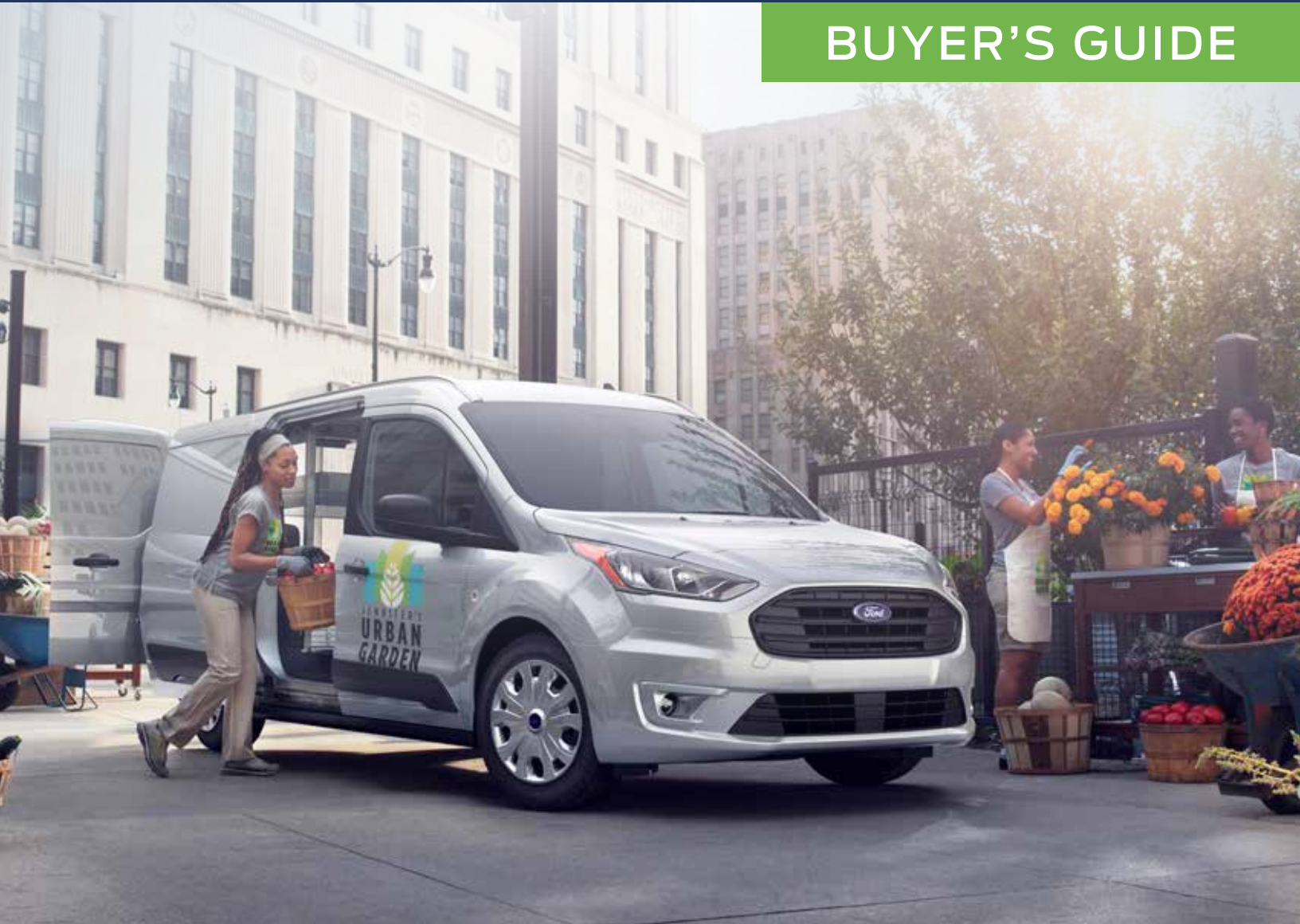



2019


ADVANCED FUEL

BUYER'S GUIDE



 COMPRESSED
NATURAL GAS


 B20 BIODIESEL

 HYBRID

 ALL-ELECTRIC

 PROPANE
AUTOGAS

 FLEX
FUEL ETHANOL

 PLUG-IN HYBRID

 HYDRAULIC-HYBRID



Go Further

WHY ADVANCED FUEL IS IMPORTANT TO YOU AND FORD

Reduced carbon footprint

For many businesses, operating a fleet is the single largest contributor to their carbon footprint.

When a business decides to reduce its carbon output, the fleet managers need to know how to identify which advanced fuel can make the biggest difference.

Reduced dependence on foreign oil

Most of the world's oil reserves are concentrated in the Middle East. Since most advanced fuels are available in the U.S. from U.S. sources, switching to advanced fuels can limit how much money is transferred offshore to support our domestic energy demands.

Ford offers customers a complete selection of Advanced Fuel Commercial Vehicles



	Transit Connect Cargo Van/ Passenger Wagon	Transit Cargo Van/ Passenger Wagon	Transit Cutaway/ Chassis Cab	E-350/E-450 Cutaway	E-350/E-450 Stripped Chassis
Advanced Fuel Type					
Ethanol (E85)	✓*	✓**	✓**	✓	✓
Biodiesel (B20)	✓	✓	✓		
CNG	✓	✓	✓	✓	✓
Propane		✓	✓	✓	✓
Electrification Options					
HEV		✓	✓	✓	✓
PHEV					
BEV		✓	✓	✓	✓
Hydraulic Hybrid				✓	✓
GVWR (lbs.)	Gas 5,110 - 5,420 Diesel 5,060 - 5,450	8,550 - 10,360	9,000 - 10,360	E-350: 10,050 - 12,500 E-450: 14,000 - 14,500	E-350: 11,500 - 12,500 E-450: 14,000 - 14,500
GCWR (lbs.)	Gas 5,930 - 6,380 Diesel 5,930 - 6,500	10,400 - 13,500	12,000 - 13,500	E-350: 13,000 - 18,500 E-450: 18,000 - 22,000	E-350: 17,000 - 18,500 E-450: 18,000 - 22,000
Payload (lbs.)††	Gas 1,250 - 1,570 Diesel 1,140 - 1,570	2,610 - 4,640	4,760 - 6,020	E-350: 5,120 - 7,330 E-450: 8,610 - 9,040	E-350: 6,870 - 7,910 E-450: 9,230 - 9,690
Engine	2.5L DOHC I-4† 2.0L GDI I-4 FFV 1.5L EcoBlue® TDCI Diesel	3.7L Ti-VCT V6† 3.5L EcoBoost® V6 3.2L I-5 Power Stroke® Diesel	3.7L Ti-VCT V6† 3.2L I-5 Power Stroke Diesel	6.8L Triton® 2V V10† 6.2L V8 FFV†	6.8L Triton 2V V10† 6.2L V8 PFDI FFV†
Transmission	2.5L 6-Speed SelectShift® Automatic with Overdrive 2.0L 8-Speed 1.5L SelectShift® Automatic with Overdrive	6-Speed SelectShift Automatic with Overdrive	6-Speed SelectShift Automatic with Overdrive	TorqShift® 6-Speed Automatic with Overdrive	TorqShift 6-Speed Automatic with Overdrive

*Available in certain states only. See dealer for details.

**Government orders only.

***Blended operation with an internal combustion engine.

†Available with CNG/Propane Gaseous Engine Prep Package.






††When properly equipped.

Cost of ownership

All fleet managers should consider the combination of acquisition costs, fuel prices, and residual values to determine the total cost of ownership of the vehicles in their fleet. Although acquisition costs for advanced fuel vehicles may be higher, these costs are often offset by the lower costs of the advanced fuels. In addition, the lower volatility of advanced fuel prices helps reduce risk of future price shocks.

