

| | |
|---|---|
| Maintenance Savings | 25% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| | |
|---|---|
| DISCOUNT RATE | 10.0% |

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 2 |
| Year 1: Storage Size (scf) | 7,261 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($1,020.23) |
| Incremental Cost/mile | ($0.0715) |

**Fleet Size**
**11-20**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $62,402 | 52.4% | $0.0517 |
| Automobiles | $6,586 | 5.5% | $0.0306 |
| Light Trucks | $33,879 | 28.5% | $0.0447 |
| Heavy Duty Trucks | $21,936 | 18.4% | $0.0941 |
| Diesel Price Diff. | $22,327 | 18.8% | $0.0333 |
| Maintenance | $34,323 | 28.8% | $0.0183 |
| **Total Savings** | $119,052 | 100.0% | $0.0634 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($18,585) | 8.8% | ($0.0099) |
| Compressor | ($22,609) | 10.7% | ($0.0120) |
| Storage Vessels | ($24,915) | 11.8% | ($0.0133) |
| Dispenser | ($24,857) | 11.8% | ($0.0132) |
| Dryer | ($9,943) | 4.7% | ($0.0053) |
| **Subtotal** | ($100,908) | 47.9% | ($0.0537) |
| **Vehicle** | | | |
| Conversion Kit | ($12,504) | 5.9% | ($0.0067) |
| Tanks | ($16,853) | 8.0% | ($0.0090) |
| Labor | ($17,170) | 8.2% | ($0.0091) |
| OEM | ($6,199) | 2.9% | ($0.0033) |
| **Subtotal** | ($52,725) | 25.1% | ($0.0281) |
| **Operating** | | | |
| Station Maint. | ($8,753) | 4.2% | ($0.0047) |
| Cylinder Recert. | ($3,666) | 1.7% | ($0.0020) |
| Power | ($17,473) | 8.3% | ($0.0093) |
| Labor - fuel time loss | ($11,756) | 5.6% | ($0.0063) |
| NG Fuel Tax | ($15,184) | 7.2% | ($0.0081) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($56,831) | 27.0% | ($0.0303) |
| **Total Costs** | ($210,464) | 100.0% | ($0.1120) |
| **Savings - Cost** | ($91,413) | N/A | ($0.0487) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 19.0 | 22,861 | $1,950 | $900 |
| Light Trucks | 5 | 13.0 | 16,093 | $2,200 | $900 |
| Heavy Duty Gasoline | 2 | 6.1 | 12,365 | $3,300 | $900 |
| Heavy Duty Diesel | 7 | 8.4 | 12,206 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 15 | | | | |

| | |
|---|---|
| Maintenance Savings | 25% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 4 |
| Year 1: Storage Size (scf) | 14,092 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($646.47) |
|---|---|

| Incremental Cost/mile | ($0.0487) |
|---|---|

# Fleet Size 21-30

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $113,695 | 59.2% | $0.0489 |
| Automobiles | $9,395 | 4.9% | $0.0299 |
| Light Trucks | $73,711 | 38.4% | $0.0431 |
| Heavy Duty Trucks | $30,588 | 15.9% | $0.1021 |
| Diesel Price Diff. | $25,183 | 13.1% | $0.0345 |
| Maintenance | $53,160 | 27.7% | $0.0174 |
| **Total Savings** | $192,037 | 100.0% | $0.0629 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($22,556) | 7.8% | ($0.0074) |
| Compressor | ($24,666) | 8.5% | ($0.0081) |
| Storage Vessels | ($38,245) | 13.2% | ($0.0125) |
| Dispenser | ($24,857) | 8.6% | ($0.0081) |
| Dryer | ($9,943) | 3.4% | ($0.0033) |
| **Subtotal** | ($120,267) | 41.6% | ($0.0394) |
| **Vehicle** | | | |
| Conversion Kit | ($20,141) | 7.0% | ($0.0066) |
| Tanks | ($27,632) | 9.6% | ($0.0090) |
| Labor | ($26,966) | 9.3% | ($0.0088) |
| OEM | ($9,186) | 3.2% | ($0.0030) |
| **Subtotal** | ($83,925) | 29.1% | ($0.0275) |
| **Operating** | | | |
| Station Maint. | ($13,359) | 4.6% | ($0.0044) |
| Cylinder Recert. | ($6,274) | 2.2% | ($0.0021) |
| Power | ($22,902) | 7.9% | ($0.0075) |
| Labor - fuel time loss | ($18,306) | 6.3% | ($0.0060) |
| NG Fuel Tax | ($23,857) | 8.3% | ($0.0078) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($84,699) | 29.3% | ($0.0277) |
| **Total Costs** | ($288,890) | 100.0% | ($0.0945) |
| **Savings - Cost** | ($96,853) | N/A | ($0.0317) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 2 | 19.4 | 16,650 | $1,950 | $900 |
| Light Trucks | 13 | 13.4 | 13,969 | $2,200 | $900 |
| Heavy Duty Gasoline | 3 | 5.6 | 10,594 | $3,300 | $900 |
| Heavy Duty Diesel | 8 | 8.1 | 11,616 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 26 | | | | |

| | |
|---|---|
| Maintenance Savings | 25% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 7 |
| Year 1: Storage Size (scf) | 25,586 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($395.16) |
|---|---|

| Incremental Cost/mile | ($0.0317) |
|---|---|

# Fleet Size 31-50

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $159,615 | 60.3% | $0.0485 |
| Automobiles | $12,829 | 4.8% | $0.0302 |
| Light Trucks | $108,741 | 41.1% | $0.0434 |
| Heavy Duty Trucks | $38,045 | 14.4% | $0.1063 |
| Diesel Price Diff. | $34,468 | 13.0% | $0.0358 |
| Maintenance | $70,787 | 26.7% | $0.0167 |
| **Total Savings** | $264,870 | 100.0% | $0.0623 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($26,920) | 7.2% | ($0.0063) |
| Compressor | ($26,983) | 7.3% | ($0.0063) |
| Storage Vessels | ($52,759) | 14.2% | ($0.0124) |
| Dispenser | ($24,857) | 6.7% | ($0.0058) |
| Dryer | ($9,943) | 2.7% | ($0.0023) |
| **Subtotal** | ($141,462) | 38.0% | ($0.0333) |
| **Vehicle** | | | |
| Conversion Kit | ($27,960) | 7.5% | ($0.0066) |
| Tanks | ($38,639) | 10.4% | ($0.0091) |
| Labor | ($36,895) | 9.9% | ($0.0087) |
| OEM | ($13,853) | 3.7% | ($0.0033) |
| **Subtotal** | ($117,348) | 31.6% | ($0.0276) |
| **Operating** | | | |
| Station Maint. | ($18,411) | 5.0% | ($0.0043) |
| Cylinder Recert. | ($8,326) | 2.2% | ($0.0020) |
| Power | ($28,825) | 7.8% | ($0.0068) |
| Labor - fuel time loss | ($25,457) | 6.8% | ($0.0060) |
| NG Fuel Tax | ($32,098) | 8.6% | ($0.0076) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($113,117) | 30.4% | ($0.0266) |
| **Total Costs** | ($371,926) | 100.0% | ($0.0875) |
| **Savings - Cost** | ($107,056) | N/A | ($0.0252) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 3 | 19.2 | 15,000 | $1,950 | $900 |
| Light Trucks | 20 | 13.3 | 13,295 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.5 | 9,492 | $3,300 | $900 |
| Heavy Duty Diesel | 10 | 7.8 | 12,248 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 37 | | | | |

| | |
|---|---|
| Maintenance Savings | 25% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 10 |
| Year 1: Storage Size (scf) | 35,472 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($306.93) |
|---|---|

| Incremental Cost/mile | ($0.0252) |
|---|---|

**Fleet Size**
**51 and up**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $346,548 | 64.9% | $0.0419 |
| Automobiles | $54,998 | 10.3% | $0.0275 |
| Light Trucks | $254,291 | 47.6% | $0.0432 |
| Heavy Duty Trucks | $37,259 | 7.0% | $0.0986 |
| Diesel Price Diff. | $35,568 | 6.7% | $0.0372 |
| Maintenance | $151,951 | 28.5% | $0.0165 |
| Total Savings | $534,066 | 100.0% | $0.0579 |

| COSTS | | % of Costs | Incremental Cost/Mile |
|---|---|---|---|
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($39,499) | 5.8% | ($0.0043) |
| Compressor | ($34,169) | 5.0% | ($0.0037) |
| Storage Vessels | ($94,415) | 13.9% | ($0.0102) |
| Dispenser | ($24,857) | 3.7% | ($0.0027) |
| Dryer | ($9,943) | 1.5% | ($0.0011) |
| Subtotal | ($202,882) | 29.8% | ($0.0220) |
| **Vehicle** | | | |
| Conversion Kit | ($62,612) | 9.2% | ($0.0068) |
| Tanks | ($77,568) | 11.4% | ($0.0084) |
| Labor | ($85,118) | 12.5% | ($0.0092) |
| OEM | ($20,986) | 3.1% | ($0.0023) |
| Subtotal | ($246,284) | 36.2% | ($0.0267) |
| **Operating** | | | |
| Station Maint. | ($33,913) | 5.0% | ($0.0037) |
| Cylinder Recert. | ($19,242) | 2.8% | ($0.0021) |
| Power | ($46,907) | 6.9% | ($0.0051) |
| Labor - fuel time loss | ($54,767) | 8.1% | ($0.0059) |
| NG Fuel Tax | ($76,292) | 11.2% | ($0.0083) |
| Additional training | $0 | 0.0% | $0.0000 |
| Subtotal | ($231,120) | 34.0% | ($0.0250) |
| Total Costs | ($680,287) | 100.0% | ($0.0737) |
| Savings - Cost | ($146,220) | N/A | ($0.0158) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 19 | 20.8 | 11,171 | $1,950 | $900 |
| Light Trucks | 54 | 13.3 | 11,575 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.8 | 10,024 | $3,300 | $900 |
| Heavy Duty Diesel | 11 | 7.5 | 11,077 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | * $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 88 | | | | |
| Maintenance Savings | 25% | | Mileage Adj. | 0% | |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 22 |
| Year 1: Storage Size (scf) | 75,181 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($176.26) |
|---|---|

| Incremental Cost/mile | ($0.0158) |
|---|---|

# APPENDIX K

# NPV COST-EFFECTIVENESS MODEL: 50 PERCENT MAINTENANCE SAVINGS

## Fleet Size
## 1-10

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $32,193 | 33.6% | $0.0474 |
| Automobiles | $6,069 | 6.3% | $0.0286 |
| Light Trucks | $15,782 | 16.4% | $0.0457 |
| Heavy Duty Trucks | $10,342 | 10.8% | $0.0848 |
| Diesel Price Diff. | $18,346 | 19.1% | $0.0346 |
| Maintenance | $45,410 | 47.3% | $0.0375 |
| **Total Savings** | $95,950 | 100.0% | $0.0793 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($15,880) | 9.9% | ($0.0131) |
| Compressor | ($21,193) | 13.3% | ($0.0175) |
| Storage Vessels | ($15,876) | 9.9% | ($0.0131) |
| Dispenser | ($24,857) | 15.6% | ($0.0205) |
| Dryer | ($9,943) | 6.2% | ($0.0082) |
| **Subtotal** | ($87,747) | 54.9% | ($0.0725) |
| **Vehicle** | | | |
| Conversion Kit | ($7,749) | 4.8% | ($0.0064) |
| Tanks | ($9,895) | 6.2% | ($0.0082) |
| Labor | ($11,026) | 6.9% | ($0.0091) |
| OEM | ($5,178) | 3.2% | ($0.0043) |
| **Subtotal** | ($33,848) | 21.2% | ($0.0280) |
| **Operating** | | | |
| Station Maint. | ($5,650) | 3.5% | ($0.0047) |
| Cylinder Recert. | ($1,927) | 1.2% | ($0.0016) |
| Power | ($13,846) | 8.7% | ($0.0114) |
| Labor - fuel time loss | ($7,976) | 5.0% | ($0.0066) |
| NG Fuel Tax | ($8,809) | 5.5% | ($0.0073) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($38,208) | 23.9% | ($0.0316) |
| **Total Costs** | ($159,803) | 100.0% | ($0.1320) |
| **Savings - Cost** | ($63,854) | N/A | ($0.0528) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 20.3 | 22,509 | $1,950 | $900 |
| Light Trucks | 2 | 12.8 | 18,327 | $2,200 | $900 |
| Heavy Duty Gasoline | 1 | 6.8 | 12,930 | $3,300 | $900 |
| Heavy Duty Diesel | 5 | 8.1 | 13,511 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 9 | | | | |

| | |
|---|---|
| Maintenance Savings | 50% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 2 |
| Year 1: Storage Size (scf) | 7,261 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($752.61) |
|---|---|

| Incremental Cost/mile | ($0.0528) |
|---|---|

**Fleet Size**
**11-20**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $62,402 | 40.7% | $0.0517 |
| Automobiles | $6,586 | 4.3% | $0.0306 |
| Light Trucks | $33,879 | 22.1% | $0.0447 |
| Heavy Duty Trucks | $21,936 | 14.3% | $0.0941 |
| Diesel Price Diff. | $22,327 | 14.6% | $0.0333 |
| Maintenance | $68,646 | 44.8% | $0.0365 |
| **Total Savings** | $153,375 | 100.0% | $0.0817 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($18,585) | 8.8% | ($0.0099) |
| Compressor | ($22,609) | 10.7% | ($0.0120) |
| Storage Vessels | ($24,915) | 11.8% | ($0.0133) |
| Dispenser | ($24,857) | 11.8% | ($0.0132) |
| Dryer | ($9,943) | 4.7% | ($0.0053) |
| **Subtotal** | ($100,908) | 47.9% | ($0.0537) |
| **Vehicle** | | | |
| Conversion Kit | ($12,504) | 5.9% | ($0.0067) |
| Tanks | ($16,853) | 8.0% | ($0.0090) |
| Labor | ($17,170) | 8.2% | ($0.0091) |
| OEM | ($6,199) | 2.9% | ($0.0033) |
| **Subtotal** | ($52,725) | 25.1% | ($0.0281) |
| **Operating** | | | |
| Station Maint. | ($8,753) | 4.2% | ($0.0047) |
| Cylinder Recert. | ($3,666) | 1.7% | ($0.0020) |
| Power | ($17,473) | 8.3% | ($0.0093) |
| Labor - fuel time loss | ($11,756) | 5.6% | ($0.0063) |
| NG Fuel Tax | ($15,184) | 7.2% | ($0.0081) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($56,831) | 27.0% | ($0.0303) |
| **Total Costs** | ($210,464) | 100.0% | ($0.1120) |
| **Savings - Cost** | ($57,090) | N/A | ($0.0304) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 19.0 | 22,861 | $1,950 | $900 |
| Light Trucks | 5 | 13.0 | 16,093 | $2,200 | $900 |
| Heavy Duty Gasoline | 2 | 6.1 | 12,365 | $3,300 | $900 |
| Heavy Duty Diesel | 7 | 8.4 | 12,206 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 15 | | | | |

| | |
|---|---|
| Maintenance Savings | 50% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 4 |
| Year 1: Storage Size (scf) | 14,092 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($403.74) |
|---|---|

| Incremental Cost/mile | ($0.0304) |
|---|---|

## Fleet Size
## 21-30

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $113,695 | 46.4% | $0.0489 |
| Automobiles | $9,395 | 3.8% | $0.0299 |
| Light Trucks | $73,711 | 30.1% | $0.0431 |
| Heavy Duty Trucks | $30,588 | 12.5% | $0.1021 |
| Diesel Price Diff. | $25,183 | 10.3% | $0.0345 |
| Maintenance | $106,319 | 43.4% | $0.0348 |
| **Total Savings** | $245,197 | 100.0% | $0.0802 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($22,556) | 7.8% | ($0.0074) |
| Compressor | ($24,666) | 8.5% | ($0.0081) |
| Storage Vessels | ($38,245) | 13.2% | ($0.0125) |
| Dispenser | ($24,857) | 8.6% | ($0.0081) |
| Dryer | ($9,943) | 3.4% | ($0.0033) |
| **Subtotal** | ($120,267) | 41.6% | ($0.0394) |
| **Vehicle** | | | |
| Conversion Kit | ($20,141) | 7.0% | ($0.0066) |
| Tanks | ($27,632) | 9.6% | ($0.0090) |
| Labor | ($26,966) | 9.3% | ($0.0088) |
| OEM | ($9,186) | 3.2% | ($0.0030) |
| **Subtotal** | ($83,925) | 29.1% | ($0.0275) |
| **Operating** | | | |
| Station Maint. | ($13,359) | 4.6% | ($0.0044) |
| Cylinder Recert. | ($6,274) | 2.2% | ($0.0021) |
| Power | ($22,902) | 7.9% | ($0.0075) |
| Labor - fuel time loss | ($18,306) | 6.3% | ($0.0060) |
| NG Fuel Tax | ($23,857) | 8.3% | ($0.0078) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($84,699) | 29.3% | ($0.0277) |
| **Total Costs** | ($288,890) | 100.0% | ($0.0945) |
| **Savings - Cost** | ($43,693) | N/A | ($0.0143) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 2 | 19.4 | 16,650 | $1,950 | $900 |
| Light Trucks | 13 | 13.4 | 13,969 | $2,200 | $900 |
| Heavy Duty Gasoline | 3 | 5.6 | 10,594 | $3,300 | $900 |
| Heavy Duty Diesel | 8 | 8.1 | 11,616 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 26 | | | | |

| | |
|---|---|
| Maintenance Savings | 50% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 7 |
| Year 1: Storage Size (scf) | 25,586 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($178.27) |
|---|---|

| Incremental Cost/mile | ($0.0143) |
|---|---|

**Fleet Size**
**31-50**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $159,615 | 47.6% | $0.0485 |
| Automobiles | $12,829 | 3.8% | $0.0302 |
| Light Trucks | $108,741 | 32.4% | $0.0434 |
| Heavy Duty Trucks | $38,045 | 11.3% | $0.1063 |
| Diesel Price Diff. | $34,468 | 10.3% | $0.0358 |
| Maintenance | $141,574 | 42.2% | $0.0333 |
| **Total Savings** | $335,657 | 100.0% | $0.0790 |
| **COSTS** | | **% of** | **Incremental** |
| **Infrastructure** | | **Costs** | **Cost/Mile** |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($26,920) | 7.2% | ($0.0063) |
| Compressor | ($26,983) | 7.3% | ($0.0063) |
| Storage Vessels | ($52,759) | 14.2% | ($0.0124) |
| Dispenser | ($24,857) | 6.7% | ($0.0058) |
| Dryer | ($9,943) | 2.7% | ($0.0023) |
| **Subtotal** | ($141,462) | 38.0% | ($0.0333) |
| **Vehicle** | | | |
| Conversion Kit | ($27,960) | 7.5% | ($0.0066) |
| Tanks | ($38,639) | 10.4% | ($0.0091) |
| Labor | ($36,895) | 9.9% | ($0.0087) |
| OEM | ($13,853) | 3.7% | ($0.0033) |
| **Subtotal** | ($117,348) | 31.6% | ($0.0276) |
| **Operating** | | | |
| Station Maint. | ($18,411) | 5.0% | ($0.0043) |
| Cylinder Recert. | ($8,326) | 2.2% | ($0.0020) |
| Power | ($28,825) | 7.8% | ($0.0068) |
| Labor - fuel time loss | ($25,457) | 6.8% | ($0.0060) |
| NG Fuel Tax | ($32,098) | 8.6% | ($0.0076) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($113,117) | 30.4% | ($0.0266) |
| **Total Costs** | ($371,926) | 100.0% | ($0.0875) |
| **Savings - Cost** | ($36,269) | N/A | ($0.0085) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 3 | 19.2 | 15,000 | $1,950 | $900 |
| Light Trucks | 20 | 13.3 | 13,295 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.5 | 9,492 | $3,300 | $900 |
| Heavy Duty Diesel | 10 | 7.8 | 12,248 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 37 | | | | |

| | |
|---|---|
| Maintenance Savings | 50% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 10 |
| Year 1: Storage Size (scf) | 35,472 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($103.98) |
|---|---|

| Incremental Cost/mile | ($0.0085) |
|---|---|

**Fleet Size**
**51 and up**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $346,548 | 50.5% | $0.0419 |
| Automobiles | $54,998 | 8.0% | $0.0275 |
| Light Trucks | $254,291 | 37.1% | $0.0432 |
| Heavy Duty Trucks | $37,259 | 5.4% | $0.0986 |
| Diesel Price Diff. | $35,568 | 5.2% | $0.0372 |
| Maintenance | $303,901 | 44.3% | $0.0329 |
| **Total Savings** | $686,017 | 100.0% | $0.0743 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($39,499) | 5.8% | ($0.0043) |
| Compressor | ($34,169) | 5.0% | ($0.0037) |
| Storage Vessels | ($94,415) | 13.9% | ($0.0102) |
| Dispenser | ($24,857) | 3.7% | ($0.0027) |
| Dryer | ($9,943) | 1.5% | ($0.0011) |
| **Subtotal** | ($202,882) | 29.8% | ($0.0220) |
| **Vehicle** | | | |
| Conversion Kit | ($62,612) | 9.2% | ($0.0068) |
| Tanks | ($77,568) | 11.4% | ($0.0084) |
| Labor | ($85,118) | 12.5% | ($0.0092) |
| OEM | ($20,986) | 3.1% | ($0.0023) |
| **Subtotal** | ($246,284) | 36.2% | ($0.0267) |
| **Operating** | | | |
| Station Maint. | ($33,913) | 5.0% | ($0.0037) |
| Cylinder Recert. | ($19,242) | 2.8% | ($0.0021) |
| Power | ($46,907) | 6.9% | ($0.0051) |
| Labor - fuel time loss | ($54,767) | 8.1% | ($0.0059) |
| NG Fuel Tax | ($76,292) | 11.2% | ($0.0083) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($231,120) | 34.0% | ($0.0250) |
| **Total Costs** | ($680,287) | 100.0% | ($0.0737) |
| **Savings - Cost** | $5,730 | N/A | $0.0006 |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 19 | 20.8 | 11,171 | $1,950 | $900 |
| Light Trucks | 54 | 13.3 | 11,575 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.8 | 10,024 | $3,300 | $900 |
| Heavy Duty Diesel | 11 | 7.5 | 11,077 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 88 | | | | |
| Maintenance Savings | 50% | | Mileage Adj. | 0% | |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 22 |
| Year 1: Storage Size (scf) | 75,181 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | $6.91 |
|---|---|

