North Central Texas Council of Governments

Dallas-Fort Worth CLEAN CITIES

REGIONAL EV INFRASTRUCTURE WORKING GROUP

Jared Wright, Senior Air Quality Planner
Joslyn Billings, Air Quality Planner

February 21, 2024

Agenda

- 2:00 – 2:05pm **Introduction**
- 2:05 – 2:30pm **Texas A&M Transportation Institute CARTEEH study**
- 2:30 – 2:50pm **NCTCOG Recent Awards Update**
- 2:50 – 3:00pm **Working Group Survey**

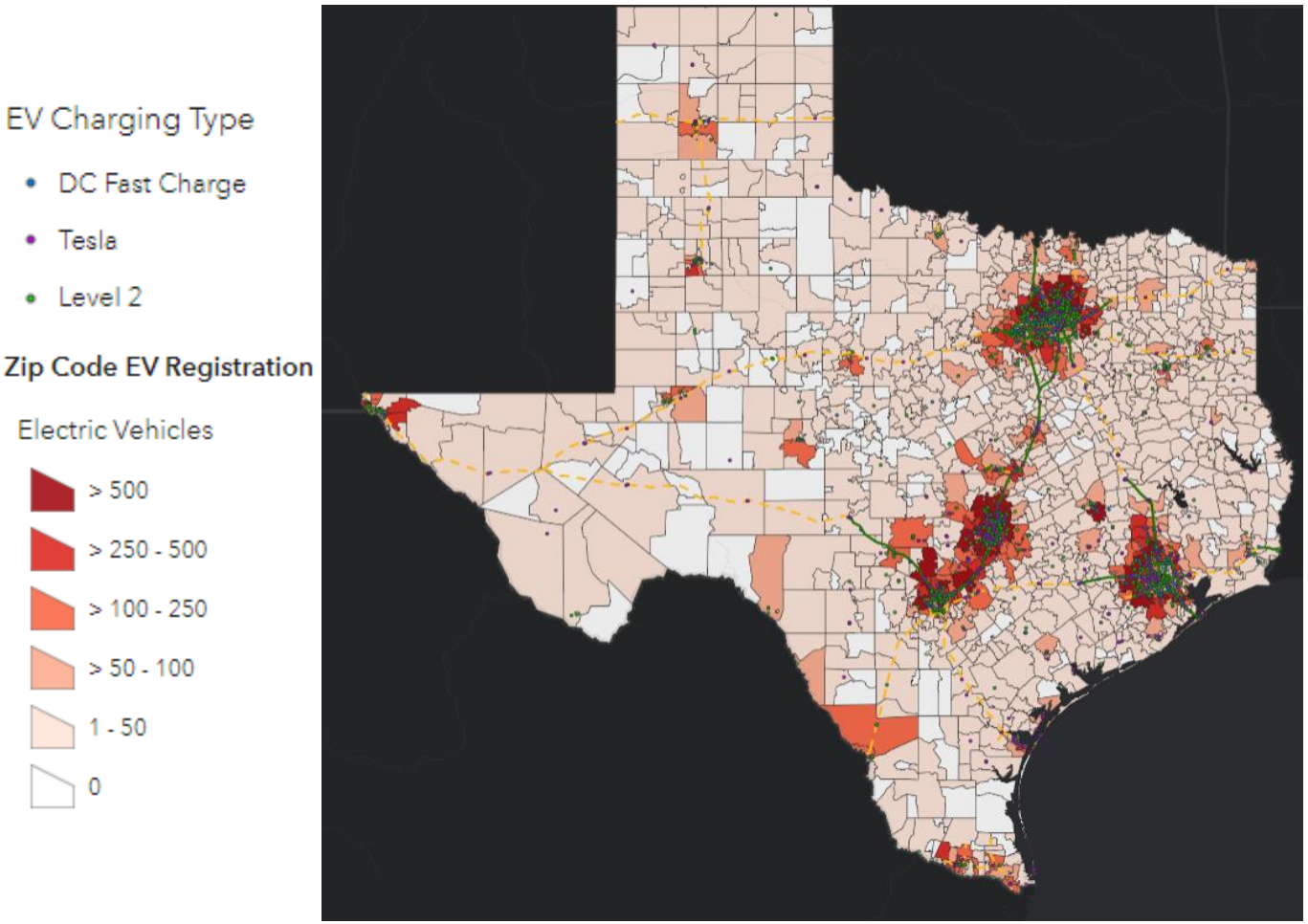
Working Group Priorities:

Coordinate EV Infrastructure efforts across North Texas

Provide guidance, resources, and collaboration opportunities to local governments and

*Working Group meetings are recorded and posted on www.dfwcleancities.org/events

Texas Data and Trends



Electric Vehicle (EV) Registration Data

www.dfwcleancities.org/evnt -> EVs and Texas

Region	February 2023	February 2024	Increase
Texas	170,654	253,076	48%
DFW	60,894	94,098	55%
Austin	35,459	49,724	40%
San Antonio	16,883	23,107	37%
Houston	40,451	62,543	55%

Charging Sites Statewide (includes Tesla):

- 2,689 Level 2
- 427 DC Fast

https://afdc.energy.gov/stations

RECHARGING DEMAND AND THEIR IMPACTS ON AIR QUALITY

An Analysis Of Emission Changes Due To Adoption Of Plug-in Electric Vehicle In Dallas-fort Worth Metropolitan Area

Madhusudhan Venugopal, P.E.

Tao Li, Ph.D.

Texas A&M Transportation Institute

Regional EV Infrastructure Working Group Meeting

February 21, 2024

Background and Motivation

Texas A&M Transportation Institute (TTI) has been developing on-road emission inventory mobile sources for multiple decades using travel demand models from the metropolitan planning organization

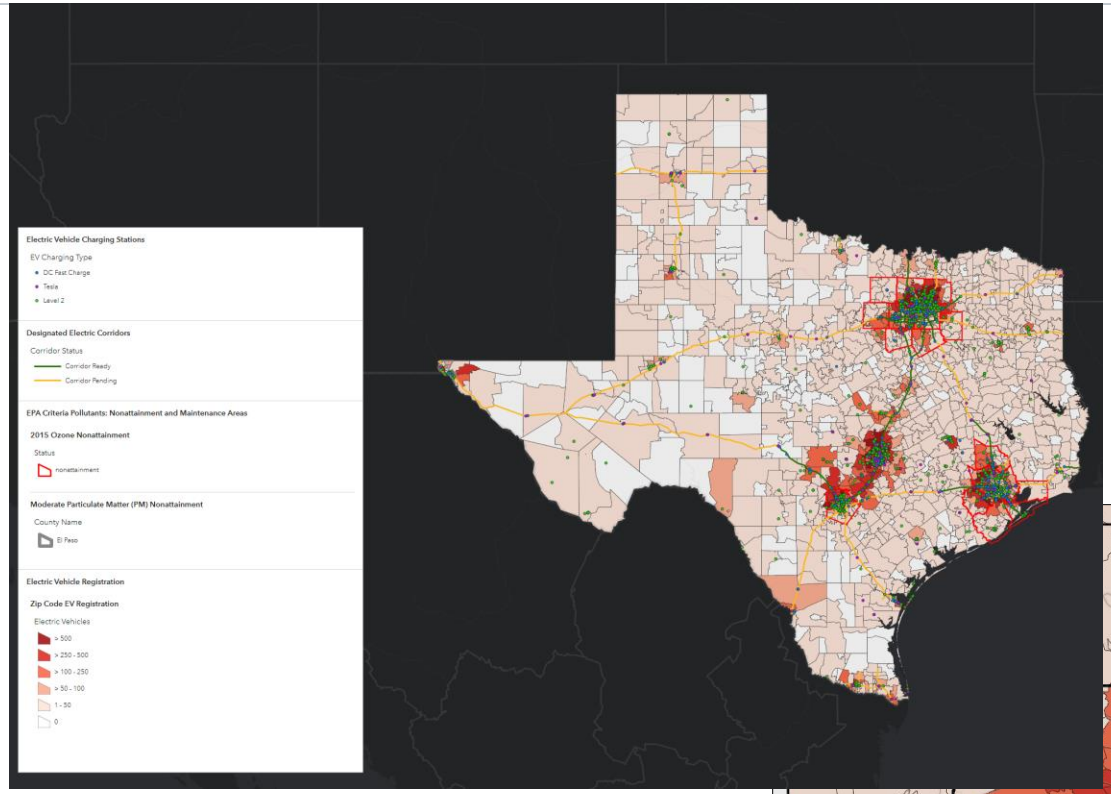
Plugged-in EVs (PEV) are anticipated to bring about the greatest upcoming change in the transportation infrastructure.