Changing the way the world moves

We are using innovative thinking and advanced technology to solve tomorrow's biggest transportation challenges today. Since launching our Ford Smart Mobility plan early in 2015, we have made significant progress in connectivity, mobility, autonomous vehicles, customer experience, and data analytics.

				
F-150 Pickup	F-250/F-350/F-450 Super Duty® Pickup	F-350/F-450/F-550 Super Duty Chassis Cab	F-650/F-750 Medium Duty Chassis Cab	F-59 Commercial/F-53 RV Stripped Chassis
✓	✓	✓		
✓	✓	✓	✓	
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
	✓	✓		✓
✓***	✓	✓ ³	✓	✓
6,070 - 7,850	9,900 - 14,000	9,800 - 19,500	Gas: 22,000 - 33,000 Diesel: 20,500 - 37,000	16,000 - 22,000 (F-59) 16,000 - 26,000 (F-53)
9,600 - 18,400	19,500 - 43,300	19,500 - 40,000	37,000 - 50,000	23,000 - 26,000 (F-59) ¹ 23,000 - 30,000 (F-53)
1,280 - 3,270	2,260 - 7,640	2,260 - 12,750	11,814 - 26,592	10,050 - 15,610 (F-59) ² 9,650 - 18,720 (F-53)
3.3L V6 PFDI FFV 2.7L EcoBoost V6 3.5L EcoBoost V6 3.0L V6 Diesel 5.0L V8 PFDI FFV†	6.2L V8 FFV† 6.7L Power Stroke V8 Diesel	6.2L V8 FFV† 6.8L Triton 3V V10† 6.7L Power Stroke V8 Diesel	6.8L Triton 3V V10† 6.7L Power Stroke V8 Diesel	6.8L Triton 3V V10†
6-speed SelectShift Automatic with selectable drive modes (std w/3.3L V6 PFDI)	TorqShift 6-Speed SelectShift Automatic with Tow/Haul Mode (NA F-250 with 6.2L Engine)	TorqShift 6-Speed SelectShift Automatic with Tow/Haul Mode	TorqShift Heavy Duty 6-Speed Automatic with Overdrive	TorqShift 6-Speed Automatic with Overdrive and Tow/Haul Mode
10-Speed SelectShift automatic with progressive range select and selectable drive modes (std w/3.5L V6 EcoBoost, 2.7L V6 EcoBoost, 3.0L V6 Diesel & 5.0L V8 engines)	TorqShift-G 6-speed with SelectShift with Tow/Haul Mode (F-250 with 6.2L V8)			

¹F-59 has a max GCWR of 29,700 lbs. with the Parcel Delivery Van Package available with the 178" WB and Max. GCWR of 27,200 lbs. with the Parcel Delivery Package available with the 168" WB.

²F-59 has a max payload of 15,750 lbs. with the Parcel Delivery Van Package available with the 178" WB/22,000 lbs. GVWR.

³F-450/F-550 only.

FORD PROVIDES COMPLETE CUSTOMER SUPPORT



Go Further

Nationwide Dealer Network – ford.com

Ford has a nationwide network of more than 3,000 dealers who provide sales, finance, and service support. Ford is a well-established leader in commercial sales and has a long history of providing vehicles that are Built Ford Tough®.



FORD CREDIT
Commercial Lending Services

Ford Credit Commercial Lending Services – credit.ford.com

Ford Credit Commercial Lending Services help meet the unique demands of your business. Our finance products can be tailored to respond to fleet needs such as advanced fuel upfits, high-mileage leases, or flexible payment plans. We also offer Commercial Lines of Credit to help obtain vehicles quickly and easily.



COMMERCIAL
VEHICLE CENTER

Commercial Vehicle Center – fordcommercialvehiclecenter.com

The right place to find the right commercial vehicle. Ford Commercial Vehicle Center dealers are specially trained and equipped to sell, service, and finance America's best-selling commercial vehicles for 32 straight years.*



Gaseous Engine Prep Package

CNG and Propane Autogas (LPG) are increasingly popular choices for cutting fuel costs and greenhouse gas emissions. Ford offers Gaseous Engine Prep packages across our entire commercial vehicle lineup. These packages include hardened valves and valve seats and other components to withstand the higher operating temperatures and lower lubricity of gaseous fuels.



Detailed Engineering Requirements

The Qualified Vehicle Modifier (QVM/eQVM) Program is intended to help modifiers achieve greater levels of customer satisfaction and product acceptance through the manufacture of high-quality vehicles. This program assures vehicle modifiers have the capability and processes in place to maintain the integrity of the Ford systems while meeting federal and Ford Motor Company required standards.

Ford
Authorized
Pool Accounts

Established Truck Equipment Upfitters – fordtoughtruck.com/findupfitter

To get the equipment your business needs to get work done in an efficient, cost-effective manner, Ford has established Pool Accounts. These equipment specialists assist Ford Dealers to ensure you have the right truck for the right job every time.



Warranty-Parts-Service

Ford Dealers are equipped to provide any necessary service repairs. They stock Ford Authorized parts, and service technicians are factory-trained. Ford service departments are backed by computerized diagnostic equipment and have access to national hotline support.



Roadside Assistance 24 Hours-Seven Days

Ford provides roadside assistance 24 hours a day, seven days a week on all Ford commercial vehicles. By dialing 1-800-241-3673, Ford commercial advanced fuel vehicle customers also have access to flat tire change, locksmith service (if locked out) and towing.

*Based on IHS Markit CY1985-2016 US TIP Registrations excluding registrations to individuals. TIP Registrations prior to 2010 do not include all GVW 1 and 2 vehicles.

FORD ENGINEERING SUPPORT

Advanced Fuel QVM's (Gaseous Fuel, Electrification, and Hydraulic Hybrids)

Advanced Fuels has recently expanded to include a new vocation with the introduction of the eQVM!

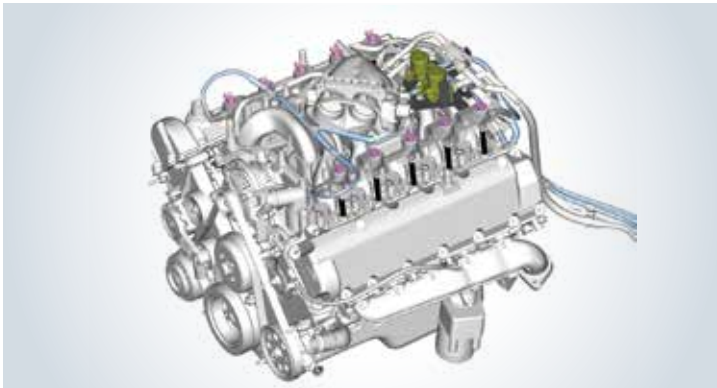
In addition to the Gaseous Fuel Program, owners of vehicles upfit with energy saving electrification and hydraulic hybrids now benefit from the same guidelines, modification recommendations, and powertrain operating specifications required to ensure customer satisfaction and reliability in line with Ford Motor Company standards.

Onsite assessments at each QVM/eQVM location help assure conformance to a high standard of manufacturing, assembly, workmanship, and customer service.

Modifiers that have demonstrated compliance with the overall vehicle modification requirements and vocation specific guidelines and validation are listed on pages 6 and 7.



Gaseous Fuel



Electrification



BROAD PORTFOLIO OF SOLUTIONS

QVM Developers

Ford recognizes seven QVM Developers. These companies develop and provide the engine calibration systems, dynamometer testing, compliance with federal safety standards, and adherence to Ford engineering specifications required for successful vehicle operation with advanced fuels. They also hold the emissions certifications (either EPA or CARB) required for air quality assurance. The QVM/eQVM Developers ensure that your vehicle is delivered to your dealership ready to operate.

Electrification & Hydraulic Hybrid QVM

Over the past five years, Ford has incorporated significant customer and QVM/eQVM feedback to help improve the customer experience with advanced fuels. Recently, customer interest in electrification of commercial vehicles has encouraged us to develop a QVM solution for electric and other powertrains (eQVM). This includes several companies such as: XL, Lightning Systems and Motiv. We continue to work with other companies engaged to address these emergent advanced options.

