

Evaluating Investments in Natural Gas Vehicles and Infrastructure for Your Fleet



Vehicle Infrastructure Cash-Flow Estimation – VICE 2.0

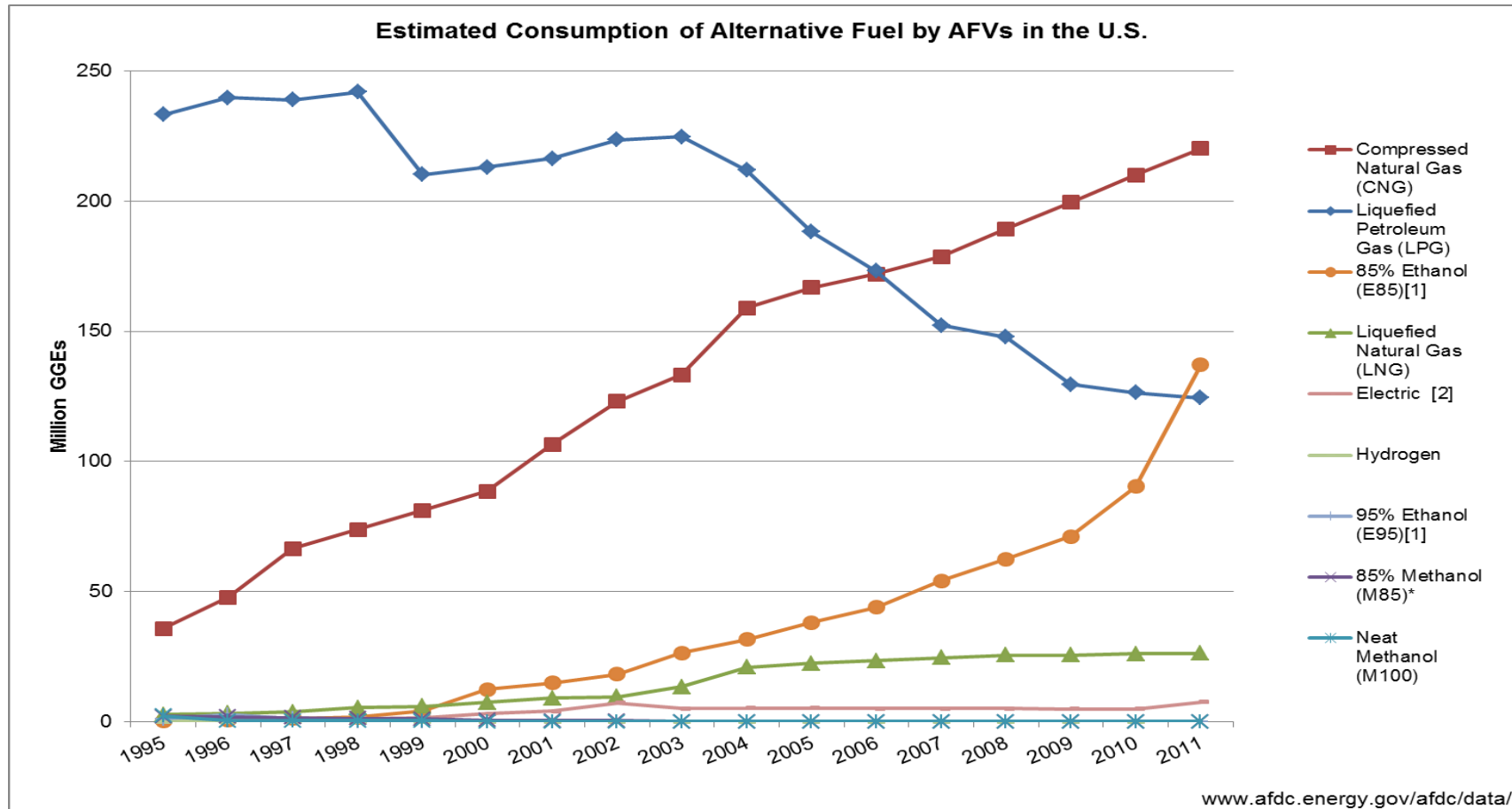
April 2, 2015

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- Trends in alternative fuel use
- Natural gas in transportation
- Natural gas as a fleet fuel
- Vehicle and Infrastructure Cash-Flow Evaluation Model (VICE 2.0)
 - Inputs
 - Calculation
 - Output
 - Sensitivities
- Additional Clean Cities tools

