



Muscogee Nation Electric Vehicle Charging Station

Jennifer Reyher
2021 Tribal Energy Webinar Series
Electric Vehicles: Opportunities and Challenges



Overview

Installed in Okmulgee, Oklahoma the Capital of the Muscogee Reservation

Funded by the VW Settlement

Designed by Muscogee Nation Tribal Construction

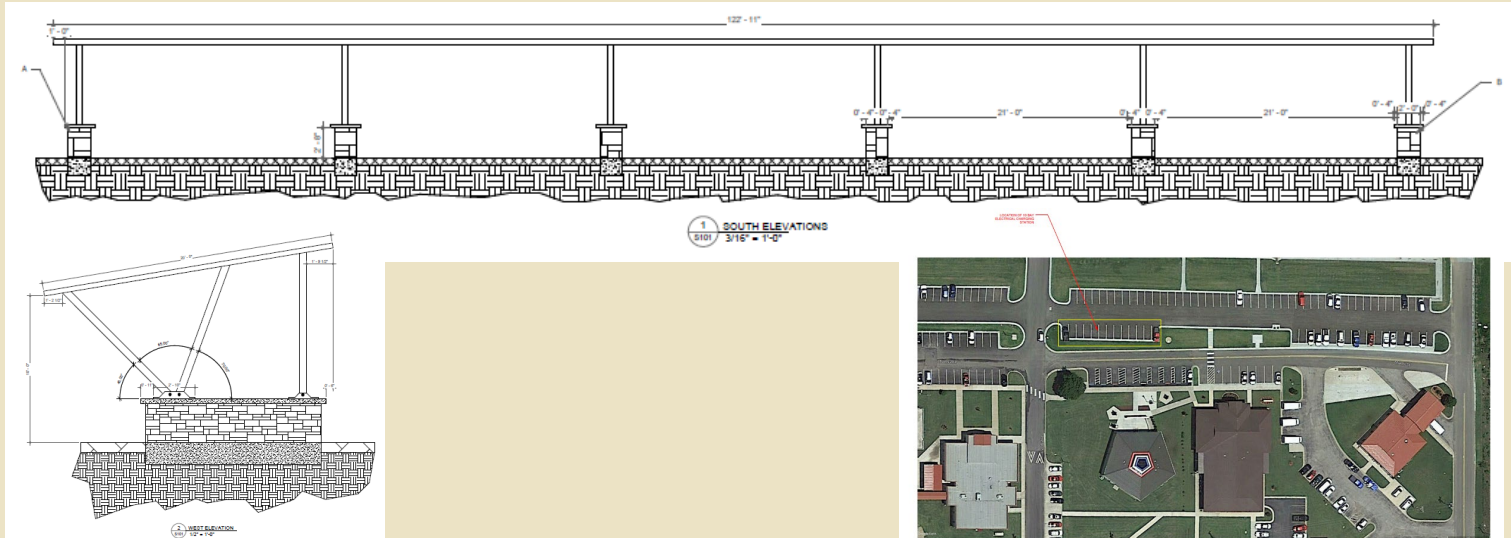
Total Project Cost: \$169,742.00



Planning and Design

Site Selection Considerations:

- Existing Infrastructure (Concrete, Electrical)
- Purpose (General Public, Employees, Fleet)
- Existing Charging Locations (Plugshare.com)



Supporting EV Infrastructure

PlugShare EN Jennifer Reyher's Profile My Vehicle Bookmarks Logout

Muscogee Nation Visitor Parking

CHARGING ONLY

Muscogee Nation Visitor Parking ✓
J-1772 Check In

You have never checked in here

BOOKMARK ADD PHOTO DIRECTIONS EDIT

1006 Bear Lane, Okmulgee, OK 74447

Free

Parking: Free, Pull in parking

★ EV Parking, Restrooms, Shopping

🕒 Open 24/7

i This charging station is free to use. The Muscogee Nation encourages visitors to use the chargers while touring the complex, learning about the Muscogee Culture and completing business on the complex.