QVM/eQVM Developer Contact Information

Codes	Company	Website	
A	Altech-Eco	altecheco.com	QVM
L	Landi Renzo®	landiusa.com	QVM
R	ROUSH® CleanTech	ROUSHcleantech.com	QVM
W	Westport	westport.com	QVM
M	Motiv	motivps.com	eQVM
X	XL	xlfleet.com	eQVM
LS	Lightning Systems	lightningsystems.com	eQVM

QVM/eQVM Developer Chart

Model	CNG		Propane		Electrification			Hydraulic Hybrid
	Dedicated	Bi-Fuel	Dedicated	Bi-Fuel	HEV	PHEV	BEV	
Transit Connect	–	–	–	–	–	–	–	–
Transit	A**, W	A	–	W	X	–	LS	–
E-350 – E-450	L**, W	–	R*	–	X	–	M ¹	LS
F-150	–	A, W	–	W	–	X	–	–
F-250–F-350	A, L*, W*	A, L, W	–	W	X	X	–	–
F-450–F-550	L*, W	–	R*	–	X	–	–	LS
F-650–F-750	L, W	–	R*	–	–	–	–	LS
F-53, F-59 Stripped Chassis	L, W	–	R*	–	X	–	M	LS

* CARB Certified.

** Only available in warm weather states. See Altech-Eco website for details.

¹ E-450 only.

QVM/eQVM NETWORK

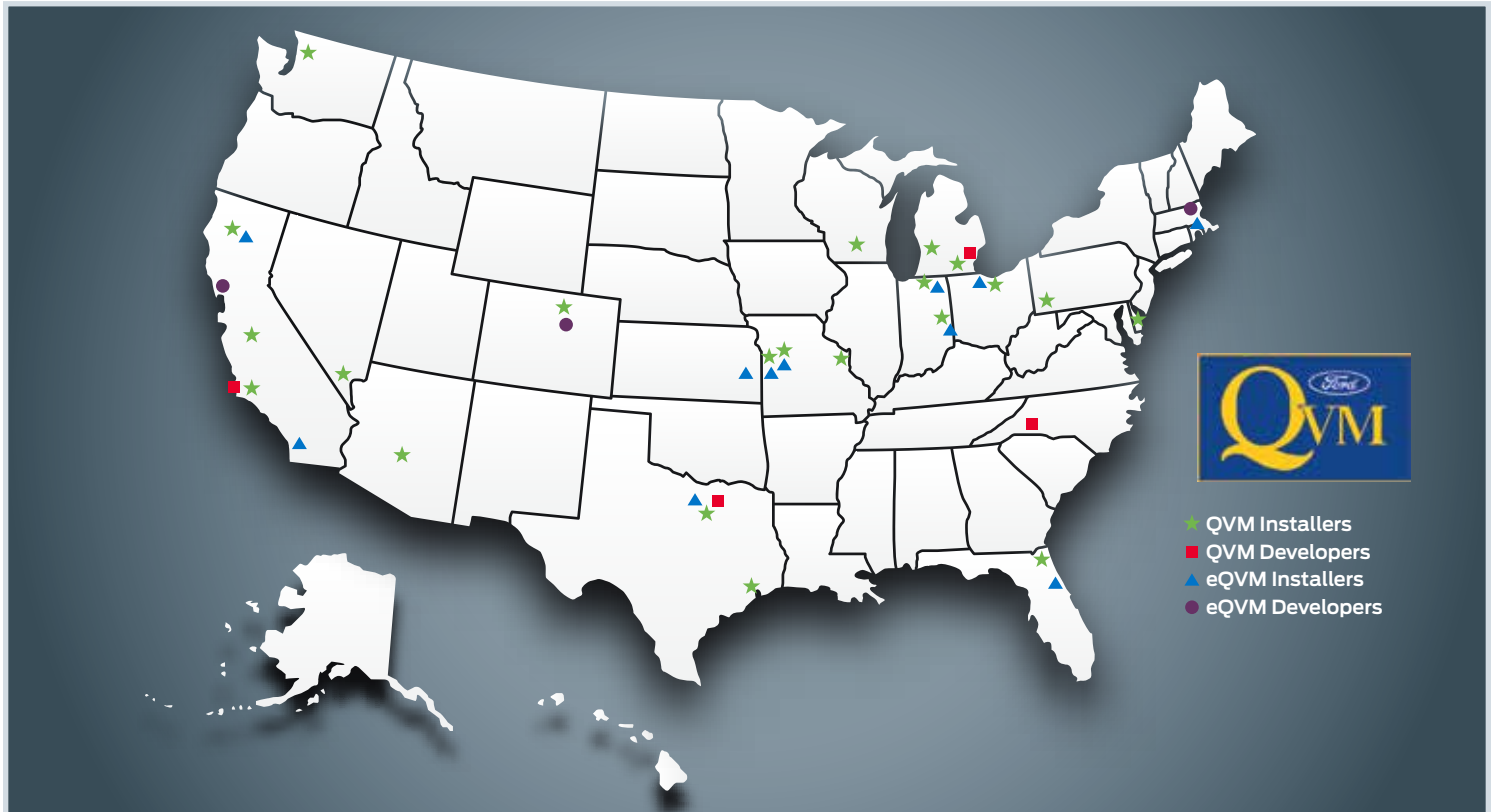
Managing Myriad Modification Options

The number of vehicle conversion options available for Ford vehicles is limited only by the ideas our customers present. Every vocation has its own set of challenges for which vehicle modifications have been developed. And every customer needs to get the right vehicle for the right job in the right place at the right time to get the job done. To help manage this process efficiently, Ford and our QVM/eQVM Developers work with a network of QVM/eQVM Installers.

QVM/eQVM Installers

Ford allows our QVM/eQVM Developers to work with various body companies and accounts to satisfy the diverse needs of our collective customer base. These modifiers are required to follow

the specific installation guidelines for each QVM/eQVM Developer to help ensure emissions and safety compliance of every installed system. This process allows for a wider distribution of advanced fuel vehicles to the complete range of Ford commercial vehicles. The QVM/eQVM Installers are held to the same rigorous assessment process used for our QVM/eQVM Developers. Furthermore, each QVM/eQVM Developer works with their Installers to ensure adherence to the unique characteristics of each developer's fuel system. The final result is a network of installation locations that maintain the warranty on the base Ford vehicle and enable Ford to assist QVM/eQVM Developers with service and maintenance of these vehicles throughout their operation.



Benefits of the QVM/eQVM Installer Network

- Designing solutions that incorporate the fuel system and body modifications simultaneously
- Efficiency in the modification process
 - One-stop-shop for fuel system and body installation
 - Ship-through capability at many locations to help reduce freight costs
 - Locations around the country for vehicle modification, close to customer operations
- Multiple QVM/eQVM Developer solutions through some QVM/eQVM Installers

FORD IS EASY TO WORK WITH



The commercial vehicle market is comprised of many unique vocations and vehicle requirements. One size does not fit all. That's why Ford is collaborating with reliable and qualified modifiers to deliver completed advanced fuel vehicles. Most Ford commercial vehicles can be ordered with a CNG/Propane Gaseous Engine Prep Package. In fact, all 6.8L V10 engines in the 2019 Super Duty® come with the Gaseous Engine Prep Package as standard equipment.

Although vehicles with Gaseous Prep Engines can be delivered driven on gasoline, most vehicles are transported to Qualified Vehicle Modifiers that install the CNG/Propane tanks and hardware. Ford has released QVM/eQVM Guidelines and Ford engineers work with QVM/eQVMs to help ensure consistent, reliable performance, and customer service.

Ford maintains the Engine and Powertrain Limited Warranty (5 years or 60,000 miles*) and the QVM/eQVM is responsible for the fuel system component warranty.