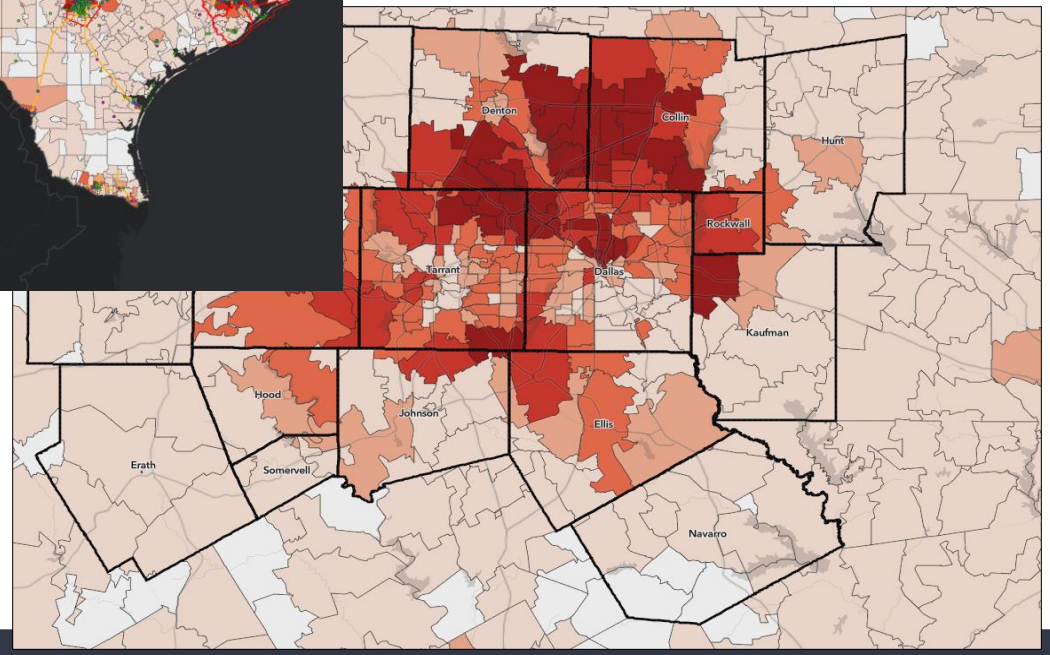
Modification to the traditional methods developed to estimate the on-road emission inventory for ICE vehicles.

Incorporation and assessment of the impacts of PEV in transportation plans

This project aims to develop a framework to incorporate PEV into the development of on-road emission inventory and evaluate their potential environmental impact in Texas metropolitan areas.

Distribution of Current EV Registrations in Texas : March 2023





Projected 2026 EV Population Scenarios for DFW Using EIA's AEO

DFW Area County	Baseline Reference Case			High Oil Price Scenario			Low Oil Price Scenario		
	All Vehicles	EV Count	EV Adoption Rate	All Vehicles	EV Count	EV Adoption Rate	All Vehicles	EV Count	EV Adoption Rate
Collin	911,404	44,266	4.86%	909,510	69,675	7.66%	915,912	42,464	4.64%
Dallas	2,210,196	52,174	2.36%	2,205,605	74,518	3.38%	2,221,129	45,415	2.04%
Denton	781,839	33,693	4.31%	780,215	48,123	6.17%	785,706	29,328	3.73%
Ellis	188,985	2,334	1.24%	188,593	3,334	1.77%	189,920	2,032	1.07%
Erath	37,247	174	0.47%	37,169	248	0.67%	37,431	151	0.40%
Hood	67,478	796	1.18%	67,338	1,138	1.69%	67,812	693	1.02%
Hunt	100,693	663	0.66%	100,484	947	0.94%	101,191	577	0.57%
Johnson	178,675	1,668	0.93%	178,304	2,382	1.34%	179,559	1,451	0.81%
Kaufman	148,782	1,919	1.29%	148,473	2,741	1.85%	149,518	1,671	1.12%
Navarro	49,847	192	0.38%	49,743	274	0.55%	50,094	167	0.33%
Palo Pinto	28,639	94	0.33%	28,580	135	0.47%	28,781	82	0.29%
Parker	157,142	2,070	1.32%	156,815	2,957	1.89%	157,919	1,802	1.14%
Rockwall	105,509	2,809	2.66%	105,290	4,012	3.81%	106,031	2,445	2.31%
Somervell	10,041	63	0.63%	10,020	91	0.90%	10,090	55	0.55%
Tarrant	1,781,478	35,697	2.00%	1,777,777	50,984	2.87%	1,790,289	31,072	1.74%
Wise	81,838	472	0.58%	81,668	674	0.83%	82,243	411	0.50%
Total	6,839,793	183,806	2.69%	6,825,584	262,521	3.85%	6,873,625	159,995	2.33%

