Operating & Maintaining Alternative Fuel Vehicles Webinar

Thursday, October 15, 2020

Sustainable Transportation

Presented by The Transportation & Innovation Partners

Alliant Energy | MGE Madison Gas and Electric | Wisconsin Clean Cities (Established 1994) | City of Madison Wisconsin

Sustainable Transportation

transportation • sustainability • technology • innovation

2020 Virtual Series

A virtual educational series for fleets

Presented by The Transportation & Innovation Partners

Alliant Energy

MGE Madison Gas and Electric

Wisconsin Clean Cities

City of Madison Wisconsin

Polls

Planning for Operating and Maintaining Alternative Fuel Vehicles

Rob Wozny – Alliant Energy

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Walking the Talk

News release

FOR IMMEDIATE RELEASE

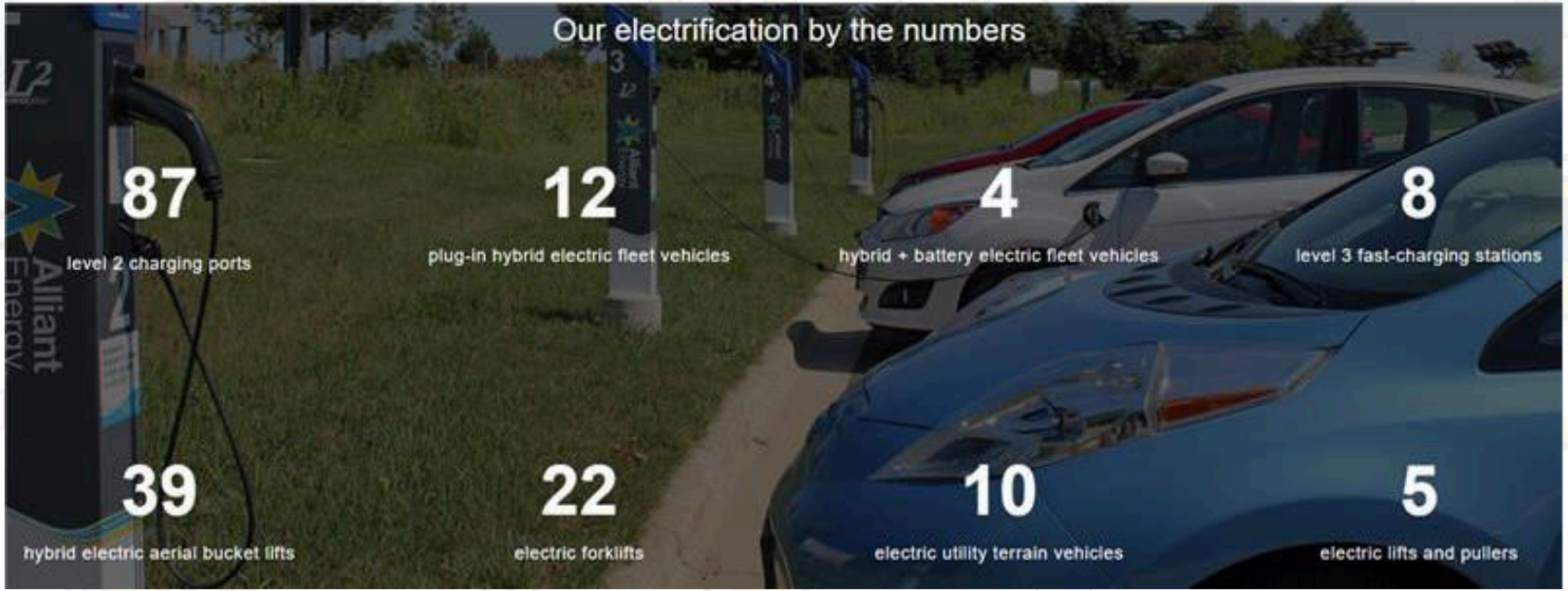
Media contact: Morgan Hawk (319) 786-4040
Investor Relations contact: Susan Gille (608) 458-3956

