National Laboratory of the Rockies

Economic Benefits of Alternative Fuels in Rural Alabama

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Alternative transportation fuels could provide economic benefits to rural Alabama by lowering operating costs for vehicle owners and creating new revenue streams and job opportunities for fuel providers, technicians, and dealerships. The use of alternative energy sources such as electricity, compressed natural gas (CNG), liquefied natural gas (LNG), and liquefied petroleum gas (LPG) or propane can result in reduced fuel costs and maintenance expenses for both public and private fleets, as well as individual consumers.

Fleet operators often invest in private fueling infrastructure, while publicly accessible stations can attract traffic and commerce to local businesses and communities. Technicians capable of retrofitting vehicles for alternative fuels and maintaining the vehicles and fueling infrastructure can develop business opportunities as well, but they require special training and often certifications. These cost savings and increased revenues get recirculated through the economy and impact more than just the beneficiaries listed above. This fact sheet will provide an overview of alternative fuel vehicle (AFV) operational cost savings, opportunities to generate revenue for the state and income for individuals, and several examples of alternative fuels supporting jobs in Alabama.

Alternative Fuel Operational Cost Savings

Alternative fuels could provide economic benefits to rural Alabama through a reduction in operational costs, which in many cases outweigh the higher up-front costs of equipment over its lifetime. These cost savings can be attributed to reduced fuel costs and maintenance costs.

Reducing Fuel Costs

When comparing costs between fuels, it is important to account for the energy density of the fuel. This is done by comparing fuels on a miles per gallon of gasoline equivalent (GGE) basis, where one gallon of gasoline has approximately 114,000 British thermal units (Btu) of energy. Since all fuel prices fluctuate, they also need to be compared over time instead of just one snapshot.

Ideally, fuel prices could be compared on a dollar per mile driven basis. For this, the specific fuel economy of the vehicle is needed. Vehicle-specific, lifecycle cost calculators on the Alternative Fuels Data Center (AFDC) tools page (AFDC 2025a) are useful for comparing the total cost of ownership between specific AFVs. Since this fact sheet doesn't have the space to elaborate on

Table 1. Average Retail Fuel Prices in Alabama ($/GGE), After Adjusting for Energy Content of Fuel and General Efficiency of Vehicles

Fuel	July-24	Oct-24	Jan-25	April-25	Average
Gasoline	$3.16	$2.81	$2.73	$2.88	$2.90
Electricity, residential	$1.23	$1.23	$1.23	$1.23	$1.23
Electricity, workplace	$1.08	$1.08	$1.08	$1.08	$1.08
Propane, retail	$3.84	$3.61	$3.48	$4.32	$3.81
Propane, fleet	$1.50	$1.59	$1.78	$1.81	$1.67
CNG	$2.07	$2.06	$2.07	$2.81	$2.25
Ethanol (E85)	$3.53	$3.24	$3.27	$3.22	$3.32
Diesel	$2.64	$2.40	$2.39	$2.45	$2.47

Sources: AFDC Alternative Fuel Price Reports (AFDC 2025d), U.S. Energy Information Administration (EIA) Petroleum Navigator (EIA 2025) for gasoline and diesel, EIA Alabama State Energy Profile (EIA 2024) for electric prices, and a major propane supplier for fleet prices. Note: Reported prices are adjusted according to energy content and vehicle efficiency, as described in the text above. Petroleum prices are for Gulf States while alternative fuel prices are Alabama-specific. Prices are reported for the first two weeks of the listed month for all fuels except fleet propane, which is reported for the entire month. Workplace electricity prices are commercial (with no markup), which are more expensive than industrial. Specific prices for charging at direct current (DC) fast chargers are not listed because they lack a good source.

these cost comparisons, a few rules of thumb can be used. Compression ignition engines used by diesel and biodiesel are on average 20% more fuel efficient than the spark ignition engines used by gasoline, CNG, ethanol, and propane (Argonne National Laboratory [ANL] 2025). Electric vehicles (EVs) are the most efficient (on a mile per GGE basis), as the average light-duty EV in the United States is 4.4 times more efficient than the average light-duty gasoline vehicle (Singer 2023).

Table 1 shows the fuel prices in Alabama, after adjusting for energy content and vehicle efficiency. EVs charged at a workplace offer the greatest fuel cost savings, followed by EVs charged at home, propane purchased by a fleet, and then CNG. Ethanol and retail propane cost more than gasoline in Alabama. However, retail propane costs depend significantly on the specific fueling station, with stations dedicated to refueling vehicles being significantly less expensive than “secondary” stations focused on refueling smaller canisters. In Alabama, 39 of the 51 retail propane stations are secondary stations.

