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16. Abstract

Increased emphasis on energy efficiency and air quality has resulted in a number of state and federal initiatives examining the use of alternative fuels for motor vehicles. Texas instituted an alternative fuels program for public fleet operations beginning in the 1991-92 fiscal year. Life-cycle cost/benefit models for evaluating the economic implications of this action have been developed at The University of Texas at Austin Center for Transportation Research for both compressed natural gas (CNG) and propane. This report documents the various input data, calculations, and assumptions of the Propane Net Present Value (NPV) model. A similar report (number 983-1) documents the same for the CNG model.

Input data with constant values across different fleets and locations are discussed first and include basic parameters for on-board storage capacity, vehicle conversion costs, equipment salvage values, etc. Variable input data, reflecting a given fleet size, composition, and location, include the number and types of vehicles, fuel consumption, etc. The next section presents the formulas for the internal model calculations. The final section discusses the basic assumptions underlying the model.

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DOCUMENTATION FOR PROPANE FLEET CONVERSION COST-EFFECTIVENESS MODEL

by

Dean Taylor
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Research Report Number 983-3

Research Project 3-4-90/2-983

Conversion of the SDHPT Automotive Fleet to Alternative Fuels

conducted for

Texas Department of Transportation

by the

CENTER FOR TRANSPORTATION RESEARCH

Bureau of Engineering Research

THE UNIVERSITY OF TEXAS AT AUSTIN

October 1992

Summary

The purpose of this report is to document the input data, calculations, and assumptions of the Propane Net Present Value (NPV) model. The model, developed at The University of Texas Center for Transportation Research for the Texas Department of Transportation (TxDOT), analyzes the cost-effectiveness of propane as an alternative fuel for fleet operations by examining the benefits and costs of a propane-fueled operation over the life cycle of a propane fueling station.

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 instituted an alternative fuels program for public fleet operations beginning in the 1991-92 fiscal year. Life-cycle cost/benefit models for evaluating the economic implications of this action have been developed at The University of Texas at Austin Center for Transportation Research for both compressed natural gas (CNG) and propane. This report documents the various input data, calculations, and assumptions of the Propane Net Present Value (NPV) model. A similar report (number 983-1) documents the same for the CNG model.

Input data with constant values across different fleets and locations are discussed first and include basic parameters for on-board storage capacity, vehicle conversion costs, equipment salvage values, etc. Variable input data, reflecting a given fleet size, composition, and location, include the number and types of vehicles, fuel consumption, etc. The next section presents the formulas for the internal model calculations. The final section discusses the basic assumptions underlying the model.

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 support documentation for use of the model.

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. 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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INTRODUCTION

Texas adopted alternative fuels legislation influencing the whole state as well as non-attainment areas. Texas Senate Bill 740, which took effect September 1, 1991, requires all school districts with more than 50 buses, state agencies with more than 15 vehicles excluding law enforcement and other emergency vehicles, and metropolitan transit authorities to purchase new vehicles that are capable of operating on natural gas or a fuel with similar emissions characteristics.[1] Affected agencies can receive a waiver of this act if they can demonstrate either that (1) the effort for operating an alternatively-fueled fleet is more expensive than that for a gasoline or diesel fleet over its useful life or that (2) alternate fuels are not available in sufficient supply. The model documented herein analyzes the first area for propane. Another similar model addresses compressed natural gas (CNG).

The model, developed at The University of Texas Center for Transportation Research for the Texas Department of Transportation (TxDOT), analyzes the cost-effectiveness of propane as an alternative fuel for fleet operations. Basically, the model examines the benefits and costs of a propane-fueled operation over the life cycle of a propane fueling station.

The purpose of this report is to document the input data, calculations, and assumptions of the Propane Net Present Value (NPV) model. Presented first are the input data that are not expected to change for different TxDOT fleet locations, followed by the input data that do change across fleets. Next, formulas for the calculations are presented and explained where necessary. Finally, the major embedded model assumptions are laid out and explained. Because the report is intended as technical documentation for a model user, variable names are used directly from the spreadsheet model. A mapping of these names to spreadsheet locations and a sample spreadsheet are provided in the Appendix.

Unless otherwise specified, all costs and prices are in 1991 dollars.

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1 The Texas Air Control Board subsequently ruled that LPG and electricity also qualify as alternative fuels.

CONSTANT INPUT DATA

This section presents input data that will be kept constant for all TxDOT locations analyzed. It is recognized that some data may be slightly different for some locations, but it is believed that these small differences will not significantly alter the final result. However, these values can be modified in order to perform site-specific analyses.

General Factors

This section contains a listing and description of miscellaneous input data, as follows:

Work.days.year - number of days the fleet is operational per year. It is assumed that TxDOT fleets are operational 5 days per week for 52 weeks a year.

Tank.fill.percentage - for safety reasons, propane storage tanks (both on the vehicle and in the fueling station) are only filled to 80 percent of their volumetric capacity.

Fuel.in.empty.tank.gal - it is assumed that 2 gallons of liquid fuel (gasoline, diesel, or propane) remain in the tank when the vehicle is filled.

Propane.Gasoline.Factor - the amount of propane (gallons) with an equivalent amount of energy as a gallon of gasoline. This is calculated by dividing the net (or lower) heating value of a gallon of gasoline by the net (or lower) heating value of a gallon of propane. This factor is taken to be 114,132 / 84,400 = 1.35 gallons propane/gallon gasoline.[2,3]

Propane.Diesel.Factor - the amount of propane (gallons) with an equivalent amount of energy as a gallon of diesel. This is calculated by dividing the net (or lower) heating value of a gallon of diesel by the net (or lower) heating value of a gallon of propane. This factor is taken to be 129,400 / 84,400 = 1.53 gallons propane/gallon diesel.[4,5]

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2 Environmental Protection Agency, Analysis of the Economic and Environmental Effects of Compressed Natural Gas as a Vehicle Fuel, Vol. I, Passenger Cars and Light Trucks, April 1990.

3 Personal communication with Larry Osgoode, Phillips 66, Bartlesville, Oklahoma.

4 Environmental Protection Agency, Analysis of the Economic and Environmental Effects of Compressed Natural Gas as a Vehicle Fuel, Vol. I, Passenger Cars and Light Trucks, April 1990.

5 Personal communication with Larry Osgoode, Phillips 66, Bartlesville, Oklahoma.

Discount.Rate - a discount rate of 10 percent is assumed to be applicable to TxDOT.[6]

Vehicle Data

These sections contain input data for each vehicle type. The sections for automobiles, light trucks, and heavy-duty gasoline vehicles are conceptually identical; the variable names differ only in the vehicle type identifier prefix of Auto, LT, or HDG. These three sections are discussed in general with the generic variable name prefix of VehType used instead. Since the diesel section accommodates both dual-fuel and dedicated conversions, it is slightly different conceptually and is discussed separately. The input data for the automobiles, light trucks, and heavy-duty gasoline vehicles are as follows:

VehType.Propane.MPG.Adj.Factor - it is assumed that converted propane vehicles will achieve fuel efficiencies of the same magnitude as (or 100 percent of) those of the original gasoline vehicles when operating on propane. This assumes that the conversion does not optimize the engine for propane usage. This is more optimistic than for CNG, since propane tanks weigh significantly less than those for CNG. Note that this factor changes to 110 percent somewhere after year 10. It is assumed that OEM vehicles are available in year 11. They are assumed to be optimized and dedicated and will therefore achieve greater fuel efficiencies than gasoline vehicles.[7,8]

VehType.Dual.fuel.MPG.Adjust.Factor - it is assumed that converted propane vehicles will achieve fuel efficiencies of the same magnitude as (or 100 percent of) the original gasoline vehicles when running on gasoline. This assumes that the conversion does not optimize the engine for propane usage.

VehType.Conv.Kit.Cost - is the cost of the under-hood equipment (e.g., mixer, regulator, piping, etc.). For automobiles this cost is assumed to be $700. For light trucks and heavy-duty gasoline vehicles this cost is assumed to be $570.[9,10]

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6 Recommended by the Texas State Purchasing and General Services Commission, Workbook on the Cost Effectiveness of Alternative Fuels Using Life Cycle Cost Benefit Analysis, June 1, 1991.

7 Personal communication with Larry Osgoode, Phillips 66, Bartlesville, Oklahoma.

8 James S. Wallace, "Assessment of 'First Generation' Propane Conversion Equipment," SAE paper number 892144, September 1989.

9 Phillips 66, "The Cleaner Air Alternative," Bartlesville, Oklahoma.

10 California Energy Commission, Cost and Availability of Low-Emission Motor Vehicles and Fuels, AB 234 Report, August 1989.

VehType.Conv.lab.cost - is the cost of labor to perform the conversion. For automobiles this cost is assumed to be $570, and for light trucks and heavy-duty gasoline vehicles, it is $340.[11]

VehType.Tank.cost - is the cost of one tank. For automobiles this cost is assumed to be $330, for light trucks it is assumed to be $280, and for heavy-duty gasoline, $290.[12,13] These costs are directly related to the VehType.Fuel.Capacity.gal input. It is assumed that TxDOT will implement volume buying in order to achieve price reductions.

VehType.Conv.Kit.Salvage.Value - is the price difference in selling a used converted propane vehicle versus the same vehicle if it were not converted. It is assumed that this value is $150. As defined, this value includes both tank, kit, and labor salvage value.

VehType.Tank.Salvage.Value - this value is currently not used (it is set to $0). The salvage value of tanks is included in VehType.Conv.Kit.Salvage.Value.

VehType.OEM.Cost.Diff - this is the cost difference between an original equipment manufacturer (OEM) dedicated optimized propane vehicle and a comparable gasoline vehicle. It is assumed that this difference is $400 for automobiles and light trucks, and $450 for heavy-duty gasoline vehicles.[14] These costs assume mature and fairly substantial OEM propane vehicle markets.

VehType.OEM.Salvage.Value - is the price difference in selling a used OEM propane vehicle versus a comparable gasoline vehicle. It is assumed that this value is $100 for automobiles, light trucks, and heavy-duty gasoline vehicles.

VehType.Fuel.Capacity.gal - the water volume of the propane tank. For automobiles this is assumed to be 27 gallons, for light trucks it is assumed to be 31 gallons, and for heavy-duty gasoline vehicles, 43 gallons. Tanks of these volumes yield on-board propane quantities similar in volume (not energy) to that of the on-board gasoline tank.

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11 Ibid.
12 Ibid.
13 Manchester Tank, Motorfuel Tanks Brochure 1990-1991, Lubbock, Texas.
14 Phillips 66, "Propane (LP Gas) Alternative Fuel Information," slide presentation, Bartlesville, Oklahoma.

VehType.tanks.per.veh - it is assumed that all vehicle types have 1 tank per vehicle.

VehType.Prcnt.Propane.miles - percentage of miles driven per vehicle on propane. Assumed to be 100 percent for dual-fuel vehicles. Must be 100 percent for dedicated OEM vehicles.

VehType.Maint.Cost.Diff - difference in costs for one vehicle's maintenance in one year. A positive amount indicates a maintenance savings for propane.

VehType.On.board.gasoline.capacity - assumed to be: automobiles - 16 gallons; light trucks - 18 gallons; and heavy-duty gasoline vehicles - 25 gallons.[15]

Since the heavy-duty diesel vehicle data section accommodates both dual-fuel and dedicated conversions, it is slightly different conceptually from automobiles, light trucks, and heavy-duty gasoline vehicles. In year 11 when OEM propane vehicles become available, it is assumed that only dedicated OEM vehicles will be produced (not dual-fuel), because of emissions regulations.[16] The input data for heavy-duty diesel vehicles are as follows:

HDD.Ded.Propane.MPG.Adj.Factor - dedicated propane vehicles will have reduced fuel efficiencies mainly because compression ratios used must be less than those for diesel. It is assumed that these reductions will be 26 percent for converted diesels and 20 percent for OEMs replacing diesels.[17] These reductions are those assumed for natural gas and are used as a proxy for propane, because no estimates for propane were found.

HDD.Dual.MPG.Adjust.Factor - it is assumed that converted dual-fuel propane vehicles will achieve fuel efficiencies that are the same as those of the original diesel vehicles on an energy-equivalent basis. This is more optimistic than for CNG.

