PLANNING FOR AN ELECTRIC FUTURE

Ford Commercial Vehicle Charging Guide for Fleets

Computer-generated images with optional accessories and aftermarket equipment shown throughout.

Preproduction model shown.

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CONTACT INFORMATION

For further information on the charging solutions provided in this guide, please contact us at 1-800-34-FLEET (1-800-343-5338) or through http://www.fleet.ford.com/contact-us/customer-information-center/email-us/

CHARGING SOLUTIONS: GUIDE CONTENT

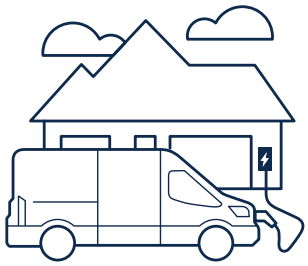
THE ELECTRIC FLEET CHARGING ECOSYSTEM

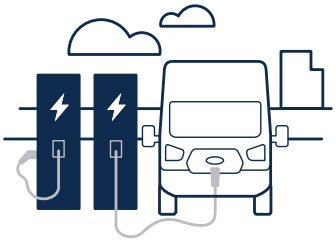
This guide is structured to cover home, public, depot charging solutions and vehicle connectivity elements that can maximize your commercial vehicle fleet solution.

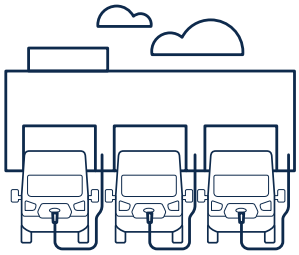
No two fleets are the same and just as fleets powered by gasoline or diesel need specialized infrastructure, so do electric-powered fleets. Fortunately, an electric infrastructure can simplify your operations by being tailored to your specific needs.

Click any box to learn more about that topic.

FORD COMMERCIAL ELECTRIC VEHICLES







Home Charging

Ford Hardware
- Mobile Charger
- Connected Charging Station
- Ordering and Installation

Ford Commercial Solutions Software
- Fleet Alerts
- Home Reimbursement Reporting
- Fraud Management

Public Charging

Hardware
- Access to 16,000+ public charging stations

Ford Commercial Solutions Software
- Central Billing
- Plug and Charge
- Access & Payment
- Public Charge Reporting
- Fraud Management

Depot Charging*

Hardware
- Depot Charging Infrastructure
- Advanced or Back-up Energy Sources

Software
- Charge Point Management System(CPMS)
- Energy Management System

*3rd party solutions

Vehicle Management

Ford Commercial Solutions Software
- Vehicle Health
- Energy Usage
- Preconditioning
- Charge Alerts
- Range Information
- Charging Insights – Vehicle Charge Logs
- Real-Time Vehicle Insights
- In-Vehicle Driver Coaching

EXECUTIVE SUMMARY

As you plan to electrify your fleet, setting up your charging infrastructure is key to optimizing uptime and improving efficiency. All-electric commercial vehicles unlock the opportunity to rethink the "fueling process" – drivers no longer need gas stations – charging can now be integrated at your facility, at public charging locations or even your drivers' homes.

Within this guide you will find information that can help inform your decisions regarding hardware and software solutions to support your charging needs whether charging occurs at home or on the go. These solutions include:

- **An available home Ford Connected Charging Station and installation service**
- **Reimbursement reporting for home charging**
- **Access to the nation's top charging providers through Ford's charging network and central billing for public charging**

This guide also provides information for fleets interested in charging their vehicles at their own facilities or sites, including recommendations for the planning process and discussion topics with depot service providers.

Designed to help meet your needs, our all-electric commercial solutions will bring even more connectivity and productivity, as well as reduced cost of operation, efficiency of operation and reduced CO_2 emissions. Now is the time to start making preparations for the switch to an electric fleet.

BUILT TO MOVE FORWARD

Ford is all-in on the future of electrification, investing more than $22 billion in Electric Vehicles through the year 2025.

For our customers, it starts by making the world's best-selling cargo van* fully electric. E-Transit - arriving in late 2021 - will be the zero emissions workhorse that will power the future of business, partnering with the Built Ford Tough® all-electric F-150 that will appear in North America by mid-2022.

In addition to being electric, our vehicles will be smart and connected. Ford's commercial vehicle ecosystem is expanding to include electric vehicle monitoring software and connected solutions for electric vehicles to seamlessly integrate into fleet day-to-day operations.

*Based on the total U.S. reported sales (1979-2019CY). Includes Ford E-Series, formerly called Econoline, van and chassis; Club Wagon; Transit Connect cargo van and passenger wagon; Transit cargo van, passenger van and chassis.

BOOST YOUR BOTTOM LINE

Thanks to our 35 years of commercial vehicle leadership, Ford will continue to be the go-to solution – with digital services to improve productivity and help our fleet and commercial customers achieve maximum uptime, lower total cost of operation and meet sustainability directives. With connected technologies and the ability to help achieve sustainability goals, Ford commercial battery electric vehicles are good for business and can benefit your operations and the environment at the same time.

Scheduled Maintenance – Estimated 40%* lower Costs vs. Comparable Internal Combustion Vehicles

Ford Electric Vehicles require less scheduled maintenance than their Internal Combustion Engine (ICE) counterparts and have fewer moving parts. No more oil changes, transmission flushes or other maintenance and by spending less time in the shop your fleet can generate more revenue on the road.

Incentive Types

There are several types of incentives, that vary by state, that may be available when purchasing a Battery Electric Vehicle (BEV). Examples can include, but are not limited to:

- **Vouchers at point of sale**
- **Rebates**
- **Tax credits and exemptions**
- **Grants**
- **Reduced electric rates**
- **Free parking**
- **Low Carbon Fuel Standard Credits (in CA)**
- **HOV lane permits, etc.**

Incentives for purchase and installation of charging infrastructure may also be available. More information can be found here: Search by Your State Here. Please consult your tax professional to determine eligibility and amount of your incentive. Tax incentives are not within Ford's control and this information does not constitute tax advice.

Qualifying for Incentives

You could be eligible for incentives based on a number factors, including but not limited to:

- **Vehicle (e.g. price, weight, range)**
- **Charging location (e.g. depot, residential, etc.)**
- **Charging type (e.g. AC Level 2 DC Fast Charging, etc.)**
- **Organization type (e.g. school, transit agency, commercial delivery company)**
- **Search by Your State Here**

Federal and State Incentives

You may qualify for as much as $7,500 in Federal tax incentives for purchasing an all-electric Ford vehicle in 2021. The E-Transit has not yet been certified as qualified for the credit by the IRS. Please consult your tax professional to determine eligibility and amount of your incentive. Tax incentives are not within Ford's control and this information does not constitute tax advice. For additional information go to Search by Your State Here

*Scheduled maintenance costs based on recommended service schedule as published in the owner's manual. Analysis reflects Ford Motor Company's standard method for calculating scheduled maintenance cost, and reflects data available in 2019 and 2020. See http://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 the credit you may eligible for.