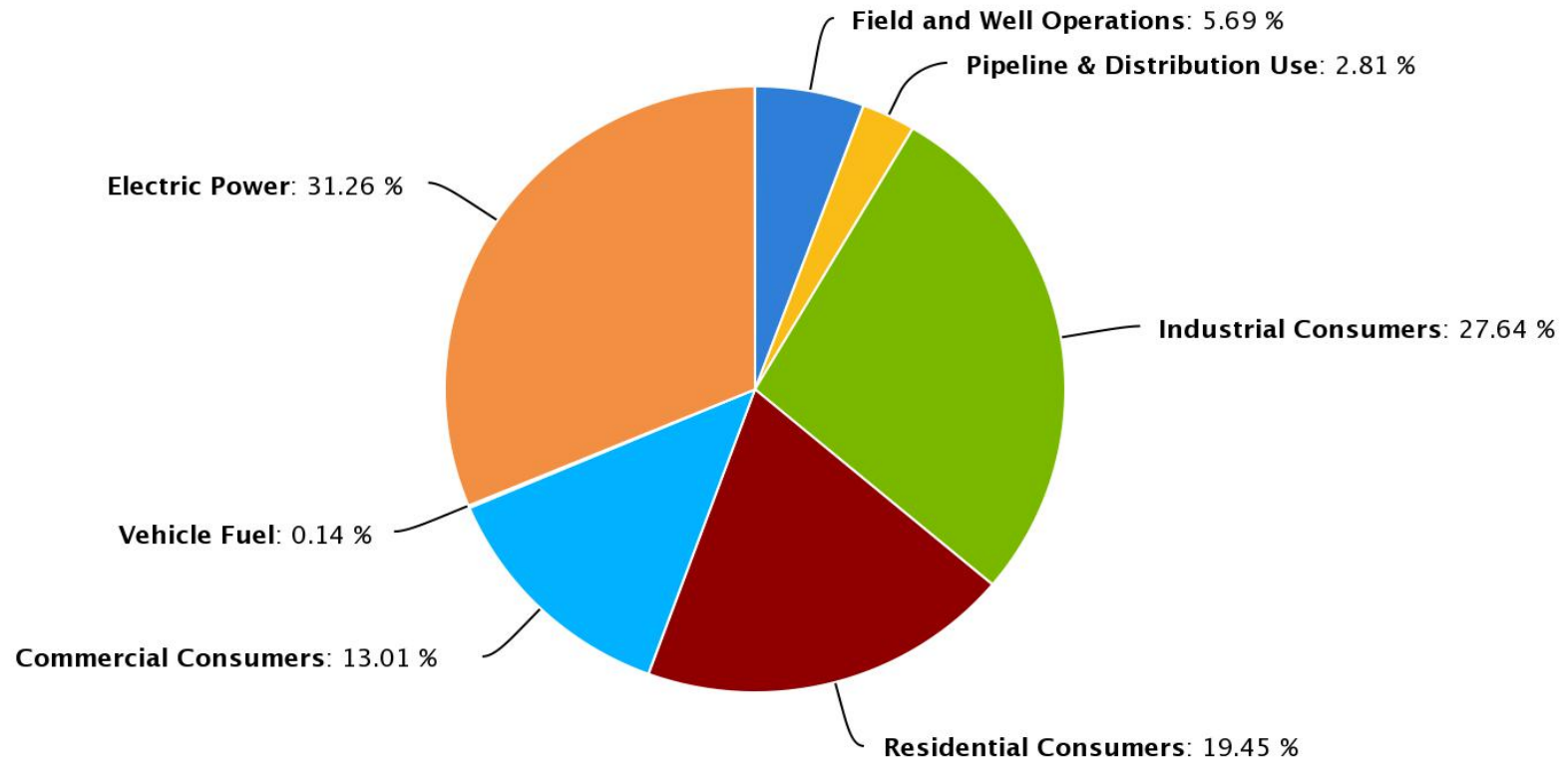
Alternative Fuel Consumption



- Alternative fuels have shown steady growth with the exception of propane

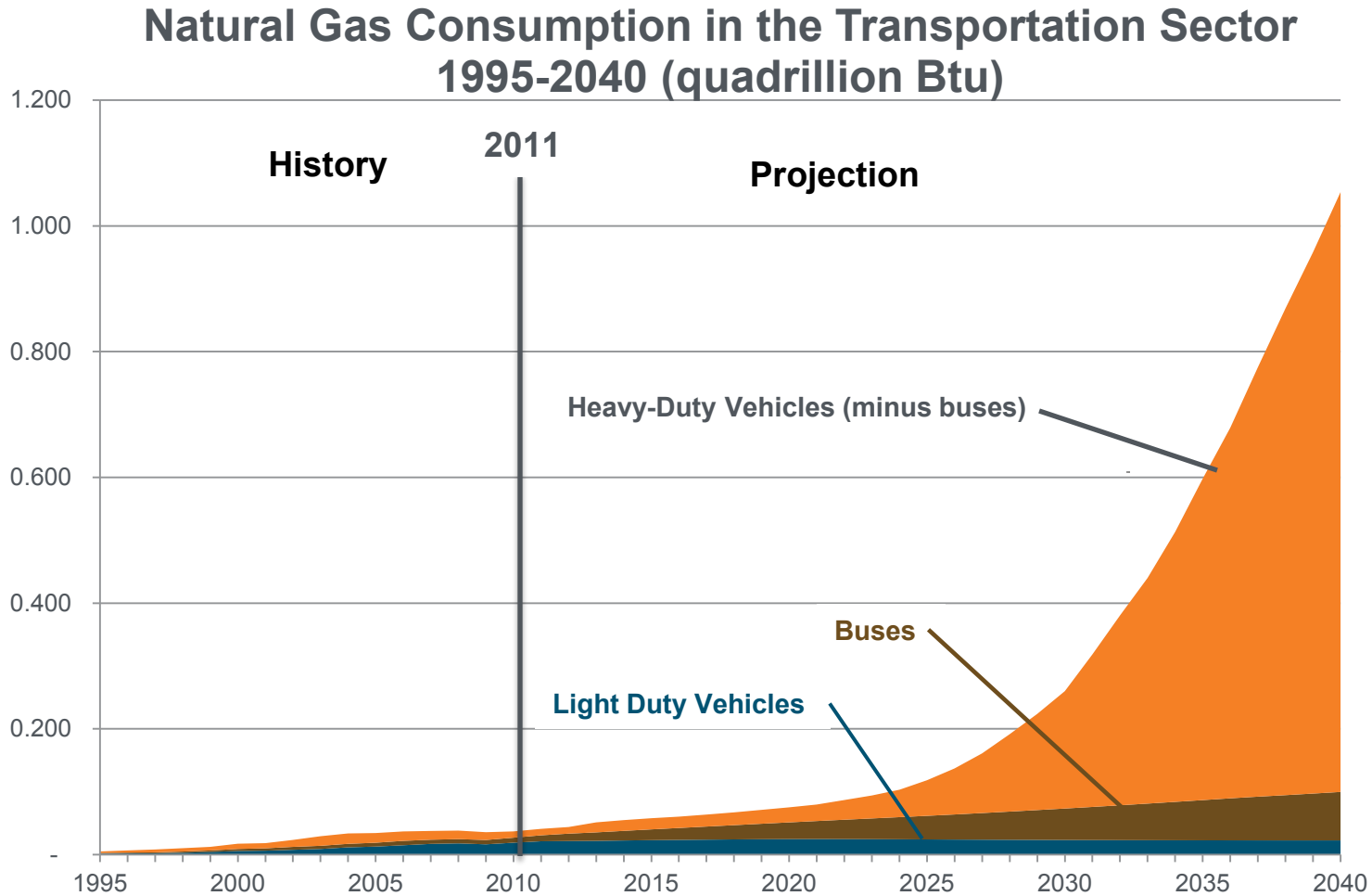
Data Source: EIA's Alternative Fuel Vehicle Data Alternatives to Traditional Transportation Fuels, (http://www.eia.gov/renewable/afv/users.cfm#tabs_charts-2)

Consumption of Natural Gas in the U.S.



- Vehicle fuel is a small fraction of overall usage

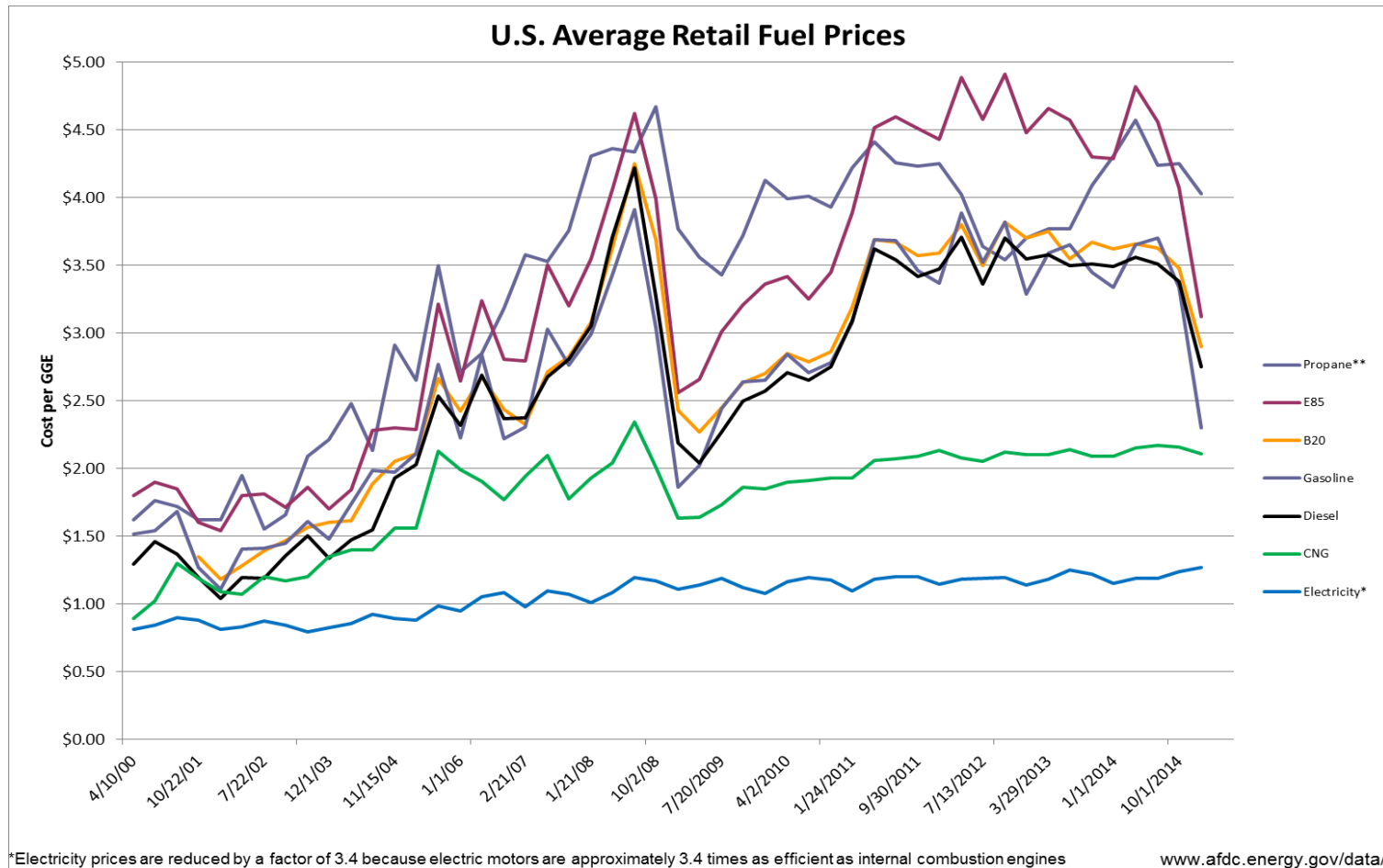
Source: U.S. Energy Information Administration



- Significant heavy-duty vehicle usage forecasted

Source: U.S. Energy Information Administration

Retail Fuel Prices



- **CNG provides cost stability and predictability**
- **Commercial natural gas is even more stable**

Natural Gas as a Fleet Fuel



Interest in natural gas as a transportation fuel

- Lower cost and less market volatility than gasoline and diesel
- Increased, steady supply of domestic natural gas
- Potential environmental benefits associated with lower GHG emissions from vehicles.