HDD.Ded.Conv.Kit.Cost - this cost is assumed to be $1,630. Because heavy-duty dedicated propane conversion cost estimates were not found in the literature, this cost was estimated from the cost of a heavy-duty diesel dedicated CNG conversion (proportional to

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15 Personal communication with Terry Eulenfeld, TxDOT, Austin, Texas.

16 Environmental Protection Agency, Analysis of the Economic and Environmental Effects of Compressed Natural Gas as a Vehicle Fuel, Vol. II, Heavy Duty Vehicles, April 1990.

17 Ibid.

heavy-duty gasoline vehicle costs).[18]

HDD.Ded.Conv.Kit.Salvage.Value - this value is assumed to be $300. As defined, this value includes both tank, kit, and labor salvage value.

HDD.Ded.Conv.lab.cost - this cost is assumed to be $1,330. As for the conversion kit cost, this cost is estimated from the cost of a CNG conversion.

HDD.Dual.Conv.Kit.Cost - this cost is assumed to be $2,040. As for the conversion kit cost, this cost is estimated from the cost of a CNG conversion.

HDD.Dual.Conv.Kit.Salvage.Value - this value is assumed to be $300. As defined, this value includes both tank, kit, and labor salvage value.

HDD.Dual.Conv.lab.cost - this cost is assumed to be $1,130. As for the conversion kit cost, this cost is estimated from the cost of a CNG conversion.

HDD.Tank.cost - this cost is assumed to be $365.[19] This cost is directly related to the HDD.Fuel.Capacity.gal input. It is assumed that TxDOT will implement volume buying in order to achieve price reductions.

HDD.Tank.Salvage.Value - this value is currently not used (it is set to $0). The salvage value of tanks is included in the conversion kit salvage value.

HDD.OEM.Cost.Diff - it is assumed that this difference is $1,400. As for the conversion kit cost, this cost is estimated from the cost of a CNG OEM vehicle.

HDD.OEM.Salvage.Value - this value is assumed to be $300.

HDD.Fuel.Capacity.gal - the water volume of the propane tank. It is assumed to be 76 gallons. A tank of this volume yields an on-board propane quantity similar in volume (not energy) to that of the on-board gasoline tank.

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

[19] Manchester Tank, Motorfuel Tanks Brochure 1990-1991, Lubbock, Texas.

HDD.tanks.per.Ded.veh - assumed to be 1 tank.

HDD.tanks.per.Dual.veh - assumed to be 1 tank.

HDD.Prcnt.Propane.consumed.dual - this factor applies to dual-fuel conversions only. It is the percentage of energy used by the vehicle over its normal driving schedule which is obtained from propane. The rest of the energy is obtained from the diesel fuel. This factor is assumed to be 15 percent.[20]

HDD.Maint.Cost.Diff.Ded - difference in costs for one dedicated propane vehicle's maintenance in one year.

HDD.Maint.Cost.Diff.Dual - difference in costs for one dual-fuel vehicle's maintenance in one year.

HDD.On.board.diesel.capacity - assumed to be 45 gallons.[21]

Fuel Prices

Propane.cost.at.refinery.gallon - a refinery price of 36 cents per gallon is assumed, given that the yearly average refinery propane price at Mount Belvieu, Texas was 35.9 cents in 1991 and 37.7 cents in 1990.[22]

Transportation.cost.gallon - this is the cost to transport the propane from the refinery to the local supplier. This cost is assumed to be 3 cents per gallon for all locations in Texas, though it will vary by a few cents depending on the distance from the refinery.[23,24,25]

Supplier.markup.small.fleet.gallon - this is the local supplier's profit per gallon for small-volume propane deliveries (via bobtail trucks in quantities of about 2,000 gallons). This

20 Jim McCray, "'Fumigation' Process Hailed as Answer to Pollution from 4-Stroke Diesels," in Butane-Propane News, September 1991.

21 Personal communication with Terry Eulenfeld, TxDOT, Austin, Texas.

22 Butane-Propane News, weekly average principal propane postings at Mount Belvieu, Texas, 1990-1991.

23 Personal communication with J.R. Anderson, Texas LP-Gas Association, Austin, Texas, 1992.

24 Personal communication with Jerry Hill, Amerigas Company, 1992.

25 Personal communication with Lon Holloway, Suburban Propane, Denton, Texas, 1992.

mark-up is assumed to be 21 cents per gallon.[26,27,28,29]

Supplier.markup.large.fleet.gallon - this is the local supplier's profit per gallon for large-volume propane deliveries (via transport trucks in quantities of about 10,000 gallons). This mark-up is assumed to be 4 cents per gallon.[30,31,32,33]

Federal.tax.gallon.propane - there are no federal taxes on propane for TxDOT vehicles.

Gasoline.Price.gallon - assumed to be $0.89.[34]

Diesel.Price.gallon - assumed to be $0.85.[35]

Annual.Fuel.Price.Adjustment - allows all fuel prices to be increased by a certain percentage per year. It is assumed that fuel prices remain constant over time (except for inflation), so this adjustment is set to 0.0 percent.

Station Design

Switch.Time.min - time to pull vehicle up to station, get out of vehicle, connect fuel probe, disconnect fill probe, get back into vehicle, and drive away. Includes all time except time that propane is actually being transferred to the vehicle. This time is assumed to be 3 minutes.

Propane.fill.rate.gal.min - the average flow rate per hose is assumed to be the same as that for gasoline and diesel (7 gallons/minute).

Number.of.Hoses - 2 propane hoses are assumed. A small station design will probably only have 1 hose, but assuming 2 hoses does not change the outcome, since 2 gasoline

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26 Personal communication with J.R. Anderson, Texas LP-Gas Association, Austin, Texas, 1992.
27 Personal communication with Jerry Hill, Amerigas Company, 1992.
28 Personal communication with Lon Holloway, Suburban Propane, Denton, Texas, 1992.
29 Ferrellgas, "Dispensing and Storage Systems," Liberty, Missouri, 1988.
30 Personal communication with J.R. Anderson, Texas LP-Gas Association, Austin, Texas, 1992.
31 Personal communication with Jerry Hill, Amerigas Company, 1992.
32 Personal communication with Lon Holloway, Suburban Propane, Denton, Texas, 1992.
33 Ferrellgas, "Dispensing and Storage Systems," Liberty, Missouri, 1988.
34 Based on prices paid by TxDOT in 1991.
35 Based on prices paid by TxDOT in 1991.

hoses are also assumed. These values are only used to compute fueling session times and labor-fuel time losses.

Station.Setup.Cost.Factor - the cost of miscellaneous items such as installation labor and construction overhead is approximated by assuming that it is equal to 15 percent of the total cost of the storage and dispenser. This value is less than that assumed for CNG, because CNG fast-fill stations require some miscellaneous hardware, such as sequencer and priority panels, which propane stations do not, and the installation of a CNG station is more complicated and demanding.[36]

Labor Time Loss Calculation

Gasoline.fill.rate.gal.min - the average flow rate per hose is assumed to be 7 gallons/minute (without topping off tank).[37]

Diesel.fill.rate.gal.min - the average flow rate per hose is assumed to be 7 gallons/minute (without topping off tank).[38]

Gasoline.diesel.switch.time - same definition as for propane switch time. This time is assumed to be 3 minutes.

Labor.Cost.hour - cost per man-hour for fueling vehicles (includes salary, benefits, etc). Assumed to be $15.00.

Number.Gasoline.hoses - assumed to be 2.

Number.Diesel.hoses - assumed to be 1.

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

37 Based on only one gasoline data point.

38 Based on gasoline data only (not diesel).

Costs

Storage.Dispenser.costs.small(or large).fleet - storage/dispenser purchase cost is assumed to be $10,000 for a small station design with a storage capacity (water) of 2,000 gallons and $57,000 for a large station design with a storage capacity (water) of 14,400 gallons.[39,40,41,42,43] It is assumed that new pump/meter/dispenser units are purchased after 15 years at a cost of $3,000 for a small station (1 unit) and $6,000 for a large station (2 units).[44,45] The salvage value of the storage/dispenser is assumed to be 50 percent of the purchase cost (after 30 years).

Fueling station maintenance is assumed to be $500 annually for a small station and $1,500 annually for a large station.[46,47,48,49]

VARIABLE INPUT DATA

The input data discussed in this section are intended to reflect the characteristics of a particular fleet operating at a given TxDOT location. As such, these data differ across locations and are fleet specific.

Vehicle Data

These sections contain input data for each vehicle type. It is usually assumed that the number of vehicles in each TxDOT location will remain constant over time (though the model can accommodate changes over time). The sections for automobiles, light trucks, and heavy-duty gasoline vehicles are conceptually identical; the variable names differ only in the vehicle type identifier prefix of Auto, LT, or HDG. These three sections are discussed in general with the

39 Ferrellgas, "Dispensing and Storage Systems," Liberty, Missouri, 1988.
40 Personal communication with Jerry Hill, Amerigas Company, 1992.
41 Personal communication with Lon Holloway, Suburban Propane, Denton, Texas, 1991.
42 California Energy Commission, Cost and Availability of Low-Emission Motor Vehicles and Fuels, AB 234 Report, August 1989.
43 Phillips 66, "Propane (LP Gas) Alternative Fuel Information," slide presentation, Bartlesville, Oklahoma.
44 Personal communication with Lon Holloway, Suburban Propane, Denton, Texas, 1991.
45 Personal communication with Jerry Hill, Amerigas Company, 1992.
46 Ferrellgas, "Dispensing and Storage Systems," Liberty, Missouri, 1988.
47 Personal communication with Jerry Hill, Amerigas Company, 1992.
48 Personal communication with Lon Holloway, Suburban Propane, Denton, Texas, 1991.
49 California Energy Commission, Cost and Availability of Low-Emission Motor Vehicles and Fuels, AB 234 Report, August 1989.

generic variable name prefix of VehType used instead. Since the diesel section accommodates both dual-fuel and dedicated conversions, it is slightly different conceptually and is discussed separately. The input data for the automobiles, light trucks, and heavy-duty gasoline vehicles are as follows:

VehType.Num.Propane.Converted - this is the number of vehicles converted to dual-fuel propane operation in a certain year. It is assumed that conversions must be performed for the first 10 years, since OEM vehicles are not available.

VehType.Num.Propane.Trans - when converted vehicles reach the end of their TxDOT life at the beginning of a specific year, their kits and tanks are assumed to be transferred to the new replacement vehicles, unless OEM vehicles are available. In that case, the kit is salvaged.

VehType.Num.Propane.Retired - number of converted vehicles reaching the end of their TxDOT life at the beginning of a given year.

VehType.Num.OEM - number of OEM propane vehicles purchased at the beginning of a given year.

VehType.Num.OEM.Retired - number of OEM propane vehicles reaching the end of their TxDOT life at the beginning of a given year.

VehType.Gasoline.MPG - average gasoline fuel efficiency for a particular vehicle type at a given location.

VehType.miles - average annual miles traveled by a particular vehicle type at a given location.

As before, because the diesel vehicle data section accommodates both dual-fuel and dedicated conversions, it is slightly different conceptually from the other three types of vehicles. As for CNG, it is assumed that only dedicated OEM vehicles will be produced (i.e., no dual-fuel OEM vehicles).[50] The input data for heavy-duty diesel vehicles are as follows:

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50 Environmental Protection Agency, Analysis of the Economic and Environmental Effects of Compressed Natural Gas as a Vehicle Fuel, Vol. II, Heavy Duty Vehicles, April 1990.

HDD.Num.New.Ded.Converted - this is the number of vehicles converted to dedicated propane operation in a certain year. It is assumed that conversions must be performed in years 6 through 10, since OEM vehicles are not available. It is also assumed that dedicated propane conversions are not available until year 6.

HDD.Num.Ded.Kits.Trans - when dedicated converted vehicles reach the end of their TxDOT life at the beginning of a specific year, their kits and tanks are assumed to be transferred to the new replacement vehicles, unless OEM vehicles are available. In that case, the kit is salvaged.

HDD.Num.Ded.Conv.Retired - number of dedicated converted vehicles reaching the end of their TxDOT life at the beginning of a given year.

HDD.Num.New.Dual.Converted - this is the number of vehicles converted to dual-fuel operation in a certain year. It is assumed that conversions must be performed in years 6 through 10, since OEM vehicles are not available. It is also assumed that dual-fuel conversions are not available until year 6.