LEADING THE CHARGE

FORD IS PROUD TO BRING ALL-ELECTRIC COMMERCIAL SOLUTIONS TO THE INDUSTRY

The all-new, U.S.-assembled Ford E-Transit and all-electric F-150* are the same work-ready vehicles you've come to rely on – with the added benefits of being electric. You get the same quality, durability and reliability you've come to expect from Ford but with all the benefits electric propulsion provides.

CONNECTIVITY – KEEPING YOU FOCUSED ON EFFICIENCY

Ford Commercial Solutions (FCS) blends Ford technical expertise with a hands-on understanding of real-world fleet challenges to give customers vehicle data and telematics services they can depend on. We're focused on developing cutting-edge tools to help fleets of all sizes operate at peak efficiency and offer services tailored to meet the needs of fleet professionals. Using your built-in or plug-in Ford modem, you can access manufacturer-grade vehicle data through an authorized telematics service provider using Ford Data Services™ or through Ford Telematics™. With its intuitive interface, Ford Telematics lets you monitor your vehicles and understand where they go, how they're used and how they're running.

Fleet operators will be able to monitor/manage in real-time, to help optimize cost and uptime:

- **Vehicle health**
- **Energy usage like kWh consumption, charge speed, state of charge, distance to empty/range, etc.**
- **Remote "command and control" capabilities like Departure Preconditioning while on a charger ensuring cabin temperature is optimal for driver comfort while maximizing range on the road**
- **Driver behavior insights including available in-vehicle, real-time driver coaching**
- **Charging services including public charging, centralized fleet billing, notification if vehicle is not plugged in and many others**

Ford Commercial Solutions recognizes no two fleets operate the same way, that's why we provide the ability to assess our suite of connected services across electric and gasoline-powered vehicles via the Ford Fleet Marketplace. To get started with Ford Commercial Solutions and set up your Ford Fleet Marketplace account: Call 833-811-FORD (833-811-3673) or Email fcs1@ford.com.

*E-Transit coming late 2021 and all-electric F-150 coming mid-2022.

CHARGING 101

LEVEL 2	LEVEL 2	DC FAST CHARGE
Ford Mobile Charger**	Ford Connected Charge Station	115 kW CCS
240V Removable	240V Hardwired	
		
~11 hours* to full charge (0-100%)	~8 hours* to full charge (0-100%)	~15-80% in 34min*

*Charge times are representative of low roof cargo E-Transit.

**The Ford Mobile Charger is also capable of charging via a standard 120V wall outlet which provides about 1.7 miles of range per hour of charging.

FORD VEHICLE CHARGING STANDARDS:

Ford utilizes the SAE J1772 on its vehicles for AC Charging and the SAE Combined Charging System for DC charging (also known as the combo standard or CCS) is a standard J1772 plug with 2 additional DC fast charging pins below it.

ELECTRICITY SUPPLY AND CHARGING EQUIPMENT: AC VS DC

- **LEVEL 1 AC (120V) – typically in the form of a common three prong wall outlet. A Level 1 solution will provide approximately 1.7 miles of range per hour (in the case of E-Transit) through the aid of a device like the Ford Mobile Charger. Level 1 is best reserved for vehicles that have very low mileage requirements during a single day.**
- **LEVEL 2 AC (240V) – includes a range of equipment from public charging stations to home solutions like the Ford Connected Charge Station or Ford Mobile Charger. Level 2 will usually provide about 11 miles per charging hour (32A) to 15 miles per charging hour(48A) depending upon the device. It will easily get you a full charge overnight or a small boost as needed when you're on the road.**
- **DC FAST CHARGE (480V) – includes everything from high-output roadside installations to support interstate travel to quick charge setups for depots. DC fast charge stations with 115 kW output can charge the E-Transit from 15-80% in just 34 minutes*! Given the robust electrical requirements and high cost of the equipment it's not suited for all locations but can be a vital resource when you need to get back on the road ASAP.**

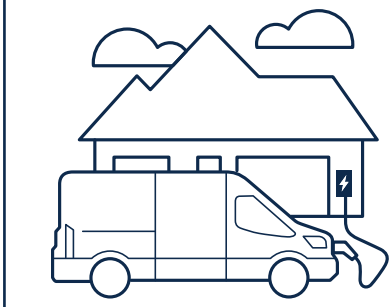
DIFFERENCES BETWEEN LEVEL 1, LEVEL 2 AND DC FAST CHARGING:

- **Fundamentally, what is the difference between these three categories? When charging an electric vehicle using an AC source, the vehicle must use its onboard charger to convert the power to DC so it can be stored in the battery. Level 1 (120V) and Level 2 (240V) chargers are typically AC. When charging an electric vehicle using a DC station, the AC power from the electrical grid is converted to DC through the charging station and the charger can send electricity directly to the vehicle's battery at a much higher rate than AC chargers. This is because the AC to DC conversion is not dependent upon the onboard charger power rating. DC charging can be referred to as DC Fast Charge (DCFC), DC High Powered Charge or DC Ultrafast Charge. DC chargers cost significantly more, draw more power, place a greater demand on the electrical grid and are only suited for properly equipped locations.**

CHARGING SAFETY:

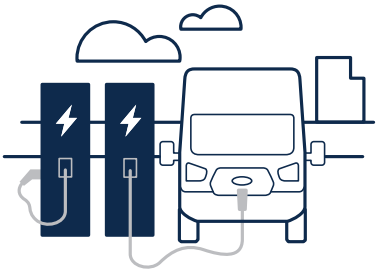
- **Please note that it is completely safe to charge in the rain or snow. All Ford-supplied charging equipment is tested and certified to handle virtually any weather condition without increased risk to the operator. Plus, all public charging stations are required to be impervious to the elements as well.**

*Low Roof Configuration



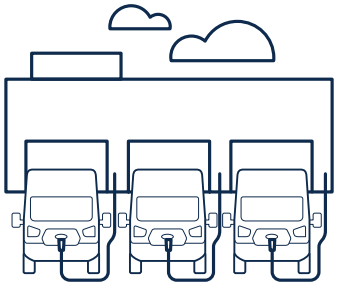
HOME CHARGING

Do your drivers take work vehicles to their home at night? If so, they can use the included Ford Mobile Charger to plug into a 240-volt NEMA 14-50 outlet or upgrade to an available Ford Connected Charge Station (both require installation by a licensed electrician). All charging events can be tracked through Ford Commercial Solutions charging reimbursement reporting.



PUBLIC CHARGING

Ford connects your drivers to 16,000+ public charging stations without the need to register with multiple charging networks. Our available built-in navigation allows you to access charging station location and availability. In addition, Ford Commercial Solutions provides drivers worry-free access to Ford's charging network, with central fleet billing and transaction management.



DEPOT CHARGING

Charging your fleet overnight or in-between trips at a dedicated charging depot at your facility.