| Incremental Benefit/mile | $0.0006 |
|---|---|

# APPENDIX L

# NPV COST-EFFECTIVENESS MODEL: 25 PERCENT MILEAGE INCREASE

# Fleet Size 1-10

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $40,189 | 63.4% | $0.0473 |
| Automobiles | $7,587 | 12.0% | $0.0286 |
| Light Trucks | $19,593 | 30.9% | $0.0454 |
| Heavy Duty Trucks | $13,010 | 20.5% | $0.0854 |
| Diesel Price Diff. | $23,151 | 36.6% | $0.0349 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $63,340 | 100.0% | $0.0419 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($17,092) | 9.8% | ($0.0113) |
| Compressor | ($21,808) | 12.5% | ($0.0144) |
| Storage Vessels | ($19,912) | 11.4% | ($0.0132) |
| Dispenser | ($24,857) | 14.3% | ($0.0164) |
| Dryer | ($9,943) | 5.7% | ($0.0066) |
| **Subtotal** | ($93,612) | 53.8% | ($0.0619) |
| **Vehicle** | | | |
| Conversion Kit | ($7,615) | 4.4% | ($0.0050) |
| Tanks | ($9,895) | 5.7% | ($0.0065) |
| Labor | ($11,631) | 6.7% | ($0.0077) |
| OEM | ($6,577) | 3.8% | ($0.0043) |
| **Subtotal** | ($35,717) | 20.5% | ($0.0236) |
| **Operating** | | | |
| Station Maint. | ($7,040) | 4.0% | ($0.0047) |
| Cylinder Recert. | ($1,600) | 0.9% | ($0.0011) |
| Power | ($15,534) | 8.9% | ($0.0103) |
| Labor - fuel time loss | ($9,937) | 5.7% | ($0.0066) |
| NG Fuel Tax | ($10,614) | 6.1% | ($0.0070) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($44,725) | 25.7% | ($0.0296) |
| **Total Costs** | ($174,053) | 100.0% | ($0.1150) |
| **Savings - Cost** | ($110,713) | N/A | ($0.0732) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 20.3 | 28,136 | $1,950 | $900 |
| Light Trucks | 2 | 12.8 | 22,909 | $2,200 | $900 |
| Heavy Duty Gasoline | 1 | 6.8 | 16,163 | $3,300 | $900 |
| Heavy Duty Diesel | 5 | 8.1 | 16,889 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 9 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 25% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 3 |
| Year 1: Storage Size (scf) | 9,065 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($1,304.93) |
|---|---|

| Incremental Cost/mile | ($0.0732) |
|---|---|

**Fleet Size**
**11-20**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $78,611 | 73.6% | $0.0521 |
| Automobiles | $8,232 | 7.7% | $0.0306 |
| Light Trucks | $42,640 | 39.9% | $0.0450 |
| Heavy Duty Trucks | $27,738 | 26.0% | $0.0952 |
| Diesel Price Diff. | $28,155 | 26.4% | $0.0336 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $106,766 | 100.0% | $0.0455 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($20,447) | 8.8% | ($0.0087) |
| Compressor | ($23,541) | 10.1% | ($0.0100) |
| Storage Vessels | ($31,143) | 13.4% | ($0.0133) |
| Dispenser | ($24,857) | 10.7% | ($0.0106) |
| Dryer | ($9,943) | 4.3% | ($0.0042) |
| **Subtotal** | ($109,930) | 47.3% | ($0.0468) |
| **Vehicle** | | | |
| Conversion Kit | ($12,217) | 5.3% | ($0.0052) |
| Tanks | ($16,853) | 7.2% | ($0.0072) |
| Labor | ($17,431) | 7.5% | ($0.0074) |
| OEM | ($9,912) | 4.3% | ($0.0042) |
| **Subtotal** | ($56,412) | 24.2% | ($0.0240) |
| **Operating** | | | |
| Station Maint. | ($10,823) | 4.7% | ($0.0046) |
| Cylinder Recert. | ($3,165) | 1.4% | ($0.0013) |
| Power | ($19,942) | 8.6% | ($0.0085) |
| Labor - fuel time loss | ($14,382) | 6.2% | ($0.0061) |
| NG Fuel Tax | ($17,982) | 7.7% | ($0.0077) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($66,294) | 28.5% | ($0.0282) |
| **Total Costs** | ($232,636) | 100.0% | ($0.0991) |
| **Savings - Cost** | ($125,870) | N/A | ($0.0536) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 19.0 | 28,576 | $1,950 | $900 |
| Light Trucks | 5 | 13.0 | 20,116 | $2,200 | $900 |
| Heavy Duty Gasoline | 2 | 6.1 | 15,456 | $3,300 | $900 |
| Heavy Duty Diesel | 7 | 8.4 | 15,258 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 15 | | | | |
| Maintenance Savings | 0% | | Mileage Adj. | 25% | |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 5 |
| Year 1: Storage Size (scf) | 17,576 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($890.15) |
|---|---|

| Incremental Cost/mile | ($0.0536) |
|---|---|

# Fleet Size 21-30

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $143,134 | 81.9% | $0.0492 |
| Automobiles | $11,825 | 6.8% | $0.0301 |
| Light Trucks | $92,723 | 53.1% | $0.0433 |
| Heavy Duty Trucks | $38,586 | 22.1% | $0.1030 |
| Diesel Price Diff. | $31,646 | 18.1% | $0.0347 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $174,780 | 100.0% | $0.0458 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($25,379) | 7.9% | ($0.0066) |
| Compressor | ($26,151) | 8.2% | ($0.0068) |
| Storage Vessels | ($47,644) | 14.9% | ($0.0125) |
| Dispenser | ($24,857) | 7.8% | ($0.0065) |
| Dryer | ($9,943) | 3.1% | ($0.0026) |
| **Subtotal** | ($133,974) | 41.8% | ($0.0351) |
| **Vehicle** | | | |
| Conversion Kit | ($19,803) | 6.2% | ($0.0052) |
| Tanks | ($27,632) | 8.6% | ($0.0072) |
| Labor | ($27,558) | 8.6% | ($0.0072) |
| OEM | ($13,268) | 4.1% | ($0.0035) |
| **Subtotal** | ($88,260) | 27.5% | ($0.0231) |
| **Operating** | | | |
| Station Maint. | ($16,543) | 5.2% | ($0.0043) |
| Cylinder Recert. | ($5,399) | 1.7% | ($0.0014) |
| Power | ($26,617) | 8.3% | ($0.0070) |
| Labor - fuel time loss | ($22,405) | 7.0% | ($0.0059) |
| NG Fuel Tax | ($27,534) | 8.6% | ($0.0072) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($98,498) | 30.7% | ($0.0258) |
| **Total Costs** | ($320,732) | 100.0% | ($0.0840) |
| **Savings - Cost** | ($145,952) | N/A | ($0.0382) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 2 | 19.4 | 20,813 | $1,950 | $900 |
| Light Trucks | 13 | 13.4 | 17,461 | $2,200 | $900 |
| Heavy Duty Gasoline | 3 | 5.6 | 13,243 | $3,300 | $900 |
| Heavy Duty Diesel | 8 | 8.1 | 14,520 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 26 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 25% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 9 |
| Year 1: Storage Size (scf) | 31,848 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($595.48) |
|---|---|

| Incremental Cost/mile | ($0.0382) |
|---|---|

# Fleet Size 31-50

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $199,625 | 82.1% | $0.0486 |
| Automobiles | $16,146 | 6.6% | $0.0304 |
| Light Trucks | $136,788 | 56.3% | $0.0437 |
| Heavy Duty Trucks | $46,691 | 19.2% | $0.1044 |
| Diesel Price Diff. | $43,465 | 17.9% | $0.0361 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $243,091 | 100.0% | $0.0457 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($30,771) | 7.3% | ($0.0058) |
| Compressor | ($29,074) | 6.9% | ($0.0055) |
| Storage Vessels | ($65,521) | 15.5% | ($0.0123) |
| Dispenser | ($24,857) | 5.9% | ($0.0047) |
| Dryer | ($9,943) | 2.4% | ($0.0019) |
| **Subtotal** | ($160,165) | 37.9% | ($0.0301) |
| **Vehicle** | | | |
| Conversion Kit | ($27,574) | 6.5% | ($0.0052) |
| Tanks | ($38,639) | 9.1% | ($0.0073) |
| Labor | ($38,596) | 9.1% | ($0.0073) |
| OEM | ($19,057) | 4.5% | ($0.0036) |
| **Subtotal** | ($123,866) | 29.3% | ($0.0233) |
| **Operating** | | | |
| Station Maint. | ($22,950) | 5.4% | ($0.0043) |
| Cylinder Recert. | ($7,740) | 1.8% | ($0.0015) |
| Power | ($34,143) | 8.1% | ($0.0064) |
| Labor - fuel time loss | ($31,491) | 7.5% | ($0.0059) |
| NG Fuel Tax | ($42,270) | 10.0% | ($0.0080) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($138,593) | 32.8% | ($0.0261) |
| **Total Costs** | ($422,624) | 100.0% | ($0.0795) |
| **Savings - Cost** | ($179,534) | N/A | ($0.0338) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 3 | 19.2 | 18,750 | $1,950 | $900 |
| Light Trucks | 20 | 13.3 | 16,619 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.5 | 11,865 | $3,300 | $900 |
| Heavy Duty Diesel | 10 | 7.8 | 15,310 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 37 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 25% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 13 |
| Year 1: Storage Size (scf) | 44,076 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($514.72) |
|---|---|

| Incremental Cost/mile | ($0.0338) |
|---|---|

## Fleet Size
## 51 and up

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $435,658 | 90.7% | $0.0421 |
| Automobiles | $69,378 | 14.4% | $0.0277 |
| Light Trucks | $319,522 | 66.5% | $0.0434 |
| Heavy Duty Trucks | $46,757 | 9.7% | $0.0990 |
| Diesel Price Diff. | $44,814 | 9.3% | $0.0375 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $480,472 | 100.0% | $0.0417 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($46,008) | 6.1% | ($0.0040) |
| Compressor | ($37,655) | 5.0% | ($0.0033) |
| Storage Vessels | ($116,112) | 15.4% | ($0.0101) |
| Dispenser | ($24,857) | 3.3% | ($0.0022) |
| Dryer | ($9,943) | 1.3% | ($0.0009) |
| **Subtotal** | ($234,575) | 31.1% | ($0.0203) |
| **Vehicle** | | | |
| Conversion Kit | ($61,577) | 8.2% | ($0.0053) |
| Tanks | ($77,568) | 10.3% | ($0.0067) |
| Labor | ($87,815) | 11.7% | ($0.0076) |
| OEM | ($32,848) | 4.4% | ($0.0028) |
| **Subtotal** | ($259,808) | 34.5% | ($0.0225) |
| **Operating** | | | |
| Station Maint. | ($42,017) | 5.6% | ($0.0036) |
| Cylinder Recert. | ($17,287) | 2.3% | ($0.0015) |
| Power | ($56,507) | 7.5% | ($0.0049) |
| Labor - fuel time loss | ($67,104) | 8.9% | ($0.0058) |
| NG Fuel Tax | ($76,292) | 10.1% | ($0.0066) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($259,206) | 34.4% | ($0.0225) |
| **Total Costs** | ($753,590) | 100.0% | ($0.0653) |
| **Savings - Cost** | ($273,118) | N/A | ($0.0237) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 19 | 20.8 | 13,964 | $1,950 | $900 |
| Light Trucks | 54 | 13.3 | 14,469 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.8 | 12,530 | $3,300 | $900 |
| Heavy Duty Diesel | 11 | 7.5 | 13,846 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 88 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 25% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 28 |
| Year 1: Storage Size (scf) | 92,584 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($329.23) |
|---|---|

| Incremental Cost/mile | ($0.0237) |
|---|---|

# APPENDIX M

# NPV COST-EFFECTIVENESS MODEL: 50 PERCENT MILEAGE INCREASE

## Fleet Size
## 1-10

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $48,334 | 63.4% | $0.0474 |
| Automobiles | $9,104 | 11.9% | $0.0286 |
| Light Trucks | $23,511 | 30.8% | $0.0454 |
| Heavy Duty Trucks | $15,719 | 20.6% | $0.0860 |
| Diesel Price Diff. | $27,897 | 36.6% | $0.0350 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $76,232 | 100.0% | $0.0420 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($18,308) | 9.8% | ($0.0101) |
| Compressor | ($22,456) | 12.0% | ($0.0124) |
| Storage Vessels | ($23,927) | 12.8% | ($0.0132) |
| Dispenser | ($24,857) | 13.3% | ($0.0137) |
| Dryer | ($9,943) | 5.3% | ($0.0055) |
| **Subtotal** | ($99,490) | 53.3% | ($0.0548) |
| **Vehicle** | | | |
| Conversion Kit | ($7,543) | 4.0% | ($0.0042) |
| Tanks | ($9,895) | 5.3% | ($0.0055) |
| Labor | ($12,091) | 6.5% | ($0.0067) |
| OEM | ($8,122) | 4.3% | ($0.0045) |
| **Subtotal** | ($37,650) | 20.2% | ($0.0207) |
| **Operating** | | | |
| Station Maint. | ($8,415) | 4.5% | ($0.0046) |
| Cylinder Recert. | ($1,600) | 0.9% | ($0.0009) |
| Power | ($17,126) | 9.2% | ($0.0094) |
| Labor - fuel time loss | ($11,855) | 6.3% | ($0.0065) |
| NG Fuel Tax | ($10,614) | 5.7% | ($0.0058) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($49,610) | 26.6% | ($0.0273) |
| **Total Costs** | ($186,750) | 100.0% | ($0.1029) |
| **Savings - Cost** | ($110,518) | N/A | ($0.0609) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 20.3 | 33,764 | $1,950 | $900 |
| Light Trucks | 2 | 12.8 | 27,491 | $2,200 | $900 |
| Heavy Duty Gasoline | 1 | 6.8 | 19,395 | $3,300 | $900 |
| Heavy Duty Diesel | 5 | 8.1 | 20,267 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 9 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 50% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 3 |
| Year 1: Storage Size (scf) | 10,865 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($1,302.63) |
|---|---|

| Incremental Cost/mile | ($0.0609) |
|---|---|

**Fleet Size**
**11-20**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $94,212 | 73.5% | $0.0520 |
| Automobiles | $9,879 | 7.7% | $0.0306 |
| Light Trucks | $50,819 | 39.7% | $0.0447 |
| Heavy Duty Trucks | $33,514 | 26.2% | $0.0958 |
| Diesel Price Diff. | $33,882 | 26.5% | $0.0337 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $128,095 | 100.0% | $0.0455 |
| **COSTS** | | % of | Incremental |
| **Infrastructure** | | Costs | Cost/Mile |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($22,313) | 8.9% | ($0.0079) |
| Compressor | ($24,537) | 9.7% | ($0.0087) |
| Storage Vessels | ($37,324) | 14.8% | ($0.0132) |
| Dispenser | ($24,857) | 9.9% | ($0.0088) |
| Dryer | ($9,943) | 3.9% | ($0.0035) |
| **Subtotal** | ($118,973) | 47.2% | ($0.0422) |
| **Vehicle** | | | |
| Conversion Kit | ($12,177) | 4.8% | ($0.0043) |
| Tanks | ($16,853) | 6.7% | ($0.0060) |
| Labor | ($19,363) | 7.7% | ($0.0069) |
| OEM | ($11,016) | 4.4% | ($0.0039) |
| **Subtotal** | ($59,409) | 23.6% | ($0.0211) |
| **Operating** | | | |
| Station Maint. | ($12,991) | 5.2% | ($0.0046) |
| Cylinder Recert. | ($2,797) | 1.1% | ($0.0010) |
| Power | ($22,485) | 8.9% | ($0.0080) |
| Labor - fuel time loss | ($17,315) | 6.9% | ($0.0061) |
| NG Fuel Tax | ($17,982) | 7.1% | ($0.0064) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($73,569) | 29.2% | ($0.0261) |
| **Total Costs** | ($251,951) | 100.0% | ($0.0894) |
| **Savings - Cost** | ($123,856) | N/A | ($0.0440) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 19.0 | 34,292 | $1,950 | $900 |
| Light Trucks | 5 | 13.0 | 24,140 | $2,200 | $900 |
| Heavy Duty Gasoline | 2 | 6.1 | 18,548 | $3,300 | $900 |
| Heavy Duty Diesel | 7 | 8.4 | 18,309 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 15 | | | | |
| Maintenance Savings | 0% | | Mileage Adj. | 50% | |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 6 |
| Year 1: Storage Size (scf) | 21,044 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($875.91) |
|---|---|

| Incremental Cost/mile | ($0.0440) |
|---|---|

## Fleet Size
## 21-30

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $172,721 | 81.9% | $0.0495 |
| Automobiles | $14,093 | 6.7% | $0.0299 |
| Light Trucks | $112,031 | 53.1% | $0.0436 |
| Heavy Duty Trucks | $46,597 | 22.1% | $0.1037 |
| Diesel Price Diff. | $38,216 | 18.1% | $0.0349 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $210,937 | 100.0% | $0.0460 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($28,165) | 8.0% | ($0.0061) |
| Compressor | ($27,607) | 7.8% | ($0.0060) |
| Storage Vessels | ($56,930) | 16.1% | ($0.0124) |
| Dispenser | ($24,857) | 7.0% | ($0.0054) |
| Dryer | ($9,943) | 2.8% | ($0.0022) |
| **Subtotal** | ($147,502) | 41.8% | ($0.0322) |
| **Vehicle** | | | |
| Conversion Kit | ($19,473) | 5.5% | ($0.0042) |
| Tanks | ($27,632) | 7.8% | ($0.0060) |
| Labor | ($28,811) | 8.2% | ($0.0063) |
| OEM | ($17,394) | 4.9% | ($0.0038) |
| **Subtotal** | ($93,309) | 26.4% | ($0.0204) |
| **Operating** | | | |
| Station Maint. | ($19,682) | 5.6% | ($0.0043) |
| Cylinder Recert. | ($4,787) | 1.4% | ($0.0010) |
| Power | ($30,299) | 8.6% | ($0.0066) |
| Labor - fuel time loss | ($26,425) | 7.5% | ($0.0058) |
| NG Fuel Tax | ($31,055) | 8.8% | ($0.0068) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($112,247) | 31.8% | ($0.0245) |
| **Total Costs** | ($353,058) | 100.0% | ($0.0770) |
| **Savings - Cost** | ($142,121) | N/A | ($0.0310) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 2 | 19.4 | 24,975 | $1,950 | $900 |
| Light Trucks | 13 | 13.4 | 20,954 | $2,200 | $900 |
| Heavy Duty Gasoline | 3 | 5.6 | 15,891 | $3,300 | $900 |
| Heavy Duty Diesel | 8 | 8.1 | 17,424 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 26 | | | | |
| Maintenance Savings | 0% | | Mileage Adj. | 50% | |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 11 |
| Year 1: Storage Size (scf) | 38,056 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($579.85) |
|---|---|

| Incremental Cost/mile | ($0.0310) |
|---|---|

# Fleet Size 31-50

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $240,838 | 82.2% | $0.0488 |
| Automobiles | $19,243 | 6.6% | $0.0302 |
| Light Trucks | $165,273 | 56.4% | $0.0440 |
| Heavy Duty Trucks | $56,322 | 19.2% | $0.1049 |
| Diesel Price Diff. | $52,306 | 17.8% | $0.0362 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $293,144 | 100.0% | $0.0460 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($34,554) | 7.5% | ($0.0054) |
| Compressor | ($31,122) | 6.7% | ($0.0049) |
| Storage Vessels | ($78,066) | 16.9% | ($0.0122) |
| Dispenser | ($24,857) | 5.4% | ($0.0039) |
| Dryer | ($9,943) | 2.2% | ($0.0016) |
| **Subtotal** | ($178,541) | 38.6% | ($0.0280) |
| **Vehicle** | | | |
| Conversion Kit | ($27,225) | 5.9% | ($0.0043) |
| Tanks | ($38,639) | 8.4% | ($0.0061) |
| Labor | ($40,466) | 8.8% | ($0.0063) |
| OEM | ($24,054) | 5.2% | ($0.0038) |
| **Subtotal** | ($130,385) | 28.2% | ($0.0204) |
| **Operating** | | | |
| Station Maint. | ($27,335) | 5.9% | ($0.0043) |
| Cylinder Recert. | ($7,022) | 1.5% | ($0.0011) |
| Power | ($39,277) | 8.5% | ($0.0062) |
| Labor - fuel time loss | ($37,204) | 8.1% | ($0.0058) |
| NG Fuel Tax | ($42,270) | 9.1% | ($0.0066) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($153,107) | 33.1% | ($0.0240) |
| **Total Costs** | ($462,034) | 100.0% | ($0.0725) |
| **Savings - Cost** | ($168,890) | N/A | ($0.0265) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 3 | 19.2 | 22,500 | $1,950 | $900 |
| Light Trucks | 20 | 13.3 | 19,943 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.5 | 14,238 | $3,300 | $900 |
| Heavy Duty Diesel | 10 | 7.8 | 18,372 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 37 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 50% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 15 |
| Year 1: Storage Size (scf) | 52,573 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($484.21) |
|---|---|

| Incremental Cost/mile | ($0.0265) |
|---|---|

**Fleet Size**
**51 and up**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $526,398 | 90.7% | $0.0424 |
| Automobiles | $83,781 | 14.4% | $0.0279 |
| Light Trucks | $385,857 | 66.5% | $0.0437 |
| Heavy Duty Trucks | $56,759 | 9.8% | $0.1001 |
| Diesel Price Diff. | $53,964 | 9.3% | $0.0376 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $580,362 | 100.0% | $0.0419 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($52,360) | 6.2% | ($0.0038) |
| Compressor | ($41,341) | 4.9% | ($0.0030) |
| Storage Vessels | ($136,999) | 16.2% | ($0.0099) |
| Dispenser | ($24,857) | 2.9% | ($0.0018) |
| Dryer | ($9,943) | 1.2% | ($0.0007) |
| **Subtotal** | ($265,499) | 31.4% | ($0.0192) |
| **Vehicle** | | | |
| Conversion Kit | ($60,661) | 7.2% | ($0.0044) |
| Tanks | ($77,568) | 9.2% | ($0.0056) |
| Labor | ($90,250) | 10.7% | ($0.0065) |
| OEM | ($41,490) | 4.9% | ($0.0030) |
| **Subtotal** | ($269,968) | 31.9% | ($0.0195) |
| **Operating** | | | |
| Station Maint. | ($49,943) | 5.9% | ($0.0036) |
| Cylinder Recert. | ($14,817) | 1.8% | ($0.0011) |
| Power | ($65,792) | 7.8% | ($0.0048) |
| Labor - fuel time loss | ($78,872) | 9.3% | ($0.0057) |
| NG Fuel Tax | ($101,723) | 12.0% | ($0.0073) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($311,148) | 36.8% | ($0.0225) |
| **Total Costs** | ($846,615) | 100.0% | ($0.0612) |
| **Savings - Cost** | ($266,253) | N/A | ($0.0192) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 19 | 20.8 | 16,757 | $1,950 | $900 |
| Light Trucks | 54 | 13.3 | 17,363 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.8 | 15,036 | $3,300 | $900 |
| Heavy Duty Diesel | 11 | 7.5 | 16,616 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 88 | | | | |
| Maintenance Savings | 0% | | Mileage Adj. | 50% | |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 33 |
| Year 1: Storage Size (scf) | 109,430 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($320.95) |
|---|---|