Alliant Energy to electrify 100 percent of light-duty fleet vehicles by 2030

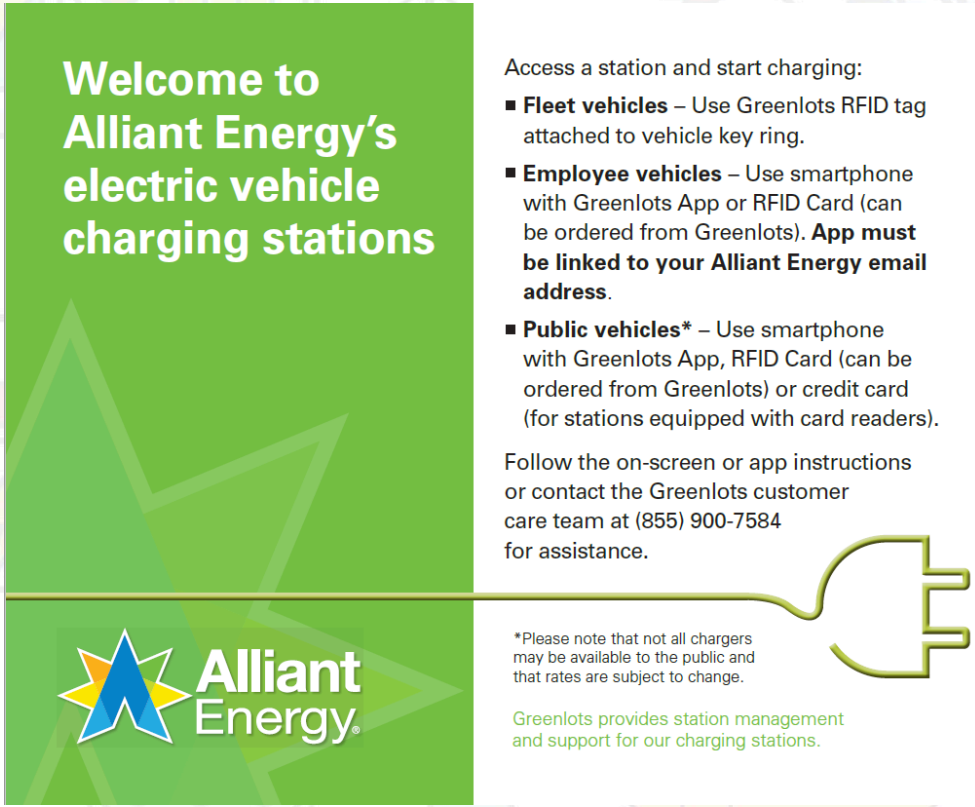
CEDAR RAPIDS, Iowa – September 24, 2020 – Guided by their purpose-driven strategy to serve customers and build strong communities, Alliant Energy announces 100 percent of the company's active light-duty fleet vehicles will be electric by 2030.

"Our customers and the communities we are privileged to serve benefit from our plan to electrify our fleet vehicles and our commitment to a cleaner energy future," said JP Brummond, Vice President of Business Planning at Alliant Energy. "By transitioning to electric vehicles, we reduce the total cost of ownership of our fleet and reduce emissions. The savings are an element of our ongoing focus to maintain affordable rates for our customers while also contributing to a cleaner environment for all to enjoy."