Hurdles to using natural gas as a transportation fuel

- 1,235 CNG stations nationwide, compared with 157,000 gasoline/diesel stations
- Incremental costs for vehicles can be significant and are more pronounced for light-duty
- Continued favorable economics depend on natural gas prices remaining lower than petroleum-based fuel prices.

| National Average Price Between January 1 and January 15, 2015 | |
|---------------------------------------------------------------|---------------|
| Fuel | Price |
| Biodiesel (B20) | \$4.55/gallon |
| Biodiesel (B99-B100) | \$5.44/gallon |
| Electricity | \$0.12/kWh |
| Ethanol (E85) | \$3.21/gallon |
| Natural Gas (CNG) | \$3.42/GGE |
| Propane | \$2.34/gallon |
| Gasoline | \$3.44/gallon |
| Diesel | \$4.32/gallon |

Source: [Alternative Fuel Price Report, January 2015](#) and [U.S. Energy Information Administration](#)

Where is Natural Gas Being Used?

Vehicles with predictable and central refueling patterns (i.e., fleets)

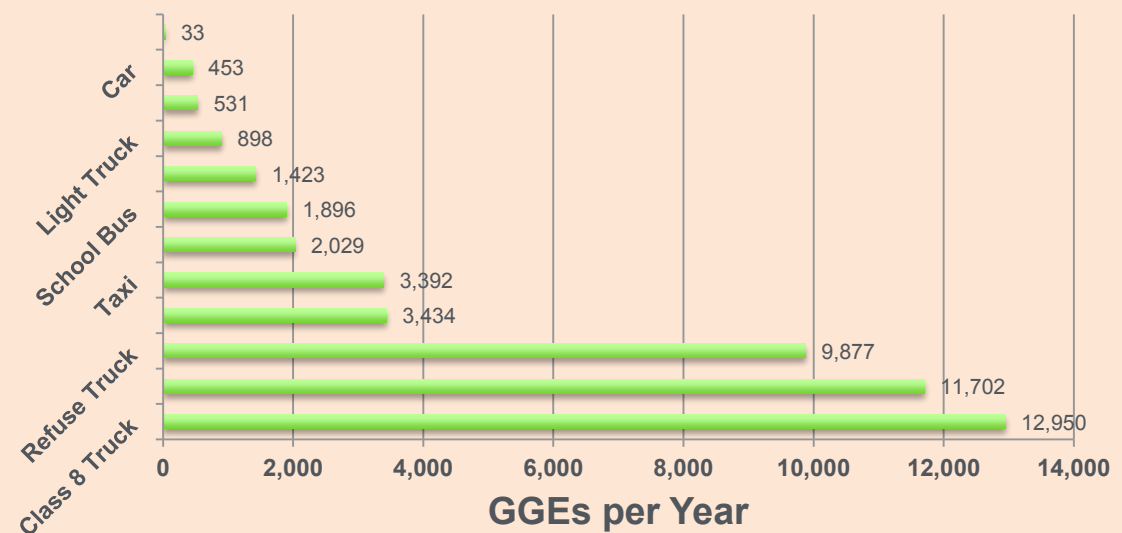
- ✓ Fleets benefit from shared infrastructure costs and logistics



High mileage and heavy fuel users

- ✓ Economic benefits come through fuel savings

Average Annual Fuel Use by Vehicle Type



- **Assesses finances for transit, refuse, school fleets, and mixes thereof**
- **Contrasts the cash flow for CNG infrastructure, vehicles, and fuel with that of a diesel fleet**
- **Determines discounted payback period, NPV, and ROI**
- **Excel-based.**

- Customizable to better represent your fleet
- Vehicle only *OR* Vehicle & Infrastructure
- Separate or combined investments
- Expanded vehicle choices
 - Light-duty and gasoline

- 20-year investment matrix for vehicles and infrastructure
- Conventional fuel displacement and GHG savings
- Multiple visual and reporting enhancements
- Still Excel-based.

VICE 2.0 can be used to investigate the operation of your fleet

- How many vehicles does it take to make a project profitable?

VICE 2.0 may be used to look at effect of operational variables

- Changes in vehicle lifespan
- Variations in fuel costs
- Changes in incremental cost
- Changes in operating cost.

VICE 2.0 – Inputs



Section 1 - Project and Investment Type Selection

| | Cell Name | Select from List | Value |
|----------------------------------------|--------------|---------------------------------|-------|
| Project Type More info | Project_Type | 1 = Vehicle & station (default) | 1 |

1 = Vehicle and infrastructure investment
2 = Vehicle acquisition investment only

| | Cell Name | Select from List | Value |
|-------------------------------------------|-------------|-----------------------------------------|-------|
| Investment Type More info | Invest_Type | 1 = Vehicle & station coupled (default) | 1 |

1 = Coupled: Ties infrastructure investment to vehicle investment so they happen in the same year throughout the life of the project.
2 = Decoupled: Allows vehicle investment and infrastructure investment to be made in different years throughout the life of the project.

If you chose project type 2, then the investment type selection is ignored.

Section 2 - Tax Exemption Status

| | Cell Name | Select from List | Value |
|-----------------------------------------------------|------------|------------------|-------|
| Is your fleet tax exempt? More info | Tax_Status | Yes | Y |

Note: Excise tax exemptions for diesel and gasoline = 0.38 \$/gal if you are a tax-exempt fleet.

Section 3 - Vehicle Data

Change the data in the yellow cells to reflect your individual fleet data and improve estimations.

| Vehicle No. | Vehicle Type | Base fuel Used | Incremental Cost | Average VMT | Average Vehicle Life | Base Fuel Economy (MPG base fuel) | CNG Fuel Economy Loss | CNG Fuel Economy (mpGGE) | Realized Fed Vehicle Incentive | Hostlers or Attendants Needed |
|-------------|--------------------------------|----------------|------------------|-------------|----------------------|-----------------------------------|-----------------------|--------------------------|--------------------------------|-------------------------------|
| 1 | Transit Bus ^{A,C,G} | Diesel | \$50,502 | 35,286 | 15 | 3.4 | 7.6% | 3.1 | \$0 | 0 |
| 2 | School Bus ^A | Diesel | \$31,376 | 12,000 | 15 | 7 | 12.5% | 6.1 | \$0 | 0 |
| 3 | Trash Truck ^{A,C} | Diesel | \$30,295 | 25,000 | 12 | 2.8 | 10.5% | 2.5 | \$0 | 0 |
| 4 | Para. Shuttle ^{A,B} | Gasoline | \$17,500 | 24,680 | 3.6 | 6.6 | 5.3% | 6.3 | \$0 | 0 |
| 5 | Delivery Truck ^{A,D} | Gasoline | \$15,000 | 13,469 | 6.5 | 6.6 | 5.3% | 6.3 | \$0 | 0 |
| 6 | Gasoline PU Truck ^A | Gasoline | \$10,000 | 13,401 | 7.4 | 13.9 | 5.3% | 13.2 | \$0 | 0 |
| 7 | Gasoline Taxi ^{E,F} | Gasoline | \$8,000 | 56,000 | 7.4 | 16.5 | 5.3% | 15.6 | \$0 | 0 |

General Sources:

A: Alternative Fuel Data Center - <http://www.afdc.energy.gov/>

B: Transportation Energy Data Book, Edition 31, Table 4.33, Summary Statistics on Demand Response Vehicles

C: Transportation Energy Data Book, Edition 31, Table 5.1, Summary Statistics on Class 3-8 Single Unit Trucks

D: Transportation Energy Data Book, Edition 31, Table 4.3, Summary Statistics on Class 1, 2, 2b Trucks

E: Transportation Energy Data Book, Edition 31, Table 4.1, Summary Statistics for Cars

F: Public Transportation Fact Book 2011: http://www.apta.com/resources/statistics/Documents/FactBook/APTA_2011_Fact_Book.pdf

G: Report &- State of the Industry: U.S. Classes 3-8 Used Trucks, <http://www.actresearch.net/reports/usedtrucksample.pdf>

AAA: <http://newsroom.aaa.com/2012/04/cost-of-owning-and-operating-vehicle-in-u-s-increased-1-9-percent-according-to-aaa%E2%80%99s-2012-%E2%80%98your-driving-costs%E2%80%99-study/>

VICE 2.0 Model Inputs

Input your fleet information in the colored cells to evaluate the financial soundness of converting your fleet to compressed natural gas (CNG).