HDD.Num.Dual.Kits.Trans - when dual-fuel converted vehicles reach the end of their TxDOT life at the beginning of a specific year, their kits and tanks are assumed to be transferred to the new replacement vehicles, unless OEM vehicles are available. In that case, the kit is salvaged.

HDD.Num.Dual.Conv.Retired - number of dual-fuel converted vehicles reaching the end of their TxDOT life at the beginning of a given year.

HDD.Num.Ded.OEM - number of dedicated OEM propane vehicles purchased at the beginning of a given year.

HDD.Num.Ded.OEM.Retired - number of dedicated OEM propane vehicles reaching the end of their TxDOT life at the beginning of a given year.

HDD.Diesel.MPG - average diesel fuel efficiency for a particular vehicle type at a given location.

HDD.miles - average annual miles traveled by a particular vehicle type at a given location.

Note that the yearly data entered for the number of new conversions, conversions retired, kits transferred, OEMs purchased, and OEMs retired are based on the TxDOT life of that vehicle type.

CALCULATIONS

A list of all the variable names (and their spreadsheet cell references) used in these calculations is included in the Appendix. This section gives the equations used in all calculations, with an explanation of the underlying assumptions where applicable.

Vehicle Data

Conceptually, the formulas are the same for automobile, light truck, and heavy-duty gasoline vehicle types. As before, the actual reference to Auto, LT, or HDG in each formula is replaced by VehType, and the diesel formulas are presented separately.

VehType.Num.Vehicles =
(VehType.Num.Propane.Converted + VehType.Num.OEM +
VehType.Num.Propane.Trans) -
(VehType.Num.Propane.Retired + VehType.Num.OEM.Retired)

VehType.Propane.mpg =
VehType.Gasoline.MPG * VehType.Propane.MPG.Adj.Factor

VehType.Dual.Fuel.Gasoline.MPG =
VehType.Gasoline.MPG * VehType.Dual.fuel.MPG.Adjust.Factor

VehType.Annual.Propane.consump.gal =
((VehType.Num.Vehicles * VehType.miles * VehType.Prcnt.Propane.miles) /
VehType.Propane.mpg) * Propane.Gasoline.Factor

VehType.Annual.gasoline.consumption.gal =
VehType.Num.Vehicles * VehType.miles * (1 - VehType.Prcnt.Propane.miles) /
VehType.Dual.Fuel.Gasoline.MPG

An annual fuel tax is required by Texas law. The amount charged is based on weight and annual mileage of the vehicle. Vehicle weights are assumed to be: automobiles - less than 4,000 lbs; light trucks - less than 4,000 lbs; and heavy-duty gasoline vehicles - between 10,001 and 15,000 lbs.[51]

```
Auto (or LT).Annual.Propane.Fuel.Tax =
    IF(0<VehType.miles<5000,$30)
    IF(5001<VehType.miles<10000,$60)
    IF(10001<VehType.miles<15000,$90)
    ELSE($120)
```

```
HDG.Annual.Propane.Fuel.Tax =
    IF(0 < HDG.miles < 5000, $48)
    IF(5001 < HDG.miles  10000, $96)
    IF(10001 < HDG.miles < 15000, $144)
    ELSE($192)
```

The diesel equations are as follows:

```
HDD.Num.Ded.Vehicles =
    (HDD.Num.New.Ded.Converted + HDD.Num.Ded.OEM +
    HDD.Num.Ded.Kits.Trans) -
    (HDD.Num.Ded.Conv.Retired + HDD.Num.Ded.OEM.Retired)

HDD.Num.Dual.Vehicles =
    (HDD.Num.New.Dual.Converted + HDD.Num.Dual.Kits.Trans) -
    HDD.Num.Dual.Conv.Retired

HDD.Ded.Propane.mpg =
    HDD.Diesel.MPG * HDD.Ded.Propane.MPG.Adj.Factor

HDD.Dual.MPG =
    HDD.Diesel.MPG * HDD.Dual.MPG.Adjust.Factor

HDD.Annual.Propane.consump.gal =
    ((HDD.Num.Ded.Vehicles * HDD.miles) / (HDD.Ded.Propane.mpg) *
    Propane.Diesel.Factor) +
    (HDD.Num.Dual.Vehicles * HDD.miles / HDD.Dual.MPG) *
    HDD.Prcnt.Propane.consumed.dual * Propane.Diesel.Factor

HDD.Annual.diesel.consumption.gal =
    (HDD.Num.Dual.Vehicles * HDD.miles / HDD.Dual.MPG) *
    (1 - HDD.Prcnt.Propane.consumed.dual)
```

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[51] Personal communication with Terry Eulenfeld, TxDOT, Austin, Texas.

The annual fuel tax for diesel-converted propane vehicles is identical to gasoline-converted vehicles. Heavy-duty diesel vehicle weights are assumed to be between 10,001 and 15,000 lbs.[52]

HDD.Annual.Propane.Fuel.Tax =
IF(0<HDD.miles<5000,$48)
IF(5001<HDD.miles<10000,$96)
IF(10001<HDD.miles<15000,$144)
ELSE($192)

Fuel Prices

Propane.Price.to.small.fleet.gallon =
Propane.cost.at.refinery.gallon + Transportation.cost.gallon +
Supplier.markup.small.fleet.gallon

Propane.Price.to.large.fleet.gallon =
Propane.cost.at.refinery.gallon + Transportation.cost.gallon +
Supplier.markup.large.fleet.gallon

Total.Propane.consumption.gal =
Auto.Annual.Propane.consump.gal + LT.Annual.Propane.consump.gal +
HDG.Annual.Propane.consump.gal + HDD.Annual.Propane.consump.gal

Station Design

Propane.Session.Time.min =
((Autos.per.day / Number.of.Hoses) * (Switch.Time.min +
(Auto.Propane.per.fill.gal / Propane.fill.rate.gal.min))) +
((Light.Trucks.per.day / Number.of.Hoses) * (Switch.Time.min +
(LT.Propane.per.fill.gal / Propane.fill.rate.gal.min))) +
((Heavy.Gasoline.per.day / Number.of.Hoses) * (Switch.Time.min +
(HDG.Propane.per.fill.gal / Propane.fill.rate.gal.min))) +
((Heavy.Ded.Diesel.per.day / Number.of.Hoses) * (Switch.Time.min +
(HDD.Ded.Propane.per.fill.gal / Propane.fill.rate.gal.min))) +
((Heavy.Dual.Diesel.per.day / Number.of.Hoses) * (Switch.Time.min +
(HDD.Dual.Propane.per.fill.gal / Propane.fill.rate.gal.min)))

Supply of propane on-site (weeks) =
(Storage.water.volume.gal * Tank.fill.percentage) / (Total.Propane.consump.gal / 52)

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52 Personal communication with Terry Eulenfeld, TxDOT, Austin, Texas.

Autos.(or Light.Trucks. or Heavy.Gasoline.)per.day =
(VehType.Num.Vehicles * VehType.miles * VehType.Prcnt.Propane.miles / VehType.Propane.mpg * Propane.Gasoline.Factor) / ((VehType.Propane.per.fill.gal) * Work.days.year)

Heavy.Ded.Diesel.per.day =
(HDD.Num.Ded.Vehicles * HDD.miles / HDD.Ded.Propane.mpg * Propane.Diesel.Factor) / ((HDD.Ded.Propane.per.fill.gal) * Work.days.year)

Heavy.Dual.Diesel.per.day =
(HDD.Num.Dual.Vehicles * HDD.miles * HDD.Prcnt.Propane.consumed.dual / HDD.Dual.MPG*Propane.Diesel.Factor) / ((HDD.Dual.Propane.per.fill.gal) * Work.days.year)

Auto (LT or HDG).Propane.per.fill.gal =
(VehType.Fuel.Capacity.gal * VehType.tanks.per.veh. * Tank.fill.percentage) - Fuel.in.empty.tank.gal

HDD.Ded.Propane.per.fill.gal =
(HDD.Fuel.Capacity.gal * HDD.tanks.per.Ded.veh. * Tank.fill.percentage) - Fuel.in.empty.tank.gal

HDD.Dual.Propane.per.fill.gal =
(HDD.Fuel.Capacity.gal * HDD.tanks.per.Dual.veh. * Tank.fill.percentage) - Fuel.in.empty.tank.gal

Labor Time Loss Calculations

Labor time losses are incurred when filling propane vehicles relative to the time required to fill the original vehicles with gasoline or diesel (for the same vehicle usage level). Calculation of these losses requires the evaluation of the time that would have been required to fuel the gasoline/diesel vehicles. It is first necessary to calculate the number of dedicated gasoline/diesel vehicles that require fueling daily in order to offset the propane usage of their replacement vehicles. These values can then be used to calculate dedicated gasoline and diesel fueling session times which are directly comparable to the propane fueling session time, in order to compute the desired labor losses due to fueling. The computation of labor losses assumes that the fueling of converted dual-fuel vehicles with gasoline or diesel will take the same amount of time as fueling the original gasoline or diesel vehicle, for the miles a dual-fuel vehicle utilizes gasoline or diesel. This is not entirely accurate, because gasoline/diesel fuel efficiency is expected to drop slightly when the vehicle is converted. However, the possible resulting error is undoubtedly small and is therefore ignored for simplicity and tractability of the computations. Of course, there is no error in the calculated equivalent number of gasoline vehicles and corresponding fueling time if 100 percent of the mileage driven is on propane.

Number.(Autos or LT.Trucks or Heavy.Gas).day =
((VehType.Num.Vehicles * (VehType.miles * VehType.Prcnt.Propane.miles /
VehType.Gasoline.MPG)) / Work.days.year) /
(VehType.On.board.gasoline.capacity - Fuel.in.empty.tank.gal)

Number.Diesel.day =
((HDD.Num.Ded.Vehicles * (HDD.miles /
HDD.Diesel.MPG)) / Work.days.year) /
(HDD.On.board.diesel.capacity - Fuel.in.empty.tank.gal) +
((HDD.Num.Dual.Vehicles * (HDD.miles * HDD.Prcnt.Propane.consumed.dual /
HDD.Diesel.MPG)) / Work.days.year) /
(HDD.On.board.diesel.capacity - Fuel.in.empty.tank.gal)

The following two equations give the continuous fueling session times necessary if dedicated gasoline and diesel vehicles are retained.

Ded.Gasoline.Session.Time =
((Number.Autos.day / Number.Gasoline.hoses) *
(Gasoline.diesel.switch.time + ((Auto.On.board.gasoline.capacity -
Fuel.in.empty.tank.gal) / Gasoline.fill.rate.gal.min))) +
((Number.LT.Trucks.day / Number.Gasoline.hoses) *
(Gasoline.diesel.switch.time + ((LT.On.board.gasoline.capacity - Fuel.in.empty.tank.gal)
/ Gasoline.fill.rate.gal.min))) +
((Number.Heavy.Gas.day / Number.Gasoline.hoses) *
(Gasoline.diesel.switch.time + ((HDG.On.board.gasoline.capacity -
Fuel.in.empty.tank.gal) / Gasoline.fill.rate.gal.min)))

Ded.Diesel.Session.Time =
((Number.Diesel.day / Number.Diesel.hoses) *
(Gasoline.diesel.switch.time + ((HDD.On.board.diesel.capacity - Fuel.in.empty.tank.gal)
/ Diesel.fill.rate.gal.min)))

Savings

Savings are computed for propane prices corresponding to two fuel-purchasing strategies: small-volume purchases (at a higher price), or large-volume purchases. The Cumulative NPV can then be computed for both propane volume purchase strategies, and the most cost-effective purchase strategy is then chosen for the fleet in question. (This strategy is indicated on the Summary Sheet.) The following first two formulas are used for both small- and large-volume purchases. The third formula is for the computation of maintenance savings given the maintenance cost differences input by the user.