Overview of the Methodology

Estimate PEV Charging Demand

Model Developed by TTI

EGUs Responding to PEV Charging Demand

Model Developed by Texas A&M Engineering Experimental Station (TEES)

On-road emission reduction due to PEV adoption

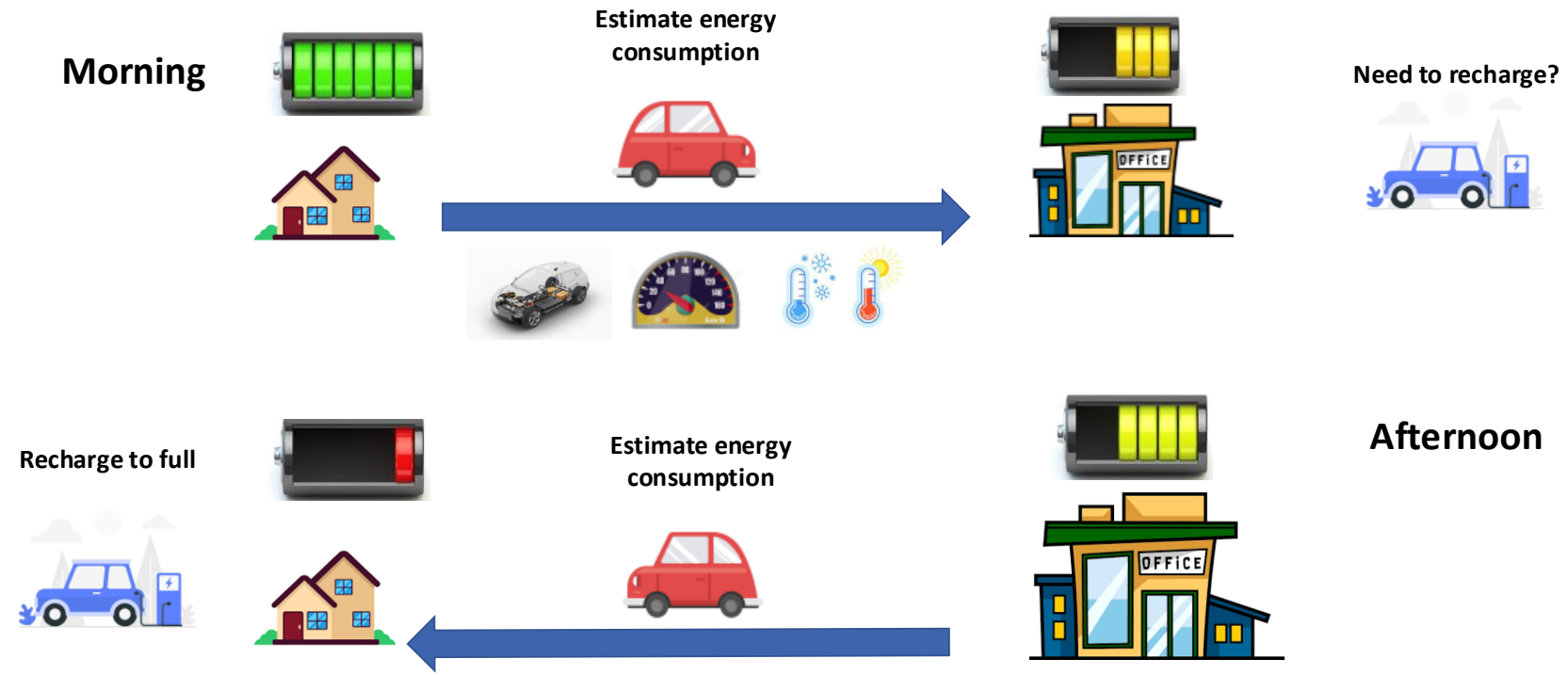