Input Cell Key

| | |
|--|-------------------------------------------------------------------------------------|
| | Select project type, investment type, and tax status from dropdown list. (Required) |
| | Enter vehicle acquisition and infrastructure investment data. (Required) |
| | Enter vehicle data - infrastructure/fuels/operations/incentives. (Optional)* |
| | Calculated value. (Cannot be changed.) |

* Changing defaults to match your operating parameters will enhance the accuracy of the results.

Seven vehicle types



VICE 2.0 – Inputs (continued)



Section 4 - Infrastructure, Fuels, Operations, and Incentives

| Infrastructure | Cell Name | Value | Unit | Default |
|----------------------------------------------------|----------------------------|-------------|---------------------|------------|
| CNG Station Salvage Value | CNG_Station_Salv | 20% | % of original price | 20% |
| Monthly Cost of Hostler | Hostler_Cost | \$0.00 | \$/month | \$4,167 |
| Infrastructure tax credit rate | infra_tax_credit_rate | 0% | percent | 0% |
| Infrastructure tax credit cap | infra_tax_credit_cap | \$30,000 | \$ | \$30,000 |
| realized infrastructure tax credit | infra_tax_credit_realized | \$0 | \$ | Calculated |
| Fuels | | | | |
| Alt Fuel Excise Tax Credit | Excise_Tax_Credit | \$0.00 | \$/GGE | \$0.00 |
| Realized Alt Fuel Excise Tax Credit | Realized_Excise_Tax_Credit | \$0.000 | \$/GGE | Calculated |
| Price of CNG (per GGE) | CNG_Price | \$1.18 | \$/GGE | \$1.18 |
| CNG Price Increase | CNG_Inflation | 1.8% | % per year | 1.8% |
| CNG Lifecycle Greenhouse Gas Factor (per GGE) | CNG_GHG | 22.5 | lbs/GGE | 22.5 lbs |
| Diesel Fuel Price | Diesel_Price | \$3.91 | \$/gallon | \$3.91 |
| Diesel Price Increase | Diesel_Inflation | 2.9% | %/year | 2.9% |
| Federal Diesel Excise Tax | Fed_Diesel_tax | \$0.244 | \$ per gallon | \$0.244 |
| State Diesel Excise Tax | State_Diesel_Tax | \$0.244 | \$ per gallon | \$0.243 |
| Realized Diesel Excise Tax Exemption | Diesel_tax_exempt | \$0.488 | \$ per gallon | Calculated |
| DGE/GGE Conversion factor | GGE_DGE_Conv | 0.904 | DGEs per GGE | 0.904 |
| Diesel Lifecycle Greenhouse Gas Factor (per GGE) | Diesel_GHG | 25.4 | lbs/GGE | 25.4 lbs |
| Gasoline Fuel Price | Gasoline_Price | \$3.45 | \$/gallon | \$3.450 |
| Gasoline Price Increase | Gasoline_Inflation | 2.5% | %/year | 2.5% |
| Federal Gasoline Excise Tax | Fed_Gas_tax | \$0.184 | \$ per gallon | \$0.184 |
| State Gasoline Excise Tax | State_Gas_Tax | \$0.235 | \$ per gallon | \$0.235 |
| Realized Gasoline Excise Tax Exemption | Gasoline_Tax_Exemption | \$0.419 | \$ per gallon | Calculated |
| Gasoline Lifecycle Greenhouse Gas Factor (per GGE) | Gasoline_GHG | 24.8 | lbs/GGE | 24.8 lbs |
| Operations | | | | |
| CNG Vehicle Maintenance Costs | CNG_Diesel_Maint_Costs | \$0.52 | \$/mile | \$0.52 |
| Diesel Vehicle Maintenance | Diesel_Maint | \$0.52 | \$/mile | \$0.52 |
| Total Number of Vehicles | No_Vehicles | 50 | Vehicles | Calculated |
| LDV Gasoline Vehicle Maintenance ^{AAA} | Gasoline_Maint | \$0.047 | \$/mile | \$0.047 |
| LDV CNG Vehicle Maintenance Costs | CNG_LDV_Maint_Costs | \$0.047 | \$/mile | \$0.047 |
| Incentives | | | | |
| Required Rate of Return / Nominal Discount Rate | Required_ROR | 6.000% | % | 6.00% |
| Federal Vehicle Tax Incentive | Tax_Incentive | 0.00% | % of Inc_Cost | 0% |
| Realized Fed Veh Incentive | Total_Realized_Incentive | \$0 | \$ | Calculated |
| Post-Incentive Incremental Cost | Total_Inc_Cost | \$2,525,100 | \$ | Calculated |

Base Case Parameters

- Numerous data sources
 - Most published, a few from interviews
 - multiple sources averaged
- Common starting point
- Links provided for updating



VICE 2.0 – Inputs (continued)



No individual or total vehicle limits

Vehicle quantities and investments can be made at any time in 20 year project timeline

Section 5 - Vehicle Acquisition Matrix

Vehicle type, number of vehicles, and desired project year must be entered.

Enter the number of vehicles of each specific type to be purchased in years 0 through 20.

| Project Year | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | Total Vehicles |
|---------------------------|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----------------|
| Vehicle Type | | | | | | | | | | | | | | | | | | | | | | |
| No_Transit_Buses | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| No_School_Buses | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| No_Trash_Trucks | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| No_Para_Shuttle | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| No_Delivery_Truck | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| No_Pickup_Trucks | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| No_Taxis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Vehicle Investments | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

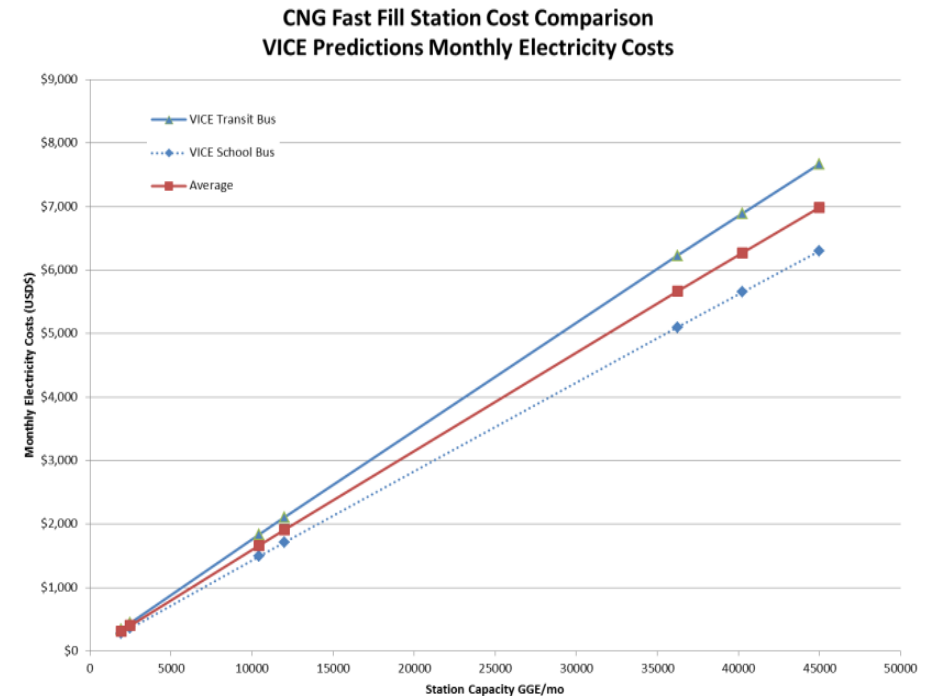
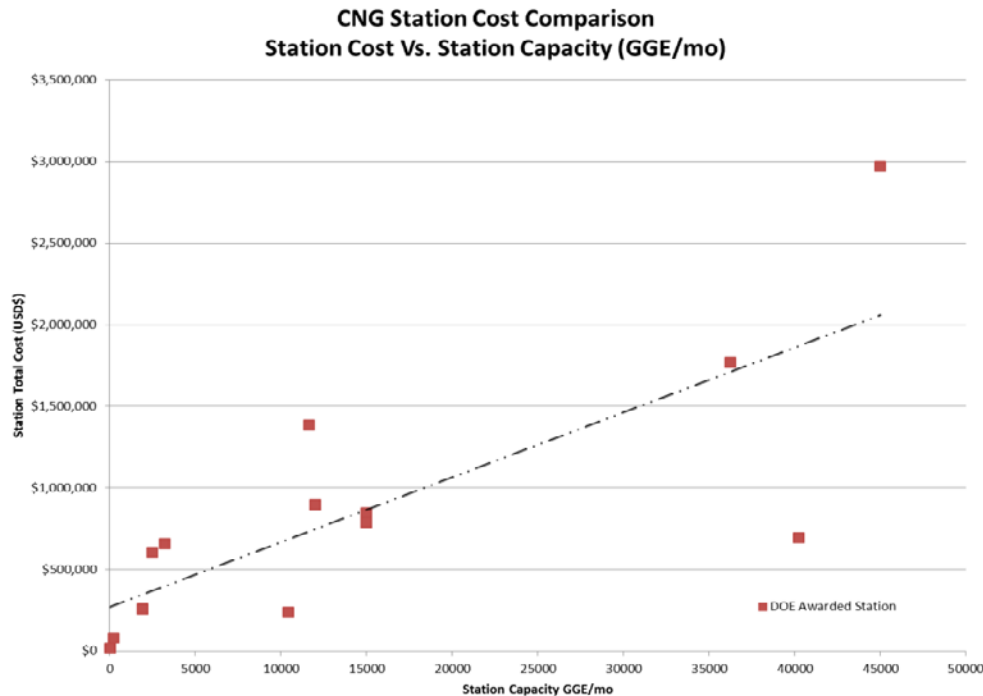
Section 6 - Station Investment Matrix