Maintenance Savings

Many AFVs have lower maintenance costs than their gasoline and diesel alternatives. EV maintenance savings are particularly well-documented, but the same is true for propane and sometimes CNG and biodiesel, depending on a variety of factors.

Consumer Reports and ANL both investigated the maintenance costs of 100% battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs), which can use gasoline or electricity. Consumer Reports measured $0.03/mile in real-world reported savings (about 50%) for BEVs and PHEVs (Harto 2020), while ANL modeled $0.04/mile for BEVs and $0.01/mile for PHEVs (ANL 2021), as illustrated in Table 2.

Table 2. Maintenance Costs for EVs and Comparable Gasoline Vehicles

	Gasoline Vehicle	BEV		PHEV	
Source	**Cost/Mile**	**Cost/Mile**	**Savings**	**Cost/Mile**	**Savings**
Consumer Reports	$0.06	$0.03	49%	$0.03	51%
ANL	$0.10	$0.06	40%	$0.09	11%

Table 3. Maintenance Costs for Propane Vehicles and Comparable Diesel Vehicles

	Diesel Vehicle	Propane Vehicle	
Vehicle Class	**Cost/Mile**	**Cost/Mile**	**Savings**
Light Duty	$0.29	$0.19	34%
Heavy Duty	$1.17	$0.77	34%

Propane vehicles benefit from higher octane ratings than gasoline as well as low oil-contamination characteristics due to their gaseous nature. These attributes lead to fewer fueling system issues and cold-start issues common with diesel vehicles, enabling them to operate with simpler emissions control systems that require less maintenance (AFDC 2025b). Using a different methodology to the one in Table 2, ANL estimated 34% savings running propane compared to diesel (ANL 2025) for both light-duty and heavy-duty vehicles (Table 3). CNG vehicles can provide maintenance cost savings as well. CNG is more common in medium- and heavy-duty vehicles, segments in which it competes primarily with diesel. Diesel vehicles often suffer from particulate filter clogging when operating consistently at lower speeds, and they require diesel exhaust fluid to reduce nitrogen oxides. Neither system is required for CNG because the fuel naturally burns more cleanly. However, CNG storage tanks aboard vehicles require frequent inspection and may require replacement in the event of a vehicle collision. Maintenance cost estimates for CNG vehicles range from a savings of 80% (Boyce 2022) to approximately the same as for diesel vehicles (Burnham et al. 2021).

Table 4. Major Sources of Revenue for Fueling Stations by Fuel Type

Fuel	Major Sources of Revenue
Gasoline	In-store sales, fuel markup
Diesel	In-store sales, fuel markup
CNG	Fleet savings, RINs
Propane	Fleet savings, fuel markup
E85	In-store sales, RINs
Electricity	In-store sales
Biodiesel	In-store sales, RINs

Potential Income/ Revenue Generation

Revenue Sources

Various fuels have different sources of revenue or savings beyond a station simply selling the fuel. Table 4 displays which sources of revenue are the most prevalent for given fuels. These revenues are largely determined by competition, if they serve a fleet or private owner, and if they qualify for renewable identification number (RIN) credits used in renewable fuel markets.

Fuel markup is largely determined by the amount of competition nearby and how transparent the fuel price is (Johnson and Melendez 2007). The greater the price transparency of a fuel is, the less profit a retailer can make on fuel markup. This is the most extreme for gasoline and diesel sales, where prices are prominently displayed and easily compared between numerous stations. Therefore, in 2024 the average profit from a gallon of gasoline was less than 2% of retail price (NACS 2024, Kinner 2022). For fuels that have fewer stations, or where prices cannot be easily compared, greater profit margins can be made.

In-store sales refer to the goods that retailers can charge a higher profit margin for by using cost-competitive fuel to attract customers. For the fuels typically sold at convenience stores (gasoline, diesel, and E85), inexpensive fuel is often used to attract customers into the store to purchase high-margin goods. For convenience stores, the gross profit margin for in-store goods has typically been between three to four times greater than for fuel (NACS 2024). EV charging stations have partnered with a wider variety of businesses and are being used to attract customers to purchase groceries, coffee, restaurant food, nights at a hotel, and other goods or services.