Model Developed by TTI

Additional Emissions produced by EGUs to meet the Demand

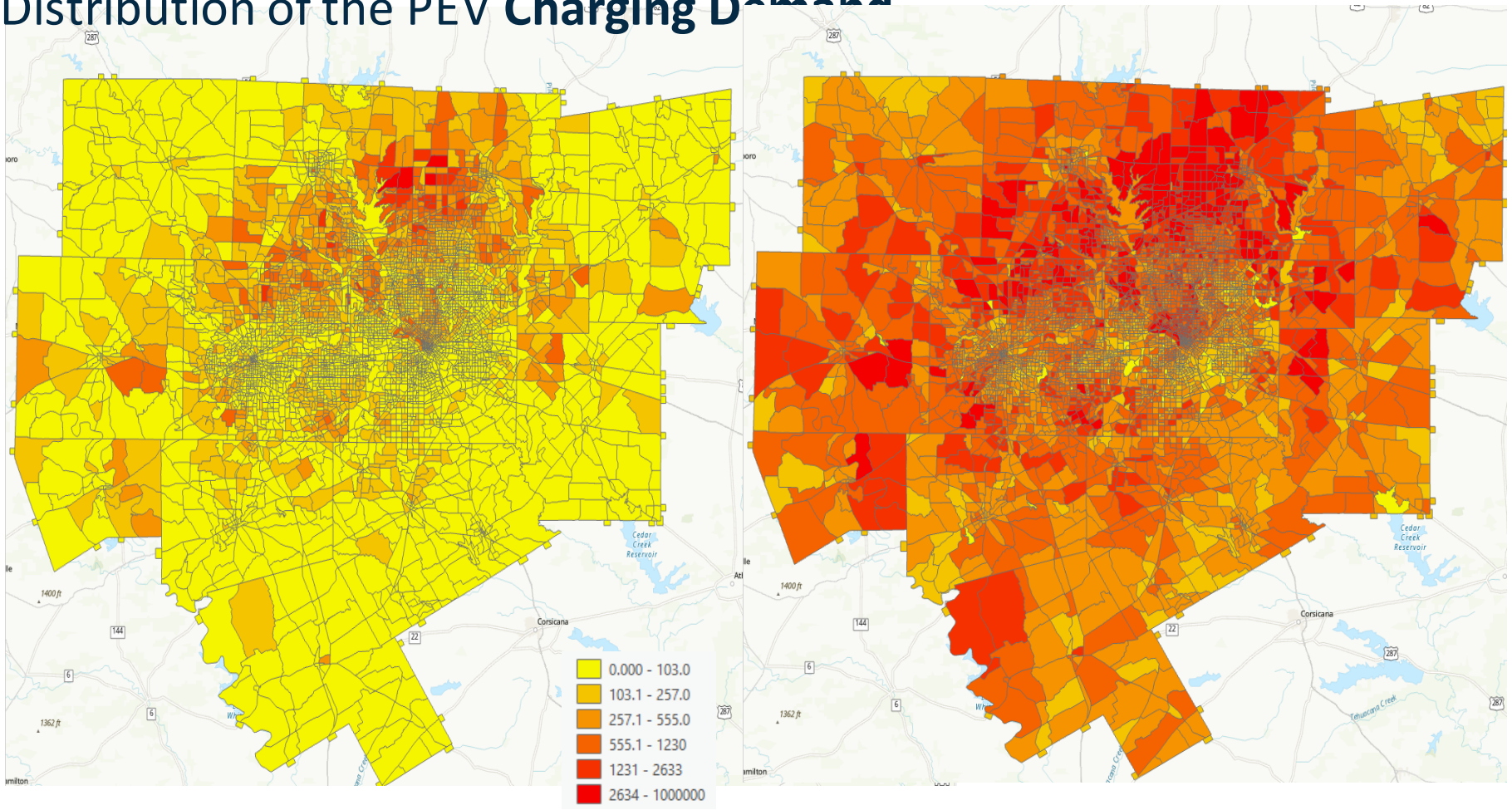
Method Developed by TTI

Charging demand estimation

Trips predicted by TDM → **Assignment of EV based on local EV population forecasts** → **Forecasts of EV trips**