Only fill in if you chose project type 1 (vehicle and station) and investment type 1 (coupled) in Section 1.

| Project Year | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | |
|-------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| Station Investment Input ¹ (\$) | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Station Investment Calculated ² (\$) | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$ - |

- 20-year project life
- Input matrices for both vehicle acquisitions and infrastructure investment

VICE 2.0 – Station Calculations



- Cost versus throughput from DOE-awarded stations
 - Utility costs based on throughput
- Fleet composition and operation determines throughput

VICE 2.0 Results

Project/investment type: Combined vehicle and infrastructure investment (coupled)

| Business Case Results Summary | |
|-------------------------------|--------------|
| Net Present Value | \$14,261,317 |
| Payback Period (yrs) | 5.79 |
| Simple Payback Period (yrs) | 5.13 |

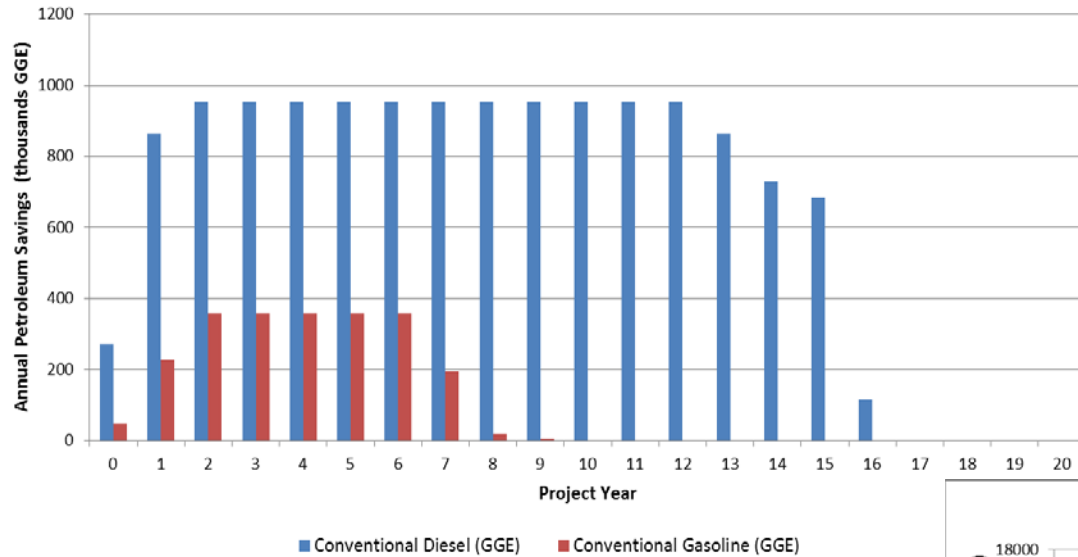
| Petroleum and Greenhouse Gas Reduction Summary | |
|------------------------------------------------|------------|
| Displaced Diesel (GGEs) | 15,497,557 |
| Displaced Gasoline (GGEs) | 2,291,604 |
| Total Petroleum Displacement (GGEs) | 17,789,161 |
| Project Lifetime GHG Displaced (tons) | 188,968 |

| Vehicle Types | Vehicles Acquired | Total Incremental Cost (\$) |
|---------------------------------------------|-------------------|-----------------------------|
| Transit Bus | 66 | \$3,333,132 |
| School Bus | 0 | \$0 |
| Trash Truck | 30 | \$908,850 |
| Para. Shuttle | 0 | \$0 |
| Delivery Truck | 120 | \$1,800,000 |
| Gasoline PU Truck | 30 | \$300,000 |
| Gasoline Taxi | 25 | \$200,000 |
| | | \$6,541,982 |
| Total Infrastructure Investment (\$) | | \$5,529,315 |

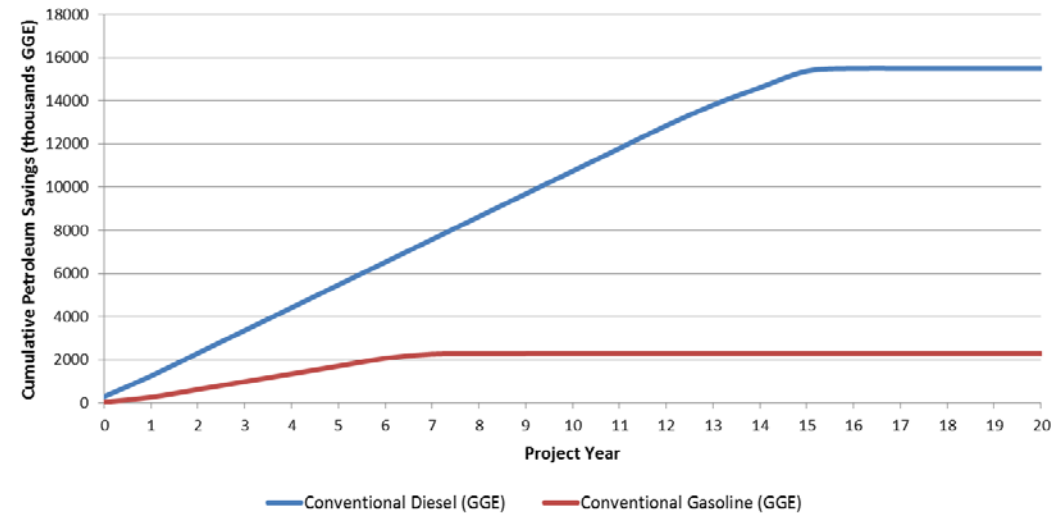
VICE 2.0 – Results & Visualizations



CNG Project Annual Petroleum Savings (GGEs)



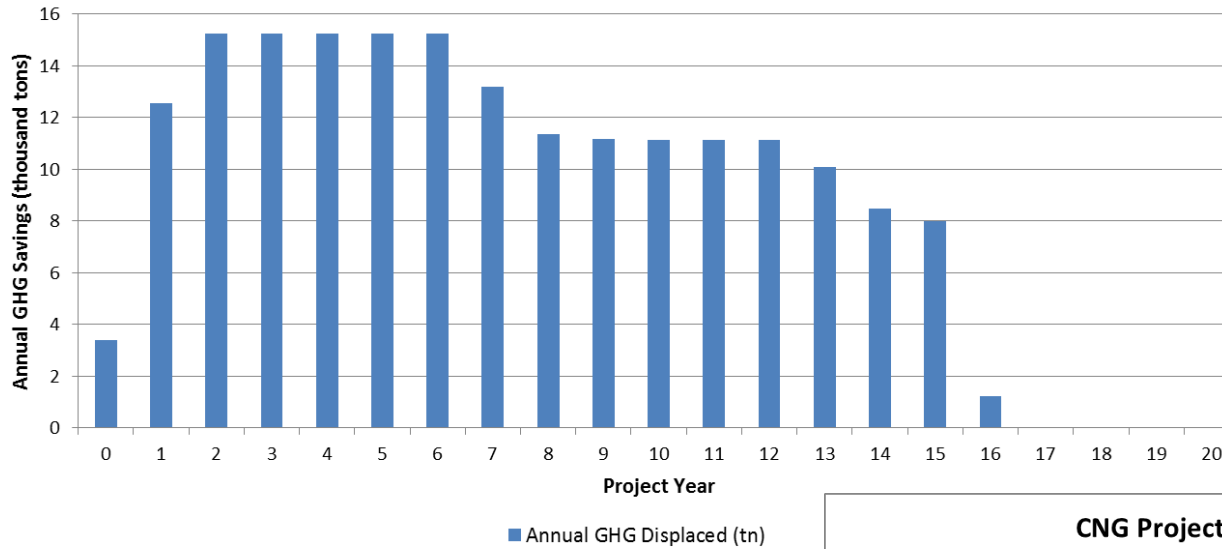
CNG Project Cumulative Petroleum Savings (GGEs)