Gasoline Savings (Auto or LT or HDG) =
((((VehType.miles * VehType.Num.Vehicles) /
VehType.Gasoline.MPG) * Gasoline.Price.gallon) -
(VehType.Annual.Propane.consump.gal * Propane.Price.to.small(or large).fleet.gallon) -
(VehType.Annual.gasoline.consump.gal * Gasoline.Price.gallon))

Diesel Savings =
((((HDD.miles * (HDD.Num.Ded.Vehicles + HDD.Num.Dual.Vehicles)) /
HDD.Diesel.MPG) * Diesel.Price.gallon) -
(HDD.Annual.Propane.consump.gal * Propane.Price.to.small(or large).fleet.gallon) -
(HDD.Annual.diesel.consump.gal * Diesel.Price.gallon))

Maintenance savings =
(Auto.Num.Vehicles * Auto.Maint.Cost.Diff) +
(LT.Num.Vehicles * LT.Maint.Cost.Diff) +
(HDG.Num.Vehicles * HDG.Maint.Cost.Diff) +
(HDD.Num.Ded.Vehicles * HDD.Maint.Cost.Diff.Ded) +
(HDD.Num.Dual.Vehicles * HDD.Maint.Cost.Diff.Dual)

Costs

Infrastructure

Land.costs are assumed to be negligible for TxDOT.

Station.setup.costs =
Station.Setup.Cost.Factor * Storage.Dispenser.costs.small(or large).fleet

Vehicle

Conversion.Kit.costs =
((Auto.Num.Propane.Converted * Auto.Conv.Kit.Cost) +
(LT.Num.Propane.Converted * LT.Conv.Kit.Cost) +
(HDG.Num.Propane.Converted * HDG.Conv.Kit.Cost) +
(HDD.Num.New.Ded.Converted * HDD.Ded.Conv.Kit.Cost) +
(HDD.Num.New.Dual.Converted * HDD.Dual.Conv.Kit.Cost)) -
(((Auto.Num.Propane.Retired - Auto.Num.Propane.Trans) *
Auto.Conv.Kit.Salvage.Value) +
((LT.Num.Propane.Retired - LT.Num.Propane.Trans) *
LT.Conv.Kit.Salvage.Value) +
((HDG.Num.Propane.Retired - HDG.Num.Propane.Trans) *
HDG.Conv.Kit.Salvage.Value) +
((HDD.Num.Ded.Conv.Retired - HDD.Num.Ded.Kits.Trans) *
HDD.Ded.Conv.Kit.Salvage.Value) +
((HDD.Num.Dual.Conv.Retired - HDD.Num.Dual.Kits.Trans) *
HDD.Dual.Conv.Kit.Salvage.Value))

Tanks.costs =
(Auto.Num.Propane.Converted * Auto.Tank.cost * Auto.tanks.per.veh.) +
(LT.Num.Propane.Converted * LT.Tank.cost * LT.tanks.per.veh.) +
(HDG.Num.Propane.Converted * HDG.Tank.cost * HDG.tanks.per.veh.) +
(HDD.Num.New.Ded.Converted * HDD.Tank.cost * HDD.tanks.per.Ded.veh.) +
(HDD.Num.New.Dual.Converted * HDD.Tank.cost * HDD.tanks.per.Dual.veh.) -
((Auto.Num.Propane.Retired * Auto.Tank.Salvage.Value * Auto.tanks.per.veh.) +
(LT.Num.Propane.Retired * LT.Tank.Salvage.Value * LT.tanks.per.veh.) +
(HDG.Num.Propane.Retired * HDG.Tank.Salvage.Value * HDG.tanks.per.veh.) +
(HDD.Num.Ded.Conv.Retired * HDD.Tank.Salvage.Value * HDD.tanks.per.Ded.veh.) +
(HDD.Num.Dual.Conv.Retired * HDD.Tank.Salvage.Value * HDD.tanks.per.Dual.veh.))

Labor.costs =
((Auto.Num.Propane.Converted + Auto.Num.Propane.Trans) * Auto.Conv.lab.cost) +
((LT.Num.Propane.Converted + Lt.Num.Propane.Trans) * LT.Conv.lab.cost) +
((HDG.Num.Propane.Converted + HDG.Num.Propane.Trans) * HDG.Conv.lab.cost) +
((HDD.Num.New.Ded.Converted + HDD.Num.Ded.Kits.Trans) *
HDD.Ded.Conv.lab.cost) +
((HDD.Num.New.Dual.Converted + HDD.Num.Dual.Kits.Trans) *
HDD.Dual.Conv.lab.cost)

OEM.costs =
((Auto.Num.OEM * Auto.OEM.Cost.Diff) +
(LT.Num.OEM * LT.OEM.Cost.Diff) +
(HDG.Num.OEM*HDG.OEM.Cost.Diff) +
(HDD.Num.Ded.OEM*HDD.OEM.Cost.Diff)) -
((Auto.Num.OEM.Retired * Auto.OEM.Salvage.Value) +
(LT.Num.OEM.Retired * LT.OEM.Salvage.Value) +
(HDG.Num.OEM.Retired * HDG.OEM.Salvage.Value) +
(HDD.Num.Ded.OEM.Retired*HDD.OEM.Salvage.Value))

Operating

Labor Fueling Time Loss =
((Number.of.Hoses * Propane.Session.Time.min -
Number.Gasoline.hoses * Ded.Gasoline.Session.Time -
Number.Diesel.hoses * Ded.Diesel.Session.Time) / 60) *
Work.days.year * Labor.Cost.hour

Propane Fuel Tax =
Auto.Num.Vehicles * Auto.Annual.Propane.Fuel.Tax +
LT.Num.Vehicles * LT.Annual.Propane.Fuel.Tax +
HDG.Num.Vehicles * HDG.Annual.Propane.Fuel.Tax +
HDD.Num.Ded.Vehicles * HDD.Annual.Propane.Fuel.Tax +
HDD.Num.Dual.Vehicles*HDD.Annual.Propane.Fuel.Tax

Additional training can include costs to train mechanics to work on propane vehicles, costs to train drivers to operate propane vehicles, costs to train maintenance workers to perform fueling station maintenance, etc. For TxDOT fleets there is no cost added for this item.

Cumulative Net Present Value (NPV)

Cumulative.NPV.small(or large).fleet - the cumulative NPV of all costs and benefits (of CNG vehicle operation relative to gasoline/diesel) over the 30-year analysis period is the major output of the spreadsheet model.

Cost (or Benefit) Per Vehicle Per Year and Cost (or Benefit) Per Mile

Cost.per.veh.per.year.small(or large).volume - the cost (or benefit) per vehicle per year is calculated by computing an annuity equivalent to the Cumulative NPV and then dividing this annuity by the number of vehicles in the fleet in Year 30. Note that this value is not as meaningful if the number of vehicles varies over the analysis time horizon as it would be for a constant number of vehicles. Also note that each vehicle type is given equal weight in the calculation.

The cost per mile (shown only on the Summary Sheet) is computed similarly, except that the annualized Cumulative NPV is divided by the annual miles driven by the fleet. Diesel vehicle miles are adjusted downward by one-sixth, to account for the fact that diesel vehicles are not introduced until year six (out of 30).

Both of these costs allow one to compare conversion of different size fleets or to compute items such as gasoline taxes required to make conversion cost-effective.

EMBEDDED MODEL ASSUMPTIONS

This section presents the embedded model assumptions that have not been discussed previously.

It is assumed that the cost of electric power to run the propane dispenser pumps is the same as that to power gasoline and diesel dispenser pumps. This is assumed even though (1) a larger volume of propane must be pumped to achieve equivalent energy with either gasoline or diesel and (2) the propane system is technologically different in that it is sealed.

No savings are accrued for maintenance savings because of reduced usage of gasoline/diesel fuel dispensers. Nor are any savings given for possible elimination of gasoline/diesel fueling stations, such as those required for underground gasoline/diesel tank inspection and maintenance.

Conversion costs are not automatically adjusted over time to attempt to account for factors such as kit technology improvements of increasingly complex gasoline engine controls.

It is assumed that the original conversion kits (and tanks) are used until OEM vehicles become available, regardless of the mileage on the kits (and tanks).

APPENDIX

Variable Name	Cell Reference
Annual.Fuel.Price.Adjustment	=$B$260
Auto.Annual.gasoline.consump.gal	=$B$109:$AH$109
Auto.Annual.Propane.consump.gal	=$B$108:$AH$108
Auto.Annual.Propane.Fuel.Tax	=$B$121:AF$121
Auto.Conv.Kit.Cost	=$B$110:$AH$110
Auto.Conv.Kit.Salvage.Value	=$B$111:$AH$111
Auto.Conv.lab.cost	=$B$112:$AH$112
Auto.Dual.Fuel.Gasoline.MPG	=$B$105:$AH$105
Auto.Dual.fuel.MPG.Adjust.Factor	=$B$104:$AH$104
Auto.Fuel.Capacity.gal	=$B$117:$AH$117
Auto.Gasoline.MPG	=$B$100:$AH$100
Auto.Maint.Cost.Diff	=$B$120:$AH$120
Auto.miles	=$B$107:$AH$107
Auto.Num.OEM	=$B$96:$AH$96
Auto.Num.OEM.Retired	=$B$98:$AH$98
Auto.Num.Propane.Converted	=$B$90:$AH$90
Auto.Num.Propane.Retired	=$B$94:$AH$94
Auto.Num.Propane.Trans	=$B$92:$AH$92
Auto.Num.Vehicles	=$B$88:$AH$88
Auto.OEM.Cost.Diff	=$B$115:$AH$115
Auto.OEM.Salvage.Value	=$B$116:$AH$116
Auto.On.board.gasoline.capacity	=$A$122:$AH$122
Auto.Prcnt.Propane.miles	=$B$119:$AH$119
Auto.Propane.mpg	=$B$103:$AH$103
Auto.Propane.MPG.Adj.Factor	=$B$102:$AH$102
Auto.Propane.per.fill.gal	=$B$275:$AH$275
Auto.Tank.cost	=$B$113:$AH$113
Auto.Tank.Salvage.Value	=$B$114:$AH$114
Auto.tanks.per.veh.	=$B$118:$AH$118
Autos.per.day	=$B$270:$AH$270
Conversion.Kit.costs	=$B$22:$AH$22 $B$64:$AH$64
Cost.per.veh.per.year.large.volume	=$B$84
Cost.per.veh.per.year.small.volume	=$B$42
Cumulative.NPV.large.fleet	=$AI$79
Cumulative.NPV.small.fleet	=$AI$37
Ded.Diesel.Session.Time	=$B$294:$AH$294
Ded.Gasoline.Session.Time	=$B$293:$AH$293
Diesel.fill.rate.gal.min	=$B$284:$AH$284
Diesel.Price.gallon	=$B$259:$AH$259

Variable Name	Cell Reference
Discount.Rate	=$B$302
Federal.tax.gallon.propane	=$B$257:$AH$257
Fuel.in.empty.tank.gal	=$B$299
Gasoline.diesel.switch.time	=$B$285:$AH$285
Gasoline.fill.rate.gal.min	=$B$283:$AH$283
Gasoline.Price.gallon	=$B$258:$AH$258
HDD.Annual.diesel.consump.gal	=$B$230:$AH$230
HDD.Annual.Propane.consump.gal	=$B$229:$AH$229
HDD.Annual.Propane.Fuel.Tax	=$B$247:$AH$247
HDD.Ded.Conv.Kit.Cost	=$B$231:$AH$231
HDD.Ded.Conv.Kit.Salvage.Value	=$B$232:$AH$232
HDD.Ded.Conv.lab.cost	=$B$233:$AH$233
HDD.Ded.Propane.mpg	=$B$224:$AH$224
HDD.Ded.Propane.MPG.Adj.Factor	=$B$223:$AH$223
HDD.Ded.Propane.per.fill.gal	=$B$278:$AH$278
HDD.Diesel.MPG	=$B$221:$AH$221
HDD.Dual.Conv.Kit.Cost	=$B$234:$AH$234
HDD.Dual.Conv.Kit.Salvage.Value	=$B$235:$AH$235
HDD.Dual.Conv.lab.cost	=$B$236:$AH$236
HDD.Dual.MPG	=$B$226:$AH$226
HDD.Dual.MPG.Adjust.Factor	=$B$225:$AH$225
HDD.Dual.Propane.per.fill.gal	=$B$279:$AH$279
HDD.Fuel.Capacity.gal	=$B$241:$AH$241
HDD.Maint.Cost.Diff.Ded	=$B$245:$AH$245
HDD.Maint.Cost.Diff.Dual	=$B$246:$AH$246
HDD.miles	=$B$228:$AH$228
HDD.Num.Ded.Conv.Retired	=$B$209:$AH$209
HDD.Num.Ded.Kits.Trans	=$B$207:$AH$207
HDD.Num.Ded.OEM	=$B$217:$AH$217
HDD.Num.Ded.OEM.Retired	=$B$219:$AH$219
HDD.Num.Ded.Vehicles	=$B$202:$AH$202
HDD.Num.Dual.Conv.Retired	=$B$215:$AH$215
HDD.Num.Dual.Kits.Trans	=$B$213:$AH$213
HDD.Num.Dual.Vehicles	=$B$203:$AH$203
HDD.Num.New.Ded.Converted	=$B$205:$AH$205
HDD.Num.New.Dual.Converted	=$B$211:$AH$211
HDD.OEM.Cost.Diff	=$B$239:$AH$239
HDD.OEM.Salvage.Value	=$B$240:$AH$240
HDD.On.board.diesel.capacity	=$B$248:$AH$248
HDD.Prcnt.Propane.consumed.dual	=$B$244:$AH$244