| Incremental Cost/mile | ($0.0192) |
|---|---|

# APPENDIX N

# NPV COST-EFFECTIVENESS MODEL: 100 PERCENT MILEAGE INCREASE

## Fleet Size
## 1-10

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $64,386 | 63.2% | $0.0474 |
| Automobiles | $12,222 | 12.0% | $0.0288 |
| Light Trucks | $31,348 | 30.8% | $0.0454 |
| Heavy Duty Trucks | $20,816 | 20.4% | $0.0854 |
| Diesel Price Diff. | $37,506 | 36.8% | $0.0353 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $101,892 | 100.0% | $0.0421 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($20,723) | 9.7% | ($0.0086) |
| Compressor | ($23,754) | 11.2% | ($0.0098) |
| Storage Vessels | ($31,895) | 15.0% | ($0.0132) |
| Dispenser | ($24,857) | 11.7% | ($0.0103) |
| Dryer | ($9,943) | 4.7% | ($0.0041) |
| **Subtotal** | ($111,171) | 52.3% | ($0.0459) |
| **Vehicle** | | | |
| Conversion Kit | ($7,404) | 3.5% | ($0.0031) |
| Tanks | ($9,895) | 4.7% | ($0.0041) |
| Labor | ($13,605) | 6.4% | ($0.0056) |
| OEM | ($11,496) | 5.4% | ($0.0047) |
| **Subtotal** | ($42,400) | 19.9% | ($0.0175) |
| **Operating** | | | |
| Station Maint. | ($11,183) | 5.3% | ($0.0046) |
| Cylinder Recert. | ($1,249) | 0.6% | ($0.0005) |
| Power | ($20,354) | 9.6% | ($0.0084) |
| Labor - fuel time loss | ($15,676) | 7.4% | ($0.0065) |
| NG Fuel Tax | ($10,614) | 5.0% | ($0.0044) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($59,077) | 27.8% | ($0.0244) |
| **Total Costs** | ($212,649) | 100.0% | ($0.0878) |
| **Savings - Cost** | ($110,757) | N/A | ($0.0458) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 20.3 | 45,018 | $1,950 | $900 |
| Light Trucks | 2 | 12.8 | 36,654 | $2,200 | $900 |
| Heavy Duty Gasoline | 1 | 6.8 | 25,860 | $3,300 | $900 |
| Heavy Duty Diesel | 5 | 8.1 | 27,022 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 9 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 100% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 4 |
| Year 1: Storage Size (scf) | 14,451 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($1,305.45) |
|---|---|

| Incremental Cost/mile | ($0.0458) |
|---|---|

**Fleet Size**
**11-20**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $125,402 | 73.3% | $0.0519 |
| Automobiles | $13,262 | 7.8% | $0.0308 |
| Light Trucks | $67,759 | 39.6% | $0.0447 |
| Heavy Duty Trucks | $44,381 | 26.0% | $0.0952 |
| Diesel Price Diff. | $45,573 | 26.7% | $0.0339 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $170,975 | 100.0% | $0.0455 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($26,008) | 8.9% | ($0.0069) |
| Compressor | ($26,533) | 9.1% | ($0.0071) |
| Storage Vessels | ($49,543) | 17.0% | ($0.0132) |
| Dispenser | ($24,857) | 8.5% | ($0.0066) |
| Dryer | ($9,943) | 3.4% | ($0.0026) |
| **Subtotal** | ($136,883) | 46.9% | ($0.0364) |
| **Vehicle** | | | |
| Conversion Kit | ($12,013) | 4.1% | ($0.0032) |
| Tanks | ($16,853) | 5.8% | ($0.0045) |
| Labor | ($22,132) | 7.6% | ($0.0059) |
| OEM | ($15,118) | 5.2% | ($0.0040) |
| **Subtotal** | ($66,116) | 22.7% | ($0.0176) |
| **Operating** | | | |
| Station Maint. | ($17,294) | 5.9% | ($0.0046) |
| Cylinder Recert. | ($2,797) | 1.0% | ($0.0007) |
| Power | ($27,522) | 9.4% | ($0.0073) |
| Labor - fuel time loss | ($22,989) | 7.9% | ($0.0061) |
| NG Fuel Tax | ($17,982) | 6.2% | ($0.0048) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($88,584) | 30.4% | ($0.0236) |
| **Total Costs** | ($291,583) | 100.0% | ($0.0776) |
| **Savings - Cost** | ($120,608) | N/A | ($0.0321) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 19.0 | 45,722 | $1,950 | $900 |
| Light Trucks | 5 | 13.0 | 32,186 | $2,200 | $900 |
| Heavy Duty Gasoline | 2 | 6.1 | 24,730 | $3,300 | $900 |
| Heavy Duty Diesel | 7 | 8.4 | 24,412 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 15 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 100% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 8 |
| Year 1: Storage Size (scf) | 27,932 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($852.93) |
|---|---|

| Incremental Cost/mile | ($0.0321) |
|---|---|

## Fleet Size
## 21-30

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $229,703 | 81.7% | $0.0494 |
| Automobiles | $18,791 | 6.7% | $0.0299 |
| Light Trucks | $148,356 | 52.8% | $0.0433 |
| Heavy Duty Trucks | $62,556 | 22.3% | $0.1044 |
| Diesel Price Diff. | $51,402 | 18.3% | $0.0352 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $281,105 | 100.0% | $0.0460 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($33,678) | 8.2% | ($0.0055) |
| Compressor | ($30,635) | 7.4% | ($0.0050) |
| Storage Vessels | ($75,166) | 18.3% | ($0.0123) |
| Dispenser | ($24,857) | 6.0% | ($0.0041) |
| Dryer | ($9,943) | 2.4% | ($0.0016) |
| **Subtotal** | ($174,279) | 42.3% | ($0.0285) |
| **Vehicle** | | | |
| Conversion Kit | ($19,394) | 4.7% | ($0.0032) |
| Tanks | ($27,632) | 6.7% | ($0.0045) |
| Labor | ($33,510) | 8.1% | ($0.0055) |
| OEM | ($21,341) | 5.2% | ($0.0035) |
| **Subtotal** | ($101,876) | 24.7% | ($0.0167) |
| **Operating** | | | |
| Station Maint. | ($26,263) | 6.4% | ($0.0043) |
| Cylinder Recert. | ($4,787) | 1.2% | ($0.0008) |
| Power | ($38,019) | 9.2% | ($0.0062) |
| Labor - fuel time loss | ($35,449) | 8.6% | ($0.0058) |
| NG Fuel Tax | ($31,055) | 7.5% | ($0.0051) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($135,573) | 32.9% | ($0.0222) |
| **Total Costs** | ($411,728) | 100.0% | ($0.0674) |
| **Savings - Cost** | ($130,623) | N/A | ($0.0214) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 2 | 19.4 | 33,300 | $1,950 | $900 |
| Light Trucks | 13 | 13.4 | 27,938 | $2,200 | $900 |
| Heavy Duty Gasoline | 3 | 5.6 | 21,188 | $3,300 | $900 |
| Heavy Duty Diesel | 8 | 8.1 | 23,232 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 26 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 100% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 14 |
| Year 1: Storage Size (scf) | 50,312 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($532.94) |
|---|---|

| Incremental Cost/mile | ($0.0214) |
|---|---|

## Fleet Size
## 31-50

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $320,609 | 82.0% | $0.0487 |
| Automobiles | $25,657 | 6.6% | $0.0302 |
| Light Trucks | $218,861 | 56.0% | $0.0437 |
| Heavy Duty Trucks | $76,090 | 19.5% | $0.1063 |
| Diesel Price Diff. | $70,354 | 18.0% | $0.0366 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $390,963 | 100.0% | $0.0460 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($41,980) | 7.7% | ($0.0049) |
| Compressor | ($35,333) | 6.5% | ($0.0042) |
| Storage Vessels | ($102,499) | 18.8% | ($0.0121) |
| Dispenser | ($24,857) | 4.6% | ($0.0029) |
| Dryer | ($9,943) | 1.8% | ($0.0012) |
| **Subtotal** | ($214,612) | 39.4% | ($0.0252) |
| **Vehicle** | | | |
| Conversion Kit | ($27,128) | 5.0% | ($0.0032) |
| Tanks | ($38,639) | 7.1% | ($0.0045) |
| Labor | ($47,756) | 8.8% | ($0.0056) |
| OEM | ($29,402) | 5.4% | ($0.0035) |
| **Subtotal** | ($142,926) | 26.2% | ($0.0168) |
| **Operating** | | | |
| Station Maint. | ($36,442) | 6.7% | ($0.0043) |
| Cylinder Recert. | ($6,767) | 1.2% | ($0.0008) |
| Power | ($49,953) | 9.2% | ($0.0059) |
| Labor - fuel time loss | ($49,839) | 9.2% | ($0.0059) |
| NG Fuel Tax | ($44,080) | 8.1% | ($0.0052) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($187,080) | 34.4% | ($0.0220) |
| **Total Costs** | ($544,618) | 100.0% | ($0.0641) |
| **Savings - Cost** | ($153,655) | N/A | ($0.0181) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 3 | 19.2 | 30,000 | $1,950 | $900 |
| Light Trucks | 20 | 13.3 | 26,590 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.5 | 18,984 | $3,300 | $900 |
| Heavy Duty Diesel | 10 | 7.8 | 24,496 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 37 | | | | |
| Maintenance Savings | 0% | | Mileage Adj. | 100% | |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 20 |
| Year 1: Storage Size (scf) | 69,251 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($440.53) |
|---|---|

| Incremental Cost/mile | ($0.0181) |
|---|---|

## Fleet Size
## 51 and up

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $703,150 | 90.6% | $0.0425 |
| Automobiles | $112,475 | 14.5% | $0.0281 |
| Light Trucks | $514,477 | 66.3% | $0.0437 |
| Heavy Duty Trucks | $76,199 | 9.8% | $0.1008 |
| Diesel Price Diff. | $72,790 | 9.4% | $0.0380 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $775,940 | 100.0% | $0.0420 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($64,504) | 6.4% | ($0.0035) |
| Compressor | ($48,986) | 4.9% | ($0.0027) |
| Storage Vessels | ($176,342) | 17.6% | ($0.0096) |
| Dispenser | ($24,857) | 2.5% | ($0.0013) |
| Dryer | ($9,943) | 1.0% | ($0.0005) |
| **Subtotal** | ($324,631) | 32.4% | ($0.0176) |
| **Vehicle** | | | |
| Conversion Kit | ($59,985) | 6.0% | ($0.0033) |
| Tanks | ($77,568) | 7.7% | ($0.0042) |
| Labor | ($108,385) | 10.8% | ($0.0059) |
| OEM | ($60,236) | 6.0% | ($0.0033) |
| **Subtotal** | ($306,174) | 30.6% | ($0.0166) |
| **Operating** | | | |
| Station Maint. | ($66,280) | 6.6% | ($0.0036) |
| Cylinder Recert. | ($14,238) | 1.4% | ($0.0008) |
| Power | ($84,914) | 8.5% | ($0.0046) |
| Labor - fuel time loss | ($104,135) | 10.4% | ($0.0056) |
| NG Fuel Tax | ($101,723) | 10.2% | ($0.0055) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($371,289) | 37.1% | ($0.0201) |
| **Total Costs** | ($1,002,095) | 100.0% | ($0.0543) |
| **Savings - Cost** | ($226,155) | N/A | ($0.0123) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 19 | 20.8 | 22,342 | $1,950 | $900 |
| Light Trucks | 54 | 13.3 | 23,150 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.8 | 20,048 | $3,300 | $900 |
| Heavy Duty Diesel | 11 | 7.5 | 22,154 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 88 | | | | |
| Maintenance Savings | 0% | | Mileage Adj. | 100% | |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 44 |
| Year 1: Storage Size (scf) | 141,451 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($272.62) |
|---|---|

| Incremental Cost/mile | ($0.0123) |
|---|---|

# APPENDIX O

# NPV COST-EFFECTIVENESS MODEL: NO DIESEL CONVERSIONS

# Fleet Size 1-10

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $32,193 | 100.0% | $0.0474 |
| Automobiles | $6,069 | 18.9% | $0.0286 |
| Light Trucks | $15,782 | 49.0% | $0.0457 |
| Heavy Duty Trucks | $10,342 | 32.1% | $0.0848 |
| Diesel Price Diff. | $0 | 0.0% | $0.0000 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $32,193 | 100.0% | $0.0474 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($13,200) | 12.0% | ($0.0194) |
| Compressor | ($19,692) | 17.9% | ($0.0290) |
| Storage Vessels | ($7,206) | 6.5% | ($0.0106) |
| Dispenser | ($24,857) | 22.6% | ($0.0366) |
| Dryer | ($9,943) | 9.0% | ($0.0146) |
| **Subtotal** | ($74,897) | 68.0% | ($0.1102) |
| **Vehicle** | | | |
| Conversion Kit | ($2,554) | 2.3% | ($0.0038) |
| Tanks | ($4,250) | 3.9% | ($0.0063) |
| Labor | ($4,393) | 4.0% | ($0.0065) |
| OEM | ($2,144) | 1.9% | ($0.0032) |
| **Subtotal** | ($13,342) | 12.1% | ($0.0196) |
| **Operating** | | | |
| Station Maint. | ($2,480) | 2.3% | ($0.0036) |
| Cylinder Recert. | ($847) | 0.8% | ($0.0012) |
| Power | ($10,103) | 9.2% | ($0.0149) |
| Labor - fuel time loss | ($3,715) | 3.4% | ($0.0055) |
| NG Fuel Tax | ($4,751) | 4.3% | ($0.0070) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($21,896) | 19.9% | ($0.0322) |
| **Total Costs** | ($110,135) | 100.0% | ($0.1621) |
| **Savings - Cost** | ($77,941) | N/A | ($0.1147) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 20.3 | 22,509 | $1,950 | $900 |
| Light Trucks | 2 | 12.8 | 18,327 | $2,200 | $900 |
| Heavy Duty Gasoline | 1 | 6.8 | 12,930 | $3,300 | $900 |
| Heavy Duty Diesel | 0 | 0.0 | 1 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 4 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 2 |
| Year 1: Storage Size (scf) | 7,261 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($2,066.99) |
|---|---|

| Incremental Cost/mile | ($0.1147) |
|---|---|

**Fleet Size**
**11-20**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $62,402 | 100.0% | $0.0517 |
| Automobiles | $6,586 | 10.6% | $0.0306 |
| Light Trucks | $33,879 | 54.3% | $0.0447 |
| Heavy Duty Trucks | $21,936 | 35.2% | $0.0941 |
| Diesel Price Diff. | $0 | 0.0% | $0.0000 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $62,402 | 100.0% | $0.0517 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($15,340) | 10.5% | ($0.0127) |
| Compressor | ($20,776) | 14.2% | ($0.0172) |
| Storage Vessels | ($14,432) | 9.9% | ($0.0120) |
| Dispenser | ($24,857) | 17.0% | ($0.0206) |
| Dryer | ($9,943) | 6.8% | ($0.0082) |
| **Subtotal** | ($85,347) | 58.4% | ($0.0707) |
| **Vehicle** | | | |
| Conversion Kit | ($5,173) | 3.5% | ($0.0043) |
| Tanks | ($8,950) | 6.1% | ($0.0074) |
| Labor | ($7,884) | 5.4% | ($0.0065) |
| OEM | ($3,195) | 2.2% | ($0.0026) |
| **Subtotal** | ($25,203) | 17.2% | ($0.0209) |
| **Operating** | | | |
| Station Maint. | ($4,880) | 3.3% | ($0.0040) |
| Cylinder Recert. | ($1,876) | 1.3% | ($0.0016) |
| Power | ($12,886) | 8.8% | ($0.0107) |
| Labor - fuel time loss | ($6,538) | 4.5% | ($0.0054) |
| NG Fuel Tax | ($9,502) | 6.5% | ($0.0079) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($35,683) | 24.4% | ($0.0296) |
| **Total Costs** | ($146,233) | 100.0% | ($0.1211) |
| **Savings - Cost** | ($83,831) | N/A | ($0.0694) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 19.0 | 22,861 | $1,950 | $900 |
| Light Trucks | 5 | 13.0 | 16,093 | $2,200 | $900 |
| Heavy Duty Gasoline | 2 | 6.1 | 12,365 | $3,300 | $900 |
| Heavy Duty Diesel | 0 | 0.0 | 1 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 8 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 4 |
| Year 1: Storage Size (scf) | 14,092 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($1,111.60) |
|---|---|

| Incremental Cost/mile | ($0.0694) |
|---|---|

## Fleet Size
## 21-30

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $113,695 | 100.0% | $0.0489 |
| Automobiles | $9,395 | 8.3% | $0.0299 |
| Light Trucks | $73,711 | 64.8% | $0.0431 |
| Heavy Duty Trucks | $30,588 | 26.9% | $0.1021 |
| Diesel Price Diff. | $0 | 0.0% | $0.0000 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $113,695 | 100.0% | $0.0489 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($18,940) | 8.8% | ($0.0081) |
| Compressor | ($22,594) | 10.5% | ($0.0097) |
| Storage Vessels | ($26,588) | 12.3% | ($0.0114) |
| Dispenser | ($24,857) | 11.5% | ($0.0107) |
| Dryer | ($9,943) | 4.6% | ($0.0043) |
| **Subtotal** | ($102,921) | 47.6% | ($0.0443) |
| **Vehicle** | | | |
| Conversion Kit | ($11,764) | 5.4% | ($0.0051) |
| Tanks | ($18,600) | 8.6% | ($0.0080) |
| Labor | ($16,354) | 7.6% | ($0.0070) |
| OEM | ($5,753) | 2.7% | ($0.0025) |
| **Subtotal** | ($52,470) | 24.3% | ($0.0226) |
| **Operating** | | | |
| Station Maint. | ($8,992) | 4.2% | ($0.0039) |
| Cylinder Recert. | ($4,229) | 2.0% | ($0.0018) |
| Power | ($17,778) | 8.2% | ($0.0076) |
| Labor - fuel time loss | ($12,420) | 5.7% | ($0.0053) |
| NG Fuel Tax | ($17,364) | 8.0% | ($0.0075) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($60,783) | 28.1% | ($0.0261) |
| **Total Costs** | ($216,175) | 100.0% | ($0.0930) |
| **Savings - Cost** | ($102,480) | N/A | ($0.0441) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 2 | 19.4 | 16,650 | $1,950 | $900 |
| Light Trucks | 13 | 13.4 | 13,969 | $2,200 | $900 |
| Heavy Duty Gasoline | 3 | 5.6 | 10,594 | $3,300 | $900 |
| Heavy Duty Diesel | 0 | 0.0 | 1 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 18 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| | |
|---|---|
| **DISCOUNT RATE** | 10.0% |

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 7 |
| Year 1: Storage Size (scf) | 25,586 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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** | ($603.95) |
| **Incremental Cost/mile** | ($0.0441) |