Given the number of unique applications, this strategy provides the greatest flexibility to commercial customers from many vocations.

WARRANTY & SERVICE SUPPORT



Our dealers service what they sell. Similar to other commercial vehicles (ambulances, motorhomes, utility trucks, etc.), Ford maintains the warranty on the base vehicles, and any QVM/eQVM modifications and installed hardware are warranted by the QVM. For Advanced Fuel modifications, Ford stands behind the engine warranty (as described in the 5-year/60,000-mile Powertrain limited warranty*) when the modifications comply with QVM requirements.

The QVM/eQVMs provide service training programs for dealership or fleet service technicians. This training helps to ensure the dealership or service facility can accurately diagnose and safely repair modified vehicles. The QVM/eQVMs also provide technical hotlines to assist in diagnosing component or drivability issues.

Engine calibration and emission certification and compliance (if required) are part of the QVM-supplied modification to the vehicle. The Powertrain Control Module (PCM) is re-flashed with the certified calibration by the QVM/eQVM when the vehicle is modified. In the event service is needed on the PCM, the QVM/eQVM will work with the dealer to provide a new or replacement calibration.



*See dealer for limited warranty details.

THE RIGHT PLACE TO FIND THE RIGHT COMMERCIAL VEHICLE



COMMERCIAL
VEHICLE CENTER

Ford Commercial Vehicle Center

Advanced commercial vehicle expertise, in stock.

Dedicated service, customer commitment, and advanced commercial vehicle expertise come standard with every Ford Commercial Vehicle Center dealer.

Participating dealers offer a variety of hardworking Ford vehicles (in stock), with dedicated service, outstanding customer commitment, and custom financing.

Bottom line? Program dealers help your business run smoothly — today and down the road. Find a highly qualified dealer near you at www.fordcommercialvehiclecenter.com.

Service Parts Warranty

A warranty with no commercial exceptions.

You can expect commercial expertise from your Ford Commercial Vehicle Center dealer. Motorcraft® and Ford Parts offer a two-year with unlimited mileage Service Parts Warranty, labor included. No commercial exceptions.*

Specialized Training

Certified in commercial vehicle service, and more.

Participating dealers' sales, finance, service and parts personnel are trained and certified to understand the unique requirements of commercial customers, the complexity of vehicle applications, and your lease and finance options.

Choosing The Right Vehicle

Finding the vehicle that meets your needs.

Ford Commercial Vehicle Center dealers guide you in buying the right vehicle to fit your needs. Personnel are trained and certified in commercial vehicles and their applications. They also use a proprietary diagnostic software, Commercial Vehicle Tools (CVT), to recommend the most appropriate vehicle specifications for your business, based on your unique requirements (payload, cargo space, upfits, etc.).

*Labor may have a limit. See your seller for a copy of the limited warranty. Motorcraft® is a registered trademark of Ford Motor Company.



Vehicles shown with aftermarket equipment.

Commercial Lending

Finance programs designed with your business in mind.

Ford Credit Commercial Lending Services provides finance and lease options designed with your business in mind — including a wide range of finance and leasing solutions and unique fleet vehicle finance options, customized for your business and vehicle use. Ford Credit financing is available through your Ford Commercial Vehicle Center dealer.

Ford Fleet Care

Convenient service and parts billing options, just for commercial customers.

Ford Fleet Care provides a convenient monthly consolidated bill for your service and wholesale parts invoices through Ford Fleet Care (FFC). Consolidated billing is available for both Ford and non-Ford vehicles and trailers at participating Ford and Lincoln dealers. Enroll at www.fleetcare.ford.com.

Ford Protect™ Extended Service Plans

Ford Protect mitigates risk in commercial vehicle ownership by minimizing a variety of unexpected repair costs, from the engine to the electrical systems. Visit your local Ford Commercial Vehicle Center dealer to learn more.

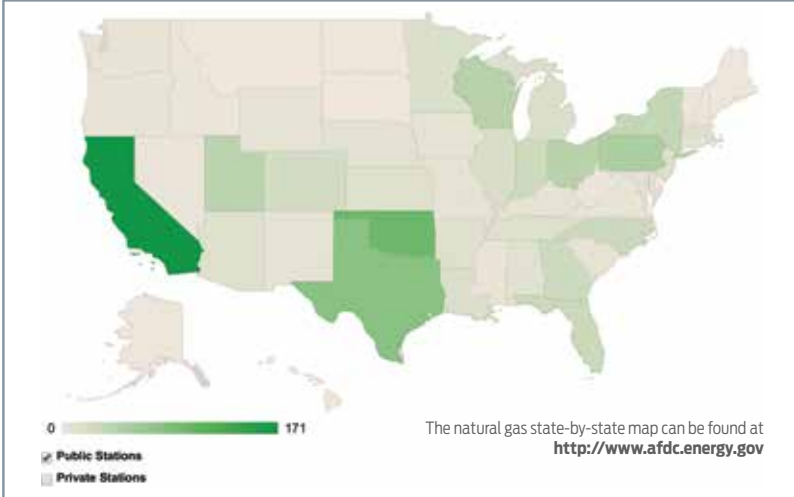


CNG INFRASTRUCTURE



Natural Gas (CNG) Infrastructure

Number of Natural Gas (CNG) Public Stations by State



Commercial

Companies and fleet owners want an efficient, reliable, and cost-effective system that enables them to refuel their vehicles without spending a fortune – Cubogas Pocket is one solution. This plug and fill station comes with one 50-hp skid-mounted compressor, air cooler, 47 GGE onboard storage, control panel and integrated double dispenser, all in one small unit easy to install and relocate. The Pocket can be used for both fast and slow fill applications: light-duty vehicles can be filled up in less than 8 minutes or slow-filled overnight. Equipped with a temperature compensation system and a lubrication-free compressor to reduce oil contamination, it refuels vehicles efficiently and safely. The Pocket's capacity can be increased with the installation of additional external storage. For more information, visit www.cubogas.com.

Public

The growth of public CNG refueling stations goes hand in hand with the increasing number of CNG vehicles available on the market (as of August 2018, there were almost 1,700 CNG stations in the U.S.). Federal and state incentives for the opening of advanced fuel stations and the attractive price difference between gasoline and natural gas provide a business case. Independence from oil and fewer emissions complete the equation.



Home

BRC FuelMaker offers a complete line of 240-volt home and vehicle refueling appliances (HRA-VRA), the only CSA-certified natural gas compressors for individuals and small fleets. Fast and easy to install, these compressors generally do not require any special permit or authorization. Home refueling has never been so easy: contact your local BRC FuelMaker dealer and ask them to install Phill® to refuel your car inside your garage or outside your house. Plug your vehicle in, push the start button and the compressor starts to refuel automatically. Phill® comes with an internal gas sensor, gas filter and dryer to ensure safe refueling in most conditions. For bigger fleets you can get an FMQ compressor that can refuel 2+ vehicles at the same time. For more information, visit www.brcfuelmaker.com.



Resources

Current refueling stations can be found at one of the following websites:

www.drivealternatives.com

Online database of CNG/Propane and Ethanol (E85) refueling stations.

www.cleanenergyfuels.com

One of the leading providers of natural gas fuel in North America.

www.cngnow.com

Provides a locator for CNG refueling stations, as well as a great source for CNG information.

www.ngvamerica.org

Helpful with a station map, along with information on different types of stations and station builders.

Smartphone apps: Dozens of smartphone applications can locate CNG/Propane/E85/B20/Electric refueling stations.*

*Message and data rates may apply.