Variable Name	Cell Reference
HDD.Tank.cost	=$B$237:$AH$237
HDD.Tank.Salvage.Value	=$B$238:$AH$238
HDD.tanks.per.Ded.veh.	=$B$242:$AH$242
HDD.tanks.per.Dual.veh.	=$B$243:$AH$243
HDG.Annual.gasoline.consump.gal	=$B$185:$AH$185
HDG.Annual.Propane.consump.gal	=$B$184:$AH$184
HDG.Annual.Propane.Fuel.Tax	=$B$197:$AH$197
HDG.Conv.Kit.Cost	=$B$186:$AH$186
HDG.Conv.Kit.Salvage.Value	=$B$187:$AH$187
HDG.Conv.lab.cost	=$B$188:$AH$188
HDG.Dual.Fuel.Gasoline.MPG	=$B$181:$AH$181
HDG.Dual.fuel.MPG.Adjust.Factor	=$B$180:$AH$180
HDG.Fuel.Capacity.gal	=$B$193:$AH$193
HDG.Gasoline.MPG	=$B$176:$AH$176
HDG.Maint.Cost.Diff	=$B$196:$AH$196
HDG.miles	=$B$183:$AH$183
HDG.Num.OEM	=$B$172:$AH$172
HDG.Num.OEM.Retired	=$B$174:$AH$174
HDG.Num.Propane.Converted	=$B$166:$AH$166
HDG.Num.Propane.Retired	=$B$170:$AH$170
HDG.Num.Propane.Trans	=$B$168:$AH$168
HDG.Num.Vehicles	=$B$164:$AH$164
HDG.OEM.Cost.Diff	=$B$191:$AH$191
HDG.OEM.Salvage.Value	=$B$192:$AH$192
HDG.On.board.gasoline.capacity	=$B$198:$AH$198
HDG.Prcnt.Propane.miles	=$B$195:$AH$195
HDG.Propane.mpg	=$B$179:$AH$179
HDG.Propane.MPG.Adj.Factor	=$B$178:$AH$178
HDG.Propane.per.fill.gal	=$B$277:$AH$277
HDG.Tank.cost	=$B$189:$AH$189
HDG.Tank.Salvage.Value	=$B$190:$AH$190
HDG.tanks.per.veh.	=$B$194:$AH$194
Heavy.Ded.Diesel.per.day	=$B$273:$AH$273
Heavy.Dual.Diesel.per.day	=$B$274:$AH$274
Heavy.Gasoline.per.day	=$B$272:$AH$272
Labor.Cost.hour	=$B$286:$AH$286
Labor.costs	=$B$24:$AH$24 $B$66:$AH$66
Land.costs	=$B$16:$AH$16 $B$58:$AH$58

Variable Name	Cell Reference
Light.Trucks.per.day	=$B$271:$AH$271
LT.Annual.gasoline.consump.gal	=$B$147:$AH$147
LT.Annual.Propane.consump.gal	=$B$146:$AH$146
LT.Annual.Propane.Fuel.Tax	=$B$159:$AH$159
LT.Conv.Kit.Cost	=$B$148:$AH$148
LT.Conv.Kit.Salvage.Value	=$B$149:$AH$149
LT.Conv.lab.cost	=$B$150:$AH$150
LT.Dual.Fuel.Gasoline.MPG	=$B$143:$AH$143
LT.Dual.fuel.MPG.Adjust.Factor	=$B$142:$AH$142
LT.Fuel.Capacity.gal	=$B$155:$AH$155
LT.Gasoline.MPG	=$B$138:$AH$138
LT.Maint.Cost.Diff	=$B$158:$AH$158
LT.miles	=$B$145:$AH$145
LT.Num.OEM	=$B$134:$AH$134
LT.Num.OEM.Retired	=$B$136:$AH$136
LT.Num.Propane.Converted	=$B$128:$AH$128
LT.Num.Propane.Retired	=$B$132:$AH$132
Lt.Num.Propane.Trans	=$B$130:$AH$130
LT.Num.Vehicles	=$B$126:$AH$126
LT.OEM.Cost.Diff	=$B$153:$AH$153
LT.OEM.Salvage.Value	=$B$154:$AH$154
LT.On.board.gasoline.capacity	=$B$160:$AH$160
LT.Prcnt.Propane.miles	=$B$157:$AH$157
LT.Propane.mpg	=$B$141:$AH$141
LT.Propane.MPG.Adj.Factor	=$B$140:$AH$140
LT.Propane.per.fill.gal	=$B$276:$AH$276
LT.Tank.cost	=$B$151:$AH$151
LT.Tank.Salvage.Value	=$B$152:$AH$152
LT.tanks.per.veh.	=$B$156:$AH$156
Number.Autos.day	=$B$289:$AH$289
Number.Diesel.day	=$B$292:$AH$292
Number.Diesel.hoses	=$B$288:$AH$288
Number.Gasoline.hoses	=$B$287:$AH$287
Number.Heavy.Gas.day	=$B$291:$AH$291
Number.LT.Trucks.day	=$B$290:$AH$290
Number.of.Hoses	=$B$269:$AH$269
OEM.costs	=$B$25:$AH$25 $B$67:$AH$67
Propane.cost.at.refinery.gallon	=$B$253:$AH$253
Propane.Diesel.Factor	=$B$301

Variable Name	Cell Reference
Propane.fill.rate.gal.min	=$B$266:$AH$266
Propane.Gasoline.Factor	=$B$300
Propane.Price.to.large.fleet.gallon	=$B$252:$AH$252
Propane.Price.to.small.fleet.gallon	=$B$251:$AH$251
Propane.Session.Time.min	=$B$265:$AH$265
Station.Setup.Cost.Factor	=$B$280:$AH$280
Station.setup.costs	=$B$17:$AH$17 $B$59:$AH$59
Storage.Dispenser.costs.large.fleet	=$B$60:$AH$60
Storage.Dispenser.costs.small.fleet	=$B$18:$AH$18
Storage.water.volume.gal	=$B$267:$AH$267
Supplier.markup.large.fleet.gallon	=$B$256:$AH$256
Supplier.markup.small.fleet.gallon	=$B$255:$AH$255
Switch.Time.min	=$B$264:$AH$264
Tank.fill.percentage	=$B$298
Tanks.costs	=$B$23:$AH$23 $B$65:$AH$65
Total.Propane.consump.gal	=$B$261:$AH$261
Transportation.cost.gallon	=$B$254:$AH$254
Work.days.year	=$B$297

SAVINGS	30 year NPV	% of Savings	Incremental Savings/Mile
Gasoline Price Diff.	$748,258	99.4%	$0.0252
Automobiles	$36,078	4.8%	$0.0170
Light Trucks	$587,549	78.0%	$0.0231
Heavy Duty Trucks	$124,632	16.6%	$0.0588
Diesel Price Diff.	$4,707	0.6%	$0.0010
Maintenance	$0	0.0%	$0.0000
Total Savings	$752,965	100.0%	$0.0219
COSTS		% of Costs	Incremental Cost/Mile
Infrastructure			
Land	$0	0.0%	$0.0000
Station setup	($8,746)	1.4%	($0.0003)
Storage/Dispenser	($56,672)	9.3%	($0.0016)
Subtotal	($65,418)	10.8%	($0.0019)
Vehicle			
Conversion Kit	($93,630)	15.4%	($0.0027)
Tanks	($43,921)	7.2%	($0.0013)
Labor	($115,933)	19.1%	($0.0034)
OEM	($55,394)	9.1%	($0.0016)
Subtotal	($308,877)	50.9%	($0.0090)
Operating			
Station Maint.	($14,140)	2.3%	($0.0004)
Labor - fuel time loss	($31,419)	5.2%	($0.0009)
Propane Fuel Tax	($186,802)	30.8%	($0.0054)
Additional training	$0	0.0%	$0.0000
Subtotal	($232,362)	38.3%	($0.0068)
Total Costs	($606,657)	100.0%	($0.0176)
Savings - Cost	$146,308	N/A	$0.0043

VEHICLE DATA	# Vehicles in Year 30	MPG	Annual Miles per vehicle	LPG Conversion Cost per vehicle	OEM Cost Differential per vehicle
Automobiles	10	19.0	22,500	$1,600	$400
Light Trucks	120	14.0	22,500	$1,190	$400
Heavy Duty Gasoline	10	5.5	22,500	$1,200	$450
Heavy Duty Diesel	20	9.0	30,000	-	-
Dedicated	-	-	-	$3,325	$1,400
Dual-fuel	-	-	-	$3,535	N/A
Total	160				

DISCOUNT RATE	10.0%

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

OTHER FACTORS	
Labor Cost ($/hr)	$15.00

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

MAJOR ASSUMPTIONS

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

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

Benefit/vehicle/year	$97.00

Incremental Benefit/mile	$0.0043

Summary Sheet

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	**SMALL VOLUME PROPANE PURCHASE**																
2																	
3	**Period**	**Begin 1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
4	**SAVINGS**																
5	Gasoline Price Diff.		19,313	19,313	19,313	19,313	19,313	19,313	19,313	19,313	19,313	19,313	19,313	19,313	37,430	37,430	37,430
6	Automobiles		931	931	931	931	931	931	931	931	931	931	931	931	1,805	1,805	1,805
7	Light Trucks		15,165	15,165	15,165	15,165	15,165	15,165	15,165	15,165	15,165	15,165	15,165	15,165	29,391	29,391	29,391
8	Heavy Duty Trucks		3,217	3,217	3,217	3,217	3,217	3,217	3,217	3,217	3,217	3,217	3,217	3,217	6,234	6,234	6,234
9	Diesel Price Diff.		0	0	0	0	0	-13,453	-13,453	-13,453	-13,453	-13,453	-19,992	-19,992	-19,992	-19,992	-19,992
10	Maintenance		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11																	
12	**Total Savings**	0	19,313	19,313	19,313	19,313	19,313	5,860	5,860	5,860	5,860	5,860	-679	-679	17,438	17,438	17,438
13																	
14	**COSTS**																
15	**Infrastructure**																
16	Land																
17	Station setup	1,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	Storage/Dispenser	10,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	**Subtotal**	11,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20																	
21	**Vehicle**																
22	Conversion Kit	81,100	0	0	0	0	0	36,700	0	0	0	0	-6,000	0	-21,000	0	0
23	Tanks	39,800	0	0	0	0	0	7,300	0	0	0	0	0	0	0	0	0
24	Labor	49,900	0	0	0	0	49,900	24,600	0	0	49,900	0	0	0	0	0	0
25	OEM	0	0	0	0	0	0	0	0	0	0	0	28,000	0	56,500	0	0
26	**Subtotal**	170,800	0	0	0	0	49,900	68,600	0	0	49,900	0	22,000	0	35,500	0	0
27																	
28	**Operating**																
29	Station Maint.		500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
30	Labor - fueling time loss		2,554	2,554	2,554	2,554	2,554	4,235	4,235	4,235	4,235	4,235	5,203	5,203	3,172	3,172	3,172
31	Propane Fuel Tax		17,520	17,520	17,520	17,520	17,520	21,360	21,360	21,360	21,360	21,360	21,360	21,360	21,360	21,360	21,360
32	Additional Training																
33	**Subtotal**	0	20,574	20,574	20,574	20,574	20,574	26,095	26,095	26,095	26,095	26,095	27,063	27,063	25,032	25,032	25,032
34																	
35	**Total Costs**	182,300	20,574	20,574	20,574	20,574	70,474	94,695	26,095	26,095	75,995	26,095	49,063	27,063	60,532	25,032	25,032
36																	
37	**Savings - Cost**	-182,300	-1,260	-1,260	-1,260	-1,260	-51,160	-88,835	-20,235	-20,235	-70,135	-20,235	-49,741	-27,741	-43,095	-7,595	-7,595
38	**NPV**	-182,300	-1,146	-1,041	-947	-861	-31,766	-50,145	-10,384	-9,440	-29,744	-7,801	-17,434	-8,839	-12,483	-2,000	-1,818
39	**NPV-cumulative**	-182,300	-183,446	-184,487	-185,434	-186,295	-218,061	-268,206	-278,590	-288,030	-317,774	-325,575	-343,009	-351,848	-364,331	-366,331	-368,149
40	Discount Factor	1.000	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138	3.452	3.797	4.177
41																	
42	**Cost per vehicle per year**	-272.93															