# Fleet Size
# 31-50

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $159,615 | 100.0% | $0.0485 |
| Automobiles | $12,829 | 8.0% | $0.0302 |
| Light Trucks | $108,741 | 68.1% | $0.0434 |
| Heavy Duty Trucks | $38,045 | 23.8% | $0.1063 |
| Diesel Price Diff. | $0 | 0.0% | $0.0000 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $159,615 | 100.0% | $0.0485 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($22,031) | 7.9% | ($0.0067) |
| Compressor | ($24,142) | 8.7% | ($0.0073) |
| Storage Vessels | ($37,045) | 13.4% | ($0.0113) |
| Dispenser | ($24,857) | 9.0% | ($0.0076) |
| Dryer | ($9,943) | 3.6% | ($0.0030) |
| **Subtotal** | ($118,018) | 42.5% | ($0.0359) |
| **Vehicle** | | | |
| Conversion Kit | ($17,488) | 6.3% | ($0.0053) |
| Tanks | ($27,350) | 9.9% | ($0.0083) |
| Labor | ($23,630) | 8.5% | ($0.0072) |
| OEM | ($9,561) | 3.4% | ($0.0029) |
| **Subtotal** | ($78,029) | 28.1% | ($0.0237) |
| **Operating** | | | |
| Station Maint. | ($12,433) | 4.5% | ($0.0038) |
| Cylinder Recert. | ($5,770) | 2.1% | ($0.0018) |
| Power | ($21,818) | 7.9% | ($0.0066) |
| Labor - fuel time loss | ($17,402) | 6.3% | ($0.0053) |
| NG Fuel Tax | ($23,982) | 8.6% | ($0.0073) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($81,404) | 29.3% | ($0.0248) |
| **Total Costs** | ($277,452) | 100.0% | ($0.0844) |
| **Savings - Cost** | ($117,837) | N/A | ($0.0358) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 3 | 19.2 | 15,000 | $1,950 | $900 |
| Light Trucks | 20 | 13.3 | 13,295 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.5 | 9,492 | $3,300 | $900 |
| Heavy Duty Diesel | 0 | 0.0 | 1 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 27 | | | | |
| Maintenance Savings | 0% | | Mileage Adj. | 0% | |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 10 |
| Year 1: Storage Size (scf) | 35,472 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($462.96) |
|---|---|

| Incremental Cost/mile | ($0.0358) |
|---|---|

**Fleet Size**
**51 and up**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $346,548 | 100.0% | $0.0419 |
| Automobiles | $54,998 | 15.9% | $0.0275 |
| Light Trucks | $254,291 | 73.4% | $0.0432 |
| Heavy Duty Trucks | $37,259 | 10.8% | $0.0986 |
| Diesel Price Diff. | $0 | 0.0% | $0.0000 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $346,548 | 100.0% | $0.0419 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($34,671) | 6.0% | ($0.0042) |
| Compressor | ($31,213) | 5.4% | ($0.0038) |
| Storage Vessels | ($79,046) | 13.6% | ($0.0096) |
| Dispenser | ($24,857) | 4.3% | ($0.0030) |
| Dryer | ($9,943) | 1.7% | ($0.0012) |
| **Subtotal** | ($179,729) | 31.0% | ($0.0217) |
| **Vehicle** | | | |
| Conversion Kit | ($51,011) | 8.8% | ($0.0062) |
| Tanks | ($65,150) | 11.2% | ($0.0079) |
| Labor | ($70,526) | 12.1% | ($0.0085) |
| OEM | ($16,723) | 2.9% | ($0.0020) |
| **Subtotal** | ($203,410) | 35.0% | ($0.0246) |
| **Operating** | | | |
| Station Maint. | ($27,714) | 4.8% | ($0.0034) |
| Cylinder Recert. | ($16,430) | 2.8% | ($0.0020) |
| Power | ($39,601) | 6.8% | ($0.0048) |
| Labor - fuel time loss | ($46,403) | 8.0% | ($0.0056) |
| NG Fuel Tax | ($67,365) | 11.6% | ($0.0081) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($197,513) | 34.0% | ($0.0239) |
| **Total Costs** | ($580,652) | 100.0% | ($0.0702) |
| **Savings - Cost** | ($234,104) | N/A | ($0.0283) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 19 | 20.8 | 11,171 | $1,950 | $900 |
| Light Trucks | 54 | 13.3 | 11,575 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.8 | 10,024 | $3,300 | $900 |
| Heavy Duty Diesel | 0 | 0.0 | 1 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 77 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 22 |
| Year 1: Storage Size (scf) | 75,181 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($322.51) |
|---|---|

| Incremental Cost/mile | ($0.0283) |
|---|---|

# APPENDIX P

# NPV COST-EFFECTIVENESS MODEL: DIESEL REPLACEMENT WITH GASOLINE TO CNG

## Fleet Size
## 1-10

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $86,228 | 100.0% | $0.0655 |
| Automobiles | $6,069 | 7.0% | $0.0286 |
| Light Trucks | $15,782 | 18.3% | $0.0457 |
| Heavy Duty Trucks | $64,377 | 74.7% | $0.0848 |
| Diesel Price Diff. | $0 | 0.0% | $0.0000 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $86,228 | 100.0% | $0.0655 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($17,003) | 10.1% | ($0.0129) |
| Compressor | ($21,581) | 12.8% | ($0.0164) |
| Storage Vessels | ($20,084) | 11.9% | ($0.0153) |
| Dispenser | ($24,857) | 14.7% | ($0.0189) |
| Dryer | ($9,943) | 5.9% | ($0.0076) |
| **Subtotal** | ($93,468) | 55.4% | ($0.0710) |
| **Vehicle** | | | |
| Conversion Kit | ($5,815) | 3.4% | ($0.0044) |
| Tanks | ($14,250) | 8.4% | ($0.0108) |
| Labor | ($8,793) | 5.2% | ($0.0067) |
| OEM | ($3,815) | 2.3% | ($0.0029) |
| **Subtotal** | ($32,672) | 19.4% | ($0.0248) |
| **Operating** | | | |
| Station Maint. | ($6,731) | 4.0% | ($0.0051) |
| Cylinder Recert. | ($2,905) | 1.7% | ($0.0022) |
| Power | ($15,144) | 9.0% | ($0.0115) |
| Labor - fuel time loss | ($6,388) | 3.8% | ($0.0049) |
| NG Fuel Tax | ($11,539) | 6.8% | ($0.0088) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($42,706) | 25.3% | ($0.0324) |
| **Total Costs** | ($168,846) | 100.0% | ($0.1283) |
| **Savings - Cost** | ($82,619) | N/A | ($0.0628) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 20.3 | 22,509 | $1,950 | $900 |
| Light Trucks | 2 | 12.8 | 18,327 | $2,200 | $900 |
| Heavy Duty Gasoline | 6 | 6.8 | 13,414 | $3,300 | $900 |
| Heavy Duty Diesel | 0 | 0.0 | 1 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 9 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 5 |
| Year 1: Storage Size (scf) | 19,436 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($973.79) |
|---|---|

| Incremental Cost/mile | ($0.0628) |
|---|---|

**Fleet Size**
**11-20**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $138,188 | 100.0% | $0.0687 |
| Automobiles | $6,586 | 4.8% | $0.0306 |
| Light Trucks | $33,879 | 24.5% | $0.0447 |
| Heavy Duty Trucks | $97,723 | 70.7% | $0.0941 |
| Diesel Price Diff. | $0 | 0.0% | $0.0000 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $138,188 | 100.0% | $0.0687 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($20,682) | 9.1% | ($0.0103) |
| Compressor | ($23,529) | 10.3% | ($0.0117) |
| Storage Vessels | ($32,418) | 14.2% | ($0.0161) |
| Dispenser | ($24,857) | 10.9% | ($0.0124) |
| Dryer | ($9,943) | 4.4% | ($0.0049) |
| **Subtotal** | ($111,429) | 48.8% | ($0.0554) |
| **Vehicle** | | | |
| Conversion Kit | ($9,796) | 4.3% | ($0.0049) |
| Tanks | ($22,950) | 10.1% | ($0.0114) |
| Labor | ($13,866) | 6.1% | ($0.0069) |
| OEM | ($4,813) | 2.1% | ($0.0024) |
| **Subtotal** | ($51,425) | 22.5% | ($0.0256) |
| **Operating** | | | |
| Station Maint. | ($10,923) | 4.8% | ($0.0054) |
| Cylinder Recert. | ($5,093) | 2.2% | ($0.0025) |
| Power | ($19,930) | 8.7% | ($0.0099) |
| Labor - fuel time loss | ($10,419) | 4.6% | ($0.0052) |
| NG Fuel Tax | ($19,005) | 8.3% | ($0.0094) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($65,370) | 28.6% | ($0.0325) |
| **Total Costs** | ($228,224) | 100.0% | ($0.1134) |
| **Savings - Cost** | ($90,036) | N/A | ($0.0447) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 19.0 | 22,861 | $1,950 | $900 |
| Light Trucks | 5 | 13.0 | 16,093 | $2,200 | $900 |
| Heavy Duty Gasoline | 9 | 6.1 | 12,241 | $3,300 | $900 |
| Heavy Duty Diesel | 0 | 0.0 | 1 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 15 | | | | |
| Maintenance Savings | 0% | | Mileage Adj. | 0% | |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 9 |
| Year 1: Storage Size (scf) | 31,098 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($636.73) |
|---|---|

| Incremental Cost/mile | ($0.0447) |
|---|---|

**Fleet Size**
**21-30**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $203,602 | 100.0% | $0.0636 |
| Automobiles | $9,395 | 4.6% | $0.0299 |
| Light Trucks | $73,711 | 36.2% | $0.0431 |
| Heavy Duty Trucks | $120,495 | 59.2% | $0.1025 |
| Diesel Price Diff. | $0 | 0.0% | $0.0000 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $203,602 | 100.0% | $0.0636 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($25,191) | 8.1% | ($0.0079) |
| Compressor | ($25,863) | 8.3% | ($0.0081) |
| Storage Vessels | ($47,589) | 15.3% | ($0.0149) |
| Dispenser | ($24,857) | 8.0% | ($0.0078) |
| Dryer | ($9,943) | 3.2% | ($0.0031) |
| **Subtotal** | ($133,442) | 42.9% | ($0.0417) |
| **Vehicle** | | | |
| Conversion Kit | ($17,026) | 5.5% | ($0.0053) |
| Tanks | ($34,600) | 11.1% | ($0.0108) |
| Labor | ($23,259) | 7.5% | ($0.0073) |
| OEM | ($7,743) | 2.5% | ($0.0024) |
| **Subtotal** | ($82,629) | 26.5% | ($0.0258) |
| **Operating** | | | |
| Station Maint. | ($16,133) | 5.2% | ($0.0050) |
| Cylinder Recert. | ($7,905) | 2.5% | ($0.0025) |
| Power | ($26,075) | 8.4% | ($0.0081) |
| Labor - fuel time loss | ($16,981) | 5.5% | ($0.0053) |
| NG Fuel Tax | ($28,224) | 9.1% | ($0.0088) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($95,318) | 30.6% | ($0.0298) |
| **Total Costs** | ($311,389) | 100.0% | ($0.0973) |
| **Savings - Cost** | ($107,787) | N/A | ($0.0337) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 2 | 19.4 | 16,650 | $1,950 | $900 |
| Light Trucks | 13 | 13.4 | 13,969 | $2,200 | $900 |
| Heavy Duty Gasoline | 11 | 5.6 | 11,337 | $3,300 | $900 |
| Heavy Duty Diesel | 0 | 0.0 | 1 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 26 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 13 |
| Year 1: Storage Size (scf) | 45,441 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($439.77) |
|---|---|

| Incremental Cost/mile | ($0.0337) |
|---|---|

# Fleet Size
# 31-50

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $279,424 | 100.0% | $0.0629 |
| Automobiles | $12,829 | 4.6% | $0.0302 |
| Light Trucks | $108,741 | 38.9% | $0.0434 |
| Heavy Duty Trucks | $157,854 | 56.5% | $0.1044 |
| Diesel Price Diff. | $0 | 0.0% | $0.0000 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $279,424 | 100.0% | $0.0629 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($30,326) | 7.5% | ($0.0068) |
| Compressor | ($28,581) | 7.1% | ($0.0064) |
| Storage Vessels | ($64,811) | 16.1% | ($0.0146) |
| Dispenser | ($24,857) | 6.2% | ($0.0056) |
| Dryer | ($9,943) | 2.5% | ($0.0022) |
| **Subtotal** | ($158,517) | 39.3% | ($0.0357) |
| **Vehicle** | | | |
| Conversion Kit | ($24,215) | 6.0% | ($0.0054) |
| Tanks | ($47,350) | 11.7% | ($0.0107) |
| Labor | ($33,192) | 8.2% | ($0.0075) |
| OEM | ($11,204) | 2.8% | ($0.0025) |
| **Subtotal** | ($115,961) | 28.7% | ($0.0261) |
| **Operating** | | | |
| Station Maint. | ($22,133) | 5.5% | ($0.0050) |
| Cylinder Recert. | ($10,812) | 2.7% | ($0.0024) |
| Power | ($33,113) | 8.2% | ($0.0075) |
| Labor - fuel time loss | ($23,776) | 5.9% | ($0.0054) |
| NG Fuel Tax | ($39,367) | 9.8% | ($0.0089) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($129,201) | 32.0% | ($0.0291) |
| **Total Costs** | ($403,679) | 100.0% | ($0.0908) |
| **Savings - Cost** | ($124,255) | N/A | ($0.0280) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 3 | 19.2 | 15,000 | $1,950 | $900 |
| Light Trucks | 20 | 13.3 | 13,295 | $2,200 | $900 |
| Heavy Duty Gasoline | 14 | 5.5 | 11,461 | $3,300 | $900 |
| Heavy Duty Diesel | 0 | 0.0 | 1 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 37 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 18 |
| Year 1: Storage Size (scf) | 61,723 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($356.24) |
|---|---|

| Incremental Cost/mile | ($0.0280) |
|---|---|

**Fleet Size**
**51 and up**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $459,772 | 100.0% | $0.0488 |
| Automobiles | $54,998 | 12.0% | $0.0275 |
| Light Trucks | $254,291 | 55.3% | $0.0432 |
| Heavy Duty Trucks | $150,483 | 32.7% | $0.0986 |
| Diesel Price Diff. | $0 | 0.0% | $0.0000 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $459,772 | 100.0% | $0.0488 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($42,131) | 6.0% | ($0.0045) |
| Compressor | ($35,382) | 5.0% | ($0.0038) |
| Storage Vessels | ($103,837) | 14.8% | ($0.0110) |
| Dispenser | ($24,857) | 3.5% | ($0.0026) |
| Dryer | ($9,943) | 1.4% | ($0.0011) |
| **Subtotal** | ($216,149) | 30.7% | ($0.0229) |
| **Vehicle** | | | |
| Conversion Kit | ($58,351) | 8.3% | ($0.0062) |
| Tanks | ($87,150) | 12.4% | ($0.0093) |
| Labor | ($79,671) | 11.3% | ($0.0085) |
| OEM | ($18,749) | 2.7% | ($0.0020) |
| **Subtotal** | ($243,921) | 34.7% | ($0.0259) |
| **Operating** | | | |
| Station Maint. | ($36,842) | 5.2% | ($0.0039) |
| Cylinder Recert. | ($21,485) | 3.1% | ($0.0023) |
| Power | ($50,311) | 7.2% | ($0.0053) |
| Labor - fuel time loss | ($52,363) | 7.4% | ($0.0056) |
| NG Fuel Tax | ($82,297) | 11.7% | ($0.0087) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($243,299) | 34.6% | ($0.0258) |
| **Total Costs** | ($703,370) | 100.0% | ($0.0747) |
| **Savings - Cost** | ($243,599) | N/A | ($0.0259) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 19 | 20.8 | 11,171 | $1,950 | $900 |
| Light Trucks | 54 | 13.3 | 11,575 | $2,200 | $900 |
| Heavy Duty Gasoline | 15 | 5.8 | 10,796 | $3,300 | $900 |
| Heavy Duty Diesel | 0 | 0.0 | 1 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 88 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 29 |
| Year 1: Storage Size (scf) | 98,621 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($293.64) |
|---|---|

| Incremental Cost/mile | ($0.0259) |
|---|---|

# APPENDIX Q

# NPV COST-EFFECTIVENESS MODEL: 10 PERCENT VEHICLE LIFE EXTENSION

# Fleet Size
# 1-10

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $32,074 | 63.7% | $0.0472 |
| Automobiles | $6,111 | 12.1% | $0.0288 |
| Light Trucks | $15,674 | 31.1% | $0.0454 |
| Heavy Duty Trucks | $10,289 | 20.4% | $0.0844 |
| Diesel Price Diff. | $18,307 | 36.3% | $0.0345 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $50,381 | 100.0% | $0.0416 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($15,883) | 10.0% | ($0.0131) |
| Compressor | ($21,204) | 13.4% | ($0.0175) |
| Storage Vessels | ($15,876) | 10.0% | ($0.0131) |
| Dispenser | ($24,857) | 15.7% | ($0.0205) |
| Dryer | ($9,943) | 6.3% | ($0.0082) |
| **Subtotal** | ($87,762) | 55.4% | ($0.0725) |
| **Vehicle** | | | |
| Conversion Kit | ($7,810) | 4.9% | ($0.0065) |
| Tanks | ($9,895) | 6.2% | ($0.0082) |
| Labor | ($10,554) | 6.7% | ($0.0087) |
| OEM | ($3,843) | 2.4% | ($0.0032) |
| **Subtotal** | ($32,103) | 20.3% | ($0.0265) |
| **Operating** | | | |
| Station Maint. | ($5,672) | 3.6% | ($0.0047) |
| Cylinder Recert. | ($2,173) | 1.4% | ($0.0018) |
| Power | ($13,866) | 8.8% | ($0.0115) |
| Labor - fuel time loss | ($8,028) | 5.1% | ($0.0066) |
| NG Fuel Tax | ($8,809) | 5.6% | ($0.0073) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($38,548) | 24.3% | ($0.0318) |
| **Total Costs** | ($158,413) | 100.0% | ($0.1309) |
| **Savings - Cost** | ($108,032) | N/A | ($0.0893) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 20.3 | 22,509 | $1,950 | $900 |
| Light Trucks | 2 | 12.8 | 18,327 | $2,200 | $900 |
| Heavy Duty Gasoline | 1 | 6.8 | 12,930 | $3,300 | $900 |
| Heavy Duty Diesel | 5 | 8.1 | 13,511 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 9 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 2 |
| Year 1: Storage Size (scf) | 7,261 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($1,273.33) |
|---|---|

| Incremental Cost/mile | ($0.0893) |
|---|---|

# Fleet Size
# 11-20

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $62,147 | 73.6% | $0.0515 |
| Automobiles | $6,631 | 7.9% | $0.0308 |
| Light Trucks | $33,666 | 39.9% | $0.0444 |
| Heavy Duty Trucks | $21,850 | 25.9% | $0.0937 |
| Diesel Price Diff. | $22,269 | 26.4% | $0.0332 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $84,416 | 100.0% | $0.0449 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($18,585) | 8.9% | ($0.0099) |
| Compressor | ($22,609) | 10.8% | ($0.0120) |
| Storage Vessels | ($24,915) | 11.9% | ($0.0133) |
| Dispenser | ($24,857) | 11.9% | ($0.0132) |
| Dryer | ($9,943) | 4.7% | ($0.0053) |
| **Subtotal** | ($100,908) | 48.2% | ($0.0537) |
| **Vehicle** | | | |
| Conversion Kit | ($12,607) | 6.0% | ($0.0067) |
| Tanks | ($16,853) | 8.0% | ($0.0090) |
| Labor | ($16,599) | 7.9% | ($0.0088) |
| OEM | ($5,362) | 2.6% | ($0.0029) |
| **Subtotal** | ($51,421) | 24.5% | ($0.0274) |
| **Operating** | | | |
| Station Maint. | ($8,794) | 4.2% | ($0.0047) |
| Cylinder Recert. | ($3,825) | 1.8% | ($0.0020) |
| Power | ($17,548) | 8.4% | ($0.0093) |
| Labor - fuel time loss | ($11,859) | 5.7% | ($0.0063) |
| NG Fuel Tax | ($15,184) | 7.2% | ($0.0081) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($57,209) | 27.3% | ($0.0305) |
| **Total Costs** | ($209,538) | 100.0% | ($0.1116) |
| **Savings - Cost** | ($125,122) | N/A | ($0.0666) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 19.0 | 22,861 | $1,950 | $900 |
| Light Trucks | 5 | 13.0 | 16,093 | $2,200 | $900 |
| Heavy Duty Gasoline | 2 | 6.1 | 12,365 | $3,300 | $900 |
| Heavy Duty Diesel | 7 | 8.4 | 12,206 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 15 | | | | |
| Maintenance Savings | 0% | | Mileage Adj. | 0% | |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 4 |
| Year 1: Storage Size (scf) | 14,092 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($884.86) |
|---|---|

| Incremental Cost/mile | ($0.0666) |
|---|---|

## Fleet Size
## 21-30

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $114,002 | 82.0% | $0.0490 |
| Automobiles | $9,395 | 6.8% | $0.0299 |
| Light Trucks | $73,328 | 52.7% | $0.0428 |
| Heavy Duty Trucks | $31,278 | 22.5% | $0.1044 |
| Diesel Price Diff. | $25,057 | 18.0% | $0.0343 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $139,058 | 100.0% | $0.0455 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($22,569) | 7.9% | ($0.0074) |
| Compressor | ($24,714) | 8.6% | ($0.0081) |
| Storage Vessels | ($38,245) | 13.3% | ($0.0125) |
| Dispenser | ($24,857) | 8.7% | ($0.0081) |
| Dryer | ($9,943) | 3.5% | ($0.0033) |
| **Subtotal** | ($120,328) | 42.0% | ($0.0394) |
| **Vehicle** | | | |
| Conversion Kit | ($20,251) | 7.1% | ($0.0066) |
| Tanks | ($27,632) | 9.6% | ($0.0090) |
| Labor | ($25,941) | 9.1% | ($0.0085) |
| OEM | ($7,856) | 2.7% | ($0.0026) |
| **Subtotal** | ($81,679) | 28.5% | ($0.0267) |
| **Operating** | | | |
| Station Maint. | ($13,333) | 4.7% | ($0.0044) |
| Cylinder Recert. | ($6,250) | 2.2% | ($0.0020) |
| Power | ($22,809) | 8.0% | ($0.0075) |
| Labor - fuel time loss | ($18,307) | 6.4% | ($0.0060) |
| NG Fuel Tax | ($23,857) | 8.3% | ($0.0078) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($84,556) | 29.5% | ($0.0277) |
| **Total Costs** | ($286,563) | 100.0% | ($0.0938) |
| **Savings - Cost** | ($147,504) | N/A | ($0.0483) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 2 | 19.4 | 16,650 | $1,950 | $900 |
| Light Trucks | 13 | 13.4 | 13,969 | $2,200 | $900 |
| Heavy Duty Gasoline | 3 | 5.6 | 10,594 | $3,300 | $900 |
| Heavy Duty Diesel | 8 | 8.1 | 11,616 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 26 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 7 |
| Year 1: Storage Size (scf) | 25,586 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($601.81) |
|---|---|

| Incremental Cost/mile | ($0.0483) |
|---|---|

**Fleet Size**
**31-50**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $158,834 | 82.2% | $0.0483 |
| Automobiles | $12,748 | 6.6% | $0.0301 |
| Light Trucks | $108,177 | 56.0% | $0.0432 |
| Heavy Duty Trucks | $37,909 | 19.6% | $0.1059 |
| Diesel Price Diff. | $34,378 | 17.8% | $0.0357 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $193,212 | 100.0% | $0.0455 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($26,952) | 7.3% | ($0.0063) |
| Compressor | ($27,106) | 7.3% | ($0.0064) |
| Storage Vessels | ($52,759) | 14.3% | ($0.0124) |
| Dispenser | ($24,857) | 6.7% | ($0.0058) |
| Dryer | ($9,943) | 2.7% | ($0.0023) |
| **Subtotal** | ($141,616) | 38.3% | ($0.0333) |
| **Vehicle** | | | |
| Conversion Kit | ($28,256) | 7.6% | ($0.0066) |
| Tanks | ($38,639) | 10.4% | ($0.0091) |
| Labor | ($36,274) | 9.8% | ($0.0085) |
| OEM | ($10,916) | 3.0% | ($0.0026) |
| **Subtotal** | ($114,086) | 30.8% | ($0.0268) |
| **Operating** | | | |
| Station Maint. | ($18,525) | 5.0% | ($0.0044) |
| Cylinder Recert. | ($8,853) | 2.4% | ($0.0021) |
| Power | ($28,900) | 7.8% | ($0.0068) |
| Labor - fuel time loss | ($25,829) | 7.0% | ($0.0061) |
| NG Fuel Tax | ($32,098) | 8.7% | ($0.0076) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($114,205) | 30.9% | ($0.0269) |
| **Total Costs** | ($369,907) | 100.0% | ($0.0870) |
| **Savings - Cost** | ($176,695) | N/A | ($0.0416) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 3 | 19.2 | 15,000 | $1,950 | $900 |
| Light Trucks | 20 | 13.3 | 13,295 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.5 | 9,492 | $3,300 | $900 |
| Heavy Duty Diesel | 10 | 7.8 | 12,248 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 37 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 10 |
| Year 1: Storage Size (scf) | 35,472 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($506.59) |
|---|---|