PROPANE AUTOGAS (LPG) INFRASTRUCTURE



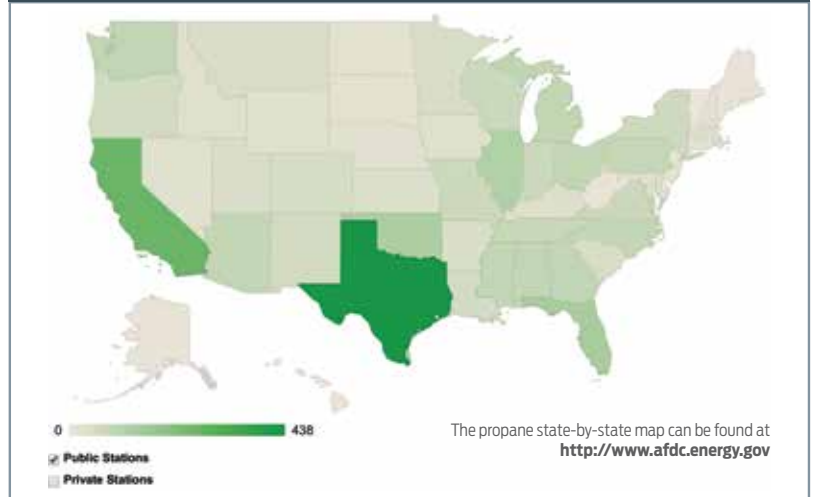
Worldwide, more than 26 million vehicles (source: World LP Gas Association) are powered by propane autogas. In the U.S., there are more than 200,000 propane-autogas-powered vehicles on the road. This popularity has led to more technology development in OEM-supported vehicles powered by propane autogas, including light- and medium-duty trucks, vans, and shuttles.

Propane offers a variety of refueling options. It gives fleet managers the freedom to shape a refueling plan around budget and fleet size. In addition to the thousands of propane autogas fueling stations found throughout the U.S., installation of on-site dispensing is easy and convenient. Propane autogas provides an affordable infrastructure for on-site refueling compared with conventional and alternative fuels. There are four options for propane autogas refueling — standard skid-mount station, advanced permanent station, temporary station, and mobile refueling. With standard skid-mount, above-ground refueling stations typically come preassembled and are easy and inexpensive to have installed. Advanced permanent stations feature underground propane storage tanks and may include a canopy and multiple dispensers. A fleet in the process of building permanent refueling infrastructure can take advantage of a temporary refueling solution which includes a dispenser, pump, and fuel storage tank mounted on a trailer. The propane supplier owns all of the equipment, and your fleet refuels using the tank and dispenser as long as necessary. Mobile refueling is a good option for fleets that don't have infrastructure investment plans yet, but want to get started with propane autogas. At a scheduled time, your propane supplier will come to your location and refuel your vehicles on-site with a propane delivery truck. Cost and situations vary; talk to your supplier for more details. All options have dispensers for ease-of-use, similar to conventional refueling.

For a list of propane companies refer to the ROUSH® CleanTech website below.

Propane Autogas (LPG) Infrastructure

Number of Propane Autogas (LPG) Public Stations by State



Resources

www.afdc.energy.gov/afdc/locator/stations

With more than 23,590 fueling stations across the United States, propane is easily accessible. To find a location, visit the Department of Energy website.

www.propane.com/on-road-fleets/

The Propane Education & Research Council (PERC) promotes the safe, efficient use of propane as a preferred energy resource through research and development, training and safety programs.

www.roushcleantech.com/altfuels

Provides a locator for propane refueling stations, as well as a great source of propane information.

Smartphone apps: Dozens of smartphone applications can locate CNG/Propane/E85/B20/Electric refueling stations.*

*Message and data rates may apply.

ELECTRIC VEHICLE INFRASTRUCTURE



Charging Stations



Commercial

A number of companies offer commercial electric vehicle (EV) charging infrastructure. These commercial grade Level 2 (240V) systems can charge vehicles significantly faster than using an ordinary 110V outlet.

Plug your vehicle in and initiate the charging process. The charging station will indicate that the vehicle is in the process of charging. When charging is complete, users simply stow the cord, keeping it organized for the next user. Stations are available in pedestal or wall-mount configurations. Wall-mount units can either be hardwired for permanent installations or plugged into an existing 240V outlet for simple removal of the unit. As an added benefit, it is possible for network stations to let users know if a vehicle is charging or how much energy was dispensed. This information can be used to determine EV miles driven as well as fuel and CO₂ saved.

Public

For fleet drivers to charge their battery-electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs) in public, charging stations are being deployed with consideration for daily commutes and typical driving habits.

Most BEV & PHEV users find it most convenient to charge their vehicle at home/office/business during vehicle downtime or overnight via a L2 charger.

Generally, public charging stations use Level 2 (240V) service and are usually located where vehicle owners are likely to be for an extended time, such as shopping centers, city parking lots and garages, airports, hotels, government offices, and other businesses.

Private Charging: Home, Business, Work

A 240V charging station is available for purchase with or without installation services from AeroVironment™. If you decide to have the unit installed, an AeroVironment affiliated electrician will perform an electrical audit and then install the 240V charging station. The electrician can handle everything, including securing the required permits. In many cases, installation could be performed in less than one day. It is branded by Ford Motor Company, and can be hardwired or plugged into a 240V outlet for non-permanent installation, easy removal or replacement. For more information, please call 1-888-219-6747, or visit evsolutions.com/ford.

AeroVironment is a trademark of AeroVironment, Inc.

Technology	Typical Infrastructure Required	Considerations
Hybrid	None	None
Plug-in Hybrid	120V (L1) or 240V (L2)	EVSE L1 charger and an available 110V/20A outlet may be sufficient for all charging needs
Full Electric	240V (L2) or DC Fast Charge	Typically requires professional installation and potential service upgrades

FORD PROVIDES ELECTRIFICATION CHOICES



XL's hybrid (HEV) and plug-in hybrid (PHEV) electric drive systems can improve the fuel economy of factory Ford vehicles by 25-50%, while reducing greenhouse gas emissions by 20-33%. Our electrification systems operate in parallel with the gas-powered engine and provide an electric assist during acceleration, allowing fleets to save money and meet sustainability targets without sacrificing performance or modifying operations.

xlfleet.com

Ford Products Used:

Transit, E-350/E-450, F-150/F-250, F-59

Product Examples:



HYBRID



PLUG-IN HYBRID



Motiv builds the Electric Powered Intelligent Chassis (EPIC 4, 5 and 6). These are all-electric versions of Ford's medium-duty commercial chassis – the E450, F59 and F53. Motiv's EPIC chassis are CARB certified, Ford eQVM approved, and assembled by existing Ford production partners. Motiv's EPIC chassis are used to build walk-in vans, box trucks, school buses, shuttle buses, work trucks, and specialty vehicles for fleet deployments.

motivps.com

Ford Products Used:

E-450, F-59

Product Example:



ALL-ELECTRIC



The Lightning Electric is a modular zero-emission powertrain for commercial fleets. The Lightning team works with forward-thinking fleets to provide the right electric powertrain on the right chassis in the right drive cycle. Lightning's products improve a fleet's operating costs and safety, and make sure they are driving the cleanest and most advanced technology available.

lightningsystems.com

Ford Products Used:

Transit 350HD, E-450, F59

Product Example:



HYDRAULIC-HYBRID

COST OF OWNERSHIP



The primary goal of most fleet managers is to achieve and maintain the lowest Total Cost of Ownership (TCO) for their fleet.

TCO calculations should include the acquisition cost of the vehicle, duty cycle, mileage traveled, fuel (or fuels) used, associated infrastructure, maintenance costs, and the residual value of the vehicle, along with any other ancillary costs.