E-TRANSIT CHARGE TIMES*

Ford Connected Charge Station 240V/48A (Wi-Fi and Bluetooth enabled)	Ford Mobile Charger** 240V/32A wall outlet	DC Fast Charging (115 kW)
15 miles can be added per hour	11 miles can be added per hour	15-80% in approx. 34 minutes
0 - 100%: 8 hours	0 - 100%: 11 hours	–
Use: Mid-day refill or overnight charge	Use: Overnight charge	Use: Quick turn-around

*Charge times shown for low roof configurations.
** Level 1 - 1.7 miles/charging hour.

UTILITY RATE BASICS

Pricing Structure per Kilowatt hour (kWh)

Kilowatt Hour (kWh) defined: Utility rates or "tariffs" come in all different shapes and sizes. However, the pricing structure that an electrical utility applies to their customers is usually built upon fixed fees for the provision of the service and a variable charge relative to the amount of energy consumed over time. That energy consumed over time is expressed as a function of kilowatt hours or kWh. While you may have never stopped to think about kWh before, it's actually a simple concept. Say you lit a room with ten 100-watt light bulbs (10 x 100 watts = 1,000 watts or 1 kilowatt). If you left those bulbs on for one hour, you will have consumed 1 kWh of energy.

Residential, Commercial and Industrial Utility Rates

The exact rate that a utility charges per kWh of energy will vary widely, however, it can generally be boiled down to three generic classes: residential, commercial and industrial. Residential, as the name implies, is reserved for dwellings which on a per-capita basis represent a relatively moderate demand on the grid relative to other sectors. As of October of 2020, the average residential utility rate in the U.S. was approximately $0.14 per kWh[1]. Commercial includes a large class of ratepayers generally consisting of wholesale or retail businesses, health and educational institutions, government facilities, etc. As of October 2020, the average rate for a commercial consumer in the U.S. was approximately $0.11 per kWh[1]. Finally, Industrial encompasses some of the largest consumers per-capita and includes facilities that are involved in all steps of production, processing, and assembling of goods with everything from mines to factories. As of October 2020, the average industrial rate in the U.S. was $0.07 per kWh[1].

Demand Charges

Commercial and industrial rates are often subject to another utility fee structure called Demand Charges. Unlike residential and light-duty commercial, larger commercial and industrial users can often see sizable variations in demand. Some will require more power every so often whereas others will depend on an almost constant heavy demand draw. Supporting customers with occasional high power demand draws above their normal constant requires installing expensive transmission equipment including transformers, wires, substations, etc. which must remain on constant standby and always be in working order. Moreover, this equipment must be sized according to that customer's absolute peak demand, something that, if not done correctly, could require almost constant upgrades. Accordingly, utilities employ Demand Charges to ensure their largest users pay the greatest share of maintaining the electrical system. With careful considerations for charging and energy solutions discussed in this guide, utility customers can help to understand and mitigate Demand Charge-related fees that might substantially increase their monthly electric bills without management. More information can be found in the Depot Charging portion of this guide.

Time-of-Use Rates

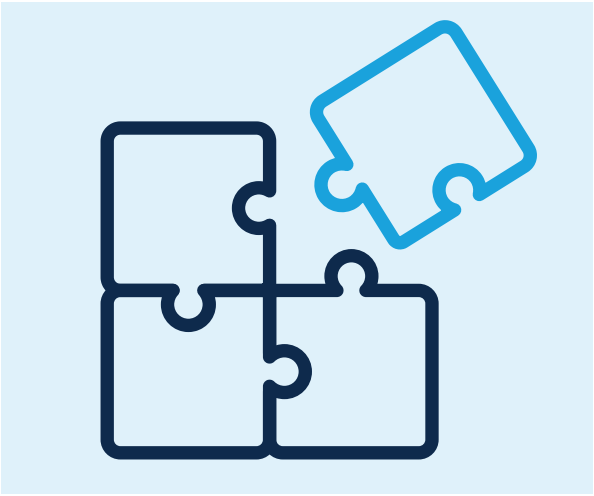
One final utility mechanism worth mentioning is what's known as "Time-of-Use" rates or TOU. While not applicable to every utility, customers in certain markets may have the ability to sign up for a TOU plan which provides variable kWh pricing throughout the day. When utilized correctly, TOU plans can equate to substantial savings in the long run for consumers that shift their electricity usage to lower cost "off peak" hours. More information on TOUs and a software solution that can help fleets take advantage of them can be found within the Depot Charge Point Management Software section of this guide.

[1] US Energy Information Administration, Average Price of Electricity to Ultimate Customers by End-Use Sector, https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_6_a

CHARGING METHODS THAT FIT YOUR FLEET

When determining what charging solutions might be appropriate for your fleet, much of the decision comes down to these factors:

1. **How far does a specific vehicle typically drive per day?**
2. **What is the vehicle downtime/dwell time in-between shifts or routes?**
3. **Are the range requirements calculated from the driver's home or your facility location?**
4. **How many vehicles will need to be charged at the same time at your facility?**



We understand charging solutions are contingent on individual fleet needs. Selection of home, depot and/or public charging solutions can be evaluated based on operational and cost factors associated with the solutions as well as application to your fleet use cases. For example, vehicles that are assigned to consistent regional routes from either your business location or your driver's home can be fully recharged overnight or, if necessary, topped off occasionally during the day using a fast-charging station.

ADDITIONAL FACTORS TO CONSIDER WHEN PLANNING YOUR CHARGING SOLUTIONS

Use of public charging is likely more applicable as an "insurance policy" than the primary mode of charging for your EVs. Public charging rates tend to be more expensive than home or at your depot, particularly if those vehicles have the opportunity to charge overnight. Additionally, downtime at a public charging station means downtime for your driver and fleet operations. Therefore, although public charging can be very useful for emergency or occasional boosts for your battery, very frequent use may mean significant downtime and/or an increase in expenses.

Driver turnover can also be a factor that influences the home charging solution equation. You will need to evaluate the costs and selection of home charging installations in a way that accounts for potential employee turnover.

The location of your maintenance and facility operations (loading docks, etc.) may change as you are evaluating the opportunities electrification provides. These changes in turn may influence the factors that will impact your choice of home, depot or public charging. That's why a complete evaluation of your operations when going electric is important to consider as you select the optimized charging solution for your fleet.

There is an optimal charging solution for every use case – below are two examples that demonstrate how the work purposes for the 2022 E-Transit* will influence decisions for fleet customers on charging operations, including when and where to charge.

SERVICE PROVIDERS

Service and repair – including cable installers, appliance repair, or utility companies

CONSIDERATIONS INFLUENCING CHARGING SOLUTIONS:

Efficiency: They are always on a schedule, running from job to job with customers waiting.

Uptime: When they aren't on the road, they aren't making money.

Overnight Location: Vehicles often travel home with employees.

OPTIMIZED CHARGING SOLUTIONS:

A combination of Ford home charging solutions and our public charging network meet the charging demands for this use case. Including:

Home Charging: Home Charging optimizes uptime as drivers charge at home overnight instead of during the work day.