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
43	**LARGE VOLUME PROPANE PURCHASE**																
44																	
45	**Period**	**Begin 1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
46	**SAVINGS**																
47	Gasoline Price Diff.		75,776	75,776	75,776	75,776	75,776	75,776	75,776	75,776	75,776	75,776	75,776	75,776	88,759	88,759	88,759
48	Automobiles		3,654	3,654	3,654	3,654	3,654	3,654	3,654	3,654	3,654	3,654	3,654	3,654	4,280	4,280	4,280
49	Light Trucks		59,501	59,501	59,501	59,501	59,501	59,501	59,501	59,501	59,501	59,501	59,501	59,501	69,695	69,695	69,695
50	Heavy Duty Trucks		12,621	12,621	12,621	12,621	12,621	12,621	12,621	12,621	12,621	12,621	12,621	12,621	14,784	14,784	14,784
51	Diesel Price Diff.		0	0	0	0	0	-410	-410	-410	-410	-410	1,728	1,728	1,728	1,728	1,728
52	Maintenance		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53																	
54	**Total Savings**	0	75,776	75,776	75,776	75,776	75,776	75,366	75,366	75,366	75,366	75,366	77,503	77,503	90,487	90,487	90,487
55																	
56	**COSTS**																
57	**Infrastructure**																
58	Land																
59	Station setup	8,550	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	Storage/Dispenser	57,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61	**Subtotal**	65,550	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
62																	
63	**Vehicle**																
64	Conversion Kit	81,100	0	0	0	0	0	36,700	0	0	0	0	-6,000	0	-21,000	0	0
65	Tanks	39,800	0	0	0	0	0	7,300	0	0	0	0	0	0	0	0	0
66	Labor	49,900	0	0	0	0	49,900	24,600	0	0	49,900	0	0	0	0	0	0
67	OEM	0	0	0	0	0	0	0	0	0	0	0	28,000	0	56,500	0	0
68	**Subtotal**	170,800	0	0	0	0	49,900	68,600	0	0	49,900	0	22,000	0	35,500	0	0
69																	
70	**Operating**																
71	Station Maint.		1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
72	Labor - fueling time loss		2,554	2,554	2,554	2,554	2,554	4,235	4,235	4,235	4,235	4,235	5,203	5,203	3,172	3,172	3,172
73	Propane Fuel Tax		17,520	17,520	17,520	17,520	17,520	21,360	21,360	21,360	21,360	21,360	21,360	21,360	21,360	21,360	21,360
74	Additional Training																
75	**Subtotal**	0	21,574	21,574	21,574	21,574	21,574	27,095	27,095	27,095	27,095	27,095	28,063	28,063	26,032	26,032	26,032
76																	
77	**Total Costs**	236,350	21,574	21,574	21,574	21,574	71,474	95,695	27,095	27,095	76,995	27,095	50,063	28,063	61,532	26,032	26,032
78																	
79	**Savings - Cost**	-236,350	54,202	54,202	54,202	54,202	4,302	-20,329	48,271	48,271	-1,629	48,271	27,441	49,441	28,954	64,454	64,454
80	**NPV**	-236,350	49,274	44,795	40,723	37,021	2,671	-11,475	24,771	22,519	-691	18,611	9,618	15,753	8,387	16,973	15,430
81	**NPV-cumulative**	-236,350	-187,076	-142,281	-101,558	-64,537	-61,866	-73,341	-48,571	-26,052	-26,743	-8,132	1,486	17,239	25,626	42,599	58,029
82	Discount Factor	1.000	1.100	1.210	1.331	1.464	1.611	1.772	1.949	2.144	2.358	2.594	2.853	3.138	3.452	3.797	4.177
83																	
84	**Benefit per vehicle per year**	97.00															

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
85	Period	Begin 1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
86	VEHICLE DATA																
87	Automobiles:																
88	Number of Vehicles	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
90	Number New Conversions	10															
92	Number Kits Transferred						10				10						
94	Number Conversions Retired						10				10				10		
96	Number OEM														10		
98	Number OEM Retired																
100	Gasoline MPG	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
102	Propane MPG Adjust. Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	1.1	1.1
103	Propane MPG (gasoline equivalent)	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	20.9	20.9	20.9
104	Dual-fuel MPG Adjust. Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
105	Dual-Fuel Gasoline MPG	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
107	Annual miles traveled per vehicle	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500
108	Annual Propane consump (gal)		16,014	16,014	16,014	16,014	16,014	16,014	16,014	16,014	16,014	16,014	16,014	16,014	14,558	14,558	14,558
109	Annual gasoline consump (gal)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	Conversion Kit Cost	$700	$700	$700	$700	$700	$700	$700	$700	$700	$700	$700	$700	$700	$700	$700	$700
111	Conv. Kit Salvage Value	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150
112	Conv. labor cost	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570
113	Tank cost	$330	$330	$330	$330	$330	$330	$330	$330	$330	$330	$330	$330	$330	$330	$330	$330
114	Tank Salvage Value	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
115	OEM Cost Difference	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400
116	OEM Salvage Value Difference	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100
117	Propane tank water volume (gal)	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
118	Number tanks/veh.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
119	% Propane miles	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
120	Maint. Cost Difference/year	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
121	Annual Propane Fuel Tax per vehicle	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120
122	On-board gasoline capacity	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
123	Period	Begin 1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
124	VEHICLE DATA																
125	Light Trucks:																
126	Number of Vehicles	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
128	Number New Conversions	120															
130	Number Kits Transferred						120				120						
132	Number Conversions Retired						120				120				120		
134	Number OEM														120		
136	Number OEM Retired																
138	Gasoline MPG	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
140	Propane MPG Adjust. Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	1.1	1.1
141	Propane MPG (gasoline equivalent)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	15.4	15.4	15.4
142	Dual-fuel MPG Adjust. Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
143	Dual-Fuel Gasoline MPG	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
145	Annual miles traveled per vehicle	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500
146	Annual Propane consump (gal)		260,796	260,796	260,796	260,796	260,796	260,796	260,796	260,796	260,796	260,796	260,796	260,796	237,087	237,087	237,087
147	Annual gasoline consump (gal)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
148	Conversion Kit Cost	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570
149	Conv. Kit Salvage Value	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150
150	Conv. labor cost	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340
151	Tank cost	$280	$280	$280	$280	$280	$280	$280	$280	$280	$280	$280	$280	$280	$280	$280	$280
152	Tank Salvage Value	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
153	OEM Cost Difference	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400
154	OEM Salvage Value Difference	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100
155	Propane tank water volume (gal)	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
156	Number tanks/veh.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
157	% Propane miles	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
158	Maint. Cost Difference/year	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
159	Annual Propane Fuel Tax per vehicle	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120
160	On-board gasoline capacity	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
161	Period	Begin 1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
162	VEHICLE DATA																
163	Heavy Duty Gasoline:																
164	Number of Vehicles	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
166	Number New Conversions	10															
168	Number Kits Transferred						10				10						
170	Number Conversions Retired						10				10				10		
172	Number OEM														10		
174	Number OEM Retired																
176	Gasoline MPG	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
178	Propane MPG Adjust. Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	1.1	1.1
179	Propane MPG (gasoline equivalent)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	6.1	6.1	6.1
180	Dual-fuel MPG Adjust. Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
181	Dual-Fuel Gasoline MPG	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
183	Annual miles traveled per vehicle	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500
184	Annual Propane consump (gal)		55,320	55,320	55,320	55,320	55,320	55,320	55,320	55,320	55,320	55,320	55,320	55,320	50,291	50,291	50,291
185	Annual gasoline consump (gal)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
186	Conversion Kit Cost	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570
187	Conv. Kit Salvage Value	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150
188	Conv. labor cost	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340
189	Tank cost	$290	$290	$290	$290	$290	$290	$290	$290	$290	$290	$290	$290	$290	$290	$290	$290
190	Tank Salvage Value	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
191	OEM Cost Difference	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450
192	OEM Salvage Value Difference	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100
193	Propane tank water volume (gal)	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
194	Number tanks/veh.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
195	% Propane miles	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
196	Maint. Cost Difference/year	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
197	Annual Propane Fuel Tax per vehicle	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192
198	On-board gasoline capacity	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
199	Period	Begin 1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
200	VEHICLE DATA																
201	Heavy Duty Diesel:																
202	Number of Ded. Propane Vehicles	0	0	0	0	0	0	10	10	10	10	10	20	20	20	20	20
203	Number of Dual-Fuel Vehicles	0	0	0	0	0	0	10	10	10	10	10	0	0	0	0	0
205	Number New Ded. Conversions							10									
207	Number Ded. Kits Transferred																
209	Number Ded Conversions Retired												10				
211	Number New Dual Conversions							10									
213	Number Dual Kits Transferred																
215	Number Dual Conversions Retire												10				
217	Number OEM (Ded.)												20				
219	Number OEM Retired (Ded.)																
221	Diesel MPG	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
223	Ded. Propane MPG Adjust. Factor	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.8	0.8	0.8	0.8	0.8
224	Ded. Propane MPG (diesel equiv.)	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	7.2	7.2	7.2	7.2	7.2
225	Dual-Fuel MPG Adjust. Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
226	Dual-Fuel MPG	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
228	Annual miles traveled per vehicle	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000
229	Annual Propane consump (gal)		0	0	0	0	0	76,728	76,728	76,728	76,728	76,728	127,765	127,765	127,765	127,765	127,765
230	Annual diesel consump (gal)		0	0	0	0	0	28,333	28,333	28,333	28,333	28,333	0	0	0	0	0
231	Ded. Conversion Kit Cost	$1,630	$1,630	$1,630	$1,630	$1,630	$1,630	$1,630	$1,630	$1,630	$1,630	$1,630	$1,630	$1,630	$1,630	$1,630	$1,630
232	Ded. Conv. Kit Salvage Value	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300
233	Ded. Conv. labor cost	$1,330	$1,330	$1,330	$1,330	$1,330	$1,330	$1,330	$1,330	$1,330	$1,330	$1,330	$1,330	$1,330	$1,330	$1,330	$1,330
234	Dual Conversion Kit Cost	$2,040	$2,040	$2,040	$2,040	$2,040	$2,040	$2,040	$2,040	$2,040	$2,040	$2,040	$2,040	$2,040	$2,040	$2,040	$2,040
235	Dual Conv. Kit Salvage Value	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300
236	Dual Conv. labor cost	$1,130	$1,130	$1,130	$1,130	$1,130	$1,130	$1,130	$1,130	$1,130	$1,130	$1,130	$1,130	$1,130	$1,130	$1,130	$1,130
237	Tank cost	$365	$365	$365	$365	$365	$365	$365	$365	$365	$365	$365	$365	$365	$365	$365	$365
238	Tank Salvage Value	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
239	OEM Cost Difference (Ded.)	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400
240	OEM Salvage Value Difference	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300
241	Propane tank water volume (gal)	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
242	Number Tanks/Ded. vehicle	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
243	Number Tanks/Dual vehicle	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
244	% Propane of fuel consumed (dual-fuel	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
245	Maint. Cost Difference/year (Ded.)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
246	Maint. Cost Difference/year (Dual)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
247	Annual Propane Fuel Tax per vehicle	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192
248	On-board diesel capacity	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
249	Period	Begin 1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
250	**FUEL PRICES**																
251	Propane Price to small fleet/gallon	$0.600	$0.600	$0.600	$0.600	$0.600	$0.600	$0.600	$0.600	$0.600	$0.600	$0.600	$0.600	$0.600	$0.600	$0.600	$0.600
252	Propane Price to large fleet/gallon	$0.430	$0.430	$0.430	$0.430	$0.430	$0.430	$0.430	$0.430	$0.430	$0.430	$0.430	$0.430	$0.430	$0.430	$0.430	$0.430
253	Propane cost at refinery/gallon	$0.360	$0.360	$0.360	$0.360	$0.360	$0.360	$0.360	$0.360	$0.360	$0.360	$0.360	$0.360	$0.360	$0.360	$0.360	$0.360
254	Transportation cost/gallon	$0.030	$0.030	$0.030	$0.030	$0.030	$0.030	$0.030	$0.030	$0.030	$0.030	$0.030	$0.030	$0.030	$0.030	$0.030	$0.030
255	Supplier markup for small fleet/gal	$0.210	$0.210	$0.210	$0.210	$0.210	$0.210	$0.210	$0.210	$0.210	$0.210	$0.210	$0.210	$0.210	$0.210	$0.210	$0.210
256	Supplier markup for large fleet/gal	$0.040	$0.040	$0.040	$0.040	$0.040	$0.040	$0.040	$0.040	$0.040	$0.040	$0.040	$0.040	$0.040	$0.040	$0.040	$0.040
257	Federal tax/gallon	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000
258	Gasoline Price/gallon	$0.890	$0.890	$0.890	$0.890	$0.890	$0.890	$0.890	$0.890	$0.890	$0.890	$0.890	$0.890	$0.890	$0.890	$0.890	$0.890
259	Diesel Price/gallon	$0.850	$0.850	$0.850	$0.850	$0.850	$0.850	$0.850	$0.850	$0.850	$0.850	$0.850	$0.850	$0.850	$0.850	$0.850	$0.850
260	Annual Fuel Price Adjustment	0.0%															
261	Total Propane consump (gal)	332,130	332,130	332,130	332,130	332,130	332,130	408,858	408,858	408,858	408,858	408,858	459,895	459,895	429,701	429,701	429,701
262																	
263	**STATION DESIGN**																
264	Switch Time (min.)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
265	Propane Session Time (min.)	172	172	172	172	172	172	200	200	200	200	200	219	219	204	204	204
266	Propane fill rate (gal/min)	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
267	Storage water volume (gal)	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400
268	Supply of propane on-site (weeks)	1.8	1.8	1.8	1.8	1.8	1.8	1.5	1.5	1.5	1.5	1.5	1.3	1.3	1.4	1.4	1.4
269	Number of Hoses	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
270	Autos per day	3.14	3.14	3.14	3.14	3.14	3.14	3.14	3.14	3.14	3.14	3.14	3.14	3.14	2.86	2.86	2.86
271	Light Trucks per day	43.99	43.99	43.99	43.99	43.99	43.99	43.99	43.99	43.99	43.99	43.99	43.99	43.99	39.99	39.99	39.99
272	Heavy Gasoline per day	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	6.57	5.97	5.97	5.97
273	Heavy Diesel per day (Ded.)	0.00	0.00	0.00	0.00	0.00	0.00	4.52	4.52	4.52	4.52	4.52	8.36	8.36	8.36	8.36	8.36
274	Heavy Diesel per day (Dual)	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.50	0.50	0.50	0.50	0.00	0.00	0.00	0.00	0.00
275	Auto Propane per fill (gal)	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
276	Lt Truck Propane per fill (gal)	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
277	Heavy Gas. Propane per fill (gal)	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
278	Heavy Ded. Dies. Propane per fill (gal)	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59
279	Heavy Dual Dies. Propane per fill (gal)	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59
280	Station Setup Cost Factor	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
281																	
282	**Labor Time Loss Calculations:**																
283	Gasoline fill rate (gal/min)	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
284	Diesel fill rate (gal/min)	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
285	Gasoline/diesel switch time (min)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
286	Labor Cost ($/hour)	$15	$15	$15	$15	$15	$15	$15	$15	$15	$15	$15	$15	$15	$15	$15	$15
287	Number of Gasoline hoses	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
288	Number of Diesel hoses	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
289	Number of Autos/day	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
290	Number of Lt Trucks/day	46.36	46.36	46.36	46.36	46.36	46.36	46.36	46.36	46.36	46.36	46.36	46.36	46.36	46.36	46.36	46.36
291	Number of Heavy Gas/day	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84
292	Number of Heavy Diesel/day	0.00	0.00	0.00	0.00	0.00	0.00	3.43	3.43	3.43	3.43	3.43	5.96	5.96	5.96	5.96	5.96
293	Dedicated Gasoline Session Time	152	152	152	152	152	152	152	152	152	152	152	152	152	152	152	152
294	Dedicated Diesel Session Time	0	0	0	0	0	0	31	31	31	31	31	55	55	55	55	55
295																	