| Incremental Cost/mile | ($0.0416) |
|---|---|

## Fleet Size
## 51 and up

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $346,391 | 90.7% | $0.0419 |
| Automobiles | $54,998 | 14.4% | $0.0275 |
| Light Trucks | $253,294 | 66.3% | $0.0430 |
| Heavy Duty Trucks | $38,099 | 10.0% | $0.1008 |
| Diesel Price Diff. | $35,483 | 9.3% | $0.0371 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $381,874 | 100.0% | $0.0414 |
| **COSTS** | | % of | Incremental |
| **Infrastructure** | | Costs | Cost/Mile |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($39,488) | 5.8% | ($0.0043) |
| Compressor | ($34,126) | 5.0% | ($0.0037) |
| Storage Vessels | ($94,415) | 14.0% | ($0.0102) |
| Dispenser | ($24,857) | 3.7% | ($0.0027) |
| Dryer | ($9,943) | 1.5% | ($0.0011) |
| **Subtotal** | ($202,829) | 30.0% | ($0.0220) |
| **Vehicle** | | | |
| Conversion Kit | ($62,908) | 9.3% | ($0.0068) |
| Tanks | ($77,568) | 11.5% | ($0.0084) |
| Labor | ($82,944) | 12.3% | ($0.0090) |
| OEM | ($18,890) | 2.8% | ($0.0020) |
| **Subtotal** | ($242,310) | 35.8% | ($0.0263) |
| **Operating** | | | |
| Station Maint. | ($33,957) | 5.0% | ($0.0037) |
| Cylinder Recert. | ($18,796) | 2.8% | ($0.0020) |
| Power | ($46,985) | 6.9% | ($0.0051) |
| Labor - fuel time loss | ($55,022) | 8.1% | ($0.0060) |
| NG Fuel Tax | ($76,292) | 11.3% | ($0.0083) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($231,053) | 34.2% | ($0.0250) |
| **Total Costs** | ($676,191) | 100.0% | ($0.0733) |
| **Savings - Cost** | ($294,318) | N/A | ($0.0319) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 19 | 20.8 | 11,171 | $1,950 | $900 |
| Light Trucks | 54 | 13.3 | 11,575 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.8 | 10,024 | $3,300 | $900 |
| Heavy Duty Diesel | 11 | 7.5 | 11,077 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 88 | | | | |
| Maintenance Savings | 0% | | Mileage Adj. | 0% | |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 22 |
| Year 1: Storage Size (scf) | 75,181 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($354.78) |
|---|---|

| Incremental Cost/mile | ($0.0319) |
|---|---|

# APPENDIX R

# NPV COST-EFFECTIVENESS MODEL: 25 PERCENT VEHICLE LIFE EXTENSION

## Fleet Size
## 1-10

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $31,935 | 63.6% | $0.0470 |
| Automobiles | $6,111 | 12.2% | $0.0288 |
| Light Trucks | $15,575 | 31.0% | $0.0451 |
| Heavy Duty Trucks | $10,248 | 20.4% | $0.0841 |
| Diesel Price Diff. | $18,259 | 36.4% | $0.0344 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $50,194 | 100.0% | $0.0415 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($15,883) | 10.0% | ($0.0131) |
| Compressor | ($21,204) | 13.4% | ($0.0175) |
| Storage Vessels | ($15,876) | 10.0% | ($0.0131) |
| Dispenser | ($24,857) | 15.7% | ($0.0205) |
| Dryer | ($9,943) | 6.3% | ($0.0082) |
| **Subtotal** | ($87,762) | 55.5% | ($0.0725) |
| **Vehicle** | | | |
| Conversion Kit | ($7,875) | 5.0% | ($0.0065) |
| Tanks | ($9,895) | 6.3% | ($0.0082) |
| Labor | ($10,475) | 6.6% | ($0.0087) |
| OEM | ($3,400) | 2.1% | ($0.0028) |
| **Subtotal** | ($31,644) | 20.0% | ($0.0261) |
| **Operating** | | | |
| Station Maint. | ($5,697) | 3.6% | ($0.0047) |
| Cylinder Recert. | ($2,236) | 1.4% | ($0.0018) |
| Power | ($13,919) | 8.8% | ($0.0115) |
| Labor - fuel time loss | ($8,098) | 5.1% | ($0.0067) |
| NG Fuel Tax | ($8,809) | 5.6% | ($0.0073) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($38,761) | 24.5% | ($0.0320) |
| **Total Costs** | ($158,167) | 100.0% | ($0.1307) |
| **Savings - Cost** | ($107,973) | N/A | ($0.0892) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 20.3 | 22,509 | $1,950 | $900 |
| Light Trucks | 2 | 12.8 | 18,327 | $2,200 | $900 |
| Heavy Duty Gasoline | 1 | 6.8 | 12,930 | $3,300 | $900 |
| Heavy Duty Diesel | 5 | 8.1 | 13,511 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 9 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 2 |
| Year 1: Storage Size (scf) | 7,261 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($1,272.64) |
|---|---|

| Incremental Cost/mile | ($0.0892) |
|---|---|

**Fleet Size**
**11-20**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $62,640 | 73.9% | $0.0519 |
| Automobiles | $6,631 | 7.8% | $0.0308 |
| Light Trucks | $33,666 | 39.7% | $0.0444 |
| Heavy Duty Trucks | $22,343 | 26.3% | $0.0958 |
| Diesel Price Diff. | $22,179 | 26.1% | $0.0330 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $84,819 | 100.0% | $0.0452 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($18,579) | 8.9% | ($0.0099) |
| Compressor | ($22,584) | 10.8% | ($0.0120) |
| Storage Vessels | ($24,915) | 11.9% | ($0.0133) |
| Dispenser | ($24,857) | 11.9% | ($0.0132) |
| Dryer | ($9,943) | 4.8% | ($0.0053) |
| **Subtotal** | ($100,877) | 48.3% | ($0.0537) |
| **Vehicle** | | | |
| Conversion Kit | ($12,623) | 6.0% | ($0.0067) |
| Tanks | ($16,853) | 8.1% | ($0.0090) |
| Labor | ($16,137) | 7.7% | ($0.0086) |
| OEM | ($5,285) | 2.5% | ($0.0028) |
| **Subtotal** | ($50,897) | 24.4% | ($0.0271) |
| **Operating** | | | |
| Station Maint. | ($8,740) | 4.2% | ($0.0047) |
| Cylinder Recert. | ($3,810) | 1.8% | ($0.0020) |
| Power | ($17,490) | 8.4% | ($0.0093) |
| Labor - fuel time loss | ($11,744) | 5.6% | ($0.0063) |
| NG Fuel Tax | ($15,184) | 7.3% | ($0.0081) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($56,968) | 27.3% | ($0.0303) |
| **Total Costs** | ($208,742) | 100.0% | ($0.1111) |
| **Savings - Cost** | ($123,923) | N/A | ($0.0660) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 19.0 | 22,861 | $1,950 | $900 |
| Light Trucks | 5 | 13.0 | 16,093 | $2,200 | $900 |
| Heavy Duty Gasoline | 2 | 6.1 | 12,365 | $3,300 | $900 |
| Heavy Duty Diesel | 7 | 8.4 | 12,206 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 15 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 4 |
| Year 1: Storage Size (scf) | 14,092 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($876.38) |
|---|---|

| Incremental Cost/mile | ($0.0660) |
|---|---|

## Fleet Size
## 21-30

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $113,602 | 82.0% | $0.0489 |
| Automobiles | $9,395 | 6.8% | $0.0299 |
| Light Trucks | $73,041 | 52.7% | $0.0427 |
| Heavy Duty Trucks | $31,166 | 22.5% | $0.1040 |
| Diesel Price Diff. | $24,966 | 18.0% | $0.0342 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $138,569 | 100.0% | $0.0454 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($22,569) | 7.9% | ($0.0074) |
| Compressor | ($24,714) | 8.6% | ($0.0081) |
| Storage Vessels | ($38,245) | 13.4% | ($0.0125) |
| Dispenser | ($24,857) | 8.7% | ($0.0081) |
| Dryer | ($9,943) | 3.5% | ($0.0033) |
| **Subtotal** | ($120,328) | 42.1% | ($0.0394) |
| **Vehicle** | | | |
| Conversion Kit | ($20,453) | 7.2% | ($0.0067) |
| Tanks | ($27,632) | 9.7% | ($0.0090) |
| Labor | ($25,640) | 9.0% | ($0.0084) |
| OEM | ($6,584) | 2.3% | ($0.0022) |
| **Subtotal** | ($80,309) | 28.1% | ($0.0263) |
| **Operating** | | | |
| Station Maint. | ($13,404) | 4.7% | ($0.0044) |
| Cylinder Recert. | ($6,488) | 2.3% | ($0.0021) |
| Power | ($22,925) | 8.0% | ($0.0075) |
| Labor - fuel time loss | ($18,513) | 6.5% | ($0.0061) |
| NG Fuel Tax | ($23,857) | 8.3% | ($0.0078) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($85,187) | 29.8% | ($0.0279) |
| **Total Costs** | ($285,824) | 100.0% | ($0.0935) |
| **Savings - Cost** | ($147,255) | N/A | ($0.0482) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 2 | 19.4 | 16,650 | $1,950 | $900 |
| Light Trucks | 13 | 13.4 | 13,969 | $2,200 | $900 |
| Heavy Duty Gasoline | 3 | 5.6 | 10,594 | $3,300 | $900 |
| Heavy Duty Diesel | 8 | 8.1 | 11,616 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 26 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 7 |
| Year 1: Storage Size (scf) | 25,586 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($600.80) |
|---|---|

| Incremental Cost/mile | ($0.0482) |
|---|---|

# Fleet Size
# 31-50

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $158,286 | 82.2% | $0.0481 |
| Automobiles | $12,748 | 6.6% | $0.0301 |
| Light Trucks | $107,753 | 56.0% | $0.0430 |
| Heavy Duty Trucks | $37,786 | 19.6% | $0.1056 |
| Diesel Price Diff. | $34,240 | 17.8% | $0.0356 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $192,526 | 100.0% | $0.0453 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($26,952) | 7.3% | ($0.0063) |
| Compressor | ($27,106) | 7.4% | ($0.0064) |
| Storage Vessels | ($52,759) | 14.3% | ($0.0124) |
| Dispenser | ($24,857) | 6.7% | ($0.0058) |
| Dryer | ($9,943) | 2.7% | ($0.0023) |
| **Subtotal** | ($141,616) | 38.4% | ($0.0333) |
| **Vehicle** | | | |
| Conversion Kit | ($28,546) | 7.7% | ($0.0067) |
| Tanks | ($38,639) | 10.5% | ($0.0091) |
| Labor | ($35,811) | 9.7% | ($0.0084) |
| OEM | ($9,096) | 2.5% | ($0.0021) |
| **Subtotal** | ($112,092) | 30.4% | ($0.0264) |
| **Operating** | | | |
| Station Maint. | ($18,626) | 5.1% | ($0.0044) |
| Cylinder Recert. | ($9,150) | 2.5% | ($0.0022) |
| Power | ($29,051) | 7.9% | ($0.0068) |
| Labor - fuel time loss | ($26,120) | 7.1% | ($0.0061) |
| NG Fuel Tax | ($32,098) | 8.7% | ($0.0076) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($115,045) | 31.2% | ($0.0271) |
| **Total Costs** | ($368,752) | 100.0% | ($0.0867) |
| **Savings - Cost** | ($176,226) | N/A | ($0.0415) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 3 | 19.2 | 15,000 | $1,950 | $900 |
| Light Trucks | 20 | 13.3 | 13,295 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.5 | 9,492 | $3,300 | $900 |
| Heavy Duty Diesel | 10 | 7.8 | 12,248 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 37 | | | | |
| Maintenance Savings | 0% | | Mileage Adj. | 0% | |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 10 |
| Year 1: Storage Size (scf) | 35,472 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($505.24) |
|---|---|

| Incremental Cost/mile | ($0.0415) |
|---|---|

## Fleet Size
## 51 and up

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $352,881 | 90.9% | $0.0427 |
| Automobiles | $56,037 | 14.4% | $0.0280 |
| Light Trucks | $259,005 | 66.7% | $0.0440 |
| Heavy Duty Trucks | $37,840 | 9.7% | $0.1001 |
| Diesel Price Diff. | $35,355 | 9.1% | $0.0369 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $388,236 | 100.0% | $0.0421 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($39,397) | 6.0% | ($0.0043) |
| Compressor | ($33,775) | 5.1% | ($0.0037) |
| Storage Vessels | ($94,415) | 14.3% | ($0.0102) |
| Dispenser | ($24,857) | 3.8% | ($0.0027) |
| Dryer | ($9,943) | 1.5% | ($0.0011) |
| **Subtotal** | ($202,386) | 30.6% | ($0.0219) |
| **Vehicle** | | | |
| Conversion Kit | ($60,476) | 9.2% | ($0.0066) |
| Tanks | ($77,568) | 11.7% | ($0.0084) |
| Labor | ($64,592) | 9.8% | ($0.0070) |
| OEM | ($32,619) | 4.9% | ($0.0035) |
| **Subtotal** | ($235,255) | 35.6% | ($0.0255) |
| **Operating** | | | |
| Station Maint. | ($33,101) | 5.0% | ($0.0036) |
| Cylinder Recert. | ($15,579) | 2.4% | ($0.0017) |
| Power | ($45,982) | 7.0% | ($0.0050) |
| Labor - fuel time loss | ($51,804) | 7.8% | ($0.0056) |
| NG Fuel Tax | ($76,292) | 11.6% | ($0.0083) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($222,758) | 33.7% | ($0.0241) |
| **Total Costs** | ($660,400) | 100.0% | ($0.0716) |
| **Savings - Cost** | ($272,164) | N/A | ($0.0295) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 19 | 20.8 | 11,171 | $1,950 | $900 |
| Light Trucks | 54 | 13.3 | 11,575 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.8 | 10,024 | $3,300 | $900 |
| Heavy Duty Diesel | 11 | 7.5 | 11,077 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 88 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 22 |
| Year 1: Storage Size (scf) | 75,181 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($328.08) |
|---|---|

| Incremental Cost/mile | ($0.0295) |
|---|---|

# APPENDIX S

# NPV COST-EFFECTIVENESS MODEL: 50 PERCENT VEHICLE LIFE EXTENSION

# Fleet Size
# 1-10

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $32,006 | 63.8% | $0.0471 |
| Automobiles | $6,069 | 12.1% | $0.0286 |
| Light Trucks | $15,495 | 30.9% | $0.0448 |
| Heavy Duty Trucks | $10,442 | 20.8% | $0.0857 |
| Diesel Price Diff. | $18,150 | 36.2% | $0.0342 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $50,155 | 100.0% | $0.0414 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($15,884) | 10.1% | ($0.0131) |
| Compressor | ($21,210) | 13.5% | ($0.0175) |
| Storage Vessels | ($15,876) | 10.1% | ($0.0131) |
| Dispenser | ($24,857) | 15.8% | ($0.0205) |
| Dryer | ($9,943) | 6.3% | ($0.0082) |
| **Subtotal** | ($87,769) | 55.8% | ($0.0725) |
| **Vehicle** | | | |
| Conversion Kit | ($7,965) | 5.1% | ($0.0066) |
| Tanks | ($9,895) | 6.3% | ($0.0082) |
| Labor | ($10,152) | 6.5% | ($0.0084) |
| OEM | ($2,664) | 1.7% | ($0.0022) |
| **Subtotal** | ($30,676) | 19.5% | ($0.0253) |
| **Operating** | | | |
| Station Maint. | ($5,704) | 3.6% | ($0.0047) |
| Cylinder Recert. | ($2,321) | 1.5% | ($0.0019) |
| Power | ($13,920) | 8.8% | ($0.0115) |
| Labor - fuel time loss | ($8,146) | 5.2% | ($0.0067) |
| NG Fuel Tax | ($8,809) | 5.6% | ($0.0073) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($38,900) | 24.7% | ($0.0321) |
| **Total Costs** | ($157,346) | 100.0% | ($0.1300) |
| **Savings - Cost** | ($107,190) | N/A | ($0.0886) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 20.3 | 22,509 | $1,950 | $900 |
| Light Trucks | 2 | 12.8 | 18,327 | $2,200 | $900 |
| Heavy Duty Gasoline | 1 | 6.8 | 12,930 | $3,300 | $900 |
| Heavy Duty Diesel | 5 | 8.1 | 13,511 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 9 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 2 |
| Year 1: Storage Size (scf) | 7,261 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($1,263.41) |
|---|---|

| Incremental Cost/mile | ($0.0886) |
|---|---|

**Fleet Size**
**11-20**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $62,254 | 73.8% | $0.0516 |
| Automobiles | $6,631 | 7.9% | $0.0308 |
| Light Trucks | $33,360 | 39.6% | $0.0440 |
| Heavy Duty Trucks | $22,263 | 26.4% | $0.0955 |
| Diesel Price Diff. | $22,068 | 26.2% | $0.0329 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $84,322 | 100.0% | $0.0449 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($18,588) | 8.9% | ($0.0099) |
| Compressor | ($22,622) | 10.9% | ($0.0120) |
| Storage Vessels | ($24,915) | 12.0% | ($0.0133) |
| Dispenser | ($24,857) | 12.0% | ($0.0132) |
| Dryer | ($9,943) | 4.8% | ($0.0053) |
| **Subtotal** | ($100,925) | 48.5% | ($0.0537) |
| **Vehicle** | | | |
| Conversion Kit | ($12,819) | 6.2% | ($0.0068) |
| Tanks | ($16,853) | 8.1% | ($0.0090) |
| Labor | ($15,894) | 7.6% | ($0.0085) |
| OEM | ($3,846) | 1.8% | ($0.0020) |
| **Subtotal** | ($49,411) | 23.8% | ($0.0263) |
| **Operating** | | | |
| Station Maint. | ($8,810) | 4.2% | ($0.0047) |
| Cylinder Recert. | ($4,086) | 2.0% | ($0.0022) |
| Power | ($17,557) | 8.4% | ($0.0093) |
| Labor - fuel time loss | ($11,946) | 5.7% | ($0.0064) |
| NG Fuel Tax | ($15,184) | 7.3% | ($0.0081) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($57,582) | 27.7% | ($0.0307) |
| **Total Costs** | ($207,918) | 100.0% | ($0.1107) |
| **Savings - Cost** | ($123,595) | N/A | ($0.0658) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 19.0 | 22,861 | $1,950 | $900 |
| Light Trucks | 5 | 13.0 | 16,093 | $2,200 | $900 |
| Heavy Duty Gasoline | 2 | 6.1 | 12,365 | $3,300 | $900 |
| Heavy Duty Diesel | 7 | 8.4 | 12,206 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 15 | | | | |

| | | | |
|---|---|---|---|
| Maintenance Savings | 0% | Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 4 |
| Year 1: Storage Size (scf) | 14,092 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($874.06) |
|---|---|

| Incremental Cost/mile | ($0.0658) |
|---|---|

## Fleet Size
## 21-30

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $114,892 | 82.2% | $0.0494 |
| Automobiles | $9,251 | 6.6% | $0.0295 |
| Light Trucks | $74,688 | 53.4% | $0.0436 |
| Heavy Duty Trucks | $30,953 | 22.1% | $0.1033 |
| Diesel Price Diff. | $24,853 | 17.8% | $0.0340 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $139,745 | 100.0% | $0.0457 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($22,550) | 8.0% | ($0.0074) |
| Compressor | ($24,642) | 8.7% | ($0.0081) |
| Storage Vessels | ($38,245) | 13.5% | ($0.0125) |
| Dispenser | ($24,857) | 8.8% | ($0.0081) |
| Dryer | ($9,943) | 3.5% | ($0.0033) |
| **Subtotal** | ($120,237) | 42.6% | ($0.0394) |
| **Vehicle** | | | |
| Conversion Kit | ($20,161) | 7.1% | ($0.0066) |
| Tanks | ($27,632) | 9.8% | ($0.0090) |
| Labor | ($22,429) | 7.9% | ($0.0073) |
| OEM | ($8,037) | 2.8% | ($0.0026) |
| **Subtotal** | ($78,259) | 27.7% | ($0.0256) |
| **Operating** | | | |
| Station Maint. | ($13,243) | 4.7% | ($0.0043) |
| Cylinder Recert. | ($6,188) | 2.2% | ($0.0020) |
| Power | ($22,744) | 8.1% | ($0.0074) |
| Labor - fuel time loss | ($17,962) | 6.4% | ($0.0059) |
| NG Fuel Tax | ($23,857) | 8.4% | ($0.0078) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($83,996) | 29.7% | ($0.0275) |
| **Total Costs** | ($282,491) | 100.0% | ($0.0925) |
| **Savings - Cost** | ($142,746) | N/A | ($0.0467) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 2 | 19.4 | 16,650 | $1,950 | $900 |
| Light Trucks | 13 | 13.4 | 13,969 | $2,200 | $900 |
| Heavy Duty Gasoline | 3 | 5.6 | 10,594 | $3,300 | $900 |
| Heavy Duty Diesel | 8 | 8.1 | 11,616 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 26 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 7 |
| Year 1: Storage Size (scf) | 25,586 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($582.40) |
|---|---|