Infrastructure and EV implementation



Welcome to Alliant Energy's charging network



Access a station and start charging:

- **Fleet vehicles** – Use Greenlots RFID tag attached to vehicle key ring.
- **Employee vehicles** – Use smartphone with Greenlots App or RFID Card (can be ordered from Greenlots). **App must be linked to your Alliant Energy email address**.
- **Public vehicles*** – Use smartphone with Greenlots App, RFID Card (can be ordered from Greenlots) or credit card (for stations equipped with card readers).

Follow the on-screen or app instructions or contact the Greenlots customer care team at (855) 900-7584 for assistance.

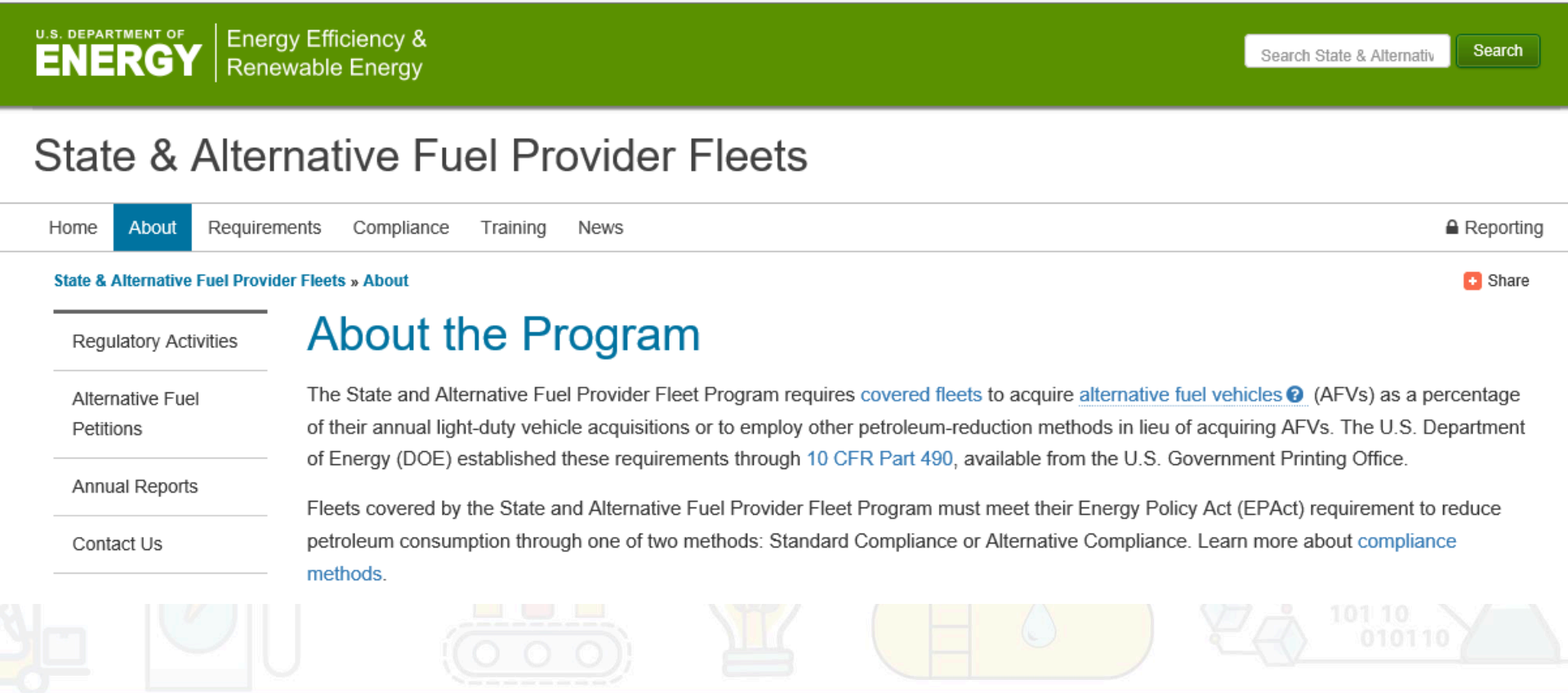
*Please note that not all chargers may be available to the public and that rates are subject to change.