- **Charge usage reports to enable easy energy reimbursement for drivers**
- **Alerts to notify you if the vehicle isn't plugged in**

Public Charging:

- **Keep your vehicle running with easy access to the nation's largest public charging network**
- **Centralized billing for all drivers and vehicles in a fleet**

DELIVERY BUSINESS

Overall transport of goods – including food, courier, or package delivery

CONSIDERATIONS INFLUENCING CHARGING SOLUTIONS:

Regular Routes: Vehicles generally follow a regular route – short but intensive with lots of stopping and starting – often 200+ stops a day.

Fleet Size: Usually vehicles are part of a large fleet based at a warehouse or distribution depot.

Overnight Location: Vehicles are typically located at the depot overnight.

OPTIMIZED CHARGING SOLUTIONS:

A combination of services provided by a depot charging service provider and the Ford public charging network fit this scenario.

Depot Charging: Depot Charging solutions can be optimized by consideration of many different elements along the planning, implementation and management of the charging systems.

- **Fleets can take advantage of central overnight vehicle storage and integrate charging into overnight parking. There are also customized solutions available to optimize both charging scheduling and energy management while charging at the depot. Ford can help provide information for discussions with your depot charging services provider**

Public Charging:

- **Keep your vehicle running with easy access to the nation's largest public charging network**
- **Centralized billing for all drivers and vehicles in a fleet**

*Coming late 2021.

HOME CHARGING SOLUTIONS

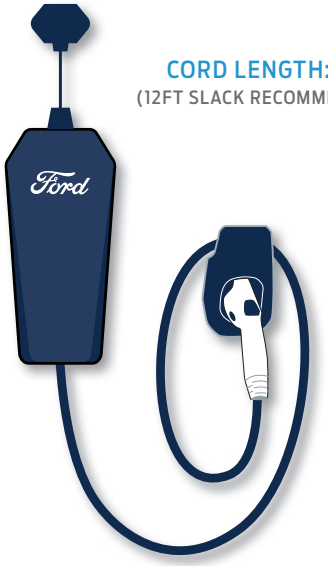
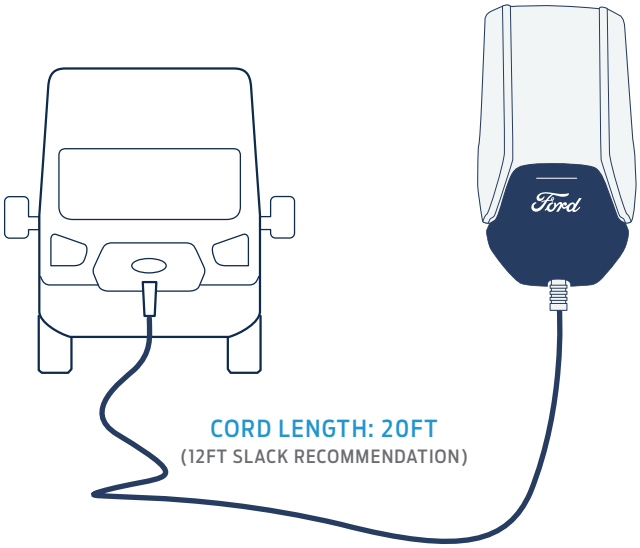
HOME CHARGING HARDWARE

FORD MOBILE CHARGER

Charging at home can be the ideal use case for many fleets. If the drivers take the vehicles home, for example, they can plug in and be ready to go the next morning. Charging can be easily tracked for driver reimbursement and equipment can be installed at almost any single-family residence (and many apartment and condominium buildings depending on their respective rules and regulations). There are also charging solutions emerging at multi-unit dwellings in the market if your drivers do not reside at a single-family residence.

The Ford Mobile Charger, included with each 2022 E-Transit*, offers a convenient and portable solution for homes. The 240V NEMA 14-50 outlet provides up to 32 amps to the vehicle and is the recommended utilization of the Ford Mobile Charger given it easily provides an overnight charge. If a 240V outlet isn't currently available at your preferred charging location, an outlet can be installed by a licensed electrician. A 120V standard wall outlet may also be utilized in limited instances, however the charge rate is not sufficiently quick enough for most to depend upon daily.

The Ford Mobile Charger is also a solution for the jobsite. 240V NEMA 14-50 outlet might be available that would be sufficient for overnight charging for a vehicle such as 2022 E-Transit*. If a NEMA 14-50 is not available, drivers may utilize a 120V standard wall outlet though some may find the charge rate to be too slow. This means that while you're out in the field, there are options for charging your Ford EV.

FORD MOBILE CHARGER	FORD CONNECTED CHARGE STATION
	
11 hour charging time, lower cost to install and easier to retrieve	8 hour charging time, higher cost to install and harder to retrieve

*Coming late 2021.

FORD CONNECTED CHARGE STATION

To maximize charging from home, your driver can utilize the Ford Connected Charge Station with up to 48 amps of charging power. Its user-friendly and flexible design includes adjustable power levels and a dedicated coupler dock that lets you conveniently store your cable. This solution must be hardwired/installed by a licensed electrician.

Designed specifically for your Ford EV

- **Works seamlessly with BEV features like:**
  - Cabin/battery preconditioning
  - Charge scheduling
  - Charge settings
- **Ability to lock/unlock charge station (especially helpful for those in semi-private parking/apartment)**
- **Backed by Ford Motor Company**
- **3-year limited warranty**
- **Works with all EVs that use US standard charging connectors (SAE J1772)**

Fastest way to charge your Ford EV at home:

- **240V / 48A charge station**
- **Fully charges your Ford EV overnight**
- **Recommended for quick charging and connected features**
- **Requires installation by a licensed electrician**
- **Wi-Fi and Bluetooth capable**
- **Includes 20-foot cable**

ORDERING AND INSTALLATION

To order your Ford Connected Charge Station go to fordparts.com or talk to your local Ford dealership. The Ford Connected Charge Station can also be integrated into the vehicle financing. Ford will work with partners who offer installation services to optimize the process for both the driver and fleet manager. Once finalized, information will be shared on the process and will also be available from your Ford dealership.

FORD SOFTWARE FOR HOME CHARGING

Alerts if your drivers forget to plug in overnight

Through Ford's connected solutions, your Ford fleet electric vehicle will be able to provide an alert if the vehicle isn't plugged in when it should be, ensuring you don't miss out on the next day's work. Therefore, whether you are using a publicly available solution, the Ford mobile charger or the Ford Connected Charge Station our Ford connected solutions have you covered.

Home fleet charging tracking for driver reimbursement

Driver home charging reimbursement is easy thanks to home charging kWh consumption reporting. Ford Home Charging Solutions incorporate smart features that allow fleets to track the amount of energy their drivers use while charging at home and effortlessly tabulate usage reports to ensure drivers are reimbursed for the electricity they consume while charging work vehicles at home.

Another benefit to the Ford home reimbursement reporting is that only company vehicles will be included – regardless of what vehicles may be using the charger. Therefore, you don't need to be concerned that charging events are being included unless they are vehicles in your fleet.

These are just a few of the many connected services that are available for purchase with your 2022 MY E-Transit* to ensure your fleet has the support it needs when transitioning to an electric fleet.