| Incremental Cost/mile | ($0.0467) |
|---|---|

## Fleet Size
## 31-50

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $159,875 | 82.4% | $0.0486 |
| Automobiles | $12,632 | 6.5% | $0.0298 |
| Light Trucks | $109,789 | 56.6% | $0.0438 |
| Heavy Duty Trucks | $37,455 | 19.3% | $0.1046 |
| Diesel Price Diff. | $34,068 | 17.6% | $0.0354 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $193,943 | 100.0% | $0.0456 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($26,923) | 7.4% | ($0.0063) |
| Compressor | ($26,998) | 7.4% | ($0.0064) |
| Storage Vessels | ($52,759) | 14.5% | ($0.0124) |
| Dispenser | ($24,857) | 6.8% | ($0.0058) |
| Dryer | ($9,943) | 2.7% | ($0.0023) |
| **Subtotal** | ($141,480) | 38.9% | ($0.0333) |
| **Vehicle** | | | |
| Conversion Kit | ($28,181) | 7.8% | ($0.0066) |
| Tanks | ($38,639) | 10.6% | ($0.0091) |
| Labor | ($30,990) | 8.5% | ($0.0073) |
| OEM | ($10,658) | 2.9% | ($0.0025) |
| **Subtotal** | ($108,469) | 29.9% | ($0.0255) |
| **Operating** | | | |
| Station Maint. | ($18,438) | 5.1% | ($0.0043) |
| Cylinder Recert. | ($8,548) | 2.4% | ($0.0020) |
| Power | ($28,856) | 7.9% | ($0.0068) |
| Labor - fuel time loss | ($25,438) | 7.0% | ($0.0060) |
| NG Fuel Tax | ($32,098) | 8.8% | ($0.0076) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($113,378) | 31.2% | ($0.0267) |
| **Total Costs** | ($363,327) | 100.0% | ($0.0855) |
| **Savings - Cost** | ($169,383) | N/A | ($0.0398) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 3 | 19.2 | 15,000 | $1,950 | $900 |
| Light Trucks | 20 | 13.3 | 13,295 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.5 | 9,492 | $3,300 | $900 |
| Heavy Duty Diesel | 10 | 7.8 | 12,248 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 37 | | | | |
| Maintenance Savings | 0% | | Mileage Adj. | 0% | |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 10 |
| Year 1: Storage Size (scf) | 35,472 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($485.62) |
|---|---|

| Incremental Cost/mile | ($0.0398) |
|---|---|

## Fleet Size
## 51 and up

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $350,493 | 90.9% | $0.0424 |
| Automobiles | $55,653 | 14.4% | $0.0278 |
| Light Trucks | $257,238 | 66.7% | $0.0437 |
| Heavy Duty Trucks | $37,601 | 9.8% | $0.0995 |
| Diesel Price Diff. | $35,147 | 9.1% | $0.0367 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $385,639 | 100.0% | $0.0418 |
| **COSTS** | | | |
| **Infrastructure** | | % of Costs | Incremental Cost/Mile |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($39,397) | 6.0% | ($0.0043) |
| Compressor | ($33,775) | 5.1% | ($0.0037) |
| Storage Vessels | ($94,415) | 14.4% | ($0.0102) |
| Dispenser | ($24,857) | 3.8% | ($0.0027) |
| Dryer | ($9,943) | 1.5% | ($0.0011) |
| **Subtotal** | ($202,386) | 30.8% | ($0.0219) |
| **Vehicle** | | | |
| Conversion Kit | ($61,578) | 9.4% | ($0.0067) |
| Tanks | ($77,568) | 11.8% | ($0.0084) |
| Labor | ($64,592) | 9.8% | ($0.0070) |
| OEM | ($25,274) | 3.8% | ($0.0027) |
| **Subtotal** | ($229,012) | 34.9% | ($0.0248) |
| **Operating** | | | |
| Station Maint. | ($33,469) | 5.1% | ($0.0036) |
| Cylinder Recert. | ($16,382) | 2.5% | ($0.0018) |
| Power | ($46,482) | 7.1% | ($0.0050) |
| Labor - fuel time loss | ($53,052) | 8.1% | ($0.0057) |
| NG Fuel Tax | ($76,292) | 11.6% | ($0.0083) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($225,678) | 34.3% | ($0.0245) |
| **Total Costs** | ($657,076) | 100.0% | ($0.0712) |
| **Savings - Cost** | ($271,437) | N/A | ($0.0294) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 19 | 20.8 | 11,171 | $1,950 | $900 |
| Light Trucks | 54 | 13.3 | 11,575 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.8 | 10,024 | $3,300 | $900 |
| Heavy Duty Diesel | 11 | 7.5 | 11,077 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 88 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 22 |
| Year 1: Storage Size (scf) | 75,181 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($327.20) |
|---|---|

| Incremental Cost/mile | ($0.0294) |
|---|---|

# APPENDIX T

# NPV COST-EFFECTIVENESS MODEL: OEM VEHICLES

**ALL OEM VEHICLES**

**Fleet Size**
**1-10**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $34,509 | 63.9% | $0.0508 |
| Automobiles | $6,514 | 12.1% | $0.0307 |
| Light Trucks | $16,824 | 31.1% | $0.0487 |
| Heavy Duty Trucks | $11,171 | 20.7% | $0.0916 |
| Diesel Price Diff. | $19,516 | 36.1% | $0.0368 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $54,025 | 100.0% | $0.0446 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($15,298) | 11.2% | ($0.0126) |
| Compressor | ($20,915) | 15.3% | ($0.0173) |
| Storage Vessels | ($13,911) | 10.2% | ($0.0115) |
| Dispenser | ($24,857) | 18.2% | ($0.0205) |
| Dryer | ($9,943) | 7.3% | ($0.0082) |
| **Subtotal** | ($84,923) | 62.1% | ($0.0702) |
| **Vehicle** | | | |
| Conversion Kit | $0 | 0.0% | $0.0000 |
| Tanks | $0 | 0.0% | $0.0000 |
| Labor | $0 | 0.0% | $0.0000 |
| OEM | ($17,834) | 13.0% | ($0.0147) |
| **Subtotal** | ($17,834) | 13.0% | ($0.0147) |
| **Operating** | | | |
| Station Maint. | ($5,165) | 3.8% | ($0.0043) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($13,402) | 9.8% | ($0.0111) |
| Labor - fuel time loss | ($6,547) | 4.8% | ($0.0054) |
| NG Fuel Tax | ($8,809) | 6.4% | ($0.0073) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($33,923) | 24.8% | ($0.0280) |
| **Total Costs** | ($136,679) | 100.0% | ($0.1129) |
| **Savings - Cost** | ($82,654) | N/A | ($0.0683) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 20.3 | 22,509 | $1,950 | $900 |
| Light Trucks | 2 | 12.8 | 18,327 | $2,200 | $900 |
| Heavy Duty Gasoline | 1 | 6.8 | 12,930 | $3,300 | $900 |
| Heavy Duty Diesel | 5 | 8.1 | 13,511 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 9 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 2 |
| Year 1: Storage Size (scf) | 6,003 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at year 1 for gasoline and year 6 for diesel.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($974.21) |
|---|---|

| Incremental Cost/mile | ($0.0683) |
|---|---|

**ALL OEM VEHICLES**

**Fleet Size**
**11-20**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $67,250 | 73.9% | $0.0557 |
| Automobiles | $7,069 | 7.8% | $0.0328 |
| Light Trucks | $36,364 | 39.9% | $0.0479 |
| Heavy Duty Trucks | $23,818 | 26.2% | $0.1022 |
| Diesel Price Diff. | $23,802 | 26.1% | $0.0355 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $91,053 | 100.0% | $0.0485 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($17,598) | 10.3% | ($0.0094) |
| Compressor | ($22,125) | 12.9% | ($0.0118) |
| Storage Vessels | ($21,587) | 12.6% | ($0.0115) |
| Dispenser | ($24,857) | 14.5% | ($0.0132) |
| Dryer | ($9,943) | 5.8% | ($0.0053) |
| **Subtotal** | ($96,110) | 56.0% | ($0.0512) |
| **Vehicle** | | | |
| Conversion Kit | $0 | 0.0% | $0.0000 |
| Tanks | $0 | 0.0% | $0.0000 |
| Labor | $0 | 0.0% | $0.0000 |
| OEM | ($26,585) | 15.5% | ($0.0142) |
| **Subtotal** | ($26,585) | 15.5% | ($0.0142) |
| **Operating** | | | |
| Station Maint. | ($7,879) | 4.6% | ($0.0042) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($16,584) | 9.7% | ($0.0088) |
| Labor - fuel time loss | ($9,222) | 5.4% | ($0.0049) |
| NG Fuel Tax | ($15,184) | 8.9% | ($0.0081) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($48,868) | 28.5% | ($0.0260) |
| **Total Costs** | ($171,563) | 100.0% | ($0.0913) |
| **Savings - Cost** | ($80,510) | N/A | ($0.0429) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 19.0 | 22,861 | $1,950 | $900 |
| Light Trucks | 5 | 13.0 | 16,093 | $2,200 | $900 |
| Heavy Duty Gasoline | 2 | 6.1 | 12,365 | $3,300 | $900 |
| Heavy Duty Diesel | 7 | 8.4 | 12,206 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 15 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 3 |
| Year 1: Storage Size (scf) | 11,660 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at year 1 for gasoline and year 6 for diesel.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($569.36) |
|---|---|

| Incremental Cost/mile | ($0.0429) |
|---|---|

**ALL OEM VEHICLES**

**Fleet Size**
**21-30**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $123,044 | 82.1% | $0.0529 |
| Automobiles | $10,084 | 6.7% | $0.0321 |
| Light Trucks | $79,618 | 53.1% | $0.0465 |
| Heavy Duty Trucks | $33,343 | 22.2% | $0.1113 |
| Diesel Price Diff. | $26,846 | 17.9% | $0.0368 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $149,891 | 100.0% | $0.0491 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($20,945) | 9.3% | ($0.0069) |
| Compressor | ($23,886) | 10.6% | ($0.0078) |
| Storage Vessels | ($32,791) | 14.5% | ($0.0107) |
| Dispenser | ($24,857) | 11.0% | ($0.0081) |
| Dryer | ($9,943) | 4.4% | ($0.0033) |
| **Subtotal** | ($112,422) | 49.9% | ($0.0368) |
| **Vehicle** | | | |
| Conversion Kit | $0 | 0.0% | $0.0000 |
| Tanks | $0 | 0.0% | $0.0000 |
| Labor | $0 | 0.0% | $0.0000 |
| OEM | ($42,313) | 18.8% | ($0.0138) |
| **Subtotal** | ($42,313) | 18.8% | ($0.0138) |
| **Operating** | | | |
| Station Maint. | ($11,850) | 5.3% | ($0.0039) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($21,239) | 9.4% | ($0.0070) |
| Labor - fuel time loss | ($13,747) | 6.1% | ($0.0045) |
| NG Fuel Tax | ($23,857) | 10.6% | ($0.0078) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($70,692) | 31.4% | ($0.0231) |
| **Total Costs** | ($225,428) | 100.0% | ($0.0738) |
| **Savings - Cost** | ($75,537) | N/A | ($0.0247) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 2 | 19.4 | 16,650 | $1,950 | $900 |
| Light Trucks | 13 | 13.4 | 13,969 | $2,200 | $900 |
| Heavy Duty Gasoline | 3 | 5.6 | 10,594 | $3,300 | $900 |
| Heavy Duty Diesel | 8 | 8.1 | 11,616 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 26 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 6 |
| Year 1: Storage Size (scf) | 21,198 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at year 1 for gasoline and year 6 for diesel.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($308.19) |
|---|---|

| Incremental Cost/mile | ($0.0247) |
|---|---|

**ALL OEM VEHICLES**

**Fleet Size**
**31-50**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $171,781 | 82.4% | $0.0522 |
| Automobiles | $13,769 | 6.6% | $0.0325 |
| Light Trucks | $117,455 | 56.3% | $0.0469 |
| Heavy Duty Trucks | $40,556 | 19.4% | $0.1133 |
| Diesel Price Diff. | $36,745 | 17.6% | $0.0382 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $208,526 | 100.0% | $0.0491 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($24,725) | 8.7% | ($0.0058) |
| Compressor | ($25,945) | 9.1% | ($0.0061) |
| Storage Vessels | ($45,302) | 15.9% | ($0.0107) |
| Dispenser | ($24,857) | 8.7% | ($0.0058) |
| Dryer | ($9,943) | 3.5% | ($0.0023) |
| **Subtotal** | ($130,771) | 46.0% | ($0.0308) |
| **Vehicle** | | | |
| Conversion Kit | $0 | 0.0% | $0.0000 |
| Tanks | $0 | 0.0% | $0.0000 |
| Labor | $0 | 0.0% | $0.0000 |
| OEM | ($59,338) | 20.9% | ($0.0140) |
| **Subtotal** | ($59,338) | 20.9% | ($0.0140) |
| **Operating** | | | |
| Station Maint. | ($16,430) | 5.8% | ($0.0039) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($26,608) | 9.4% | ($0.0063) |
| Labor - fuel time loss | ($19,306) | 6.8% | ($0.0045) |
| NG Fuel Tax | ($32,098) | 11.3% | ($0.0076) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($94,442) | 33.2% | ($0.0222) |
| **Total Costs** | ($284,551) | 100.0% | ($0.0669) |
| **Savings - Cost** | ($76,025) | N/A | ($0.0179) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 3 | 19.2 | 15,000 | $1,950 | $900 |
| Light Trucks | 20 | 13.3 | 13,295 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.5 | 9,492 | $3,300 | $900 |
| Heavy Duty Diesel | 10 | 7.8 | 12,248 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 37 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 8 |
| Year 1: Storage Size (scf) | 29,425 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at year 1 for gasoline and year 6 for diesel.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($217.96) |
|---|---|

| Incremental Cost/mile | ($0.0179) |
|---|---|

**ALL OEM VEHICLES**

**Fleet Size**
**51 and up**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $376,665 | 90.8% | $0.0455 |
| Automobiles | $59,950 | 14.5% | $0.0300 |
| Light Trucks | $276,101 | 66.6% | $0.0469 |
| Heavy Duty Trucks | $40,614 | 9.8% | $0.1075 |
| Diesel Price Diff. | $38,017 | 9.2% | $0.0397 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $414,682 | 100.0% | $0.0449 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($35,249) | 7.1% | ($0.0038) |
| Compressor | ($31,735) | 6.4% | ($0.0034) |
| Storage Vessels | ($80,375) | 16.2% | ($0.0087) |
| Dispenser | ($24,857) | 5.0% | ($0.0027) |
| Dryer | ($9,943) | 2.0% | ($0.0011) |
| **Subtotal** | ($182,158) | 36.8% | ($0.0197) |
| **Vehicle** | | | |
| Conversion Kit | $0 | 0.0% | $0.0000 |
| Tanks | $0 | 0.0% | $0.0000 |
| Labor | $0 | 0.0% | $0.0000 |
| OEM | ($126,203) | 25.5% | ($0.0137) |
| **Subtotal** | ($126,203) | 25.5% | ($0.0137) |
| **Operating** | | | |
| Station Maint. | ($29,490) | 6.0% | ($0.0032) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($41,918) | 8.5% | ($0.0045) |
| Labor - fuel time loss | ($39,487) | 8.0% | ($0.0043) |
| NG Fuel Tax | ($76,292) | 15.4% | ($0.0083) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($187,187) | 37.8% | ($0.0203) |
| **Total Costs** | ($495,548) | 100.0% | ($0.0537) |
| **Savings - Cost** | ($80,866) | N/A | ($0.0088) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 19 | 20.8 | 11,171 | $1,950 | $900 |
| Light Trucks | 54 | 13.3 | 11,575 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.8 | 10,024 | $3,300 | $900 |
| Heavy Duty Diesel | 11 | 7.5 | 11,077 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 88 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 18 |
| Year 1: Storage Size (scf) | 62,747 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at year 1 for gasoline and year 6 for diesel.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($97.48) |
|---|---|

| Incremental Cost/mile | ($0.0088) |
|---|---|

# APPENDIX U

# NPV COST-EFFECTIVENESS MODEL: OEM VEHICLES, EXCLUDING DIESEL

## ALL OEM VEHICLES (No Diesels)

**Fleet Size**
**1-10**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $34,509 | 100.0% | $0.0508 |
| Automobiles | $6,514 | 18.9% | $0.0307 |
| Light Trucks | $16,824 | 48.8% | $0.0487 |
| Heavy Duty Trucks | $11,171 | 32.4% | $0.0916 |
| Diesel Price Diff. | $0 | 0.0% | $0.0000 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $34,509 | 100.0% | $0.0508 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($12,815) | 12.8% | ($0.0189) |
| Compressor | ($19,527) | 19.6% | ($0.0287) |
| Storage Vessels | ($5,876) | 5.9% | ($0.0086) |
| Dispenser | ($24,857) | 24.9% | ($0.0366) |
| Dryer | ($9,943) | 10.0% | ($0.0146) |
| **Subtotal** | ($73,017) | 73.1% | ($0.1074) |
| **Vehicle** | | | |
| Conversion Kit | $0 | 0.0% | $0.0000 |
| Tanks | $0 | 0.0% | $0.0000 |
| Labor | $0 | 0.0% | $0.0000 |
| OEM | ($7,347) | 7.4% | ($0.0108) |
| **Subtotal** | ($7,347) | 7.4% | ($0.0108) |
| **Operating** | | | |
| Station Maint. | ($2,167) | 2.2% | ($0.0032) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($9,888) | 9.9% | ($0.0145) |
| Labor - fuel time loss | ($2,673) | 2.7% | ($0.0039) |
| NG Fuel Tax | ($4,751) | 4.8% | ($0.0070) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($19,479) | 19.5% | ($0.0287) |
| **Total Costs** | ($99,843) | 100.0% | ($0.1469) |
| **Savings - Cost** | ($65,334) | N/A | ($0.0961) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 20.3 | 22,509 | $1,950 | $900 |
| Light Trucks | 2 | 12.8 | 18,327 | $2,200 | $900 |
| Heavy Duty Gasoline | 1 | 6.8 | 12,930 | $3,300 | $900 |
| Heavy Duty Diesel | 0 | 0.0 | 1 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 4 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 2 |
| Year 1: Storage Size (scf) | 6,003 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($1,732.66) |
|---|---|

| Incremental Cost/mile | ($0.0961) |
|---|---|

**All OEM VEHICLES (No Diesels)**

**Fleet Size**
**11-20**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $67,250 | 100.0% | $0.0557 |
| Automobiles | $7,069 | 10.5% | $0.0328 |
| Light Trucks | $36,364 | 54.1% | $0.0479 |
| Heavy Duty Trucks | $23,818 | 35.4% | $0.1022 |
| Diesel Price Diff. | $0 | 0.0% | $0.0000 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $67,250 | 100.0% | $0.0557 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($14,589) | 11.6% | ($0.0121) |
| Compressor | ($20,430) | 16.3% | ($0.0169) |
| Storage Vessels | ($11,859) | 9.5% | ($0.0098) |
| Dispenser | ($24,857) | 19.8% | ($0.0206) |
| Dryer | ($9,943) | 7.9% | ($0.0082) |
| **Subtotal** | ($81,677) | 65.2% | ($0.0677) |
| **Vehicle** | | | |
| Conversion Kit | $0 | 0.0% | $0.0000 |
| Tanks | $0 | 0.0% | $0.0000 |
| Labor | $0 | 0.0% | $0.0000 |
| OEM | ($13,090) | 10.4% | ($0.0108) |
| **Subtotal** | ($13,090) | 10.4% | ($0.0108) |
| **Operating** | | | |
| Station Maint. | ($4,223) | 3.4% | ($0.0035) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($12,298) | 9.8% | ($0.0102) |
| Labor - fuel time loss | ($4,497) | 3.6% | ($0.0037) |
| NG Fuel Tax | ($9,502) | 7.6% | ($0.0079) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($30,519) | 24.4% | ($0.0253) |
| **Total Costs** | ($125,286) | 100.0% | ($0.1038) |
| **Savings - Cost** | ($58,036) | N/A | ($0.0481) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 19.0 | 22,861 | $1,950 | $900 |
| Light Trucks | 5 | 13.0 | 16,093 | $2,200 | $900 |
| Heavy Duty Gasoline | 2 | 6.1 | 12,365 | $3,300 | $900 |
| Heavy Duty Diesel | 0 | 0.0 | 1 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 8 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 3 |
| Year 1: Storage Size (scf) | 11,660 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($769.55) |
|---|---|

| Incremental Cost/mile | ($0.0481) |
|---|---|

**All OEM VEHICLES (No Diesels)**

**Fleet Size**
**21-30**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $123,044 | 100.0% | $0.0529 |
| Automobiles | $10,084 | 8.2% | $0.0321 |
| Light Trucks | $79,618 | 64.7% | $0.0465 |
| Heavy Duty Trucks | $33,343 | 27.1% | $0.1113 |
| Diesel Price Diff. | $0 | 0.0% | $0.0000 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $123,044 | 100.0% | $0.0529 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($17,584) | 10.2% | ($0.0076) |
| Compressor | ($21,971) | 12.7% | ($0.0094) |
| Storage Vessels | ($21,947) | 12.7% | ($0.0094) |
| Dispenser | ($24,857) | 14.4% | ($0.0107) |
| Dryer | ($9,943) | 5.7% | ($0.0043) |
| **Subtotal** | ($96,301) | 55.6% | ($0.0414) |
| **Vehicle** | | | |
| Conversion Kit | $0 | 0.0% | $0.0000 |
| Tanks | $0 | 0.0% | $0.0000 |
| Labor | $0 | 0.0% | $0.0000 |
| OEM | ($26,890) | 15.5% | ($0.0116) |
| **Subtotal** | ($26,890) | 15.5% | ($0.0116) |
| **Operating** | | | |
| Station Maint. | ($7,726) | 4.5% | ($0.0033) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($16,404) | 9.5% | ($0.0071) |
| Labor - fuel time loss | ($8,418) | 4.9% | ($0.0036) |
| NG Fuel Tax | ($17,364) | 10.0% | ($0.0075) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($49,913) | 28.8% | ($0.0215) |
| **Total Costs** | ($173,103) | 100.0% | ($0.0744) |
| **Savings - Cost** | ($50,059) | N/A | ($0.0215) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 2 | 19.4 | 16,650 | $1,950 | $900 |
| Light Trucks | 13 | 13.4 | 13,969 | $2,200 | $900 |
| Heavy Duty Gasoline | 3 | 5.6 | 10,594 | $3,300 | $900 |
| Heavy Duty Diesel | 0 | 0.0 | 1 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 18 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| | |
|---|---|
| **DISCOUNT RATE** | 10.0% |

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 6 |
| Year 1: Storage Size (scf) | 21,198 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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** | ($295.01) |
| **Incremental Cost/mile** | ($0.0215) |