Greenlots provides station management and support for our charging stations.

Addressing the need

Addressing the need (continued)

Reasons to migrate



Sustainability Profile

Fleet/Facility EV Implementation Initiatives and Deliverables

Fleet Vehicle/Equipment Assessment

- Used to identify vehicles coming the end of their duty cycle and up for replacement in addition to a look forward. Works in conjunction with the facility assessment and the Infrastructure requirements guidelines to determine if an electric vehicle option would be possible and which charging equipment would be needed. 5 year outlook

Infrastructure Decision Guidelines

- Guidelines used to identify level of equipment and infrastructure needed. Based on a host of input criteria (this will keep costs down and help us understand when we will need (110/L1, 220/L2, 480/50kW-400kW charging). Also helps avoid under or over purchasing and future proof to accommodate anticipate facility EV charging needs.

Infrastructure Design and Specification Guidelines

- Includes cabinetry, meter, transformer, pad, balusters, and specs that go into designing the charging infrastructure at a facility in case you would want to replicate it somewhere else.

Charger Installation Process Map (One for each: Fleet/Facilities, and Public installations)

- Step by step guidelines to follow. Includes all process owners/stakeholders and actions to walk through charger installations from identifying the vehicle and supply equipment need up to training and handoff.

Charging Station Information Repository

- Includes all charger information, ID's, specs, construction plans, billing, software licenses and anything else related to the site and each individual charger. Helps with scalability, vendor contacts, reference materials. Also identifies status of equipment and contracts.

Fleet/Facility EV Implementation Initiatives and Deliverables

Facility Electrification Assessment

- Tool to determine if a facility can accept the level of infrastructure needed to support its fleet vehicles. Currently adding a few L2 or even a DCFC is fairly easy but when you start looking at all of the fleet vehicles that could be candidates for conversion, the picture could change significantly.Not all locations will be suitable, and we will need to plan accordingly. 5 Year outlook.

Load Management Software Evaluations

- Help manage load and resources. Wired and non-wire alternative solutions

Vehicle Diagnostics Software Evaluations

- To help identify vehicles suitable for EV replacement or transportation electrification (TRU) conversions (based on idle time, travel distance, hours of operation and other variables). Data reporting in order to receive maximum funding from federal programs.

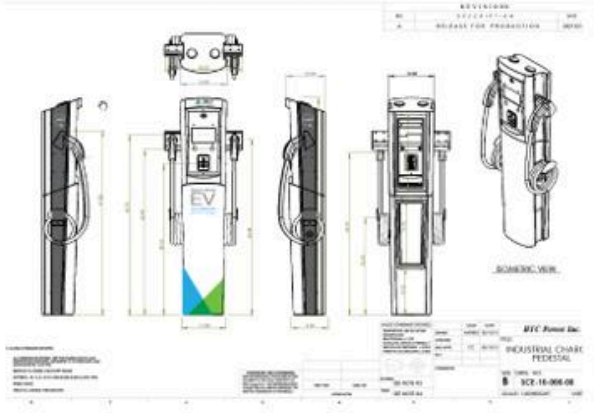
Additional Considerations

- Resiliency
- On-site Generation
- Battery Storage
- Load Management

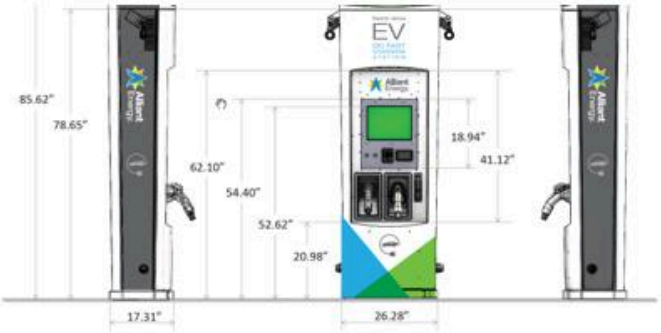
Infrastructure Design and Specification Guidelines