To get started with Ford Commercial Solutions: Call 833-811-FORD (833-811-3673) or Email fcs1@ford.com. Using your Ford Commercial Solutions Ford Fleet Marketplace account, you will be able to review and compare all available connected services to select the right solutions to support your company.

*Coming late 2021.

PUBLIC CHARGING SOLUTIONS

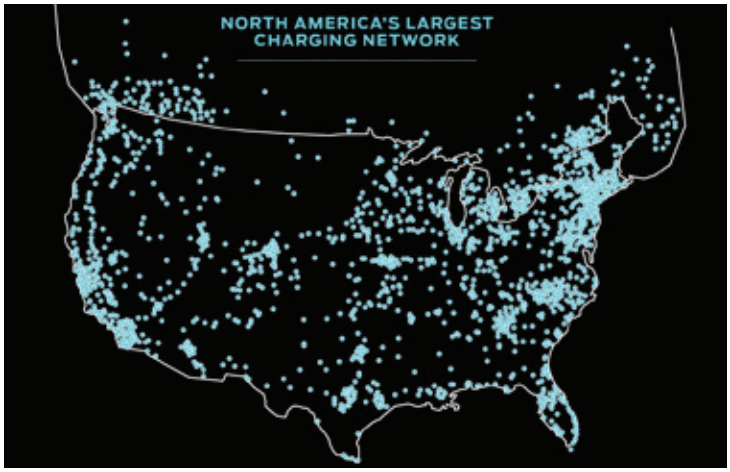
PUBLIC CHARGING HARDWARE: NETWORK ACCESS TO 16,000+ CHARGERS

Want assurance that your driver will be able to easily access charging in case of an unexpected event or route change? Do your drivers make multiple stops a day throughout a metro area with some unpredictability or deviations from established routes? Do you want your fleet to have added assurance that they will easily be able to find charging stations with automatic billing back to your fleet account? Great news if you answered "yes" to any of the questions above: Ford offers your fleet access to the largest (and growing) public charging network in North America with automatic payment and centralized billing for your Ford Fleet vehicles.

FORD PUBLIC CHARGING NETWORK ACCESSIBLE. CONVENIENT. EASY.

We know that nothing is more important than ensuring your drivers stay on target and on task. Whether for an unexpected need for a quick charge, or a planned stop for a top-off, Ford fleet commercial vehicles connect you to 16,000+ public charging stations in North America without the need to register with multiple charging networks. Ford's charging network is also growing! We've had the number of stations increase from 13,000+ to 16,000+ in just over a year. Our available built-in navigation allows you to access charging station location and availability. The driver has total access to the network without needing to download multiple apps for different charging providers and billing is handled automatically and centrally for the entire vehicle fleet.

To find public charging stations along a route or near you, please visit https://www.ford.com/buy-site-wide-content/overlays/try-the-tech.html.



NORTH AMERICA'S LARGEST PUBLIC CHARGING NETWORK.

ASSURANCE IF YOUR FLEET DRIVER NEEDS HELP OUT ON THE ROAD

Ford Roadside Assistance has you covered in the US for 5 years/60,000 miles (whichever comes first). You can choose where you would like to have your vehicle towed and recharged within 35 miles of your location: your fleet home base, your driver's home, a public charging station or an EV-Certified Ford dealership. If beyond 35 miles, Ford will take you to the nearest available option.

FORD SOFTWARE FOR PUBLIC CHARGING

Ford Commercial Solutions offers the ability for fleet managers to subscribe Ford all-electric fleet vehicles to Ford's charging network and provide drivers worry-free access while they are out on the road. Ford will offer easy ways for your drivers to activate and pay for public charging and also at participating Plug & Charge stations.

No matter the scenario, your drivers will be covered. In turn, all pay-as-you-go public charging will be centrally billed back to the fleet and will be visible to the fleet manager though public charge reporting.

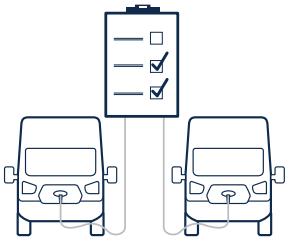
While vehicles are on the road, fleet managers will be alerted based on a fleet manager-configured threshold whenever a vehicle's range is in question. Ford Commercial Solutions provides the fleet manager with real-time vehicle monitoring with a visualization of Ford's charging network. So, if a driver needs support, the fleet manager knows exactly where the vehicle is and which charging station they should navigate to. For vehicles equipped with navigation, the vehicle will also provide multiple warnings to your drivers if the range approaches a distance where your driver would no longer be able to reach a charge station.

To get started with Ford Commercial Solutions: call 833-811-FORD (833-811-3673) or Email fcs1@ford.com. Through your Ford Commercial Solutions Ford Fleet Marketplace you will be able to review and compare all available connected services, selecting the right product by vehicle within your fleet to support your company.

DEPOT CHARGING:

Fleets with centralized operations or with vehicles parked at a facility overnight may find depot charging to be the perfect charging solution. With upfront planning and optimized design there are many technical solutions to improve operational efficiency and reduce costs – not to mention sustainability benefits. Information follows on Planning, Implementation, Charge Management and Energy Management for depot charging solutions as well as a list of depot charging service providers and considerations for discussion with providers as you choose the right match for your fleet.

Planning & Implementation



Charging Management

Energy Management & Reporting

Considerations for Selecting a Depot Charging Service Provider

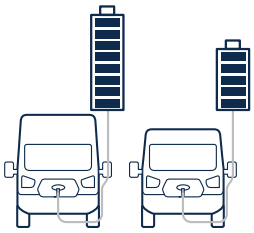
Depot Charging Service Provider List

PLANNING YOUR DEPOT CHARGING SOLUTION

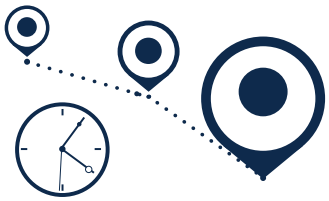
Planning for your charging depot may seem overwhelming at first, but there are a number of key elements that can simplify the process.