Table 5. Ownership of Alternative Fuel Stations by Fuel Type in Alabama

Fuel	Public	Private	% Private
Biodiesel	0	9	100%
CNG	2	16	89%
E85	26	12	32%
EV Charging Station	523	94	15%
Hydrogen	0	0	NA
LNG	1	0	0%
Propane	51	8	14%
Total	603	139	19%

Source: AFDC 2025c

Customer capture: Various fuels and vehicles appeal to different demographics, and people tend to be loyal to their fuel type (Howard 2025). This can be advantageous to retailers for two reasons. First, defined consumer groups can be targeted with products and services that align with their preferences and purchasing habits. For example, co-locating alternative fuel infrastructure with nearby stores or services can create opportunities to tailor offerings that are typical preferences of the vehicle demographic. It also adds value to targeted advertising near the alternative fuel infrastructure. Second, a new fuel can be a relatively efficient way to bring in a group of customers that might be underrepresented at a retail site. For example, Walmart is likely to have reached new customers by locating EV chargers in their parking lots (Pierce 2024).

Fleet savings are accrued by the owners and operators of fleets through operational cost savings listed in Table 3. The savings from their vehicle operations can be used to fund and operate a fueling station. Fleet-owned refueling stations are usually listed as private (i.e., public vehicles do not have access) in the AFDC station database, as shown for Alabama in Table 5 (AFDC 2025c). Therefore, biodiesel and CNG stations are the most likely to be fleet-owned and thus depend on fleet savings as an integral component of their profitability.

RINs are an accounting tool set up by the U.S. Environmental Protection Agency (EPA) to enable and incentivize the use of renewable fuels including renewable natural gas (RNG), biodiesel, and ethanol. The EPA's Renewable Fuel standard establishes a mechanism for RNG trade, and enables RNG to use the national pipeline system and be sold to vehicle uses, tracking transactions through RINs. The RIN system reduces logistical challenges that the fuels may face between source and end user, matching supply from producers with demand from end users. As a result, over 80% of the U.S. natural gas consumption in the transportation is RNG (Singer et al. 2025). RINs are a major source of income for natural gas, E85, and biodiesel refueling stations. This enables landfills, farms, and sewage treatment facilities in Alabama to profit from RNG regardless of where the fuel is sold.

Tax Collection

Gasoline and diesel fuel excise taxes paid in Alabama are dedicated exclusively to transportation-related purposes, primarily to build, maintain, and operate Alabama roads and bridges. Therefore, the amount that gets spent in Alabama results in construction and maintenance jobs. The more local a tax is (especially at the county level), the greater the chance that the money will be recycled into local communities. This is especially beneficial if the entity paying the tax is headquartered or lives outside the region. Gasoline, diesel, CNG, and LNG are taxed at the federal and state level, at $0.18 per GGE/$0.24 per diesel gallon equivalent (DGE) federally and $0.30 per GGE/$0.31 per DGE for the state (Alabama Department of Revenue [ALDOR] 2025a). Furthermore, a number of Alabama counties add taxes to transportation fuels (ALDOR 2025b). Ethanol blends are taxed at the same level as gasoline and biodiesel blends are taxed at the same level as diesel.

For fuels that are not taxed through excise taxes, a state and local sales tax is applied. The state sales tax is 4% and the local (county and city) sales tax can be as high as 7% (Avalara 2025). The state also derives revenue from annual vehicle registration fees, which are fuel neutral except for EVs. The annual registration fee is $203 for BEVs, $103 for PHEVs, and $23 to $105 for other light-duty vehicles (ALDOR 2025c). There is no federal sales tax or vehicle registration fee.

Table 6. Estimated Jobs Generated and Induced by Alternative Fuels Using Default Assumptions with 100% Local Share in ANL JOBS Models

Fuel	Station Installation	Station Operations, Maintenance, and Fuel Supply Chain	Vehicle Manufacturing	Other Vehicle-Related Jobs
CNG*	18.9/station	2.4/station	Unknown	Unknown
Electricity**	19.6/station	0.6/station	0.32/vehicle	0.12/vehicle
Propane***	2.05/station	0.24/station	Unknown	Unknown

*The CNG stations assessed can fuel up 331 GGE/hour and have two pumps.
**The electricity stations can charge at 150 kW per port with four charging ports. The EV jobs are based on production of an electric pickup truck.
***The propane stations can fuel up to 331 GGE/hour and have two pumps. The authors adjusted the natural gas JOBS model to calculate the economic impacts of propane stations using the parameters for a large propane station from Smith and Gonzales 2014.