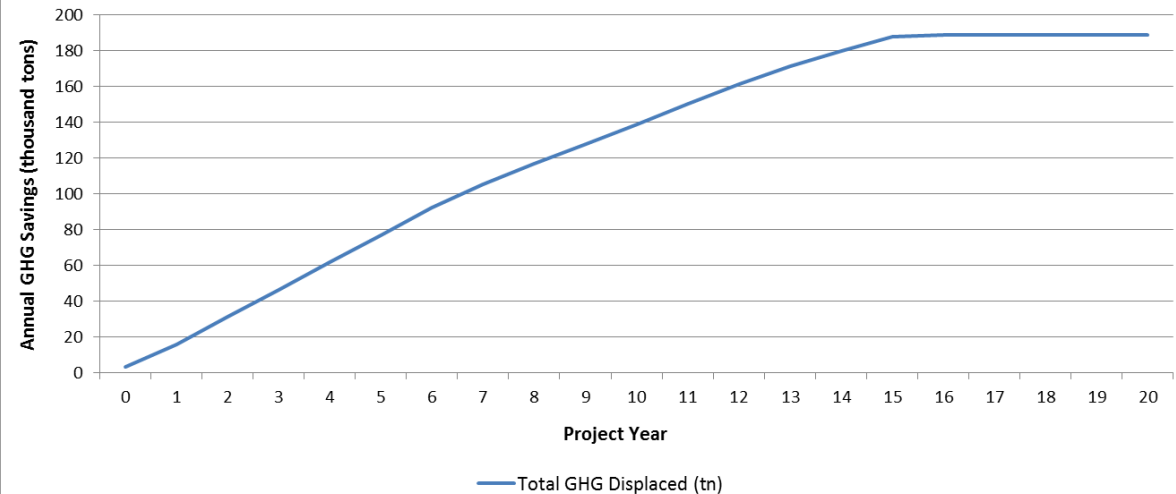
VICE 2.0 – Results & Visualizations (continued)



CNG Project Annual Lifecycle GHG Savings (thousand tons)



CNG Project Total Lifecycle GHG Savings (thousand tons)



VICE 2.0 – Sensitivity Analysis



| Mixed Fleet A ^a | Mixed Fleet B ^b | Mixed Fleet C ^c |
|------------------------------------------|------------------------------------------|------------------------------------------|
| Diesel Fuel Price | Diesel Fuel Price | Gasoline Fuel Price |
| Fuel Economy | Fuel Economy | Fuel Economy |
| VMT | VMT | CNG Vehicle M&O Costs |
| Vehicle Life | Vehicle Life | Required ROR/Nominal Discount Rate |
| CNG Vehicle M&O Costs | CNG Vehicle M&O Costs | Diesel Fuel Price |
| Price of CNG (per GGE) | Price of CNG (per GGE) | VMT |
| Vehicle Number | Required ROR/Nominal Discount Rate | Vehicle Life |
| Monthly Station M&O Cost | Gasoline Fuel Price | Price of CNG (per GGE) |
| Required ROR/Nominal Discount Rate | Vehicle Number | Vehicle Number |
| Diesel Price Increase | Incremental Cost | Incremental Cost |
| Gasoline Fuel Price | Diesel Price Increase | Monthly Station M&O Cost |
| Incremental Cost | Monthly Station M&O Cost | Diesel Price Increase |
| Realized Diesel Excise Tax Exemption | Monthly Electricity Costs | Realized Gasoline Excise Tax Exemption |
| Monthly Electricity Costs | Realized Diesel Excise Tax Exemption | Gasoline Price Increase |
| CNG Price Increase | Light-Duty Vehicle CNG Vehicle M&O Costs | Light-Duty Vehicle CNG Vehicle M&O Costs |
| Light-Duty Vehicle CNG Vehicle M&O Costs | CNG Price Increase | Realized Diesel Excise Tax Exemption |
| Realized Gasoline Excise Tax Exemption | Realized Gasoline Excise Tax Exemption | Monthly Electricity Costs |
| Gasoline Price Increase | Gasoline Price Increase | CNG Price Increase |
| CNG Station Salvage Value | CNG Station Salvage Value | CNG Station Salvage Value |

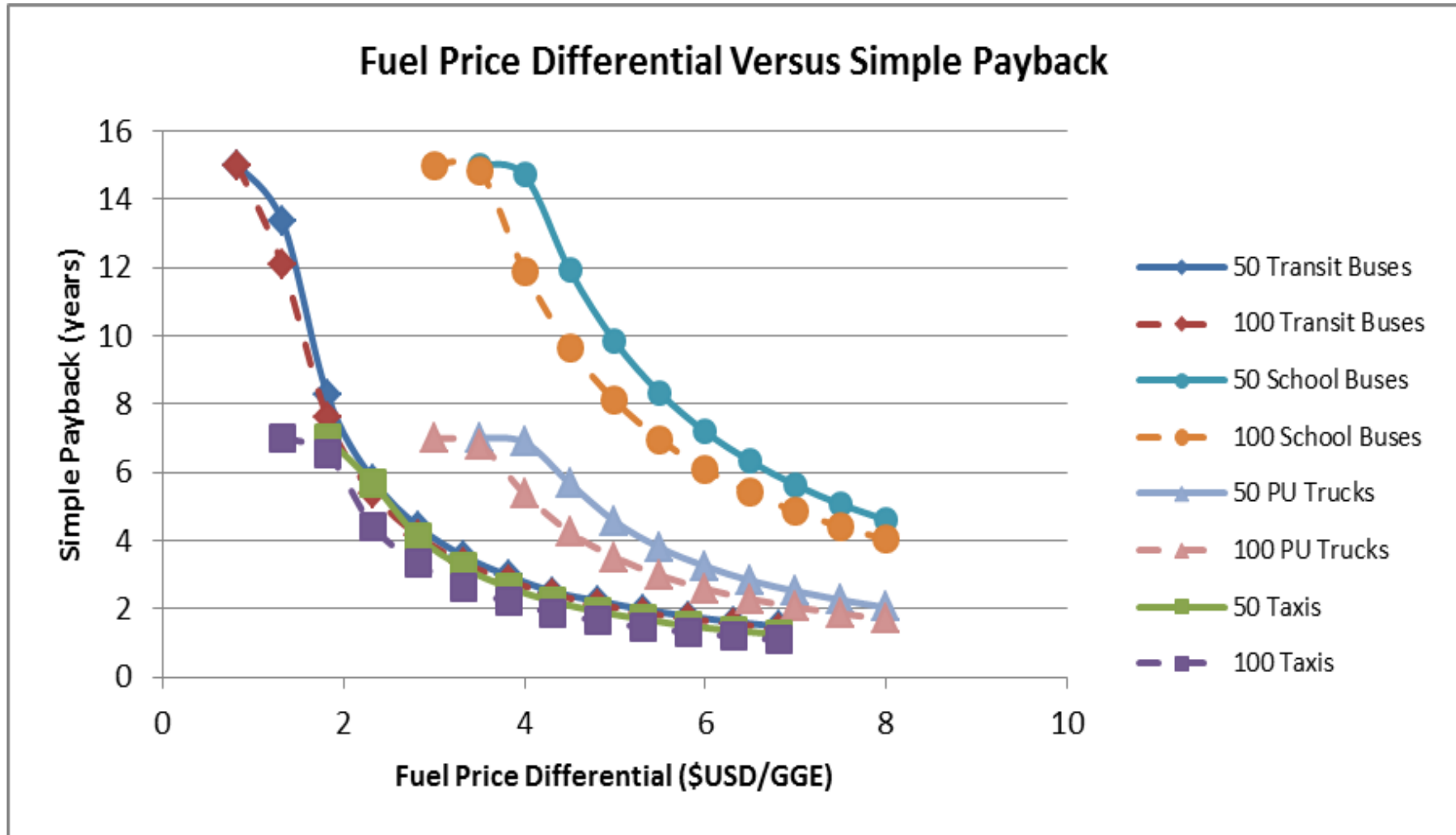
Color key: green = vehicle parameters; orange = CNG vehicle O&M; grey = fuel cost parameters; blue = RoR or discount rate and infrastructure O&M parameters