BTC Power
Electric Vehicle Supply Equipment (EVSE)

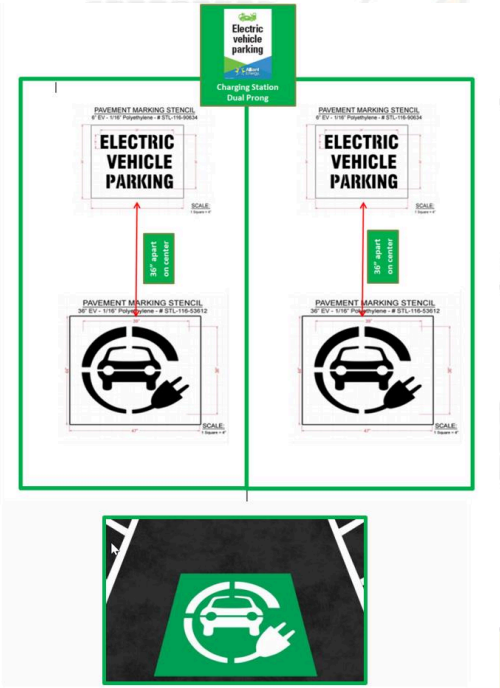
Level 2, (30 amp) dual prong



Slim 50kW DC Fast Charger



Infrastructure Design and Specification Guidelines



Electric Service Rules

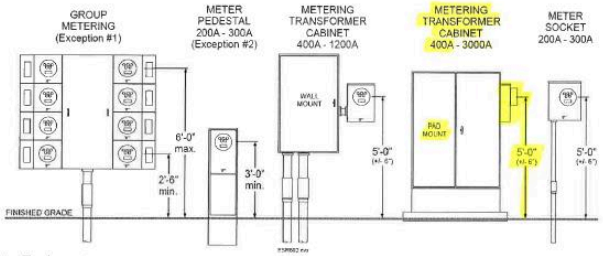
Alliant Energy

Chapter 6

ELECTRIC SERVICE RULES

SECONDARY METERING — Issued Jan 2019

602. METERING INSTALLATIONS



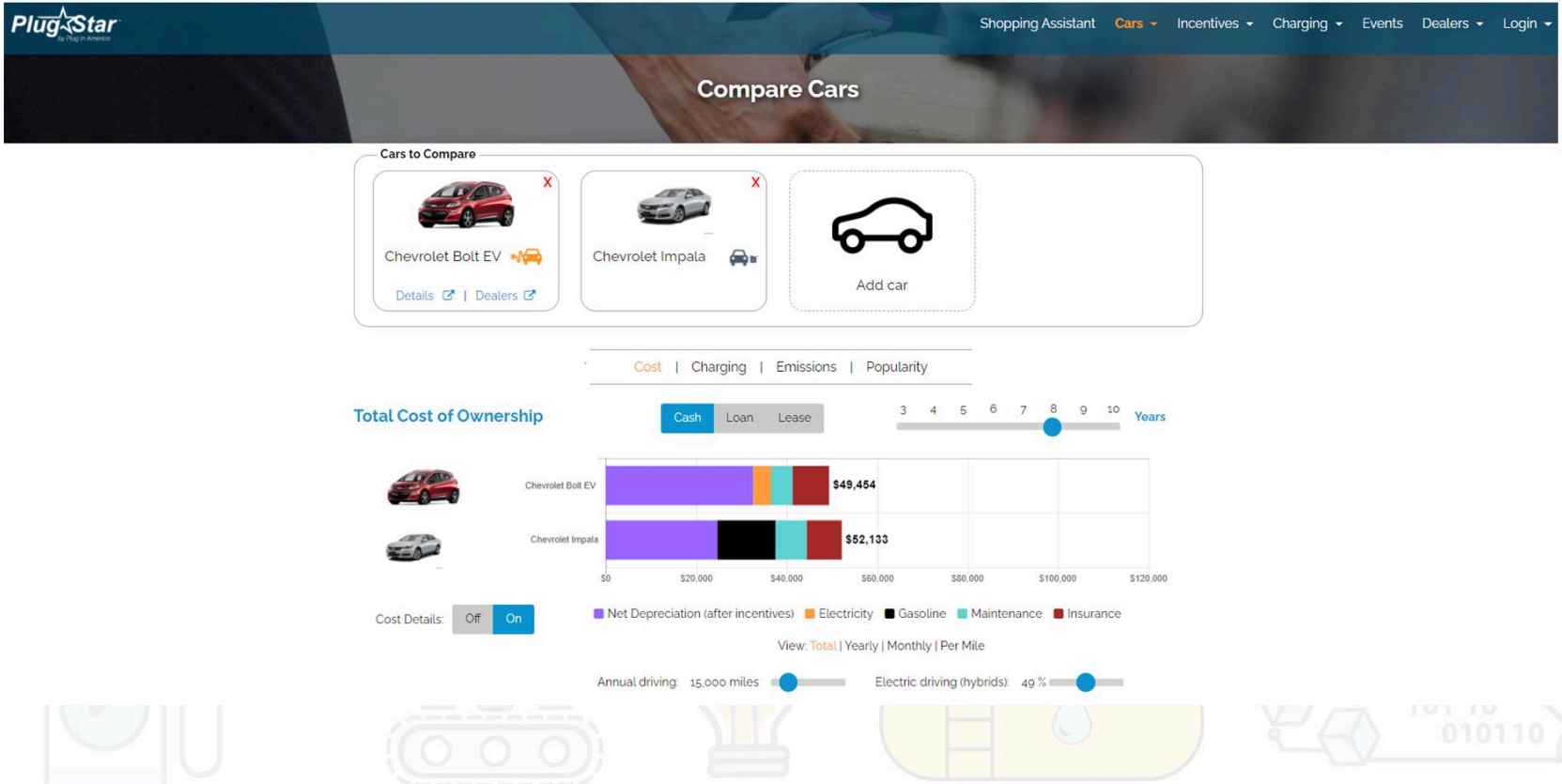
A. Equipment

1. Customer furnishes and installs:
   - Meter-sockets
   - Ganged meter sets
   - Metering transformer cabinets
   - Cable tray or raceway
   - 1" conduit for instrument transformer wiring
   - Any other related metering equipment
2. Alliant Energy furnishes and installs:
   - Meters
   - Instrument transformers (CTs and PTs)
   - Instrument transformer wiring

B. Meter mounting devices shall be securely fastened to the supporting building or structure with non-corrosive fasteners. Conduits and cables shall not be used to support wall-mounted devices. Meter sockets or cabinets shall not be installed where they will be exposed to mechanical damage, excessive dust, excessive moisture, corrosive vapors or vibrations.

C. Customer-owned equipment shall not be installed in any cabinets that are sealed by Alliant Energy, see ESR Section 604.