Workforce Development

Alternative fuels can create opportunities for new jobs in rural areas. These include jobs in the automotive industry (manufacturing and suppliers), vehicle conversions and maintenance, and station installation, maintenance, and operation. The authors used ANL JOBS models to estimate the jobs developed for target alternative fuels (ANL n.d.). Table 6 displays estimates of jobs created by installing and operating large stations as well as manufacturing vehicles based on an assumption that materials are sourced from Alabama and work is performed by local contractors. Biodiesel workforce development could not be calculated using the JOBS models, but U.S. biodiesel employment totaled 107,400 jobs in 2024 (GlobalData 2025).

Vehicle and Battery Manufacturing

The growth in the EV market coupled with federal and private investments has led directly to jobs in Alabama.

Beyond vehicle and parts manufacturing, AFVs create opportunities for Alabama to lead in research and development. To support these efforts, the Alabama Department of Commerce established a $30 million EV Technology Center to provide training on how to manufacture EV batteries, drivetrains, and associated systems (Underwood 2024). The EV Technology Center is part of a larger robotics park in Tanner, Alabama. The University of Alabama formed another research and development hub in the Alabama Mobility and Power Center (Alabama Transportation Institute 2025). The Alabama Mobility and Power Center involves a collaboration with Mercedez-Benz and the University of Alabama Transportation Institute. It focuses heavily on battery technologies along with grid and distributed energy resources.

Alabama is home to large graphite reserves, which can be used to produce anodes for the high-voltage batteries required by EVs. Westwater Resources recently announced a $202 million investment to become the first-of-its-kind U.S. company producing anode-grade graphite for lithium batteries. Westwater plans to establish an all-Alabama vertically integrated graphite supply chain capable of producing more than 40,000 metric tons of advanced anode material per year (Lasley 2023). Halfway across the state, the Urbix Project is building another facility for graphite anodes in Muscle Shoals backed by a $125 million federal investment (U.S. Department of Energy 2025). These two investments will make Alabama a major player in EV batteries for the United States.

In addition to graphite, lithium is also a highly demanded metal used in EV and other batteries. There is currently only one lithium mine operating in the United States. In January 2024, LiTHOS Energy Ltd. announced a new lithium processing facility in Bessemer, Alabama (Battery Industry 2024).

Vehicle Conversions and Maintenance

AFVs often require specialized technical skills, especially if converting an existing gasoline or diesel vehicle to run on another fuel. With AFVs being sold in greater numbers than ever before, technicians can grow their business opportunities by learning to work on different fuel types. The following examples do not constitute an exhaustive list of organizations working on AFVs, but they do showcase some of the many technicians and training programs with a local presence in Alabama.

Although CNG and propane vehicles have a smaller market share than EVs, they often involve conversions of new or existing vehicles, which create local markets for upfitting conventional vehicles. One example of a business providing CNG passenger and light-duty vehicle retrofits is Melton Automotive based out of Alabaster (Melton Automotive n.d.). The Propane Education Research Council has identified seven propane vehicle service centers in the state of Alabama run by Roush Clean Tech or Alliance Autogas (Propane Education Research Council n.d.). There are non-chain service providers for propane as well. As noted above, training is critical for upfitting and maintaining AFVs. AFVi offers several online and in-person trainings for CNG fuel systems and vehicle maintenance as well as a few courses for propane, hydrogen, and electricity (Alternative Fuel Vehicle Institute n.d.). Fueling system inspection is especially critical for CNG and hydrogen because the tanks are pressurized and require regular checks.