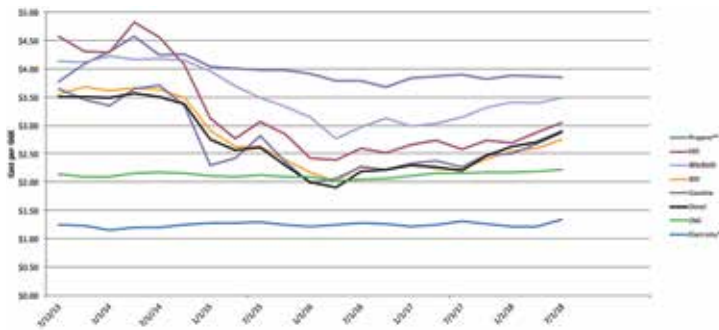
The calculations shown below are estimated and address only the cost components of selecting an advanced fuel compared to gasoline, assuming all other aspects are equal. Fuel prices for this brochure were extracted from afdc.energy.gov/fuels/prices.html.

Average Retail Fuel Prices Per Gasoline Gallon Equivalent (GGE): July 2013 - July 2018*

FUEL	PRICE
Gasoline	\$2.72
E85	\$3.22
CNG	\$2.12
Propane	\$3.97
Diesel	\$2.71
B20	\$2.76
B99/B100	\$3.53
Electricity	\$1.24

* For data collection methodology, please see the actual price report, www.afdc.energy.gov/data/

Average Retail Fuel Prices in the U.S.



Electricity costs are adjusted to account for electric motor efficiency. It takes 9.9 kWh for an electric motor to achieve 1 GGE in an internal combustion engine (33.7 kWh/3.4 efficiency).

When considering fuel prices, it is important to consider the time horizon to account for fuel price volatility over the time you operate a vehicle. The chart reflects a five-year average while the graph shows 15 years of prices. Energy density measured by gasoline gallon equivalent (GGE) should also be considered for an equitable comparison of different fuels. These relative measures allow for a more direct comparison of potential fuel expenses between different fuel alternatives.

Calculating the estimated fuel cost payback for any advanced fuel is straightforward:

- Identify the base price of the vehicle you need assuming a gasoline engine
- Identify the price increase needed to equip for advanced fuel over the base vehicle:
 - Flex Fuel (E85) is generally available at little or no upcharge
 - Diesel can range from \$4,000 and up
 - CNG/Propane Autogas conversions can range from \$9,800 and up
- Identify the price of gasoline
- Identify the price of your advanced fuel per GGE
- Determine the estimated mpg based on your duty cycle (towing, hauling, etc.)
- Determine the number of miles traveled per year

Then, perform the following calculations:

- $(F/E) \times (C-D) =$ your expected annual fuel savings over using gasoline
- Divide your upfit cost for advanced fuel (B) by your annual fuel savings to determine the time period needed to pay back the upfit
- If the payback period is a shorter time than you plan on owning your vehicle, then you are on your way to achieving lower costs, reduced emissions, and reduced dependence on foreign oil all at the same time

Example: A Ford Super Duty® customer driving 20,000 miles per year at 11 mpg. To consider a CNG conversion at \$6,000 (\$7,500 cost less \$1,500 government incentive) with gasoline priced at \$3.05 and CNG at \$2.10/GGE, the calculation is:

$$(20,000/11) \times (\$2.72 - \$2.12) = \$1,079 \text{ savings per year}$$

$$\$6,000 / \$1,079 = 5.56 \text{ years to pay back the upfit cost}$$

Many advanced fuels have additional incentives available from states and the federal government. These incentives can significantly reduce the payback period.

Some general rules of thumb:

- The higher the annual miles driven, the more likely that advanced fuels will make economic sense.
- The lower the fuel efficiency (mpg), the more likely that advanced fuels will make economic sense.
- The more the price gap widens between an advanced fuel and gasoline, the shorter the payback period.

For a detailed analysis, Ford recommends that you work with a Commercial Account Manager at one of our Commercial Vehicle Center dealerships to address your specific needs.

ADVANCED FUEL INCENTIVES



Your Stop For Upfits and Incentives

Commercial Upfit Incentives

The Ford *Commercial Connection* program was created to help businesses upfit their commercial vehicles by providing incentives and special offers. As part of this program, Ford offers incentives¹ for advanced fuel modifications such as CNG or Propane. These incentives are in addition to any potential national retail incentives and are dependent on the vehicle model series. All advanced fuel modifications must be completed by a gaseous fuel QVM/eQVM (see pages 6 and 7).

Model	Transit Connect	Transit	E-Series Stripped Chassis	F-Series Super Duty® Pickup	F-Series Super Duty Chassis Cab	F-650/F-750
Incentive ²	\$500	\$1,000	\$1,000	\$500	\$1,000	\$1,500

¹ See dealer for qualifications and complete details. Program rules subject to change.

² Upfit minimum may be required dependent on vehicle. Units receiving any form of CPA (56A), GPC, Long-Term Rental (56K) or other concessions are ineligible. Restrictions apply. See your dealer for qualifications, complete details and possible program extension. Offer correct at time of printing. Program rules subject to change. Claimed incentives cannot exceed actual price of upfit.

It is important for customers to consult with their Ford Commercial Vehicle Center dealer to obtain the most current incentive details. Go to fordtoughtruck.com for more details.

Federal Tax Incentives

The Federal Government offers various incentives to encourage the adoption of advanced fuels³.

Other Federal, State, and Local Incentives

Many state governments also offer interesting incentives for advanced fuel vehicles. The U.S. Department of Energy has established a website that allows you to search its database for federal and state laws and incentive programs related to advanced fuel vehicles.

Contact your QVM Upfitter (see page 6 for contact info) for incentives that apply to your fleet, vehicles, and the QVM technology you are considering. Many incentives cover up to 80% of the incremental cost.

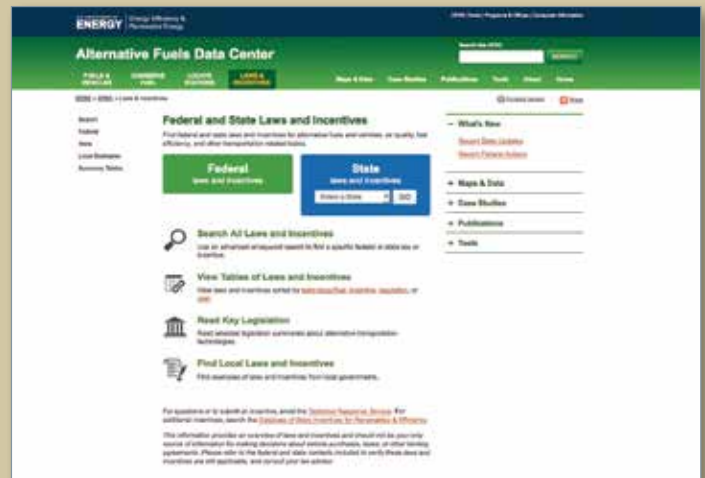
www.afdc.energy.gov/laws/

U.S. Department of Energy allows you to search its database of federal and state laws and incentive programs related to advanced fuel vehicles.

www.fueleconomy.gov

Information about federal and state tax incentives for purchasing advanced fuel vehicles.

³ See www.afdc.energy.gov/laws/409. This information should not be construed as a promise of potential tax savings or reduced tax liability. Consult your tax advisor for the amount of credit you may be eligible for.



ADVANCED FUEL FINANCING



FORD CREDIT
Commercial Lending Services

Ford Credit Commercial Lending Services – Ford Credit provides solutions so we can meet your unique business requirements. We'll work with you to help develop financially smart solutions.