**All OEM VEHICLES (No Diesels)**

**Fleet Size**
**31-50**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $171,781 | 100.0% | $0.0522 |
| Automobiles | $13,769 | 8.0% | $0.0325 |
| Light Trucks | $117,455 | 68.4% | $0.0469 |
| Heavy Duty Trucks | $40,556 | 23.6% | $0.1133 |
| Diesel Price Diff. | $0 | 0.0% | $0.0000 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $171,781 | 100.0% | $0.0522 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($20,172) | 9.3% | ($0.0061) |
| Compressor | ($23,319) | 10.8% | ($0.0071) |
| Storage Vessels | ($30,649) | 14.2% | ($0.0093) |
| Dispenser | ($24,857) | 11.5% | ($0.0076) |
| Dryer | ($9,943) | 4.6% | ($0.0030) |
| **Subtotal** | ($108,940) | 50.5% | ($0.0331) |
| **Vehicle** | | | |
| Conversion Kit | $0 | 0.0% | $0.0000 |
| Tanks | $0 | 0.0% | $0.0000 |
| Labor | $0 | 0.0% | $0.0000 |
| OEM | ($40,058) | 18.6% | ($0.0122) |
| **Subtotal** | ($40,058) | 18.6% | ($0.0122) |
| **Operating** | | | |
| Station Maint. | ($10,786) | 5.0% | ($0.0033) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($19,992) | 9.3% | ($0.0061) |
| Labor - fuel time loss | ($12,012) | 5.6% | ($0.0037) |
| NG Fuel Tax | ($23,982) | 11.1% | ($0.0073) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($66,771) | 30.9% | ($0.0203) |
| **Total Costs** | ($215,769) | 100.0% | ($0.0656) |
| **Savings - Cost** | ($43,988) | N/A | ($0.0134) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 3 | 19.2 | 15,000 | $1,950 | $900 |
| Light Trucks | 20 | 13.3 | 13,295 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.5 | 9,492 | $3,300 | $900 |
| Heavy Duty Diesel | 0 | 0.0 | 1 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 27 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 8 |
| Year 1: Storage Size (scf) | 29,425 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($172.82) |
|---|---|

| Incremental Cost/mile | ($0.0134) |
|---|---|

**All OEM VEHICLES (No Diesels)**

**Fleet Size**
**51 and up**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $376,665 | 100.0% | $0.0455 |
| Automobiles | $59,950 | 15.9% | $0.0300 |
| Light Trucks | $276,101 | 73.3% | $0.0469 |
| Heavy Duty Trucks | $40,614 | 10.8% | $0.1075 |
| Diesel Price Diff. | $0 | 0.0% | $0.0000 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $376,665 | 100.0% | $0.0455 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($30,715) | 7.2% | ($0.0037) |
| Compressor | ($29,005) | 6.8% | ($0.0035) |
| Storage Vessels | ($65,893) | 15.5% | ($0.0080) |
| Dispenser | ($24,857) | 5.9% | ($0.0030) |
| Dryer | ($9,943) | 2.3% | ($0.0012) |
| **Subtotal** | ($160,412) | 37.8% | ($0.0194) |
| **Vehicle** | | | |
| Conversion Kit | $0 | 0.0% | $0.0000 |
| Tanks | $0 | 0.0% | $0.0000 |
| Labor | $0 | 0.0% | $0.0000 |
| OEM | ($105,372) | 24.9% | ($0.0127) |
| **Subtotal** | ($105,372) | 24.9% | ($0.0127) |
| **Operating** | | | |
| Station Maint. | ($23,650) | 5.6% | ($0.0029) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($35,072) | 8.3% | ($0.0042) |
| Labor - fuel time loss | ($31,941) | 7.5% | ($0.0039) |
| NG Fuel Tax | ($67,365) | 15.9% | ($0.0081) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($158,028) | 37.3% | ($0.0191) |
| **Total Costs** | ($423,812) | 100.0% | ($0.0512) |
| **Savings - Cost** | ($47,147) | N/A | ($0.0057) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 19 | 20.8 | 11,171 | $1,950 | $900 |
| Light Trucks | 54 | 13.3 | 11,575 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.8 | 10,024 | $3,300 | $900 |
| Heavy Duty Diesel | 0 | 0.0 | 1 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 77 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 18 |
| Year 1: Storage Size (scf) | 62,747 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($64.95) |
|---|---|

| Incremental Cost/mile | ($0.0057) |
|---|---|

# APPENDIX V

# NPV COST-EFFECTIVENESS MODEL: COMBINATION ANALYSIS

## Combination Sensitivity Analysis

| | | | |
|---|---|---|---|
| Veh. Purchase Adj. | $14,577 | 29.7% | $0.0214 |
| **SAVINGS** | **30 year NPV** | **% of Savings** | **Incremental Savings/Mile** |
| Gasoline Price Diff. | $34,509 | 70.3% | $0.0508 |
| Automobiles | $6,514 | 13.3% | $0.0307 |
| Light Trucks | $16,824 | 34.3% | $0.0487 |
| Heavy Duty Trucks | $11,171 | 22.8% | $0.0916 |
| Diesel Price Diff. | $0 | 0.0% | $0.0000 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $49,086 | 100.0% | $0.0722 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($12,815) | 12.9% | ($0.0189) |
| Compressor | ($19,527) | 19.7% | ($0.0287) |
| Storage Vessels | ($5,876) | 5.9% | ($0.0086) |
| Dispenser | ($24,857) | 25.1% | ($0.0366) |
| Dryer | ($9,943) | 10.0% | ($0.0146) |
| **Subtotal** | ($73,017) | 73.8% | ($0.1074) |
| **Vehicle** | | | |
| Conversion Kit | $0 | 0.0% | $0.0000 |
| Tanks | $0 | 0.0% | $0.0000 |
| Labor | $0 | 0.0% | $0.0000 |
| OEM | ($6,482) | 6.5% | ($0.0095) |
| **Subtotal** | ($6,482) | 6.5% | ($0.0095) |
| **Operating** | | | |
| Station Maint. | ($2,167) | 2.2% | ($0.0032) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($9,888) | 10.0% | ($0.0145) |
| Labor - fuel time loss | ($2,673) | 2.7% | ($0.0039) |
| NG Fuel Tax | ($4,751) | 4.8% | ($0.0070) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($19,479) | 19.7% | ($0.0287) |
| **Total Costs** | ($98,979) | 100.0% | ($0.1456) |
| **Savings - Cost** | ($49,893) | N/A | ($0.0734) |

**Fleet Size**
**1-10**

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 20.3 | 22,509 | $1,950 | $900 |
| Light Trucks | 2 | 12.8 | 18,327 | $2,200 | $900 |
| Heavy Duty Gasoline | 1 | 6.8 | 12,930 | $3,300 | $900 |
| Heavy Duty Diesel | 0 | 0.0 | 1 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 4 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| | |
|---|---|
| **DISCOUNT RATE** | 10.0% |

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 2 |
| Year 1: Storage Size (scf) | 6,003 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at year 1 for gasoline.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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** | ($1,323.15) |
| **Incremental Cost/mile** | ($0.0734) |

## Combination Sensitivity Analysis

| | | | |
|---|---|---|---|
| Veh. Purchase Adj. | $21,539 | 24.3% | $0.0178 |
| **SAVINGS** | **30 year NPV** | **% of Savings** | **Incremental Savings/Mile** |
| Gasoline Price Diff. | $67,250 | 75.7% | $0.0557 |
| Automobiles | $7,069 | 8.0% | $0.0328 |
| Light Trucks | $36,364 | 41.0% | $0.0479 |
| Heavy Duty Trucks | $23,818 | 26.8% | $0.1022 |
| Diesel Price Diff. | $0 | 0.0% | $0.0000 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $88,789 | 100.0% | $0.0736 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($14,589) | 11.7% | ($0.0121) |
| Compressor | ($20,430) | 16.4% | ($0.0169) |
| Storage Vessels | ($11,859) | 9.5% | ($0.0098) |
| Dispenser | ($24,857) | 20.0% | ($0.0206) |
| Dryer | ($9,943) | 8.0% | ($0.0082) |
| **Subtotal** | ($81,677) | 65.7% | ($0.0677) |
| **Vehicle** | | | |
| Conversion Kit | $0 | 0.0% | $0.0000 |
| Tanks | $0 | 0.0% | $0.0000 |
| Labor | $0 | 0.0% | $0.0000 |
| OEM | ($12,041) | 9.7% | ($0.0100) |
| **Subtotal** | ($12,041) | 9.7% | ($0.0100) |
| **Operating** | | | |
| Station Maint. | ($4,223) | 3.4% | ($0.0035) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($12,298) | 9.9% | ($0.0102) |
| Labor - fuel time loss | ($4,497) | 3.6% | ($0.0037) |
| NG Fuel Tax | ($9,502) | 7.6% | ($0.0079) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($30,519) | 24.6% | ($0.0253) |
| **Total Costs** | ($124,238) | 100.0% | ($0.1029) |
| **Savings - Cost** | ($35,448) | N/A | ($0.0294) |

**Fleet Size**
**11-20**

| **VEHICLE DATA** | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 19.0 | 22,861 | $1,950 | $900 |
| Light Trucks | 5 | 13.0 | 16,093 | $2,200 | $900 |
| Heavy Duty Gasoline | 2 | 6.1 | 12,365 | $3,300 | $900 |
| Heavy Duty Diesel | 0 | 0.0 | 1 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 8 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| **FUEL PRICES** | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| **DISCOUNT RATE** | 10.0% |
|---|---|

| **OTHER FACTORS** | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| **STATION DESIGN** | |
|---|---|
| Year 1: Compressor Size (scfm) | 3 |
| Year 1: Storage Size (scf) | 11,660 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at year 1 for gasoline.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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** | ($470.04) |
|---|---|

| **Incremental Cost/mile** | ($0.0294) |
|---|---|

## Combination Sensitivity Analysis

| Veh. Purchase Adj. | $28,201 | 18.6% | $0.0121 |
|---|---|---|---|
| **SAVINGS** | **30 year NPV** | **% of Savings** | **Incremental Savings/Mile** |
| Gasoline Price Diff. | $123,044 | 81.4% | $0.0529 |
| Automobiles | $10,084 | 6.7% | $0.0321 |
| Light Trucks | $79,618 | 52.6% | $0.0465 |
| Heavy Duty Trucks | $33,343 | 22.0% | $0.1113 |
| Diesel Price Diff. | $0 | 0.0% | $0.0000 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $151,245 | 100.0% | $0.0650 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($17,584) | 10.3% | ($0.0076) |
| Compressor | ($21,971) | 12.8% | ($0.0094) |
| Storage Vessels | ($21,947) | 12.8% | ($0.0094) |
| Dispenser | ($24,857) | 14.5% | ($0.0107) |
| Dryer | ($9,943) | 5.8% | ($0.0043) |
| **Subtotal** | ($96,301) | 56.2% | ($0.0414) |
| **Vehicle** | | | |
| Conversion Kit | $0 | 0.0% | $0.0000 |
| Tanks | $0 | 0.0% | $0.0000 |
| Labor | $0 | 0.0% | $0.0000 |
| OEM | ($24,995) | 14.6% | ($0.0107) |
| **Subtotal** | ($24,995) | 14.6% | ($0.0107) |
| **Operating** | | | |
| Station Maint. | ($7,726) | 4.5% | ($0.0033) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($16,404) | 9.6% | ($0.0071) |
| Labor - fuel time loss | ($8,418) | 4.9% | ($0.0036) |
| NG Fuel Tax | ($17,364) | 10.1% | ($0.0075) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($49,913) | 29.2% | ($0.0215) |
| **Total Costs** | ($171,209) | 100.0% | ($0.0736) |
| **Savings - Cost** | ($19,963) | N/A | ($0.0086) |

**Fleet Size**
**21-30**

| **VEHICLE DATA** | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 2 | 19.4 | 16,650 | $1,950 | $900 |
| Light Trucks | 13 | 13.4 | 13,969 | $2,200 | $900 |
| Heavy Duty Gasoline | 3 | 5.6 | 10,594 | $3,300 | $900 |
| Heavy Duty Diesel | 0 | 0.0 | 11,616 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 18 | | | | |

| Maintenance Savings | 0% |
|---|---|

| Mileage Adj. | 0% |
|---|---|

| **FUEL PRICES** | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| **DISCOUNT RATE** | 10.0% |
|---|---|

| **OTHER FACTORS** | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| **STATION DESIGN** | |
|---|---|
| Year 1: Compressor Size (scfm) | 6 |
| Year 1: Storage Size (scf) | 21,198 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at year 1 for gasoline.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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** | ($117.65) |
|---|---|

| **Incremental Cost/mile** | ($0.0086) |
|---|---|

## Combination Sensitivity Analysis

| Veh. Purchase Adj. | $46,348 | 21.2% | $0.0141 |
|---|---|---|---|
| **SAVINGS** | **30 year NPV** | **% of Savings** | **Incremental Savings/Mile** |
| Gasoline Price Diff. | $171,781 | 78.8% | $0.0522 |
| Automobiles | $13,769 | 6.3% | $0.0325 |
| Light Trucks | $117,455 | 53.8% | $0.0469 |
| Heavy Duty Trucks | $40,556 | 18.6% | $0.1133 |
| Diesel Price Diff. | $0 | 0.0% | $0.0000 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $218,129 | 100.0% | $0.0663 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($20,172) | 9.5% | ($0.0061) |
| Compressor | ($23,319) | 11.0% | ($0.0071) |
| Storage Vessels | ($30,649) | 14.4% | ($0.0093) |
| Dispenser | ($24,857) | 11.7% | ($0.0076) |
| Dryer | ($9,943) | 4.7% | ($0.0030) |
| **Subtotal** | ($108,940) | 51.2% | ($0.0331) |
| **Vehicle** | | | |
| Conversion Kit | $0 | 0.0% | $0.0000 |
| Tanks | $0 | 0.0% | $0.0000 |
| Labor | $0 | 0.0% | $0.0000 |
| OEM | ($37,067) | 17.4% | ($0.0113) |
| **Subtotal** | ($37,067) | 17.4% | ($0.0113) |
| **Operating** | | | |
| Station Maint. | ($10,786) | 5.1% | ($0.0033) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($19,992) | 9.4% | ($0.0061) |
| Labor - fuel time loss | ($12,012) | 5.6% | ($0.0037) |
| NG Fuel Tax | ($23,982) | 11.3% | ($0.0073) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($66,771) | 31.4% | ($0.0203) |
| **Total Costs** | ($212,778) | 100.0% | ($0.0647) |
| **Savings - Cost** | $5,351 | N/A | $0.0016 |

**Fleet Size**
**31-50**

| **VEHICLE DATA** | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 3 | 19.2 | 15,000 | $1,950 | $900 |
| Light Trucks | 20 | 13.3 | 13,295 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.5 | 9,492 | $3,300 | $900 |
| Heavy Duty Diesel | 0 | 0.0 | 1 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 27 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| **FUEL PRICES** | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| **DISCOUNT RATE** | 10.0% |
|---|---|

| **OTHER FACTORS** | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| **STATION DESIGN** | |
|---|---|
| Year 1: Compressor Size (scfm) | 8 |
| Year 1: Storage Size (scf) | 29,425 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at year 1 for gasoline.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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** | $21.02 |
|---|---|

| **Incremental Benefit/mile** | $0.0016 |
|---|---|

## Combination Sensitivity Analysis

| | | | |
|---|---|---|---|
| Veh. Purchase Adj. | $79,588 | 17.4% | $0.0096 |
| **SAVINGS** | **30 year NPV** | **% of Savings** | **Incremental Savings/Mile** |
| Gasoline Price Diff. | $376,665 | 82.6% | $0.0455 |
| Automobiles | $59,950 | 13.1% | $0.0300 |
| Light Trucks | $276,101 | 60.5% | $0.0469 |
| Heavy Duty Trucks | $40,614 | 8.9% | $0.1075 |
| Diesel Price Diff. | $0 | 0.0% | $0.0000 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $456,253 | 100.0% | $0.0552 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($30,715) | 7.3% | ($0.0037) |
| Compressor | ($29,005) | 6.9% | ($0.0035) |
| Storage Vessels | ($65,893) | 15.7% | ($0.0080) |
| Dispenser | ($24,857) | 5.9% | ($0.0030) |
| Dryer | ($9,943) | 2.4% | ($0.0012) |
| **Subtotal** | ($160,412) | 38.2% | ($0.0194) |
| **Vehicle** | | | |
| Conversion Kit | $0 | 0.0% | $0.0000 |
| Tanks | $0 | 0.0% | $0.0000 |
| Labor | $0 | 0.0% | $0.0000 |
| OEM | ($101,377) | 24.1% | ($0.0123) |
| **Subtotal** | ($101,377) | 24.1% | ($0.0123) |
| **Operating** | | | |
| Station Maint. | ($23,650) | 5.6% | ($0.0029) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($35,072) | 8.4% | ($0.0042) |
| Labor - fuel time loss | ($31,941) | 7.6% | ($0.0039) |
| NG Fuel Tax | ($67,365) | 16.0% | ($0.0081) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($158,028) | 37.6% | ($0.0191) |
| **Total Costs** | ($419,817) | 100.0% | ($0.0508) |
| **Savings - Cost** | $36,436 | N/A | $0.0044 |

**Fleet Size**
**51 and up**

| **VEHICLE DATA** | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 19 | 20.8 | 11,171 | $1,950 | $900 |
| Light Trucks | 54 | 13.3 | 11,575 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.8 | 10,024 | $3,300 | $900 |
| Heavy Duty Diesel | 0 | 0.0 | 11,077 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 77 | | | | |
| Maintenance Savings | 0% | | Mileage Adj. | 0% | |

| **FUEL PRICES** | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| **DISCOUNT RATE** | 10.0% |
|---|---|

| **OTHER FACTORS** | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| **STATION DESIGN** | |
|---|---|
| Year 1: Compressor Size (scfm) | 18 |
| Year 1: Storage Size (scf) | 62,747 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at year 1 for gasoline.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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** | $50.20 |
|---|---|

| **Incremental Benefit/mile** | $0.0044 |
|---|---|

# APPENDIX W

# NPV COST-EFFECTIVENESS MODEL: COMBINATION ANALYSIS, INCLUDING DIESEL

## Combination Sensitivity Analysis

| | | | |
|---|---|---|---|
| Veh. Purchase Adj. | $23,785 | 30.6% | $0.0197 |
| **SAVINGS** | **30 year NPV** | **% of Savings** | **Incremental Savings/Mile** |
| Gasoline Price Diff. | $34,509 | 44.4% | $0.0508 |
| Automobiles | $6,514 | 8.4% | $0.0307 |
| Light Trucks | $16,824 | 21.6% | $0.0487 |
| Heavy Duty Trucks | $11,171 | 14.4% | $0.0916 |
| Diesel Price Diff. | $19,516 | 25.1% | $0.0161 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $77,810 | 100.0% | $0.0643 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($15,298) | 11.3% | ($0.0126) |
| Compressor | ($20,915) | 15.5% | ($0.0173) |
| Storage Vessels | ($13,911) | 10.3% | ($0.0115) |
| Dispenser | ($24,857) | 18.4% | ($0.0205) |
| Dryer | ($9,943) | 7.4% | ($0.0082) |
| **Subtotal** | ($84,923) | 62.9% | ($0.0702) |
| **Vehicle** | | | |
| Conversion Kit | $0 | 0.0% | $0.0000 |
| Tanks | $0 | 0.0% | $0.0000 |
| Labor | $0 | 0.0% | $0.0000 |
| OEM | ($16,122) | 11.9% | ($0.0133) |
| **Subtotal** | ($16,122) | 11.9% | ($0.0133) |
| **Operating** | | | |
| Station Maint. | ($5,165) | 3.8% | ($0.0043) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($13,402) | 9.9% | ($0.0111) |
| Labor - fuel time loss | ($6,547) | 4.9% | ($0.0054) |
| NG Fuel Tax | ($8,809) | 6.5% | ($0.0073) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($33,923) | 25.1% | ($0.0280) |
| **Total Costs** | ($134,968) | 100.0% | ($0.1115) |
| **Savings - Cost** | ($57,158) | N/A | ($0.0472) |

**Fleet Size**
**1-10**

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 20.3 | 22,509 | $1,950 | $900 |
| Light Trucks | 2 | 12.8 | 18,327 | $2,200 | $900 |
| Heavy Duty Gasoline | 1 | 6.8 | 12,930 | $3,300 | $900 |
| Heavy Duty Diesel | 5 | 8.1 | 13,511 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 9 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 2 |
| Year 1: Storage Size (scf) | 6,003 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at year 1 for gasoline.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($673.69) |
|---|---|

| Incremental Cost/mile | ($0.0472) |
|---|---|

## Combination Sensitivity Analysis

| Veh. Purchase Adj. | $24,140 | 21.0% | $0.0129 |
|---|---|---|---|
| **SAVINGS** | **30 year NPV** | **% of Savings** | **Incremental Savings/Mile** |
| Gasoline Price Diff. | $67,250 | 58.4% | $0.0557 |
| Automobiles | $7,069 | 6.1% | $0.0328 |
| Light Trucks | $36,364 | 31.6% | $0.0479 |
| Heavy Duty Trucks | $23,818 | 20.7% | $0.1022 |
| Diesel Price Diff. | $23,802 | 20.7% | $0.0127 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $115,193 | 100.0% | $0.0613 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($17,598) | 10.3% | ($0.0094) |
| Compressor | ($22,125) | 13.0% | ($0.0118) |
| Storage Vessels | ($21,587) | 12.7% | ($0.0115) |
| Dispenser | ($24,857) | 14.6% | ($0.0132) |
| Dryer | ($9,943) | 5.8% | ($0.0053) |
| **Subtotal** | ($96,110) | 56.4% | ($0.0512) |
| **Vehicle** | | | |
| Conversion Kit | $0 | 0.0% | $0.0000 |
| Tanks | $0 | 0.0% | $0.0000 |
| Labor | $0 | 0.0% | $0.0000 |
| OEM | ($25,298) | 14.9% | ($0.0135) |
| **Subtotal** | ($25,298) | 14.9% | ($0.0135) |
| **Operating** | | | |
| Station Maint. | ($7,879) | 4.6% | ($0.0042) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($16,584) | 9.7% | ($0.0088) |
| Labor - fuel time loss | ($9,222) | 5.4% | ($0.0049) |
| NG Fuel Tax | ($15,184) | 8.9% | ($0.0081) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($48,868) | 28.7% | ($0.0260) |
| **Total Costs** | ($170,275) | 100.0% | ($0.0906) |
| **Savings - Cost** | ($55,083) | N/A | ($0.0293) |