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
296	**OTHER FACTORS**																
297	Work days/year	260															
298	Tank fill percentage	80%															
299	Fuel in an "empty" tank (gal)	2															
300	Gasoline to Propane Factor	1.35															
301	Diesel to Propane Factor	1.53															
302	Discount Rate	10.0%															
303																	

	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1	SMALL VOLUME PROPANE PURCHASE																	
2																		
3	**Period**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**End 30**	**NPV**
4	SAVINGS																	
5	Gasoline Price Diff.	37,430	37,430	37,430	37,430	37,430	37,430	37,430	37,430	37,430	37,430	37,430	37,430	37,430	37,430	37,430	0	229,408
6	Automobiles	1,805	1,805	1,805	1,805	1,805	1,805	1,805	1,805	1,805	1,805	1,805	1,805	1,805	1,805	1,805	0	11,061
7	Light Trucks	29,391	29,391	29,391	29,391	29,391	29,391	29,391	29,391	29,391	29,391	29,391	29,391	29,391	29,391	29,391	0	180,136
8	Heavy Duty Trucks	6,234	6,234	6,234	6,234	6,234	6,234	6,234	6,234	6,234	6,234	6,234	6,234	6,234	6,234	6,234	0	38,211
9	Diesel Price Diff.	-19,992	-19,992	-19,992	-19,992	-19,992	-19,992	-19,992	-19,992	-19,992	-19,992	-19,992	-19,992	-19,992	-19,992	-19,992	0	-97,287
10	Maintenance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11																		
12	**Total Savings**	17,438	17,438	17,438	17,438	17,438	17,438	17,438	17,438	17,438	17,438	17,438	17,438	17,438	17,438	17,438	0	132,120
13																		
14	COSTS																	
15	**Infrastructure**																	
16	Land																	0
17	Station setup	450	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1,598
18	Storage/Dispenser	3,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-5,000	-10,366
19	**Subtotal**	3,450	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-5,000	-11,964
20																		
21	**Vehicle**																	
22	Conversion Kit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-93,630
23	Tanks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-43,921
24	Labor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-115,933
25	OEM	22,000	42,500	0	0	0	64,500	0	0	0	42,500	22,000	0	0	42,500	0	-20,000	-55,394
26	**Subtotal**	22,000	42,500	0	0	0	64,500	0	0	0	42,500	22,000	0	0	42,500	0	-20,000	-308,877
27																		
28	**Operating**																	
29	Station Maint.	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	0	-4,713
30	Labor - fueling time loss	3,172	3,172	3,172	3,172	3,172	3,172	3,172	3,172	3,172	3,172	3,172	3,172	3,172	3,172	3,172	0	-31,419
31	Propane Fuel Tax	21,360	21,360	21,360	21,360	21,360	21,360	21,360	21,360	21,360	21,360	21,360	21,360	21,360	21,360	21,360	0	-186,802
32	Additional Training																	
33	**Subtotal**	25,032	25,032	25,032	25,032	25,032	25,032	25,032	25,032	25,032	25,032	25,032	25,032	25,032	25,032	25,032	0	-222,935
34																		
35	**Total Costs**	50,482	67,532	25,032	25,032	25,032	89,532	25,032	25,032	25,032	67,532	47,032	25,032	25,032	67,532	25,032	-25,000	-543,776
36																		
37	**Savings - Cost**	-33,045	-50,095	-7,595	-7,595	-7,595	-72,095	-7,595	-7,595	-7,595	-50,095	-29,595	-7,595	-7,595	-50,095	-7,595	25,000	-411,656
38	**NPV**	-7,191	-9,911	-1,366	-1,242	-1,129	-9,742	-933	-848	-771	-4,624	-2,483	-579	-527	-3,158	-435	1,433	
39	**NPV-cumulative**	-375,341	-385,252	-386,618	-387,859	-388,988	-398,731	-399,664	-400,512	-401,283	-405,906	-408,389	-408,969	-409,495	-412,653	-413,089	-411,656	
40	Discount Factor	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850	10.835	11.918	13.110	14.421	15.863	17.449	17.449	
41																		
42																		

	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
43	**LARGE VOLUME PROPANE PURCHASE**																	
44																		
45	**Period**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**End 30**	**NPV**
46	**SAVINGS**																	
47	Gasoline Price Diff.	88,759	88,759	88,759	88,759	88,759	88,759	88,759	88,759	88,759	88,759	88,759	88,759	88,759	88,759	88,759	0	748,258
48	Automobiles	4,280	4,280	4,280	4,280	4,280	4,280	4,280	4,280	4,280	4,280	4,280	4,280	4,280	4,280	4,280	0	36,078
49	Light Trucks	69,695	69,695	69,695	69,695	69,695	69,695	69,695	69,695	69,695	69,695	69,695	69,695	69,695	69,695	69,695	0	587,549
50	Heavy Duty Trucks	14,784	14,784	14,784	14,784	14,784	14,784	14,784	14,784	14,784	14,784	14,784	14,784	14,784	14,784	14,784	0	124,632
51	Diesel Price Diff.	1,728	1,728	1,728	1,728	1,728	1,728	1,728	1,728	1,728	1,728	1,728	1,728	1,728	1,728	1,728	0	4,707
52	Maintenance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53																		
54	**Total Savings**	90,487	90,487	90,487	90,487	90,487	90,487	90,487	90,487	90,487	90,487	90,487	90,487	90,487	90,487	90,487	0	752,965
55																		
56	**COSTS**																	
57	**Infrastructure**																	
58	Land																	0
59	Station setup	900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-8,746
60	Storage/Dispenser	6,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-28,500	-56,672
61	**Subtotal**	6,900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-28,500	-65,418
62																		
63	**Vehicle**																	
64	Conversion Kit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-93,630
65	Tanks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-43,921
66	Labor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-115,933
67	OEM	22,000	42,500	0	0	0	64,500	0	0	0	42,500	22,000	0	0	42,500	0	-20,000	-55,394
68	**Subtotal**	22,000	42,500	0	0	0	64,500	0	0	0	42,500	22,000	0	0	42,500	0	-20,000	-308,877
69																		
70	**Operating**																	
71	Station Maint.	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	0	-14,140
72	Labor - fueling time loss	3,172	3,172	3,172	3,172	3,172	3,172	3,172	3,172	3,172	3,172	3,172	3,172	3,172	3,172	3,172	0	-31,419
73	Propane Fuel Tax	21,360	21,360	21,360	21,360	21,360	21,360	21,360	21,360	21,360	21,360	21,360	21,360	21,360	21,360	21,360	0	-186,802
74	Additional Training																	
75	**Subtotal**	26,032	26,032	26,032	26,032	26,032	26,032	26,032	26,032	26,032	26,032	26,032	26,032	26,032	26,032	26,032	0	-232,362
76																		
77	**Total Costs**	54,932	68,532	26,032	26,032	26,032	90,532	26,032	26,032	26,032	68,532	48,032	26,032	26,032	68,532	26,032	-48,500	-606,657
78																		
79	**Savings - Cost**	35,554	21,954	64,454	64,454	64,454	-46	64,454	64,454	64,454	21,954	42,454	64,454	64,454	21,954	64,454	48,500	146,308
80	**NPV**	7,738	4,344	11,593	10,539	9,581	-6	7,918	7,198	6,544	2,026	3,562	4,916	4,469	1,384	3,694	2,779	
81	**NPV-cumulative**	65,766	70,110	81,703	92,242	101,822	101,816	109,734	116,932	123,476	125,502	129,064	133,981	138,450	139,834	143,528	146,308	
82	Discount Factor	4.595	5.054	5.560	6.116	6.727	7.400	8.140	8.954	9.850	10.835	11.918	13.110	14.421	15.863	17.449	17.449	
83																		
84																		