- **Engage upfront with your utility and depot charging provider: Recommended as early as possible in the process. Long lead time may be needed for zoning considerations, jurisdictional approvals or installation factors such upgraded or new facility electrical infrastructure or utility service upgrades.**
- **Understand the load requirements that will be added to your site: Depot charging may introduce new factors to your fleet because electric vehicles add to the power load to your site. It is important to understand the load profile that will result from your electrified vehicle fleet. That is, how much power does your fleet need to use when it is charging and how does that vary over time? Your fleet composition, dwell time between shifts or runs, vehicle battery sizes, vehicle routes and duty-cycles will be important considerations. Depot charging service providers can help by evaluating existing site power load and comparing it to the new power load that will be required to charge your vehicles. Site visits, facility management and utility interface should all be part of this process. (See page 18)**
- **Create organizational interface between facility and fleet managers: Depot charging may bring together your facility or site management, local utilities and vehicle fleet management in ways that have not been experienced previously given new energy dependencies between your fleet and facility. It may be that these organizations have not interfaced at an operational level before and may even have different management structures, budgets and planning time horizons.**
- **Plan with long term electrification time-horizon in mind: It is important to incorporate your future electrification transition plan to avoid future infrastructure tear-ups and unexpected or unnecessary costs. Planning with this time-horizon in mind is a key input to your site and implementation planning, including elements of future-proofing that not only apply to hardware, but also for the power load that your site will accommodate over time. This is especially important for planning of charging and energy management solutions.**

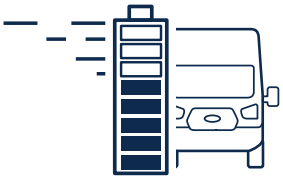
UNDERSTANDING THE LOAD REQUIREMENTS THAT WILL BE ADDED TO YOUR SITE:



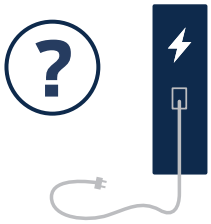
Fleet EVs, battery sizes



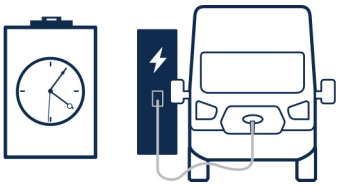
Routes, timing, duty cycle



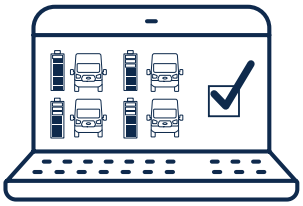
When and how fast your fleet's EVs need to charge



Number of chargers needed and charging equipment power levels



Charging schedule and power draws for charging events



Fleet charging load profile

- **Plan for incentives: As outlined on page 5, your depot charging service provider can help you identify any infrastructure-related incentives to incorporate into your planning.**
- **Understand back-up and emergency requirements: Uptime is paramount for fleet operations. Planning for robust back-up power can help to ensure you have emergency generation or even more advanced off-grid solutions available.**
- **Develop project plans with estimates for timing and costs. A comprehensive project plan can be a valuable tool to help ensure your charging solutions are on time and have realistic budgeting estimations and reliable cost and timing projections. Development of the plan may also necessitate certain trade-offs to consider when balancing requirements, timing and costs – all while mitigating inherent uncertainty in the implementation process. It can also be helpful to have the same firm develop the plan and deliver the plan.**
- **Evaluate advanced energy management options: If you plan to introduce large numbers of electric vehicles for scaled operations, there are many exciting solutions that you may want to explore with your depot charging service provider. These solutions can boost your sustainability goals and provide back-up power, improve efficiencies and/or reduce costs. Specialty solutions for advanced energy management include fleet and site power management, renewable integration, on-site energy storage, microgrids and other novel and emerging technologies. The basic definitions and concepts related to the below are reviewed in some detail in the Charging 101 section of this guide (page 7):**
  - Understand charging and energy management options to avoid any unnecessary electrical infrastructure upgrades, save energy, minimize number of chargers to install, and more
  - Understand electric utility rate schedules and available grid services to help optimize charging schedules and charging equipment selection
  - Understand electric utility rate structures to minimize demand charge impacts. Demand charges may occur if there are new peak power load draws at your site.

IMPLEMENTING YOUR DEPOT CHARGING SOLUTION

Depot charging planning as described on the previous page will provide the foundational elements to support your fleet charging – the number of chargers, number of chargers per vehicle, when and where your vehicles have to charge and how fast. For larger scale operations, optimization solutions may also be planned to improve the cost and operational equations via charging and energy management systems.

Key elements likely to be finalized during implementation deployment include:

- **Final charging operational and maintenance requirements**
- **Charger selection and procurement**
- **Final site design**
- **Charger Installation**

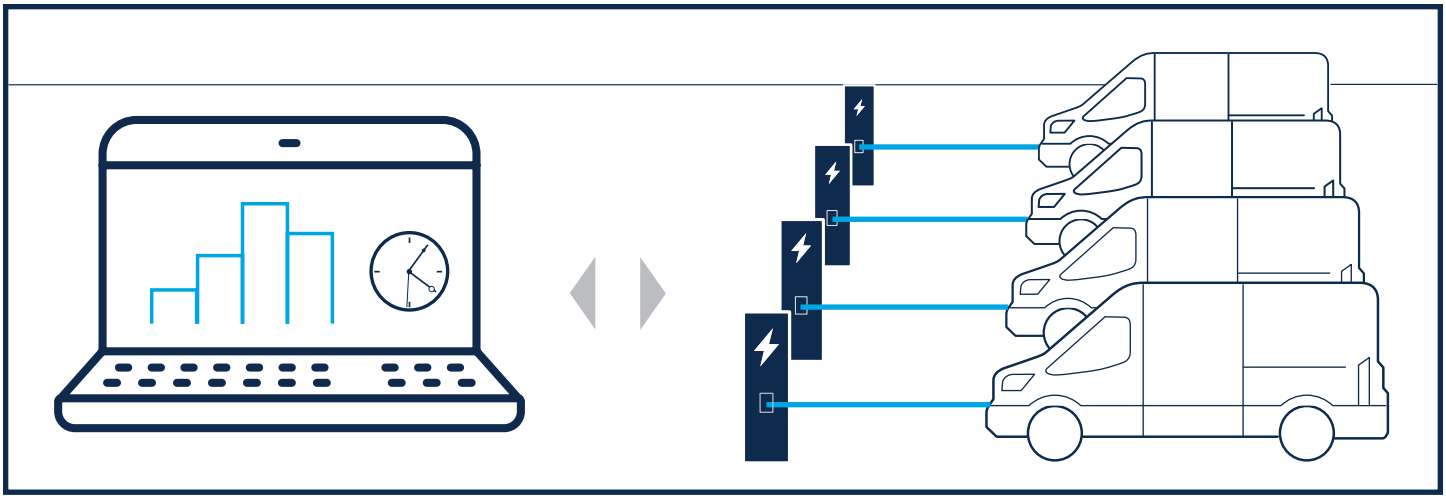
Factors that will help your depot charging service provider tailor your charging hardware to your unique needs as the charging plan is finalized and implemented include:

- **Detailed assessment of your site layout and configuration, including elements such as the facility floor plan, existing electrical infrastructure, and trenching options**
- **Configuration of the space in which your charging will take place, such as parking spots, distribution centers, and orientation of the vehicle while charging**
- **Identification of any unique environmental or operational requirements (for example if there will be any activity for the vehicle before/during/after the charging event)**
- **Evaluation of software considerations, including network connectivity and third-party system integration requirements**

When selecting charging equipment it is not only important to specify hardware configuration requirements, but also service and maintenance aspects to ensure a smooth transition to electrification for your operations. Your depot charging provider may have choices for service agreement elements necessary for your niche operational needs, including predictive maintenance, parts availability or other aspects of service level agreements that will help provide assurance that your fleet is up and operating as expected.