Muscogee Nation Visitor Parking
1006 Bear Lane,
Okmulgee, OK 74447

MUSCOGEE (CREEK) NATION

93 Charging Locations Traffic

Map Terrain Satellite

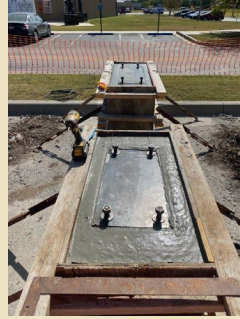
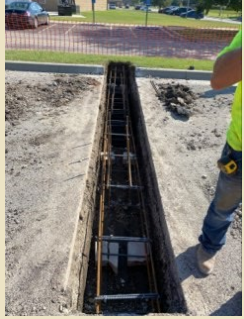
S: Map data ©2021 Google 5 mi Terms of Use Report a map error



Construction Process

Start Date: Sept. 2020

Ribbon Cutting: April 2021



EV Charging Station

Five (5) Level 2 Chargers

- Three Dual Arm, Two Single Arm

Considerations

- How long will people use chargers
- Available electrical
- Cost of Electricity
- Operation and Maintenance
- Cost of Charging Station



AC Level 2 30A / 40A
SINGLE or DUAL PORT CHARGING STATION
(PEDESTAL)

MODEL	DUAL PORT 30A		DUAL PORT 40A	
	MODEL Number	ESP-202-30-P-0010	MODEL Number	ESP-202-40-P-0010
	PRODUCT Number	L1P-30-240-15-001	PRODUCT Number	L1P-40-240-15-001
Power per Port	7.2 kW (240VAC @ 30A)		9.6 kW (240VAC @ 40A)	
ELECTRICAL SERVICE				
Power	240/208 VAC, 30A Load with 50A Branch Circuit Per Port		240/208 VAC, 40A Load with 50A Branch Circuit Per Port	
Service Panel	AOA Breakers per Port (No GFCI)		50A Breakers per Port (No GFCI)	
Service Wiring	3-Wire (L1, L2, Earth Ground)			
FUNCTIONAL INTERFACES				
Connector Type	SAE J1772			
Charging Protocol	SAE J1772			
Standard Cable Length	25 Ft.			
Cable Retractor	Optional (Cable 18 Ft w/ Cable Management)			
LCD Display	500 Nits, 7" Color, 800 x 480, UV Protected			
Card Reader	ISO 14443 Type A & B, ISO 18092 NFC			
SAFETY AND CONNECTIVITY				
Ground Fault Detection	20 mA			
Plug-Out Detection	SAE J1772			
Power Measurement (opt)	Accuracy: 1% - 5%			
Power Report Interval	Every 15 minutes on the hour			
Wireless	2.4 GHz Wi-Fi (802.11 b/g/n)			
Wide Area Network	4G Modem			
Communication Protocol	OCPP 1.5 and 1.6 Compliant			
SAFETY AND OPERATION				
Enclosure Rating	NEMA 3R			
Regulatory Compliance	ETL Certified for USA and UL Certified for Canada; Complies with UL 2594, UL 2231-1, UL 2231-2, and NEC Article 625, IBC, IFC Part 15 Class A			
Operating Temperature	-30°C to +40°C (22°F to 104°F)			
Storage Temperature	-50°C to +80°C (58°F to 176°F)			
Humidity	95% Non-Condensing			



- ▶ SINGLE or DUAL PORT, 30A or 40A, LEVEL 2
- ▶ CHARGING PROTOCOL: SAE J1772
- ▶ 7.2 kW or 9.6 kW PER PORT
- ▶ 25 FT or 18 FT with CABLE RETRACTOR
- ▶ 7" COLOR SCREEN – STANDARD
- ▶ UL COMPLIANT – ETL CERTIFIED
- ▶ OPTIONS:
 - CABLE RETRACTOR



Costs


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

Costs Associated With Non-Residential Electric Vehicle Supply Equipment

Factors to consider in the implementation of electric vehicle charging stations

November 2015

Prepared by New West Technologies, LLC for the U.S. Department of Energy Vehicle Technologies Office



EV Everywhere
U.S. DEPARTMENT OF ENERGY

Clean Cities
U.S. Department of Energy

Level 2, Single Port Scenarios	Annual Electricity Consumption & Cost	Installation Cost Amortized Over 10yrs/kWh & cost/yr.*	Assumptions
<p>Workplace charging</p> <ul style="list-style-type: none"> • 2 light-duty vehicles • Each charging 3hrs/day • 5 days/week 	<ul style="list-style-type: none"> • 10,296 kWh/yr • \$1,030/yr 	<p>\$0.006-\$0.123/kWh \$60-\$1,270/yr</p>	<ul style="list-style-type: none"> • EVSE Type: Level 2 240 VAC • EVSE Amperage: (30A) • Vehicle Power Acceptance Rate: 6.6kW • 20 miles added range/hr. of charging • Electricity Cost: \$0.10/kWh • Installation Cost: \$600-\$1,2700
<p>Public charging</p> <ul style="list-style-type: none"> • 1 light-duty vehicles • Each charging 5hrs/day • 4 days/week 	<ul style="list-style-type: none"> • 6,864 kWh/yr • \$686/yr 	<p>\$0.009-\$0.185/kWh \$60-\$1,270/yr</p>	
<p>Fleet charging</p> <ul style="list-style-type: none"> • 2 medium-duty vehicles • Each charging 5hrs/night • 5 days/week 	<ul style="list-style-type: none"> • 17,160 kWh/yr • \$1,716/yr 	<p>\$0.003-\$0.074/kWh \$60-\$1,270/yr</p>	