	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
85	**Period**	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	End 30	
86	**VEHICLE DATA**																	
87	**Automobiles:**																	
88	Number of Vehicles	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	0	
90	Number New Conversions																	
92	Number Kits Transferred																	
94	Number Conversions Retired																	
96	Number OEM		10				10				10				10			
98	Number OEM Retired		10				10				10				10		10	
100	Gasoline MPG	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	
102	Propane MPG Adjust. Factor	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	
103	Propane MPG (gasoline equivalent)	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	
104	Dual-fuel MPG Adjust. Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
105	Dual-Fuel Gasoline MPG	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	
107	Annual miles traveled per vehicle	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	
108	Annual Propane consump (gal)	14,558	14,558	14,558	14,558	14,558	14,558	14,558	14,558	14,558	14,558	14,558	14,558	14,558	14,558	14,558	0	
109	Annual gasoline consump (gal)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
110	Conversion Kit Cost	$700	$700	$700	$700	$700	$700	$700	$700	$700	$700	$700	$700	$700	$700	$700	$700	
111	Conv. Kit Salvage Value	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	
112	Conv. labor cost	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	
113	Tank cost	$330	$330	$330	$330	$330	$330	$330	$330	$330	$330	$330	$330	$330	$330	$330	$330	
114	Tank Salvage Value	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
115	OEM Cost Difference	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	
116	OEM Salvage Value Difference	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	
117	Propane tank water volume (gal)	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	
118	Number tanks/veh.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
119	% Propane miles	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
120	Maint. Cost Difference/year	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
121	Annual Propane Fuel Tax per vehicle	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	
122	On-board gasoline capacity	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	

	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
123	Period	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	End 30	
124	VEHICLE DATA																	
125	Light Trucks:																	
126	Number of Vehicles	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	0	
128	Number New Conversions																	
130	Number Kits Transferred																	
132	Number Conversions Retired																	
134	Number OEM		120				120				120				120			
136	Number OEM Retired		120				120				120				120		120	
138	Gasoline MPG	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	
140	Propane MPG Adjust. Factor	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	
141	Propane MPG (gasoline equivalent)	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	
142	Dual-fuel MPG Adjust. Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
143	Dual-Fuel Gasoline MPG	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	
145	Annual miles traveled per vehicle	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	
146	Annual Propane consump (gal)	237,087	237,087	237,087	237,087	237,087	237,087	237,087	237,087	237,087	237,087	237,087	237,087	237,087	237,087	237,087	0	
147	Annual gasoline consump (gal)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
148	Conversion Kit Cost	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	
149	Conv. Kit Salvage Value	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	
150	Conv. labor cost	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	
151	Tank cost	$280	$280	$280	$280	$280	$280	$280	$280	$280	$280	$280	$280	$280	$280	$280	$280	
152	Tank Salvage Value	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
153	OEM Cost Difference	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	
154	OEM Salvage Value Difference	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	
155	Propane tank water volume (gal)	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	
156	Number tanks/veh.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
157	% Propane miles	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
158	Maint. Cost Difference/year	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
159	Annual Propane Fuel Tax per vehicle	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	$120	
160	On-board gasoline capacity	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	

	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
161	Period	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	End 30	
162	VEHICLE DATA																	
163	Heavy Duty Gasoline:																	
164	Number of Vehicles	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	0	
166	Number New Conversions																	
168	Number Kits Transferred																	
170	Number Conversions Retired																	
172	Number OEM		10				10				10				10			
174	Number OEM Retired		10				10				10				10		10	
176	Gasoline MPG	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	
178	Propane MPG Adjust. Factor	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	
179	Propane MPG (gasoline equivalent)	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	
180	Dual-fuel MPG Adjust. Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
181	Dual-Fuel Gasoline MPG	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	
183	Annual miles traveled per vehicle	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	22,500	
184	Annual Propane consump (gal)	50,291	50,291	50,291	50,291	50,291	50,291	50,291	50,291	50,291	50,291	50,291	50,291	50,291	50,291	50,291	0	
185	Annual gasoline consump (gal)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
186	Conversion Kit Cost	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	$570	
187	Conv. Kit Salvage Value	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	$150	
188	Conv. labor cost	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	$340	
189	Tank cost	$290	$290	$290	$290	$290	$290	$290	$290	$290	$290	$290	$290	$290	$290	$290	$290	
190	Tank Salvage Value	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
191	OEM Cost Difference	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	$450	
192	OEM Salvage Value Difference	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	$100	
193	Propane tank water volume (gal)	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	
194	Number tanks/veh.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
195	% Propane miles	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
196	Maint. Cost Difference/year	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
197	Annual Propane Fuel Tax per vehicle	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	
198	On-board gasoline capacity	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	

	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
199	Period	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	End 30	
200	VEHICLE DATA																	
201	Heavy Duty Diesel:																	
202	Number of Ded. Propane Vehicles	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	0	
203	Number of Dual-Fuel Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
205	Number New Ded. Conversions																	
207	Number Ded. Kits Transferred																	
209	Number Ded Conversions Retired																	
211	Number New Dual Conversions																	
213	Number Dual Kits Transferred																	
215	Number Dual Conversions Retire																	
217	Number OEM (Ded.)	20					20					20						
219	Number OEM Retired (Ded.)	20					20					20					20	
221	Diesel MPG	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	
223	Ded. Propane MPG Adjust. Factor	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
224	Ded. Propane MPG (diesel equiv.)	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	
225	Dual-Fuel MPG Adjust. Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
226	Dual-Fuel MPG	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	
228	Annual miles traveled per vehicle	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	
229	Annual Propane consump (gal)	127,765	127,765	127,765	127,765	127,765	127,765	127,765	127,765	127,765	127,765	127,765	127,765	127,765	127,765	127,765	0	
230	Annual diesel consump (gal)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
231	Ded. Conversion Kit Cost	$1,630	$1,630	$1,630	$1,630	$1,630	$1,630	$1,630	$1,630	$1,630	$1,630	$1,630	$1,630	$1,630	$1,630	$1,630	$1,630	
232	Ded. Conv. Kit Salvage Value	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	
233	Ded. Conv. labor cost	$1,330	$1,330	$1,330	$1,330	$1,330	$1,330	$1,330	$1,330	$1,330	$1,330	$1,330	$1,330	$1,330	$1,330	$1,330	$1,330	
234	Dual Conversion Kit Cost	$2,040	$2,040	$2,040	$2,040	$2,040	$2,040	$2,040	$2,040	$2,040	$2,040	$2,040	$2,040	$2,040	$2,040	$2,040	$2,040	
235	Dual Conv. Kit Salvage Value	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	
236	Dual Conv. labor cost	$1,130	$1,130	$1,130	$1,130	$1,130	$1,130	$1,130	$1,130	$1,130	$1,130	$1,130	$1,130	$1,130	$1,130	$1,130	$1,130	
237	Tank cost	$365	$365	$365	$365	$365	$365	$365	$365	$365	$365	$365	$365	$365	$365	$365	$365	
238	Tank Salvage Value	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
239	OEM Cost Difference (Ded.)	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	$1,400	
240	OEM Salvage Value Difference	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	
241	Propane tank water volume (gal)	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	
242	Number Tanks/Ded. vehicle	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
243	Number Tanks/Dual vehicle	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
244	% Propane of fuel consumed (dual-fuel	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	
245	Maint. Cost Difference/year (Ded.)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
246	Maint. Cost Difference/year (Dual)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
247	Annual Propane Fuel Tax per vehicle	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	$192	
248	On-board diesel capacity	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	

	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
249	**Period**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**End 30**	
250	**FUEL PRICES**																	
251	Propane Price to small fleet/gallon	$0.600	$0.600	$0.600	$0.600	$0.600	$0.600	$0.600	$0.600	$0.600	$0.600	$0.600	$0.600	$0.600	$0.600	$0.600	$0.600	
252	Propane Price to large fleet/gallon	$0.430	$0.430	$0.430	$0.430	$0.430	$0.430	$0.430	$0.430	$0.430	$0.430	$0.430	$0.430	$0.430	$0.430	$0.430	$0.430	
253	Propane cost at refinery/gallon	$0.360	$0.360	$0.360	$0.360	$0.360	$0.360	$0.360	$0.360	$0.360	$0.360	$0.360	$0.360	$0.360	$0.360	$0.360	$0.360	
254	Transportation cost/gallon	$0.030	$0.030	$0.030	$0.030	$0.030	$0.030	$0.030	$0.030	$0.030	$0.030	$0.030	$0.030	$0.030	$0.030	$0.030	$0.030	
255	Supplier markup for small fleet/gal	$0.210	$0.210	$0.210	$0.210	$0.210	$0.210	$0.210	$0.210	$0.210	$0.210	$0.210	$0.210	$0.210	$0.210	$0.210	$0.210	
256	Supplier markup for large fleet/gal	$0.040	$0.040	$0.040	$0.040	$0.040	$0.040	$0.040	$0.040	$0.040	$0.040	$0.040	$0.040	$0.040	$0.040	$0.040	$0.040	
257	Federal tax/gallon	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000	
258	Gasoline Price/gallon	$0.890	$0.890	$0.890	$0.890	$0.890	$0.890	$0.890	$0.890	$0.890	$0.890	$0.890	$0.890	$0.890	$0.890	$0.890	$0.890	
259	Diesel Price/gallon	$0.850	$0.850	$0.850	$0.850	$0.850	$0.850	$0.850	$0.850	$0.850	$0.850	$0.850	$0.850	$0.850	$0.850	$0.850	$0.850	
260																		
261	Total Propane consump (gal)	429,701	429,701	429,701	429,701	429,701	429,701	429,701	429,701	429,701	429,701	429,701	429,701	429,701	429,701	429,701	429,701	
262																		
263	**STATION DESIGN**																	
264	Switch Time (min.)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
265	Propane Session Time (min.)	204	204	204	204	204	204	204	204	204	204	204	204	204	204	204	0	
266	Propane fill rate (gal/min)	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	
267	Storage water volume (gal)	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	
268	Supply of propane on-site (weeks)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	
269	Number of Hoses	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
270	Autos per day	2.86	2.86	2.86	2.86	2.86	2.86	2.86	2.86	2.86	2.86	2.86	2.86	2.86	2.86	2.86	0.00	
271	Light Trucks per day	39.99	39.99	39.99	39.99	39.99	39.99	39.99	39.99	39.99	39.99	39.99	39.99	39.99	39.99	39.99	0.00	
272	Heavy Gasoline per day	5.97	5.97	5.97	5.97	5.97	5.97	5.97	5.97	5.97	5.97	5.97	5.97	5.97	5.97	5.97	0.00	
273	Heavy Diesel per day (Ded.)	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	8.36	0.00	
274	Heavy Diesel per day (Dual)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
275	Auto Propane per fill (gal)	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
276	Lt Truck Propane per fill (gal)	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	
277	Heavy Gas. Propane per fill (gal)	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	
278	Heavy Ded. Dies. Propane per fill (gal)	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	
279	Heavy Dual Dies. Propane per fill (gal)	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	
280	Station Setup Cost Factor	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	
281																		
282	**Labor Time Loss Calculations:**																	
283	Gasoline fill rate (gal/min)	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	
284	Diesel fill rate (gal/min)	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	
285	Gasoline/diesel switch time (min)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
286	Labor Cost ($/hour)	$15	$15	$15	$15	$15	$15	$15	$15	$15	$15	$15	$15	$15	$15	$15	$15	
287	Number of Gasoline hoses	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
288	Number of Diesel hoses	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
289	Number of Autos/day	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	0.00	
290	Number of Lt Trucks/day	46.36	46.36	46.36	46.36	46.36	46.36	46.36	46.36	46.36	46.36	46.36	46.36	46.36	46.36	46.36	0.00	
291	Number of Heavy Gas/day	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	6.84	0.00	
292	Number of Heavy Diesel/day	5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96	5.96	0.00	
293	Dedicated Gasoline Session Time	152	152	152	152	152	152	152	152	152	152	152	152	152	152	152	0	
294	Dedicated Diesel Session Time	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	0	
295																		