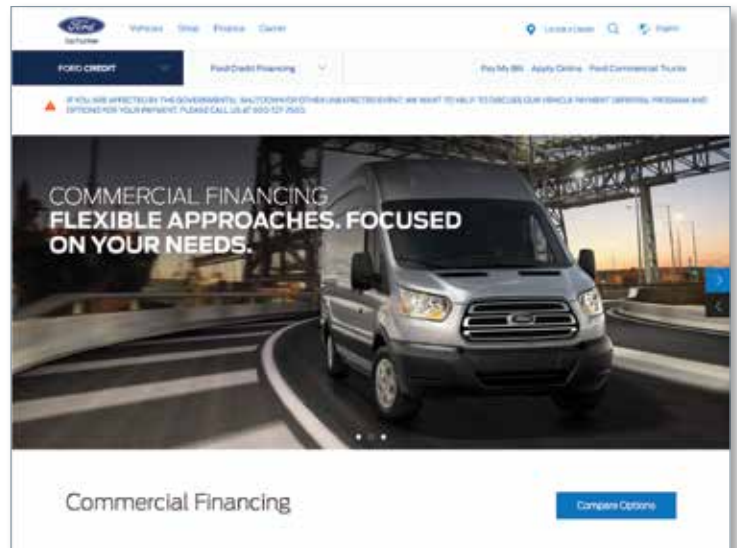
Commercial Retail Financing – a traditional financing program offering flexible terms, no hidden fees and combined billing availability.

Commercial Red Carpet Lease (RCL) – for predictable-usage vehicles, choose this closed-end lease with no residual risk. When you complete your lease as agreed, simply bring the vehicle back to your Ford dealer. You are only responsible for any excess mileage and wear and use charges.

Commercial Lease – an open-ended Terminal Rental Adjustment Clause (TRAC) lease program that allows flexibility to set the residual based upon business requirements.

Commercial Line of Credit (CLOC) – available with Commercial Retail, Commercial RCL, and Commercial Lease. With our CLOC program, you can apply for a credit line starting at \$250,000 and if you're approved, you can add vehicles to your fleet whenever you need to, for up to 12 months. No need to reapply every time you need a vehicle.

State and Local Government Municipal Financing – a lending program that helps state, local, and municipal governments make the most of their operating budgets by providing flexibility, affordability, and convenience when acquiring vehicles for essential services.



Body Manufacturers and Upfitters

Chassis Financing – provides inventory financing for qualified body companies for the purchase of truck, van chassis, limousine cars and trucks that will be converted or upfit with a specialty body.

For more details about our **Commercial Finance & Lease Payments**, visit www.ford.com/financing/commercial-financing or contact your Ford Dealer.

TOUGH ON THE STREET, EASY ON THE BUDGET



POLICE VEHICLES

The all-new Ford Police Interceptor[®] Utility and the Police Responder[®] Hybrid Sedan are purpose-built to meet the unique needs of law enforcement and represent a smart investment.

Both vehicles offer significant potential fuel savings versus traditional gas engines, thanks to reduced engine idle times and significant improvements in projected EPA-estimated fuel economy¹. When not in motion, traditional police vehicles must constantly keep their engines running to power on-board electrical equipment, like emergency lights, radios, computers and other items. With Ford hybrid Police vehicles, these high electrical loads are powered via the lithium-ion hybrid battery, allowing the gas engine to shut off for extended periods of time... now running intermittently to keep the battery charged. The savings can really add up – potentially \$3,500-\$4,200 annually at \$2.75 per gallon, per vehicle, depending on which vehicle you choose.²

And all of this is done with no trade-offs in power or performance.

Both vehicles are pursuit-rated and have completed rigorous testing by Michigan State Police and Los Angeles County Sheriff's Department.



In fact, the hybrid AWD powertrain of the all-new Ford Police Interceptor Utility features more horsepower and torque, better acceleration, and a higher top speed³ vs. the outgoing 3.7L AWD with no trade-offs in passenger or cargo space. It's also engineered to meet the 75-mph rear-impact test—the only vehicle in the world tested to this rigorous standard. It's this type of leadership that has made Ford the number one choice for law enforcement year after year.

¹ Projected EPA-estimated combined rating of 24 mpg, Police Interceptor Utility Hybrid AWD. EPA-estimated 40 city/36 hwy/38 combined mpg, Police Responder Hybrid Sedan FWD. Actual mileage will vary. ² Additional testing details are available at ford.to/2H9qBEf and ford.to/2nw5dE8. Fuel savings calculator details are available at <https://www.ford.com/police-vehicles/police-interceptor/hybrid-utility/calculator/> and <https://www.ford.com/police-vehicles/hybrid-police-responder/calculator/> ³ Based on preliminary Michigan State Police and Los Angeles County Sheriff's Department test results for the 2018 calendar year.

FORD TELEMATICS™ & FORD DATA SERVICES™



Ford Commercial Solutions enables businesses and fleet managers to improve their operations by offering Ford OEM-Grade telematics software, integrating vehicle data with your existing telematics service provider or sending vehicle data directly into your own IT systems – giving you the power or choice.



Ford-engineered and integrated telematics modem technology will enable your new Ford vehicles to connect seamlessly with our platform without the need for an aftermarket plug-in device. A Ford-engineered Plug-in Device will also be available to retrofit your unconnected existing fleet of Ford vehicles.

Key Benefits:

- **Improve Asset Utilization**
Keep track of the vehicles in your fleet with GPS tracking and Geo-Fencing capabilities
- **Maximize Your Vehicle Availability**
Receive proactive notifications and vehicle health alerts allowing you to plan ahead
- **Optimize Your Running Costs**
Monitor the fuel consumption of all your vehicles and not only identify areas of waste, but what the causes are too
- **Protect Your Fleet**
Receive a range of notifications, including advance service reminders, or a warning if a driver isn't wearing their seatbelt
- **Thinking About the Environment**
Information is provided that can help you fully utilize the benefits of hybrid vehicles in your fleet
- **Improve Driver Behavior**
Receive a range of valuable insights into driver performance, informing you of coaching opportunities to help increase efficiency, reduce waste, and improve compliance



About Ford Commercial Solutions

Ford Commercial Solutions provides the focused and relevant telematics and data tools that fleets need to optimize, adapt, and become more operationally effective.

We blend Ford technical expertise with a hands-on understanding of real-world challenges to give our customers a partner they can depend on.

We deliver purpose-built solutions for different kinds of fleets, helping them optimize resources so they can commit more time and attention to their operational priorities. Our telematics solutions are built on an integrated, open platform designed to evolve as our customers do, flexing to meet their ever-changing needs.

CONTACT US

Discover what Ford Data Services™ and Ford Telematics™ solutions can bring to your business.

Call 833-811-FORD (833-811-3673),
contact fcs1@ford.com, or visit
commercialsolutions.ford.com.

ADDITIONAL ADVANCED FUEL INFORMATION



Flexible-Fuel Vehicles (FFV) are designed to operate the internal combustion engine for a range of gasoline and ethanol blends. FFVs are capable of burning any blend, ranging from 100% gasoline (E0) up to 85% ethanol/15% gasoline (E85). Fuel injection and spark timing are automatically adjusted according to the specific blend detected by electronic sensors. E85 is the most common flex fuel and many Ford engines are equipped to handle this fuel type.

Advantage – Ethanol/E85 is clean-burning and substantially reduces CO and CO₂ emissions. Compared to gasoline, E85 has a higher octane rating, provides the same or more horsepower and burns cooler. Corn and other cellulosic plant sources are readily available.

Consideration – E85 produces less energy by volume than gasoline. One gallon of gasoline is the energy equivalent of 1.3 gallons of E85. The superior octane of E85 will allow the vehicle to operate more efficiently than would be expected for the lower energy content.

Nearly all ethanol producers add a corrosion inhibitor at a level sufficient to treat a gallon of E85.

Biodiesel is a renewable, sustainable, clean-burning diesel replacement used in existing diesel engines. Made from an increasingly diverse mix of domestic resources such as recycled cooking oil, soybean oil, and animal fats, biodiesel is the nation's first domestically produced, commercially available advanced biofuel to meet the EPA's definition as an Advanced Biofuel. According to the EPA, biodiesel reduces greenhouse gas emissions by 57% to 86% compared with petroleum diesel.

Biodiesel contains no petroleum, but can be blended with petroleum diesel, typically in blends of 5 to 20% (B5 to B20). Any diesel engine can run on biodiesel blends without modification, according to manufacturers' recommendations, making biodiesel an easy and cost-effective way to green your fleet. All Ford diesels are capable of running on any blend of biodiesel up to and including B20.