https://afdc.energy.gov/files/u/publication/evse_cost_report_2015.pdf



Costs

Electrical- \$24,970

Structure-\$107,184

Charging Stations- \$36,078

Sod- \$1,510

Total- \$169,742



Health Benefits

These benefits include the reduction of premature mortality, chronic bronchitis, asthma attacks, non-fatal heart attacks, and other health problems.

EPA, Environmental Protection Agency, 15 Sept. 2015, cfpub.epa.gov/quantifier/index.cfm?action=results.quantify.

ASTHMA & AIR POLLUTION

PARTICLES IN THE AIR LIKE DUST, DIRT, SOOT, AND SMOKE ARE CALLED **PARTICULATE MATTER & CAN CAUSE**

- Increased hospital visits
- Worsened asthma symptoms
- Adverse birth outcomes
- Breathing problems
- Decreased lung growth in kids
- Lung cancer
- Early death

GROUND-LEVEL OZONE

Forms when pollutants from cars and trucks, power plants, factories, and other sources come in contact with each other in heat and sunlight. Factors such as weather conditions and intensity of sunlight also play a part in how ozone is formed. Ground-level ozone is one of the biggest parts of smog, and it is usually worse in the summer months.

WHO'S AT RISK?

People with heart or lung disease, infants, children with asthma or who spend a lot of time outdoors, older adults, and active people of all ages who exercise or work hard outdoors

WHAT CAN YOU DO?

- Check the daily air quality forecast via newspaper, TV, radio, or online at <http://aimow.gov> to learn when particle levels are unhealthy
- Reduce the amount of time outside when pollution is high
- Plan outdoor activities when ozone levels are lower, usually in the morning and evening
- Exercise away from roads and highways. Particle pollution is usually worse near these areas
- Do easier outdoor activities, such as walking instead of running or using a riding lawn mower instead of a push mower

LEARN MORE
www.cdc.gov/ephtracking

Earth Day Ribbon Cutting



Adoption and Support

The MCN chargers have dispensed 709.6 kWh YTD. The [Alternative Fuels Database](#) uses .32 kWh per mile for their estimates which would be 3.125 miles per kWh. Using that as a reference you could conservatively say that the charging station has provided 2,217 miles of electric driving so far this year. (709.6 kWh x 3.125 miles/kWh = 2,217 miles driven)

Matthew Ellis, Francis Energy



START-TIME	CHARGE END	DURATION	kWh USED
2021-07-09 1	2021-07-09 1	0:08:50	0.8
2021-07-03 1	2021-07-03 1	0:31:55	3
2021-07-01 2	2021-07-01 2	0:09:33	0.88
2021-06-26 1	2021-06-26 1	0:36:36	3.49
2021-06-18 1	2021-06-18 1	1:22:25	11.73
2021-06-04 0	2021-06-04 1	4:10:58	13.88
2021-06-03 0	2021-06-03 1	4:38:20	15.27
2021-06-02 1	2021-06-02 1	0:27:09	3.66
2021-06-02 0	2021-06-02 1	8:18:34	23.95
2021-06-01 1	2021-06-01 1	0:41:36	2.17
2021-06-01 0	2021-06-01 1	4:15:06	14.05
2021-05-31 0	2021-05-31 0	0:11:09	1.07
2021-05-29 1	2021-05-29 2	5:22:50	43.53
2021-05-28 1	2021-05-28 1	1:32:58	5
2021-05-28 0	2021-05-28 1	3:11:38	10.68
2021-05-27 1	2021-05-27 1	3:25:43	11.3
2021-05-27 0	2021-05-27 1	2:03:39	16.35
2021-05-27 0	2021-05-27 1	3:17:47	19.8
2021-05-26 0	2021-05-26 1	3:56:09	12.95
2021-05-25 1	2021-05-25 1	0:42:11	2.2
2021-05-25 0	2021-05-25 1	4:09:03	13.62



Thank you!

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