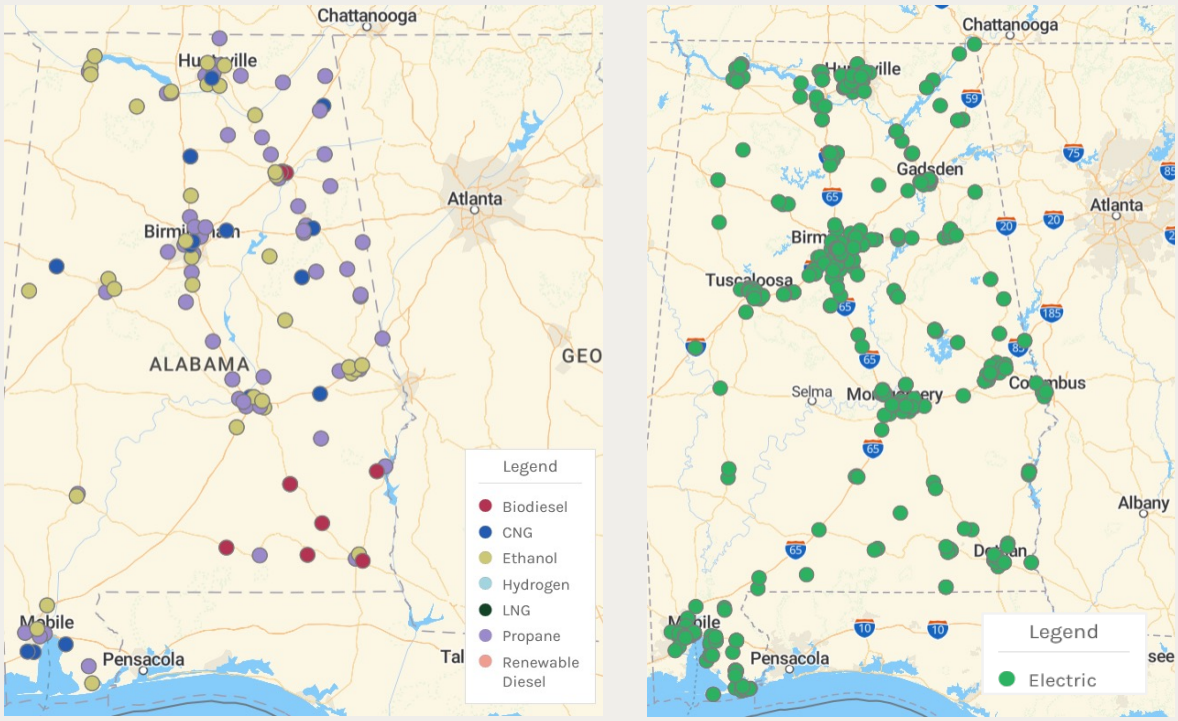
While most diesel vehicles can operate up to 20% biodiesel (B20), drivers should consider replacing hoses, gaskets, seals, and other rubber-based components of their fuel systems before switching to B100 or other high-level biodiesel blends. Local technicians with appropriate training can complete these upgrades, allowing farmers, restaurant owners, and others to reliably run vehicles with converted waste oils. The same technicians can provide maintenance on vehicles running high blends of biodiesel. The National Biodiesel Board offers a free virtual training program for technicians working on biodiesel vehicles and fueling stations (National Biodiesel Board n.d.). Wallace State Community College in Hanceville offers a more detailed online course on biofuel production operations (Wallace State Community College n.d.).

Enthusiasts have been converting conventional vehicles to EVs for decades, and now General Motors is offering a conversion package for a 200-horsepower electric motor and 66-kWh lithium-ion battery pack (Chevrolet n.d.). This could generate more local jobs for technicians with EV training or experience. Due to the proliferation of new EVs and the differences associated with their high-voltage systems, local repair shops are hiring and training more EV technicians. Such technicians are available at local repair shops such as Sweat Tire with 10 locations around Alabama (Sweat Tire & Automotive n.d.). There are several enterprises offering in-person training and certification for EV maintenance, such as EVPro+ (EVPro+ n.d.) and Universal Technical Institute (UTI Corporate n.d.).

Recent EV projects in Alabama:

- Mercedes-Benz has made the largest investment in the state of Alabama to support EV industry growth, including building a $1 billion battery factory in Bibb County in 2022 and launching EV production at Alabama plants (Mercedes-Benz Group 2022). In total, Mercedes employs 4,500 people in the state and supports approximately 11,000 additional jobs with suppliers and service providers.
- Hyundai launched EV production at its Montgomery factory and invested an additional $300 million in 2022, bringing its total Alabama investment to $1.8 billion (Underwood 2022). Hyundai produces the Genesis GV70 as well as the Santa Fe hybrid at the enhanced plant.
- Autocar launched an EV assembly line in its Birmingham manufacturing facility (Autocar LLC 2023) in June 2023. The company also plans to integrate with General Motors Ultium EV batteries and HYDROTEC hydrogen fuel cells in 2026 as part of an expanded foray into AFVs (Watson 2023). Autocar custom-engineers class 7 and 8 trucks.
- New Flyer, a manufacturer of CNG, electric, and hybrid buses, has built a Vehicle Innovation Center in Anniston, Alabama (https://www.newflyer.com/site-content/uploads/2023/04/Vehicle-Innovation-Center.pdf). The Vehicle Innovation Center incorporates research, development, innovation, and collaboration across industry experts. New Flyer had built 8,600 electric buses as of 2023 (New Flyer 2023).
- Coden, Alabama-based Master Boat Builders, Inc. will soon deliver the eWolf, the first all-electric tugboat built in the United States (Haun 2023). As of December 2023, it was undergoing sea trials and expected to enter service in 2024.