With respect to depot electric vehicle charging infrastructure installation, there are electrification infrastructure and construction specialists that may have expertise and be either integrated with or contracted by your provider. Elements that may indicate expertise include a wide breadth of experience in complex construction and installation with emphasis on understanding of regulations and permitting – these are elements as indicated in the planning section above, that may require lead time and can lead to unexpected delays when actually deploying your infrastructure at your site(s).

DEPOT CHARGE POINT MANAGEMENT



Charge Point Management Systems (CPMS) are a powerful suite of software tools that enable fleets to take their charging experience to a whole new level. They provide the capability to optimize charging around driver schedules, safeguard for uptime and even lower costs through smart energy management algorithms. Many capabilities associated with CPMS are related to mitigating energy costs from the utility relative to certain characteristics of the utility rate structures described within the Charging 101 Section (page 7). This section will help provide a better understanding of what these valuable platforms have to offer and some of the common features you can look for while evaluating options.

In short, a CPMS is essentially a back-end computer system that allows charging equipment owners to intelligently interact with and manage their charge stations – optimizing depot operations based on costs and charging needs of each vehicle.

CPMS platform features can be divided into three categories:

SCHEDULE OPTIMIZATION

Schedule Optimization refers to a system's ability to prioritize charging around the fleet's schedule, utility rate or both. With the proper telematics connection, some CPMS platforms have the capability to read the state-of-charge (SOC) fleetwide and customize the charge rate for the needs of each vehicle and the facility's electrical supply to ensure all vehicles are ready by the next scheduled departure.

The ability to optimize around variable utility rates is a feature that may differ from region to region but provides immense value to the user. The price a customer pays per kilowatt hour (kWh) of electricity may fluctuate throughout the day. This is typically referred to as a "time-of-use" (TOU) energy plan. Peak hours are when utility demand and rates are at their highest. Off peak rates are when demand and rates are at their lowest. CPMS platforms have the capability to shift as much charging as possible to off peak hours when the rates are lower – potentially saving fleets a considerable amount of money and guard against unnecessary Demand Charges. Note that almost all electric vehicles also have charge scheduling and allow a schedule to be set from the vehicle.

Unsure about whether TOU rates are available in your area? Reach out to your local utility or contact one of the charging providers at the end of this guide. They can help you determine which rate plans are available to your organization.

LOAD MANAGEMENT

CPMS can ensure that the chargers only use the power available at the site across multiple vehicles charging simultaneously or in sequence. It can even connect to real-time information based on other loads in the facility to stay within a site's available power.

EQUIPMENT UTILIZATION

Safeguarding against downtime is an essential for any fleet. With that in mind, CPMS platforms can include Equipment Utilization tools to optimize the charging station utilization and avoid down time. These tools can detect station occupancy, report on usage and even proactively monitor for issues if a fault is detected. Connected vehicles can also notify operators when charging is complete or reaches a desired level.

Depot charging service providers can help match your equipment and CPMS to optimize your charging solution. Below are some factors worth considering when talking with a depot charging provider about a CPMS.

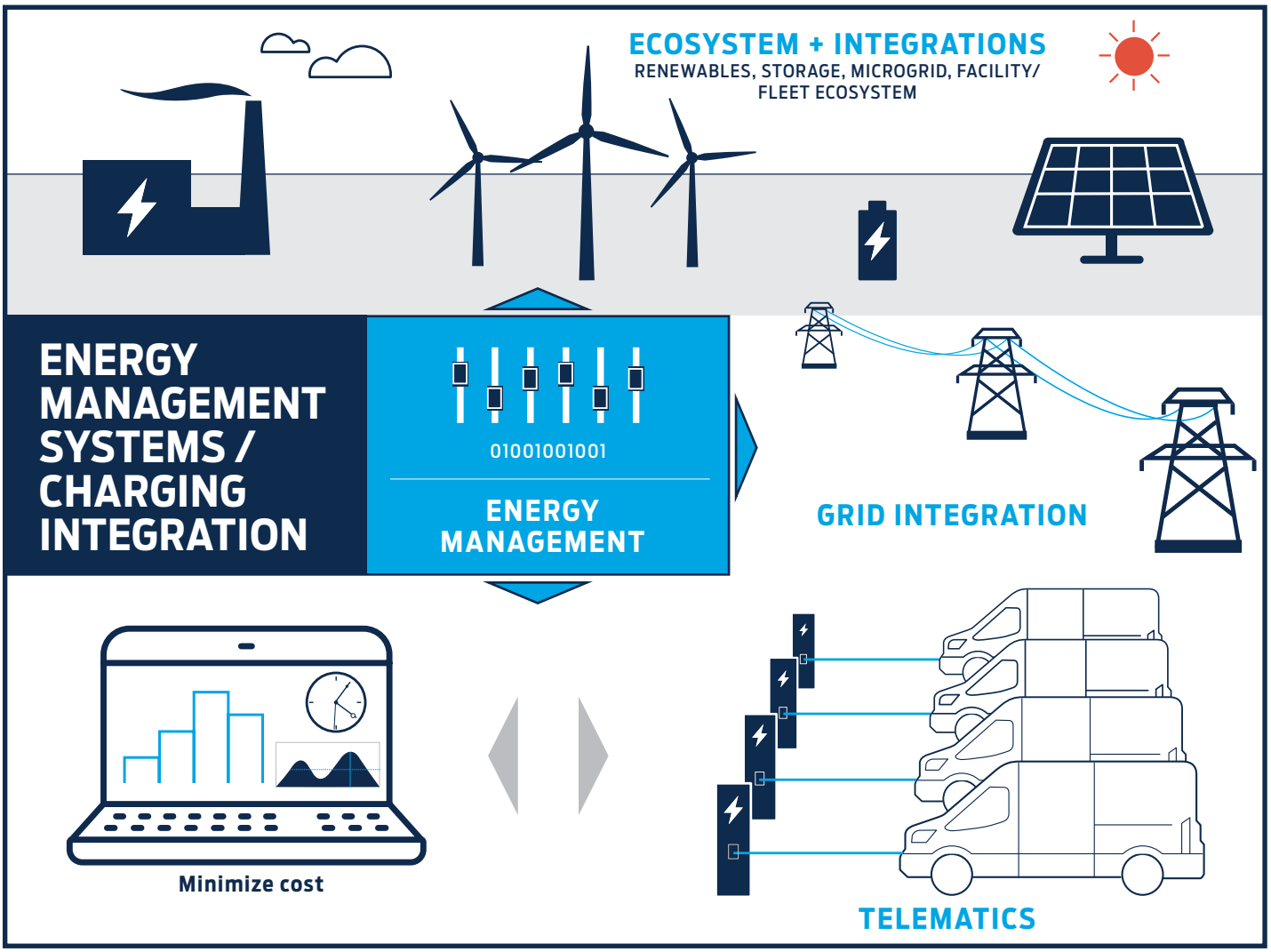
- **"Open Network" Solution**
  Charging stations communicate via a standard called OCPP or "open charge point protocol," which ensures open interface between hardware and CPMS. While the majority of CPMS platforms utilize OCPP, you may find some that operate via a "closed network" wherein a company's stations will only work with their own proprietary CPMS. While that's not necessarily a bad thing, having an open network solution provides the site host with the freedom to choose and migrate their equipment over to a different software platform or upgrade hardware if they choose.