**Fleet Size**
**11-20**

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 19.0 | 22,861 | $1,950 | $900 |
| Light Trucks | 5 | 13.0 | 16,093 | $2,200 | $900 |
| Heavy Duty Gasoline | 2 | 6.1 | 12,365 | $3,300 | $900 |
| Heavy Duty Diesel | 7 | 8.4 | 12,206 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 15 | | | | |

| Maintenance Savings | 0% |
|---|---|

| Mileage Adj. | 0% |
|---|---|

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 3 |
| Year 1: Storage Size (scf) | 11,660 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at year 1 for gasoline.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($389.54) |
|---|---|

| Incremental Cost/mile | ($0.0293) |
|---|---|

## Combination Sensitivity Analysis

| | | | |
|---|---|---|---|
| Veh. Purchase Adj. | $33,877 | 18.4% | $0.0111 |
| **SAVINGS** | **30 year NPV** | **% of Savings** | **Incremental Savings/Mile** |
| Gasoline Price Diff. | $123,044 | 67.0% | $0.0529 |
| Automobiles | $10,084 | 5.5% | $0.0321 |
| Light Trucks | $79,618 | 43.3% | $0.0465 |
| Heavy Duty Trucks | $33,343 | 18.1% | $0.1113 |
| Diesel Price Diff. | $26,846 | 14.6% | $0.0088 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $183,768 | 100.0% | $0.0601 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($20,945) | 9.4% | ($0.0069) |
| Compressor | ($23,886) | 10.7% | ($0.0078) |
| Storage Vessels | ($32,791) | 14.7% | ($0.0107) |
| Dispenser | ($24,857) | 11.1% | ($0.0081) |
| Dryer | ($9,943) | 4.5% | ($0.0033) |
| **Subtotal** | ($112,422) | 50.4% | ($0.0368) |
| **Vehicle** | | | |
| Conversion Kit | $0 | 0.0% | $0.0000 |
| Tanks | $0 | 0.0% | $0.0000 |
| Labor | $0 | 0.0% | $0.0000 |
| OEM | ($39,897) | 17.9% | ($0.0131) |
| **Subtotal** | ($39,897) | 17.9% | ($0.0131) |
| **Operating** | | | |
| Station Maint. | ($11,850) | 5.3% | ($0.0039) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($21,239) | 9.5% | ($0.0070) |
| Labor - fuel time loss | ($13,747) | 6.2% | ($0.0045) |
| NG Fuel Tax | ($23,857) | 10.7% | ($0.0078) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($70,692) | 31.7% | ($0.0231) |
| **Total Costs** | ($223,011) | 100.0% | ($0.0730) |
| **Savings - Cost** | ($39,243) | N/A | ($0.0128) |

**Fleet Size**
**21-30**

| **VEHICLE DATA** | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 2 | 19.4 | 16,650 | $1,950 | $900 |
| Light Trucks | 13 | 13.4 | 13,969 | $2,200 | $900 |
| Heavy Duty Gasoline | 3 | 5.6 | 10,594 | $3,300 | $900 |
| Heavy Duty Diesel | 8 | 8.1 | 11,616 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 26 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| **FUEL PRICES** | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| | |
|---|---|
| **DISCOUNT RATE** | 10.0% |

| **OTHER FACTORS** | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| **STATION DESIGN** | |
|---|---|
| Year 1: Compressor Size (scfm) | 6 |
| Year 1: Storage Size (scf) | 21,198 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at year 1 for gasoline.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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** | ($160.11) |
| **Incremental Cost/mile** | ($0.0128) |

## Combination Sensitivity Analysis

| Veh. Purchase Adj. | $50,064 | 19.4% | $0.0118 |
|---|---|---|---|
| **SAVINGS** | **30 year NPV** | **% of Savings** | **Incremental Savings/Mile** |
| Gasoline Price Diff. | $171,781 | 66.4% | $0.0522 |
| Automobiles | $13,769 | 5.3% | $0.0325 |
| Light Trucks | $117,455 | 45.4% | $0.0469 |
| Heavy Duty Trucks | $40,556 | 15.7% | $0.1133 |
| Diesel Price Diff. | $36,745 | 14.2% | $0.0086 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $258,590 | 100.0% | $0.0608 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($24,725) | 8.8% | ($0.0058) |
| Compressor | ($25,945) | 9.2% | ($0.0061) |
| Storage Vessels | ($45,302) | 16.1% | ($0.0107) |
| Dispenser | ($24,857) | 8.8% | ($0.0058) |
| Dryer | ($9,943) | 3.5% | ($0.0023) |
| **Subtotal** | ($130,771) | 46.5% | ($0.0308) |
| **Vehicle** | | | |
| Conversion Kit | $0 | 0.0% | $0.0000 |
| Tanks | $0 | 0.0% | $0.0000 |
| Labor | $0 | 0.0% | $0.0000 |
| OEM | ($56,005) | 19.9% | ($0.0132) |
| **Subtotal** | ($56,005) | 19.9% | ($0.0132) |
| **Operating** | | | |
| Station Maint. | ($16,430) | 5.8% | ($0.0039) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($26,608) | 9.5% | ($0.0063) |
| Labor - fuel time loss | ($19,306) | 6.9% | ($0.0045) |
| NG Fuel Tax | ($32,098) | 11.4% | ($0.0076) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($94,442) | 33.6% | ($0.0222) |
| **Total Costs** | ($281,218) | 100.0% | ($0.0662) |
| **Savings - Cost** | ($22,628) | N/A | ($0.0053) |

**Fleet Size**
**31-50**

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 3 | 19.2 | 15,000 | $1,950 | $900 |
| Light Trucks | 20 | 13.3 | 13,295 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.5 | 9,492 | $3,300 | $900 |
| Heavy Duty Diesel | 10 | 7.8 | 12,248 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 37 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 8 |
| Year 1: Storage Size (scf) | 29,425 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at year 1 for gasoline.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($64.87) |
|---|---|

| Incremental Cost/mile | ($0.0053) |
|---|---|

## Combination Sensitivity Analysis

| | | | |
|---|---|---|---|
| Veh. Purchase Adj. | $83,304 | 16.7% | $0.0090 |
| **SAVINGS** | **30 year NPV** | **% of Savings** | **Incremental Savings/Mile** |
| Gasoline Price Diff. | $376,665 | 75.6% | $0.0455 |
| Automobiles | $59,950 | 12.0% | $0.0300 |
| Light Trucks | $276,101 | 55.4% | $0.0469 |
| Heavy Duty Trucks | $40,614 | 8.2% | $0.1075 |
| Diesel Price Diff. | $38,017 | 7.6% | $0.0041 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $497,986 | 100.0% | $0.0540 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($35,249) | 7.2% | ($0.0038) |
| Compressor | ($31,735) | 6.5% | ($0.0034) |
| Storage Vessels | ($80,375) | 16.4% | ($0.0087) |
| Dispenser | ($24,857) | 5.1% | ($0.0027) |
| Dryer | ($9,943) | 2.0% | ($0.0011) |
| **Subtotal** | ($182,158) | 37.1% | ($0.0197) |
| **Vehicle** | | | |
| Conversion Kit | $0 | 0.0% | $0.0000 |
| Tanks | $0 | 0.0% | $0.0000 |
| Labor | $0 | 0.0% | $0.0000 |
| OEM | ($121,867) | 24.8% | ($0.0132) |
| **Subtotal** | ($121,867) | 24.8% | ($0.0132) |
| **Operating** | | | |
| Station Maint. | ($29,490) | 6.0% | ($0.0032) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($41,918) | 8.5% | ($0.0045) |
| Labor - fuel time loss | ($39,487) | 8.0% | ($0.0043) |
| NG Fuel Tax | ($76,292) | 15.5% | ($0.0083) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($187,187) | 38.1% | ($0.0203) |
| **Total Costs** | ($491,212) | 100.0% | ($0.0532) |
| **Savings - Cost** | $6,775 | N/A | $0.0007 |

**Fleet Size**
**51 and up**

| **VEHICLE DATA** | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 19 | 20.8 | 11,171 | $1,950 | $900 |
| Light Trucks | 54 | 13.3 | 11,575 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.8 | 10,024 | $3,300 | $900 |
| Heavy Duty Diesel | 11 | 7.5 | 11,077 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 88 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| **FUEL PRICES** | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| **DISCOUNT RATE** | 10.0% |
|---|---|

| **OTHER FACTORS** | |
|---|---|
| Electricity Cost ($/kWh) | $0.063 |
| Labor Cost ($/hr) | $15.00 |

| **STATION DESIGN** | |
|---|---|
| Year 1: Compressor Size (scfm) | 18 |
| Year 1: Storage Size (scf) | 62,747 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at year 1 for gasoline.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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** | $8.17 |
|---|---|

| **Incremental Benefit/mile** | $0.0007 |
|---|---|

# APPENDIX X

# NPV COST-EFFECTIVENESS MODEL: OPERATING AND INFRASTRUCTURE COSTS

# Fleet Size
# 1-10

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $32,942 | 64.3% | $0.0485 |
| Automobiles | $6,212 | 12.1% | $0.0293 |
| Light Trucks | $16,119 | 31.5% | $0.0467 |
| Heavy Duty Trucks | $10,611 | 20.7% | $0.0870 |
| Diesel Price Diff. | $18,272 | 35.7% | $0.0344 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $51,214 | 100.0% | $0.0423 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($12,645) | 10.4% | ($0.0104) |
| Compressor | ($21,145) | 17.4% | ($0.0175) |
| Storage Vessels | ($15,497) | 12.8% | ($0.0128) |
| Dispenser | ($12,428) | 10.2% | ($0.0103) |
| Dryer | ($4,971) | 4.1% | ($0.0041) |
| **Subtotal** | ($66,687) | 55.0% | ($0.0551) |
| **Vehicle** | | | |
| Conversion Kit | ($7,749) | 6.4% | ($0.0064) |
| Tanks | ($9,895) | 8.2% | ($0.0082) |
| Labor | ($11,026) | 9.1% | ($0.0091) |
| OEM | ($5,178) | 4.3% | ($0.0043) |
| **Subtotal** | ($33,848) | 27.9% | ($0.0280) |
| **Operating** | | | |
| Station Maint. | ($3,718) | 3.1% | ($0.0031) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($4,380) | 3.6% | ($0.0036) |
| Labor - fuel time loss | ($3,839) | 3.2% | ($0.0032) |
| NG Fuel Tax | ($8,809) | 7.3% | ($0.0073) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($20,745) | 17.1% | ($0.0171) |
| **Total Costs** | ($121,280) | 100.0% | ($0.1002) |
| **Savings - Cost** | ($70,066) | N/A | ($0.0579) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 20.3 | 22,509 | $1,950 | $900 |
| Light Trucks | 2 | 12.8 | 18,327 | $2,200 | $900 |
| Heavy Duty Gasoline | 1 | 6.8 | 12,930 | $3,300 | $900 |
| Heavy Duty Diesel | 5 | 8.1 | 13,511 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 9 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.020 |
| Labor Cost ($/hr) | $7.50 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 2 |
| Year 1: Storage Size (scf) | 6,899 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($825.84) |
|---|---|

| Incremental Cost/mile | ($0.0579) |
|---|---|

Relaxed Assumptions:
station maint.=3¢/gallon equivalent of CNG
power costs=2¢/kWh
labor=$7.50/hour
No recertification costs
Dispenser=$12,500; dryer = $5,000

# Fleet Size 11-20

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $63,965 | 74.2% | $0.0530 |
| Automobiles | $6,741 | 7.8% | $0.0313 |
| Light Trucks | $34,676 | 40.2% | $0.0457 |
| Heavy Duty Trucks | $22,548 | 26.2% | $0.0967 |
| Diesel Price Diff. | $22,221 | 25.8% | $0.0331 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $86,186 | 100.0% | $0.0459 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($15,246) | 9.3% | ($0.0081) |
| Compressor | ($22,509) | 13.7% | ($0.0120) |
| Storage Vessels | ($24,184) | 14.7% | ($0.0129) |
| Dispenser | ($12,428) | 7.6% | ($0.0066) |
| Dryer | ($4,971) | 3.0% | ($0.0026) |
| **Subtotal** | ($79,339) | 48.4% | ($0.0422) |
| **Vehicle** | | | |
| Conversion Kit | ($12,504) | 7.6% | ($0.0067) |
| Tanks | ($16,853) | 10.3% | ($0.0090) |
| Labor | ($17,170) | 10.5% | ($0.0091) |
| OEM | ($6,199) | 3.8% | ($0.0033) |
| **Subtotal** | ($52,725) | 32.1% | ($0.0281) |
| **Operating** | | | |
| Station Maint. | ($5,728) | 3.5% | ($0.0030) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($5,502) | 3.4% | ($0.0029) |
| Labor - fuel time loss | ($5,584) | 3.4% | ($0.0030) |
| NG Fuel Tax | ($15,184) | 9.3% | ($0.0081) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($31,998) | 19.5% | ($0.0170) |
| **Total Costs** | ($164,063) | 100.0% | ($0.0873) |
| **Savings - Cost** | ($77,877) | N/A | ($0.0415) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 1 | 19.0 | 22,861 | $1,950 | $900 |
| Light Trucks | 5 | 13.0 | 16,093 | $2,200 | $900 |
| Heavy Duty Gasoline | 2 | 6.1 | 12,365 | $3,300 | $900 |
| Heavy Duty Diesel | 7 | 8.4 | 12,206 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 15 | | | | |
| Maintenance Savings | 0% | | Mileage Adj. | 0% | |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.020 |
| Labor Cost ($/hr) | $7.50 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 4 |
| Year 1: Storage Size (scf) | 13,394 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($550.74) |
|---|---|

| Incremental Cost/mile | ($0.0415) |
|---|---|

Relaxed Assumptions:
station maint.=3¢/gallon equivalent of CNG
power costs=2¢/kWh
labor=$7.50/hour
No recertification costs
Dispenser=$12,500; dryer = $5,000

**Fleet Size**
**21-30**

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $116,719 | 82.3% | $0.0502 |
| Automobiles | $9,616 | 6.8% | $0.0306 |
| Light Trucks | $75,622 | 53.3% | $0.0442 |
| Heavy Duty Trucks | $31,480 | 22.2% | $0.1051 |
| Diesel Price Diff. | $25,063 | 17.7% | $0.0343 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $141,781 | 100.0% | $0.0464 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($19,047) | 8.3% | ($0.0062) |
| Compressor | ($24,486) | 10.6% | ($0.0080) |
| Storage Vessels | ($36,931) | 16.1% | ($0.0121) |
| Dispenser | ($12,428) | 5.4% | ($0.0041) |
| Dryer | ($4,971) | 2.2% | ($0.0016) |
| **Subtotal** | ($97,863) | 42.5% | ($0.0320) |
| **Vehicle** | | | |
| Conversion Kit | ($20,141) | 8.8% | ($0.0066) |
| Tanks | ($27,632) | 12.0% | ($0.0090) |
| Labor | ($26,966) | 11.7% | ($0.0088) |
| OEM | ($9,186) | 4.0% | ($0.0030) |
| **Subtotal** | ($83,925) | 36.5% | ($0.0275) |
| **Operating** | | | |
| Station Maint. | ($8,693) | 3.8% | ($0.0028) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($7,164) | 3.1% | ($0.0023) |
| Labor - fuel time loss | ($8,577) | 3.7% | ($0.0028) |
| NG Fuel Tax | ($23,857) | 10.4% | ($0.0078) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($48,291) | 21.0% | ($0.0158) |
| **Total Costs** | ($230,080) | 100.0% | ($0.0753) |
| **Savings - Cost** | ($88,298) | N/A | ($0.0289) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 2 | 19.4 | 16,650 | $1,950 | $900 |
| Light Trucks | 13 | 13.4 | 13,969 | $2,200 | $900 |
| Heavy Duty Gasoline | 3 | 5.6 | 10,594 | $3,300 | $900 |
| Heavy Duty Diesel | 8 | 8.1 | 11,616 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 26 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.020 |
| Labor Cost ($/hr) | $7.50 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 7 |
| Year 1: Storage Size (scf) | 24,327 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($360.25) |
|---|---|

| Incremental Cost/mile | ($0.0289) |
|---|---|

Relaxed Assumptions:
station maint.=3¢/gallon equivalent of CNG
power costs=2¢/kWh
labor=$7.50/hour
No recertification costs
Dispenser=$12,500; dryer = $5,000

## Fleet Size 31-50

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $163,551 | 82.7% | $0.0497 |
| Automobiles | $13,130 | 6.6% | $0.0310 |
| Light Trucks | $111,561 | 56.4% | $0.0445 |
| Heavy Duty Trucks | $38,859 | 19.6% | $0.1086 |
| Diesel Price Diff. | $34,303 | 17.3% | $0.0357 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $197,854 | 100.0% | $0.0465 |
| **COSTS** | | % of Costs | Incremental Cost/Mile |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($23,270) | 7.7% | ($0.0055) |
| Compressor | ($26,746) | 8.9% | ($0.0063) |
| Storage Vessels | ($50,958) | 16.9% | ($0.0120) |
| Dispenser | ($12,428) | 4.1% | ($0.0029) |
| Dryer | ($4,971) | 1.7% | ($0.0012) |
| **Subtotal** | ($118,374) | 39.4% | ($0.0278) |
| **Vehicle** | | | |
| Conversion Kit | ($27,960) | 9.3% | ($0.0066) |
| Tanks | ($38,639) | 12.8% | ($0.0091) |
| Labor | ($36,895) | 12.3% | ($0.0087) |
| OEM | ($13,853) | 4.6% | ($0.0033) |
| **Subtotal** | ($117,348) | 39.0% | ($0.0276) |
| **Operating** | | | |
| Station Maint. | ($11,997) | 4.0% | ($0.0028) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($9,008) | 3.0% | ($0.0021) |
| Labor - fuel time loss | ($11,954) | 4.0% | ($0.0028) |
| NG Fuel Tax | ($32,098) | 10.7% | ($0.0076) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($65,057) | 21.6% | ($0.0153) |
| **Total Costs** | ($300,778) | 100.0% | ($0.0708) |
| **Savings - Cost** | ($102,924) | N/A | ($0.0242) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 3 | 19.2 | 15,000 | $1,950 | $900 |
| Light Trucks | 20 | 13.3 | 13,295 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.5 | 9,492 | $3,300 | $900 |
| Heavy Duty Diesel | 10 | 7.8 | 12,248 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 37 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.020 |
| Labor Cost ($/hr) | $7.50 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 10 |
| Year 1: Storage Size (scf) | 33,739 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($295.09) |
|---|---|

| Incremental Cost/mile | ($0.0242) |
|---|---|

Relaxed Assumptions:
station maint.=3¢/gallon equivalent of CNG
power costs=2¢/kWh
labor=$7.50/hour
No recertification costs
Dispenser=$12,500; dryer = $5,000

## Fleet Size
## 51 and up

| SAVINGS | 30 year NPV | % of Savings | Incremental Savings/Mile |
|---|---|---|---|
| Gasoline Price Diff. | $356,333 | 91.0% | $0.0431 |
| Automobiles | $56,601 | 14.4% | $0.0283 |
| Light Trucks | $261,387 | 66.7% | $0.0444 |
| Heavy Duty Trucks | $38,345 | 9.8% | $0.1014 |
| Diesel Price Diff. | $35,397 | 9.0% | $0.0370 |
| Maintenance | $0 | 0.0% | $0.0000 |
| **Total Savings** | $391,730 | 100.0% | $0.0424 |
| **COSTS** | | **% of Costs** | **Incremental Cost/Mile** |
| **Infrastructure** | | | |
| Land | $0 | 0.0% | $0.0000 |
| Station setup | ($35,264) | 6.3% | ($0.0038) |
| Compressor | ($33,532) | 6.0% | ($0.0036) |
| Storage Vessels | ($90,741) | 16.2% | ($0.0098) |
| Dispenser | ($12,428) | 2.2% | ($0.0013) |
| Dryer | ($4,971) | 0.9% | ($0.0005) |
| **Subtotal** | ($176,937) | 31.5% | ($0.0192) |
| **Vehicle** | | | |
| Conversion Kit | ($62,612) | 11.2% | ($0.0068) |
| Tanks | ($77,568) | 13.8% | ($0.0084) |
| Labor | ($85,118) | 15.2% | ($0.0092) |
| OEM | ($20,986) | 3.7% | ($0.0023) |
| **Subtotal** | ($246,284) | 43.9% | ($0.0267) |
| **Operating** | | | |
| Station Maint. | ($21,904) | 3.9% | ($0.0024) |
| Cylinder Recert. | $0 | 0.0% | $0.0000 |
| Power | ($14,520) | 2.6% | ($0.0016) |
| Labor - fuel time loss | ($25,304) | 4.5% | ($0.0027) |
| NG Fuel Tax | ($76,292) | 13.6% | ($0.0083) |
| Additional training | $0 | 0.0% | $0.0000 |
| **Subtotal** | ($138,021) | 24.6% | ($0.0150) |
| **Total Costs** | ($561,241) | 100.0% | ($0.0608) |
| **Savings - Cost** | ($169,511) | N/A | ($0.0184) |

| VEHICLE DATA | # Vehicles | MPG | Annual Miles per vehicle | CNG Conversion Cost per vehicle | OEM Cost Differential per vehicle |
|---|---|---|---|---|---|
| Automobiles | 19 | 20.8 | 11,171 | $1,950 | $900 |
| Light Trucks | 54 | 13.3 | 11,575 | $2,200 | $900 |
| Heavy Duty Gasoline | 4 | 5.8 | 10,024 | $3,300 | $900 |
| Heavy Duty Diesel | 11 | 7.5 | 11,077 | -- | -- |
| Dedicated | -- | -- | -- | $6,350 | $2,800 |
| Dual-fuel | -- | -- | -- | $5,500 | N/A |
| Total | 88 | | | | |

| | |
|---|---|
| Maintenance Savings | 0% |
| Mileage Adj. | 0% |

| FUEL PRICES | |
|---|---|
| Natural Gas Price/mcf | $2.50 |
| Gasoline Price/gallon | $0.89 |
| Diesel Price/gallon | $0.85 |
| Natural Gas Price Equivalents: | |
| NG price per gasoline gallon equivalent | $0.31 |
| NG price per diesel gallon equivalent | $0.35 |

| DISCOUNT RATE | 10.0% |
|---|---|

| OTHER FACTORS | |
|---|---|
| Electricity Cost ($/kWh) | $0.020 |
| Labor Cost ($/hr) | $7.50 |

| STATION DESIGN | |
|---|---|
| Year 1: Compressor Size (scfm) | 21 |
| Year 1: Storage Size (scf) | 71,634 |

**MAJOR ASSUMPTIONS**

1. Fueling station is designed for continuous fast-filling in one session per day.
2. OEM vehicles are available at the beginning of year 11.
3. Diesel conversions are assumed available at the beginning of year 6.
4. 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 | ($204.34) |
|---|---|

| Incremental Cost/mile | ($0.0184) |
|---|---|

Relaxed Assumptions:
station maint.=3¢/gallon equivalent of CNG
power costs=2¢/kWh
labor=$7.50/hour
No recertification costs
Dispenser=$12,500; dryer = $5,000