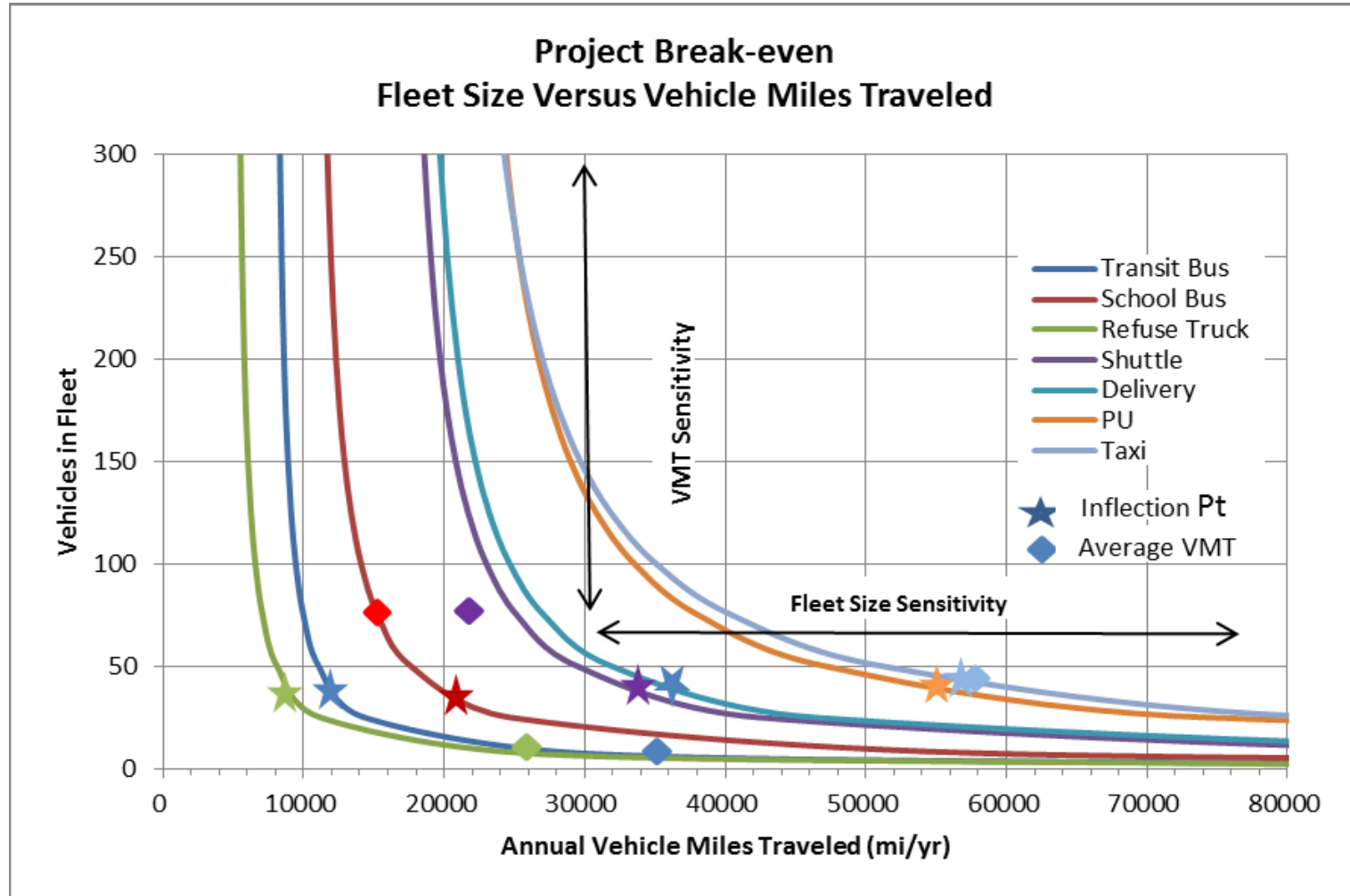
^a 20 Transit, 20 School, 15 Trash, 15 Shuttle, 10 Delivery, 10 Pickup, 10 Taxi

^b 8 Transit, 30 School, 8 Trash, 5 Delivery, 36 Pickup, 5 Taxi

^c 5 Transit, 5 school, 2 Trash, 22 Shuttle, 22 Delivery, 22 Pickup, 22 Taxi

VICE 2.0 – Sensitivity Analysis (continued)





VICE 2.0 – Sensitivity Analysis (continued)



| 100-Vehicle Fleet | Simple Payback (years) | | | | |
|-------------------|--------------------------|------------------------|------------------------|---------------------|-------------------------|
| | No Credits (Baseline) | Station Credit Only | Vehicle Credit Only | Fuel Credit Only | All Credits Combined |
| Transit Buses | 4.33 | 4.32 | 2.87 | 3.26 | 2.1 |
| School Buses | 12.38 | 12.31 | 5.68 | 9.41 | 3.9 |
| Trash Trucks | 3.84 | 3.82 | 2.49 | 2.82 | 1.8 |
| Para Shuttles | 5.93 | 5.88 | 3.57 | 4.14 | 2.4 |
| Delivery Trucks | 8.65 | 8.56 | 4.84 | 6.0 | 3.1 |
| Pickup Trucks | ≥ 7 | 6.87 | 4.66 | 5.08 | 3.0 |
| Taxis | 4.58 | 4.52 | 3.34 | 3.13 | 2.2 |
| Mixed Fleet A | 5.16 | 5.13 | 3.14 | 3.78 | 2.2 |
| Mixed Fleet B | 6.36 | 6.31 | 3.62 | 4.61 | 2.5 |

- **\$0.50/GGE or \$0.55/DGE fuel excise tax credit (currently expired)**
- **80% incremental vehicle cost tax credit (expired)**
- **\$30,000 station tax credit (expired)**

- Determining the financial soundness of any investment project is vital
- Many aspects of a CNG project combine to define overall profitability
 - Fuel price and fuel economy dominate
 - Vehicle miles traveled (VMT) and vehicle life are influential as well
- Subsidies and tax credits can have a major impact
- Simply put: the more traditional the fuel replaced with CNG, and the larger the price differential, the better the investment

VICE 2.0 is the second generation of NREL's successful Vehicle and Infrastructure Cash-Flow Evaluation model which:

- Allows fleet managers to assess the financial soundness of potentially converting their fleet to operate on CNG
- Allows comparison between different acquisition and investment strategies
- Tailors vehicle fleets to represent what you have
- Allows customization to reflect your local operating environment
- Provides visualizations of cash-flow, fuel availability and use and GHG savings
- Investigates sensitivities to a number of specific operational costs.

- Alternative fuels and vehicles
- Fuel conservation
- Station locator
- Laws & Incentives
- Maps & Data
- Case studies
- Tools.



The screenshot shows the homepage of the Alternative Fuels Data Center (AFDC) website. The header includes the U.S. Department of Energy logo and the text "Energy Efficiency & Renewable Energy". The main navigation bar features links for "FUELS & VEHICLES", "CONSERVATIVE FUEL", "LOCATE STATIONS", "LAWS & INCENTIVES", "Maps & Data", "Case Studies", "Publications", "Tools", "About", and "Home". A search bar is located in the top right corner.