Tools

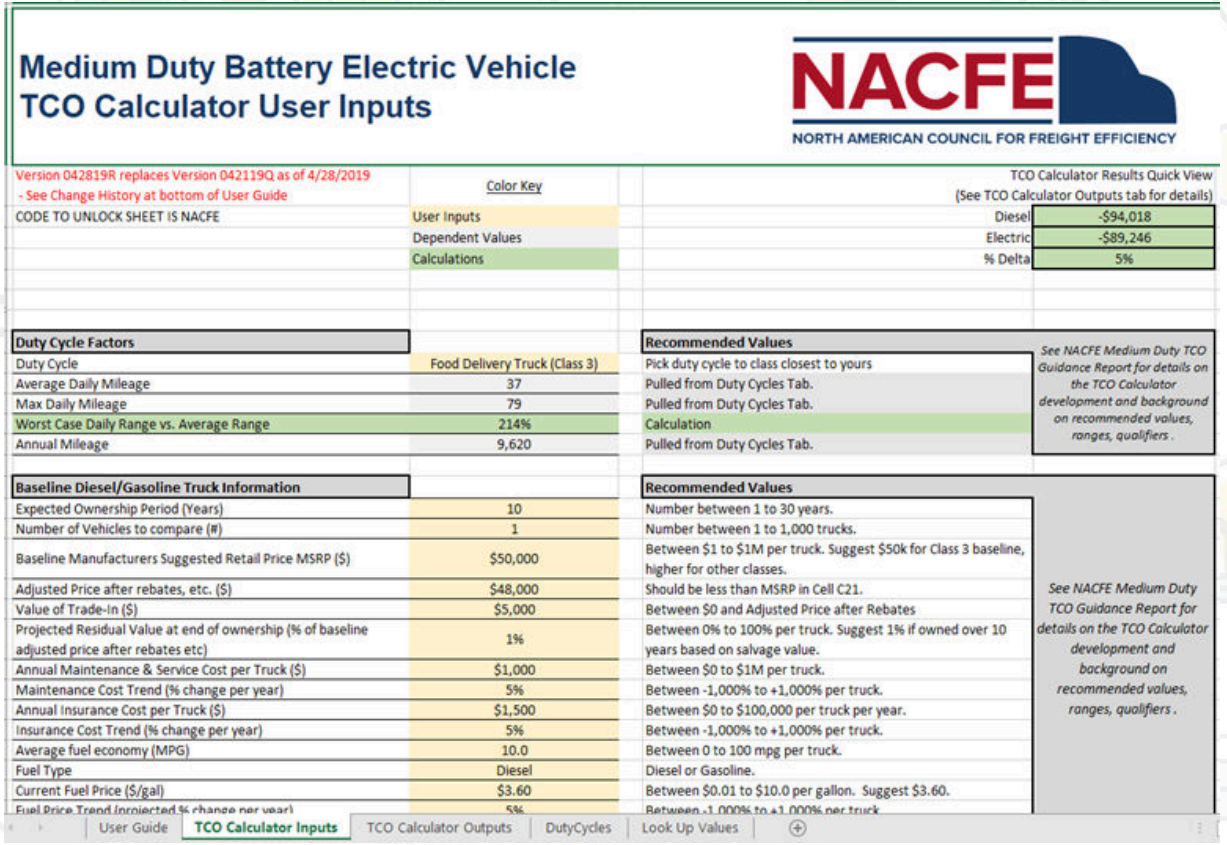

PlugStar
Shopping Assistant
Cars
Incentives
Charging
Events
Dealers
Login
Compare Cars
Cars to Compare
Chevrolet Bolt EV
Details | Dealers
Chevrolet Impala
Add car
Cost | Charging | Emissions | Popularity
Total Cost of Ownership
Cash
Loan
Lease
3 4 5 6 7 8 9 10
Years
Chevrolet Bolt EV
$49,454
Chevrolet Impala
$52,133
$0
$20,000
$40,000
$60,000
$80,000
$100,000
$120,000
Cost Details:
Off
On
Net Depreciation (after incentives)
Electricity
Gasoline
Maintenance
Insurance
View: Total | Yearly | Monthly | Per Mile
Annual driving: 15,000 miles
Electric driving (hybrids): 49 %

Tools

The Zero-Emission Technology Inventory (ZETI) tool is an interactive online resource to establish a current and shared knowledge base for worldwide commercially available offerings of zero-emission medium- and heavy-duty vehicles (MHDVs). The tool aims to provide fleets and governments with comprehensive information including regions where zero-emission brands are available for purchase, and the timeline over which additional models are expected to become available. Commercial availability is defined as availability for immediate production based on placed orders.

https://globaldrivetozero.org/tools/zero-emission-technology-inventory/

Tools



Medium Duty Battery Electric Vehicle TCO Calculator User Inputs

NACFE
NORTH AMERICAN COUNCIL FOR FREIGHT EFFICIENCY

Version 042819R replaces Version 042119Q as of 4/28/2019
- See Change History at bottom of User Guide

CODE TO UNLOCK SHEET IS NACFE

Color Key

User Inputs
Dependent Values
Calculations

TCO Calculator Results Quick View
(See TCO Calculator Outputs tab for details)

Diesel	-$94,018
Electric	-$89,246
% Delta	5%

Duty Cycle Factors		Recommended Values
Duty Cycle	Food Delivery Truck (Class 3)	Pick duty cycle to class closest to yours
Average Daily Mileage	37	Pulled from Duty Cycles Tab.
Max Daily Mileage	79	Pulled from Duty Cycles Tab.
Worst Case Daily Range vs. Average Range	214%	Calculation
Annual Mileage	9,620	Pulled from Duty Cycles Tab.

See NACFE Medium Duty TCO Guidance Report for details on the TCO Calculator development and background on recommended values, ranges, qualifiers .

Baseline Diesel/Gasoline Truck Information		Recommended Values
Expected Ownership Period (Years)	10	Number between 1 to 30 years.
Number of Vehicles to compare (#)	1	Number between 1 to 1,000 trucks.
Baseline Manufacturers Suggested Retail Price MSRP ($)	$50,000	Between $1 to $1M per truck. Suggest $50k for Class 3 baseline, higher for other classes.
Adjusted Price after rebates, etc. ($)	$48,000	Should be less than MSRP in Cell C21.
Value of Trade-In ($)	$5,000	Between $0 and Adjusted Price after Rebates
Projected Residual Value at end of ownership (% of baseline adjusted price after rebates etc)	1%	Between 0% to 100% per truck. Suggest 1% if owned over 10 years based on salvage value.
Annual Maintenance & Service Cost per Truck ($)	$1,000	Between $0 to $1M per truck.
Maintenance Cost Trend (% change per year)	5%	Between -1,000% to +1,000% per truck.
Annual Insurance Cost per Truck ($)	$1,500	Between $0 to $100,000 per truck per year.
Insurance Cost Trend (% change per year)	5%	Between -1,000% to +1,000% per truck.
Average fuel economy (MPG)	10.0	Between 0 to 100 mpg per truck.
Fuel Type	Diesel	Diesel or Gasoline.
Current Fuel Price ($/gal)	$3.60	Between $0.01 to $10.0 per gallon. Suggest $3.60.
Fuel Price Trend (projected % change per year)	5%	Between -1,000% to +1,000% per truck.