- **Fees**
  CPMS solutions can include features like dynamic load balancing, fault detection and facility-wide monitoring, which usually depends on extra equipment or services. It is important to understand any vendor fees – both one time and ongoing.

- **Inclusion of an Onsite Controller**
  Charge points are capable of sending and receiving CPMS commands through a number of mechanisms. While almost all feature some level of cloud-based connectivity, several go a step further and include an onsite controller. An onsite controller is essentially a secondary series of hardware directly wired into the depot charging system that can continue to execute commands if there's a lag or complete loss of communication from the cloud. While not always a necessity, an onsite controller can provide an added level of assurance to guarantee your depot is always running at maximum efficiency.

- **Support**
  Operational efficiency is an essential consideration for any business. Likewise, it's important that your CPMS supplier offer reliable support options to help mitigate against any potential disruptions. This could be something as simple as a call center, to more advanced alternatives like proactive station monitoring, automated repairs and uptime guarantees.

DEPOT ENERGY MANAGEMENT AND REPORTING



Electric vehicle technology and charging technology is expected to continue to advance at a fast pace. If you are interested in growing your electric vehicle fleet, now is the time to plan and prepare for an electric future and potential energy management solutions to augment your environmental benefits and cost savings. Solutions are progressing quickly and include comprehensive facility-wide site power management (e.g. lighting, HVAC, operations, fleet charging), back-up energy solutions, on-site energy storage, renewables integration, off-grid functionality, and much more. These solutions can also contribute to any sustainability goals your fleet has – both short term and long term. By having a plan in place, your business can be ready to implement energy solutions and also be prepared to seamlessly expand your electric fleet.

Integrating your fleet and facility energy management can result in novel solutions. There are some basic examples – is your facility HVAC load going up? Then dial down your conveyor system. Multiple vehicles in for a boost charge? Dial down the facility HVAC for a bit to offset the increased EV charging consumption.

ENERGY STORAGE, RENEWABLES AND OFF-GRID ENERGY OPTIONS

Energy Storage

Energy storage refers to solutions that can both provide/release power when discharging and consume power when charging. They can provide cost benefits as well as serve as buffer solutions to help with the management and integration of renewable energy.

Energy management options for your depot may include battery storage. Energy storage solutions have the ability to store energy for you to utilize during power outages or other select purposes, for example, when utility rates are high, or your site power use is peaking. These solutions can also be used to enhance integration of renewable energy at your site. This is especially true given renewable technologies which may provide intermittent or weather-dependent power supply. Battery storage provides a way for you to store that energy during generation and utilize it on a different schedule. With full and novel energy management systems at scale, depot solutions could include microgrids with a variety of sources providing power and advanced energy management systems. The technologies and solutions are accelerating quickly in this space. Your depot charging service provider may be able to help guide you if you are considering these types of solutions for your depot.

Renewables Integration and Off-Grid Energy Options

For fleets wanting to incorporate renewables integration there are options and solutions emerging in the market that may help increase utilization of renewable energy and additionally incorporate off-grid energy to provide back-up energy in case of power outage. There are, of course, also conventional generator and back-up systems that can be discussed with your depot charging services provider.

Microgrids are an example of a back-up energy solution that can also be utilized as an off-grid source; both for select use cases and in cases of need for emergency power. A microgrid can connect and disconnect from the grid to enable it to operate either connected or independently. On-site energy storage is another solution that can help manage costs and provide a CO_2 benefit. Your depot charging service provider may be able to provide more information on these types of energy management solutions.

Depot Charging – Monitoring and Reporting

Ford understands that it is important for fleets to monitor and report on their improved energy use, CO_2 saving, use of renewable energy, and other sustainability metrics and to demonstrate improvements over internal combustion engine products. Ford Commercial Solutions can help monitor/track these metrics, by vehicle. It is also a good idea to talk to your depot charging services provider regarding any tracking and monitoring requirements you have to ensure you capture both fleet and facility metrics.

DEPOT CHARGING PROVIDERS – KEY CONSIDERATIONS

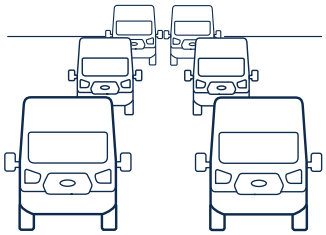
Every fleet has unique operations, characteristics and needs. Ford recognizes this and understands that engaging and selecting a depot charging service provider will require multiple considerations. This guide is designed to highlight important steps and considerations for depot charging solutions - from planning to some potentially unique and novel charging and energy management services. One of our key recommendations is that you engage with your depot charging service provider as early as possible in the process.

Below are some suggestions to help guide your discussions with your service provider to understand their approaches and capabilities as matched to your fleet's needs and capabilities.

Core Capabilities and Partnerships	Elements of the depot charging solutions (e.g. site assessment, CPMS, reporting capabilities) offered and any key partners or subcontractors.
Fee Structure	Fee structures of the services, especially with respect to charging management and recurring expenses.
Engagement with Utilities and Fleet Managers	Process for engagement with utilities and fleet facility managers.
Incentives Information	Infrastructure-related incentives information available and for fleets in California, ability to calculate Low Carbon Fuel Standard credits.
Vehicle Load Profile Development, Project Planning	Process for vehicle load profile development, site evaluation and forecasting of estimated infrastructure costs and timing.
Hardware Options	Charging hardware options and selection criteria for optimization of a bespoke fleet solution.
Software Platform Characteristics and Integration	Depot Charging Solutions software characteristics and integration elements with vehicle and external system, open platform CPMS, third party API integration for reporting, telematics integration and ability to integrate with existing or external fleet management systems that your fleet may utilize.
Knowledge and Expertise in Energy Management	Knowledge of advanced fleet and facility energy management systems or partnership with providers of services such as integrating renewables, battery storage and/or off-grid or back-up solutions.

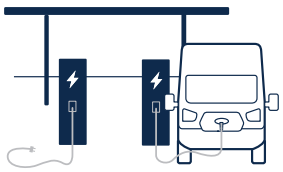
Efficiency Management

Independent + Compatible



Fleet

Modular + Scalable



Charging Stations

Simple + Intuitive

Monitoring

Innovative + Visionary

DEPOT CHARGING INFRASTRUCTURE PROVIDERS

SBD Automotive has identified third party depot charging service providers for Ford to reference in this guide. This list is not exhaustive and is not intended to show preference toward any provider.

Click on a logo to navigate to company website.

CONTACT INFORMATION

For further information on the charging solutions provided in this guide, please contact us at 1-800-34-FLEET (1-800-343-5338) or through http://www.fleet.ford.com/contact-us/customer-information-center/email-us/