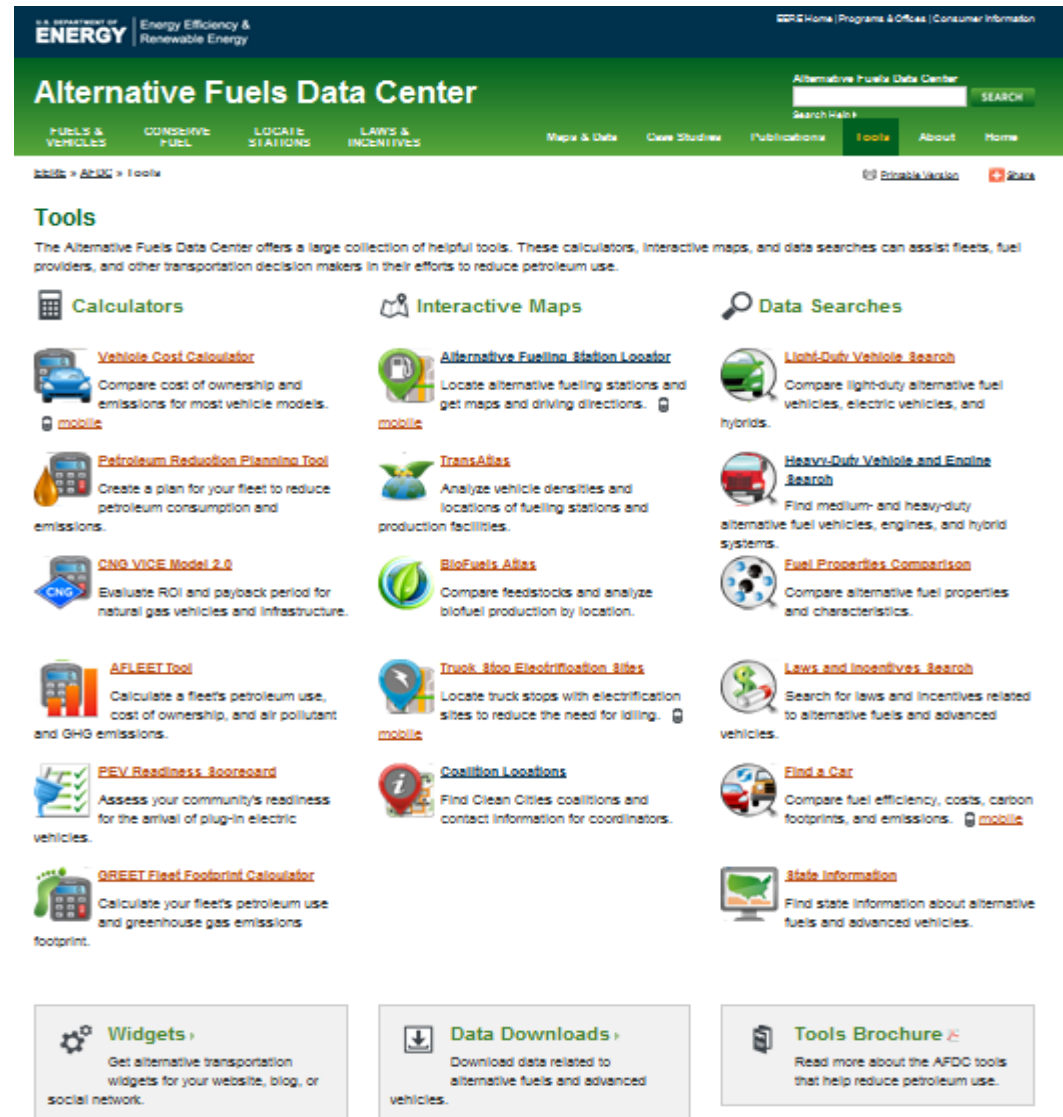
The main content area is divided into several sections:

- Fuels & Vehicles:** A section with icons for Biodiesel, Electricity, Ethanol, Hydrogen, Natural Gas, and Propane. Below these icons is a banner for "Alternative fuels, to go" with the text "Download the new Alternative Fueling Station Locator iPhone app." and an image of a smartphone displaying a map.
- Maps & Data:** A section with links for "U.S. Alternative Fueling Stations by Fuel Type", "Alternative Fuel Vehicles on Use", and "U.S. Hybrid/Electric Vehicle Sales by Model". It also features a "Fuel Prices" graph and a "Compare alternative fuel prices to gasoline" link.
- Tools:** A section with links for "Laws & Incentives", "Petroleum Reduction Planning Tool", "Vehicle Cost Calculator", "Light-Duty Vehicle Search", and "Heavy-Duty Vehicle Search". It also includes a "Station Locator" map and a "Find alternative fueling station locations" link.
- Find State Information:** A section with a "Select a state" dropdown menu and a "GO" button.
- Poll:** A section titled "I am primarily interested in (check all that apply):" with a list of checkboxes for various interests, including "Finding alternative fueling stations", "Comparing alternative fuel and gasoline prices", "Researching alternative fuels and vehicles", "Finding technical assistance for my project", "Finding alternative transportation data", "Learning about others using alternative fuels", "Finding incentives or funding opportunities", "Researching laws and regulations", and "Other".

At the bottom of the page, there is a "Clean Cities" logo, a YouTube logo, and a "VOTE" button.

<http://www.afdc.energy.gov>

- Light- and Heavy-Duty vehicle search tools
- Vehicle cost of ownership
- VICE 2.0
- Station locator.



The screenshot shows the homepage of the Alternative Fuels Data Center (AFDC), a website managed by the U.S. Department of Energy. The header includes the Department of Energy logo and navigation links for Home, Programs & Offices, and Consumer Information. The main navigation bar features categories like Fuels & Vehicles, Conserve Fuel, Locate Stations, Laws & Incentives, Maps & Data, Case Studies, Publications, Tools, About, and Home. A search bar is prominently displayed. The 'Tools' section is highlighted, showing a grid of various calculators and interactive maps. These include tools for vehicle cost calculation, fueling station location, light-duty and heavy-duty vehicle searches, petroleum reduction planning, VICE 2.0 model evaluation, fleet petroleum use calculation, PEV readiness assessment, fleet footprint calculation, interactive maps for fueling stations, truck stops, and coalition locations, and data searches for light-duty and heavy-duty vehicles, fuel properties, laws, and state information. At the bottom, there are three boxes for Widgets, Data Downloads, and Tools Brochure.

Alternative Fuels Data Center

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Home | Programs & Offices | Consumer Information

Alternative Fuels Data Center

Search Here

FUELS & VEHICLES | CONSERVE FUEL | LOCATE STATIONS | LAWS & INCENTIVES | Maps & Data | Case Studies | Publications | **Tools** | About | Home

Home > AFDC > Tools

Tools

The Alternative Fuels Data Center offers a large collection of helpful tools. These calculators, interactive maps, and data searches can assist fleets, fuel providers, and other transportation decision makers in their efforts to reduce petroleum use.

Calculators

- Vehicle Cost Calculator**
Compare cost of ownership and emissions for most vehicle models. [mobile](#)
- Petroleum Reduction Planning Tool**
Create a plan for your fleet to reduce petroleum consumption and emissions.
- CNG VICE Model 2.0**
Evaluate ROI and payback period for natural gas vehicles and infrastructure.
- AFLEET Tool**
Calculate a fleet's petroleum use, cost of ownership, and air pollutant and GHG emissions.
- PEV Readiness Scorecard**
Assess your community's readiness for the arrival of plug-in electric vehicles.
- GREET Fleet Footprint Calculator**
Calculate your fleet's petroleum use and greenhouse gas emissions footprint.

Interactive Maps

- Alternative Fueling Station Locator**
Locate alternative fueling stations and get maps and driving directions. [mobile](#)
- TransAtlas**
Analyze vehicle densities and locations of fueling stations and production facilities.
- BioFuels Atlas**
Compare feedstocks and analyze biofuel production by location.
- Truck Stop Electrification Sites**
Locate truck stops with electrification sites to reduce the need for idling. [mobile](#)
- Coalition Locations**
Find Clean Cities coalitions and contact information for coordinators.

Data Searches

- Light-Duty Vehicle Search**
Compare light-duty alternative fuel vehicles, electric vehicles, and hybrids.
- Heavy-Duty Vehicle and Engine Search**
Find medium- and heavy-duty alternative fuel vehicles, engines, and hybrid systems.
- Fuel Properties Comparison**
Compare alternative fuel properties and characteristics.
- Laws and Incentives Search**
Search for laws and incentives related to alternative fuels and advanced vehicles.
- Find a Car**
Compare fuel efficiency, costs, carbon footprints, and emissions. [mobile](#)
- State Information**
Find state information about alternative fuels and advanced vehicles.

Widgets
Get alternative transportation widgets for your website, blog, or social network.

Data Downloads
Download data related to alternative fuels and advanced vehicles.

Tools Brochure
Read more about the AFDC tools that help reduce petroleum use.

Thank You

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Building a Business Case for Compressed Natural Gas in Fleet Applications:
http://www.afdc.energy.gov/uploads/publication/business_case_cng_fleets.pdf