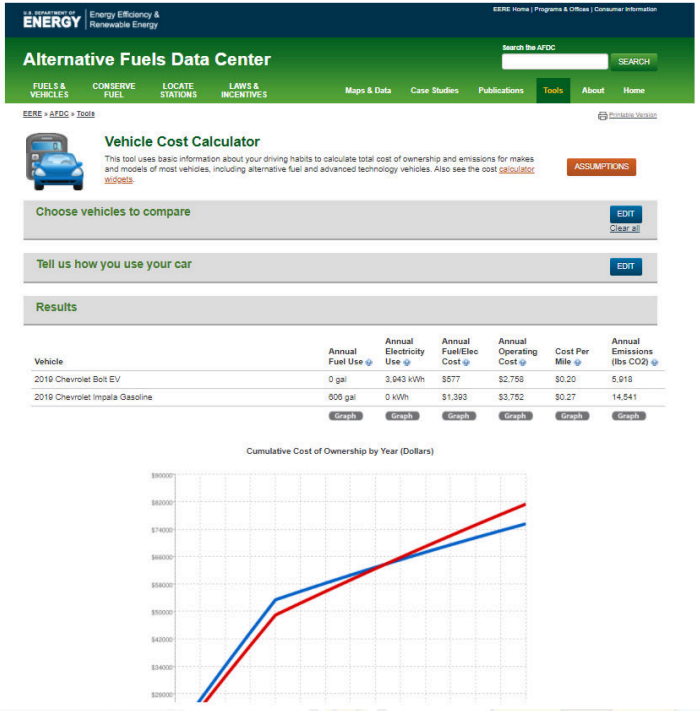
See NACFE Medium Duty TCO Guidance Report for details on the TCO Calculator development and background on recommended values, ranges, qualifiers .

User Guide | TCO Calculator Inputs | TCO Calculator Outputs | DutyCycles | Look Up Values

Tools

Tools

https://afdc.energy.gov/calc/



Questions?

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robwozny@alliantenergy.com

DANE COUNTY DEPARTMENT OF PUBLIC WORKS, HIGHWAY & TRANSPORTATION

REDUCTION IN GREEN HOUSE GASES

Comparing Single Axle Diesel 4.51 mpg to Single Axle CNG 4.34 DGE

- Operating CNG trucks in lieu of Diesel results in 23% reduction in Green-house gases
- 4,711 CO2 KG Reduction Operating One Truck for One Year. Equals 4.7 metric-tons

PLANNING, OPERATING, AND MAINTAINING ALTERNATE FUEL VEHICLES

- VEHICLES
- FUELING FACILITIES
- BUILDINGS

PLANNING - TRUCKS

What truck would we like to be CNG? Our goal is to have all the trucks CNG. Currently we have the following vehicles that are CNG:

- **Class 8 Trucks**
  - 2 - Single Axle Plow Trucks
  - 23 - Tandem Axle Plow Trucks
  - 4 - Tri-Axle Plow Trucks
  - 1 - Sign Truck
  - 1 - Low Boy Tractor

- **Cars and Pickups**
  - 3 - Cars
  - 7 - ½ ton pickups
  - 8 - 1 ton dumps
  - 4 - 19,500 GVW Crew Trucks

Trucks currently ordered

4 - Tri-Axle Plow Trucks 4 - ½ ton pickups

CNG STATIONS

1. **Dane County Eastside Facility**
   3103 Luds Lane, McFarland WI 53558

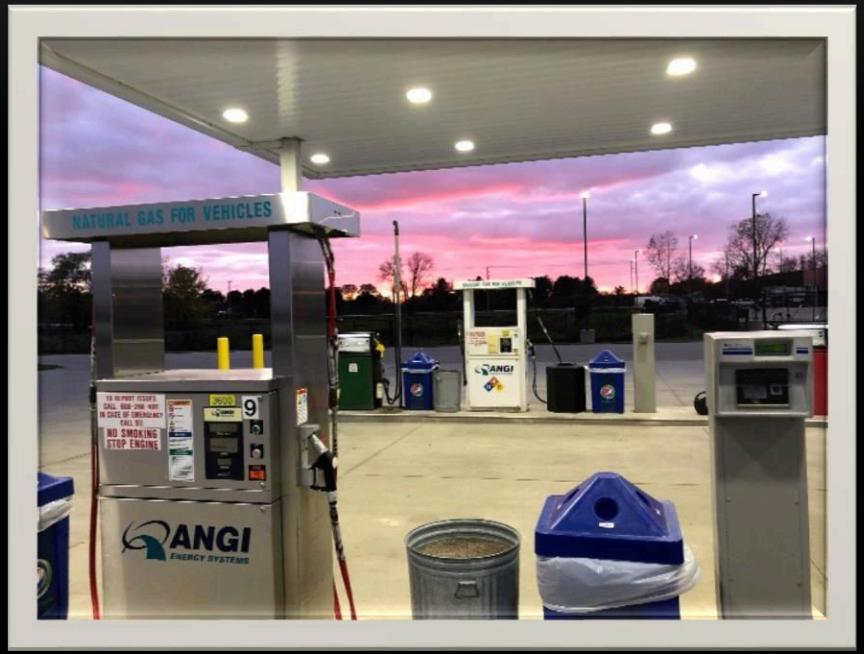
2. **Dane County Parks**
   4318 Robertson Rd, Madison, WI 53714