Figure 1. Alternative fueling stations in Alabama (including private stations)



Maps from AFDC 2025c.

Installation and Operation of Alternative Fueling Stations

Installing alternative fueling stations can generate opportunities for another segment of the Alabama economy. Electricians may benefit most with the between 2014 and 2023 (AFDC 2024). These figures do not include home stations, which likely grew in close correlation to the nearly 120-time increase in EV registrations (AFDC 2023). Biodiesel stations grew by 117% over the last decade (all private) and ethanol experienced strong growth as well).

The Electric Vehicle Infrastructure Training Program references 35 businesses in Alabama with staff trained on the installation of electric vehicle supply equipment (EVSE). Goodwill supports EVSE installation workforce development through its Clean Tech Accelerator. Bevill State Community College and SkillFusion launched a training center focused on EVSE diagnostics in Jasper. Each of these programs contributes to job growth and skill development in rural and urban communities.

Conclusion

There are economic opportunities across the board for alternative fuels, including cost savings for drivers or fleet managers, revenue generation for fueling station hosts and government entities, and workforce growth. Alabama has created jobs in EV manufacturing lines, battery production plants, CNG and propane vehicles conversion shops, biofuels, the installation of EVSE, and the training of automotive professionals.

Additional Resources

Johnson, Caley. 2010. Business Case for Compressed Natural Gas in Municipal Fleets. https://docs.nlr.gov/docs/fy10osti/47919.pdf.

Johnson 2010 describes a methodology for calculating the financial impact of incorporating CNG into municipal fleets, and it introduces a tool to do so (VICE).

Kelly, Kay and John Gonzales. 2017. What Fleets Need to Know About Alternative Fuel Vehicle Conversions, Retrofits, and Repowers. https://afdc.energy.gov/files/u/publication/afv_conversions_retrofits_repowers.pdf.

This primer describes technology options by vehicle applications, infrastructure costs, and other key considerations before proceeding with vehicle conversions to alternative fuels.

McCormick, Robert and Kristi Moriarty. 2023. Biodiesel Handling and Use Guide: Sixth Edition. NREL. https://docs.nlr.gov/docs/fy23osti/86939.pdf.

The Biodiesel Handling and Use Guide describes basic safety information for storing and handling biodiesel.

NLR 2025. EVI-FAST https://www.nlr.gov/transportation/evi-fast.

The Electric Vehicle Infrastructure – Financial Analysis Scenario Tool (EVI-FAST) is a spreadsheet tool that can be used to calculate payback period, net present value, and break-even first-year charging cost.

Propane Education and Research Council. “Refueling, Your Way. Get to Know Propane Autogas Refueling Options.” https://afdc.energy.gov/files/u/publication/refueling_your_way.pdf?b7a55c9c0d.

This propane guide describes the technology, including refueling options, and explains how to incorporate propane Autogas into a fleet or other business.

U.S. Department of Energy. 2019. EV Dollars and Sense https://afdc.energy.gov/case/3085.

This video describes the total cost of ownership for electric vehicles and compares them to conventional vehicles.

U.S. Department of Energy. 2025. Alternative Fuel and Advanced Vehicle Search. https://afdc.energy.gov/vehicles/search.

The Alternative Fuel Data Center vehicle search tool queries a database of AFVs by fuel type, vehicle type, manufacturer, and model.

U.S. Department of Energy. 2025. Vehicle Cost Calculator. https://afdc.energy.gov/calc/.

The Vehicle Cost Calculator is a webtool that can be used to compare economics of different vehicles.

World Resources Institute. 2025. Electric School Bus Initiative Guide for School Bus Electrification. https://electricschoolbusinitiative.org/tools.

The step-by-step guide to electric school bus planning describes five steps for incorporating electric buses into school fleets.

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