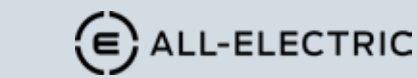
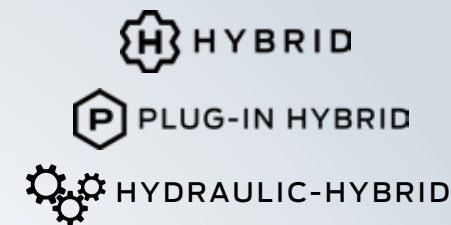
Advantage – U.S. biodiesel on average provides an 80% reduction in carbon emissions compared to petroleum diesel. Biodiesel also has higher cetane than U.S. diesel fuel, while also offering superior lubricity and the highest BTU content of any advanced fuel. B20 (20% blend of biodiesel with diesel fuel) provides similar fuel economy, horsepower, torque and haulage rates as diesel fuel.

Consideration – Just like No. 2 diesel fuel, biodiesel can gel in very cold temperatures. Although pure biodiesel has a slightly higher cloud point than No. 2 diesel, blends of 20% biodiesel are usually managed with similar techniques as diesel fuel. Blends of 5% and below have virtually no impact on cold weather operability.

Compressed Natural Gas (CNG) is a fossil fuel substitute for gasoline or diesel. CNG is domestically sourced and reduces our dependence on foreign oil. Landfills and biologic waste also provide CNG through digesters and emission recapture turning waste into fuel. It is stored and distributed, in hard containers at a pressure of 2,900–3,600 psi. It is safer than other fuels in the event of a spill (natural gas is lighter than air, and disperses quickly when released). CNG is made by compressing natural gas, which is mainly composed of methane.

Advantage – CNG is an extremely clean-burning fuel and significantly reduces greenhouse gases such as CO, CO₂, and NOx on a well-to-wheels basis compared to gasoline. CNG is typically less expensive than gasoline and the fuel price is also less volatile. CNG has an octane rating of 130 and has the potential to optimize the engine's thermodynamic efficiency by utilizing a higher compression ratio.

Consideration – CNG has slightly less energy than gasoline per unit volume. CNG at 3,600 psi occupies about 3.5 times the volume that gasoline does for the equivalent amount of energy and, therefore, requires a larger fuel tank to maintain the same range. Refueling time and infrastructure are also considerations.



Propane Autogas also known as **Liquefied Petroleum Gas (LPG)** is a mixture of hydrocarbon gases, most commonly propane and butane. A powerful odorant, ethyl mercaptan, is added so that leaks can be detected easily.

As opposed to relying on foreign oil sources, approximately 90% of the United States propane supply is produced domestically. 7% of the remaining supply is imported from Canada and Mexico.

Propane is nontoxic and cannot get into the water table if there is a leak in the storage container.

From an economic perspective, propane is an effective alternative to conventional transportation fuels when capital cost (vehicle and infrastructure), operation, and maintenance are all taken into consideration.

Advantage – Power, acceleration, payload, and cruise speed are unchanged compared to an equivalent vehicle fueled by gasoline. Propane has a high octane rating of 104, in between Compressed Natural Gas (CNG) at 130 and unleaded gasoline at 87.

Consideration – Propane Autogas has fewer BTUs than gasoline, which may result in an mpg loss compared to gasoline.

Hybrids and Plug-In Hybrids are vehicles that utilize both an internal combustion engine AND electric motors to propel the vehicle.

Hybrids (HEVs) are powered in part by gasoline and part by a battery-driven electric motor. They seamlessly switch between the gasoline engine, electric motor, or a combination of both to offer efficiency and performance. The battery is automatically recharged by the gasoline engine and through regenerative braking. Hybrids do not plug in.

Plug-In Hybrids (PHEVs) are progressive hybrids that expand capability by providing a level of full or blended electric operation that enhances ICE operation. PHEVs offer the best of both worlds, giving the driver the opportunity to drive as EV for short trips or in a hybrid for longer trips.**

Hydraulic Hybrid Vehicles (HHVs) are vehicles that utilize both an internal combustion engine AND hydraulic motors to propel the vehicle. The hydraulic hybrid provides regenerative braking by using one or more accumulators to store energy captured when the vehicle is braking, and delivering that energy to assist the subsequent acceleration of the vehicle. The hybrid system's operation is automatic, responding seamlessly to driver input through the accelerator and brake pedals.

Consideration – Because the HHV uses regenerative braking, this technology is best suited to vehicles which experience frequent stops and starts, such as urban deliveries, airport/hotel/hospital shuttle buses, etc.

Battery Electric Vehicles (BEVs) are powered completely by a rechargeable battery so you never need a drop of gasoline or an oil change. Key features are the electric motor, charge port, and lithium-ion battery pack. Battery electric vehicles provide a CO₂ free driving experience. Drivers plug their vehicle in to fully charge the battery pack. While driving, regenerative braking also aids in charging the battery.

Advantage – Vehicles that run solely on electric power require no warm-up, run almost silently, and have excellent performance. Electric vehicles can be recharged at night when generating plants are underutilized. Electric vehicles produce zero tailpipe emissions.

Consideration – Pure electric vehicles have limited range*. Charge time is also important to assess. Depending on voltage, charging overnight may be needed to fully recharge a depleted battery.

* Actual range varies with conditions such as external elements, driving behaviors, vehicle maintenance and lithium-ion battery age.

** XL offers a "Blended operation" with an internal combustion engine.

FORD HITS CO₂ MANUFACTURING EMISSIONS REDUCTION TARGET YEARS AHEAD OF SCHEDULE

Ford Motor Company is proud to report it has met its goal to reduce manufacturing emissions eight years ahead of schedule!

Back in 2010, The Environmental Quality Office announced an ambitious goal – to reduce the company’s carbon dioxide emissions from manufacturing operations by 30 percent per vehicle produced by 2025.

But through dedication and diligence, Ford hit the target twice as fast as expected. And the results are dramatic, with a global manufacturing CO2 emissions reduction of more than 3.4 million metric tons from 2010 to 2017 – that’s equivalent to greenhouse gas emissions from more than 728,000 passenger vehicles driven for one year.

Products and Operations

In addition to reaching the company’s goal of reducing manufacturing greenhouse gas emissions—early—with a 32 percent reduction, Ford makes roughly 300 vehicle parts from renewable materials, with eight sustainable materials featured in production vehicles, including soy, wheat, rice, castor, kenaf (hibiscus), tree cellulose, jute, and coconut.

By using less energy, less waste, and moving away from the use of fossil fuels, the company has achieved a 228 million pound reduction in CO2 since the switch to soybean-based foam in 2011 – the equivalent to the carbon capture by four million trees in one year.

Ford’s Contribution to Society

All of this is further evidence that Ford is committed to contributing to communities and the world around us. In 2017, \$63 million of charitable donations were made through Ford Motor Company Fund. More than 237,000 volunteering hours were donated by current and retired employees across more than 1,700 community projects in 40 countries.

Ford and Lincoln dealers additionally contributed more than \$110 million and 50,000 hours to charitable causes, disaster relief efforts and non-profits in the communities they serve.



Mobility Solutions

In 2018, Ford launched a ground-breaking program in Jeddah, Saudi Arabia, with the help of Jeddah’s Effat University called Driving Skills for Life ‘For Her’.

This first-of-its-kind program is focused on driving education for women, following the royal decree to lift the ban on females obtaining a driving license in the country. More than 250 students were among the first graduates – completing courses that teach vital skills necessary for new drivers, tips from highly skilled experts and a deep understanding of safe driving practices.

This customized version of our award-winning program, Driving Skills for Life, empowers women to access greater mobility.



Commercial Vehicle Sales & Marketing
North American Fleet, Lease and Remarketing Operations
Ford Motor Company



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