3. **Speedway**
   2500 Royal Ave, Monona, WI 53713

4. **Kwik Trip - Windsor**
   6325 Pepsi Way, Windsor, WI 53598

5. **Kwik Trip - Verona**
   2145 County Road PB, Verona, WI 53593

6. **Middleton Farmers Coop**
   1755 N Pleasant View Rd, Middleton, WI 53562

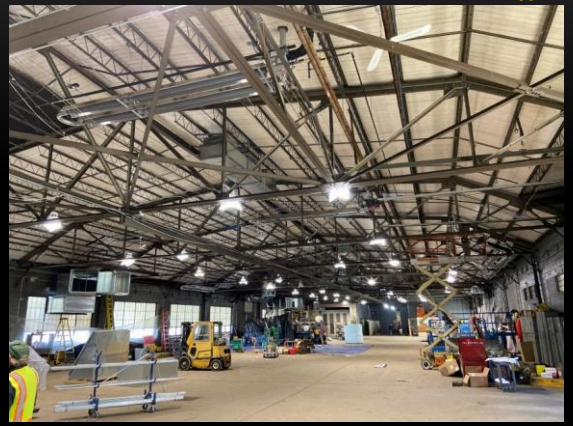


BUILDINGS

Retrofit Buildings

Before

After



New Buildings

CLASS 8 TRUCK ENGINE CHOICES

CUM ISL G 320 HP

CUM ISX12N 400 HP

MAINTENANCE

Key Maintenance Items on CNG Trucks:

- Spark Plugs - annually replaced
- Fan Belt - annually replaced
- Valve Adjustment – annually adjusted
- Oil Changes – Every 500 Hours
- On 9 Liter Engines – Daily drain fuel filter

Less Maintenance on CNG Trucks:

- Exhaust System
- No Diesel Particulate Filter
- No DEF fluid

Working on CNG Trucks:

- To do Hot Work on a CNG Truck – Vehicle must be defueled
- To leave a CNG truck in a Building – Building must be CNG compliant

CLASS 8 TRUCK ENGINE CHOICES

CUM ISL G 320 HP

CUM ISX12N 400 HP

CNG PICKUP ENGINES

Engine Choices in Pickups

- Ford 150, 250, and 350 are Bifuel Engine
- Ford 450 and 550 – Dedicated CNG Fuel Engine
- Truck Chassis engine must be ordered from the factory with CNG engines.
- The CNG engines will have harder engine valves among other items.

Maintaining LPG Powered Buses

Its way more than just cheaper fuel!

John Krett
School District of Arcadia
Transportation Director

- krettj@arcadia.k12.wi.us
- 608-323-7082

Our Fleet in Arcadia Timeline

- 2013 100% diesel experiencing 25-60% downtime on newest diesel units
- 2014 the first LP buses were purchased
- 2015-2019 after LP successes no diesel units added
- 2020 up to 12 LP units more than 50% of fleet and more than 90% of daily route buses
- Downtime and wrecker calls have dropped drastically. The vast majority of downtime and wrecker calls are experienced with our remaining diesel units.

Service Costs

- 7qts (LP Ford) vs. up to 7.5 gallons (Diesel)
- $7 filter vs. $20+ filter
- Quicker service
- Not as messy
- Less initial fluid so less disposal fluid

Engine design

- Proven Ford V10
- New large Ford V8 option coming soon
- Other brands are out there, there is a GM design
- Ford V10 currently in use has design dating back to the early 1990’s

Cost of parts and labor

- Lower cost automotive style parts
  - Example $150 LP starter vs. $300-500 starter diesel
  - Example $100 fuel injector LP vs. $400+ fuel injector/ diesel
  - Easier parts to handle/auto style starter vs. DSL starter
  - Much quicker and easier to change a coil pack vs. a diesel injector(s)

Simplicity of emissions system

- Single EGR valve, Catalytic converter
- Similar emissions components to gas cars/trucks
- No DEF issues
- No after treatment issues
- No particulate filters
- Engine Design Longevity
  - example-2-F350's running on gas at 220K and 284K. Several of our buses are now at 100K, about half of their life cycle

Fuel system design

- Night and day different and improved from LP systems of the past
- No LP related issues have caused downtime in 7 years of service
- Fuel system designed for both power and economy 3.5-5MPG @$.90-1.25/gal

Fuel site design/maintenance

- Own Equipment and Site
  - Lowest fuel cost, but highest maintenance responsibility
- Own Site but not Equipment
  - Somewhat lower fuel cost
  - No wasted fuel traveling offsite for fuel
  - Less driver time spent traveling for fuel
- Off site fueling
  - Higher fuel cost but no equipment or site responsibilities

Other benefits

- Last year 2019-2020 we received over $60K in grants dollars toward this project
- Most drivers like our LP buses and would much rather drive a LP unit in the winter especially, faster heat, less complaints
- Potentially safer since you can hear what is going on around you

John Krett
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Transportation Director

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Questions?

Put your questions in the chatbox and we'll get to as many as we can!

Thank you for attending the Sustainable Transportation Series!

Alternative Fuel & Infrastructure Webinar

Funding Your Sustainable Fleet Webinar

Electric Vehicles Webinar

EV Charging Infrastructure Webinar

Sustainable Truck & Bus Solutions Webinar

Operating & Maintaining Alternative Fuel Vehicles Webinar

All Webinar recordings are available on the Wisconsin Clean Cities Website

Join us June 10, 2021 for the Transportation & Innovation Expo!

Registration & additional information is available on the Wisconsin Clean Cities Website