Spatial Distribution of the PEV **Charging Demand**



2019 Base Year

2026 High Oil Price Scenario

Maximum Possible Emissions Reduced from Twelve DFW Counties Under Three Scenarios for a 2026 Summer Weekday

Electric Passenger Cars and Truck Inventory Parameter	2026 EV Population Scenario for 12-County DFW		
	Baseline	High Oil Price	Low Oil Price
EV Population Projection	178,561	261,485	159,361
Total EV Miles Traveled per Day	8,243,527	12,072,777	7,358,002
Daily Accumulation (miles per vehicle)	46.2	46.2	46.2
NO_X Exhaust (tons per day)	0.18	0.26	0.16
NO Exhaust (tons per day)	0.15	0.22	0.13
NO_2 Exhaust (tons per day)	0.02	0.04	0.02
HONO Exhaust (tons per day)	0.001	0.002	0.001
VOC Exhaust and Evaporative (tons per day)	0.39	0.57	0.35
VOC Refueling (tons per day)	0.08	0.11	0.07
CO Exhaust (tons per day)	10.38	15.20	9.26
SO_2 Exhaust (tons per day)	0.02	0.03	0.02
NH_3 Exhaust (tons per day)	0.16	0.24	0.15
$PM_{2.5}$ Exhaust (tons per day)	0.01	0.02	0.01
PM_{10} Exhaust (tons per day)	0.02	0.02	0.01
CO_2 Exhaust (tons per day)	2,796.47	4,097.85	2,497.41
CH_4 Exhaust (tons per day)	0.05	0.07	0.04
N_2O Exhaust (tons per day)	0.04	0.06	0.03
Fuel Consumption (daily gallons not consumed)	296,636	434,679	264,913

Modeled Emissions for All Texas Power Plants in ERCOT Grid

Texas Reliability Entity (TRE) Power Plant Fuel Type	Argonne Emission Rates for TRE (pounds per MWh)		
	PM_{10}	VOC	CO
Coal	Multiply $PM_{2.5}$ by 1.0367	0.0390	0.5542
Natural Gas	Multiply $PM_{2.5}$ by 1.0000	0.0197	0.2229

Generation Scenario	Modeled Emissions for All Texas Fossil Fuel Power Plants (tons per day)								
	NO_X	VOC	CO	SO_2	$PM_{2.5}$	PM_{10}	CO_2	CH_4	N_2O
Base (No EV Charging)	391.34	10.51	132.49	413.57	31.33	31.97	572,607	38.49	5.39
EV Charging	392.01	10.53	132.76	414.58	31.39	32.03	573,813	38.56	5.40
Net Increase for EV Charging	0.67	0.02	0.27	1.01	0.06	0.06	1,206	0.07	0.01

Comparison of EV Charging Emissions Increase versus Maximum Possible Reductions from EV Operation

EV Scenario	Net Emissions Increase from EGU Charging versus Maximum Possible Reductions from EV Operation (tons per day)								
	NO_X	VOC	CO	SO_2	$PM_{2.5}$	PM_{10}	CO_2	CH_4	N_2O
EV: EGU Generation for Baseline Scenario	+0.67	+0.02	+0.27	+1.01	+0.06	+0.06	+1,206	+0.07	+0.01
EV: Baseline Population	-0.18	-0.47	-10.38	-0.02	-0.01	-0.02	-2,796	-0.05	-0.04
EV: High Oil Price Population	-0.26	-0.68	-15.20	-0.03	-0.02	-0.02	-4,098	-0.07	-0.06
EV: Low Oil Price Population	-0.16	-0.42	-19.26	-0.02	-0.01	-0.01	-2,497	-0.04	-0.03

Other Potential Applications

The PEV charging demand and emission reduction estimation methodologies have many other potential applications:

- Estimate the energy and environmental impact of PEV in other areas of Texas.
- Assess the energy demand needed at various spatial and temporal profiles
- Assist with the planning and evaluation of the EV charging infrastructures in Texas.
- Assist with the evaluation of how convective weather (e.g., extremely cold or hot temperature) in Texas impacts travel by PEV and grid.
- Explore possible ways to improve PEV's environmental benefits.

Acknowledgement

- Center for Advancing Research in Transportation Emissions, Energy, and Health (CARTEEH)
- Texas A&M Engineering Experiment Station (TEES)
- North Central Texas Council of Government (NCTCOG)

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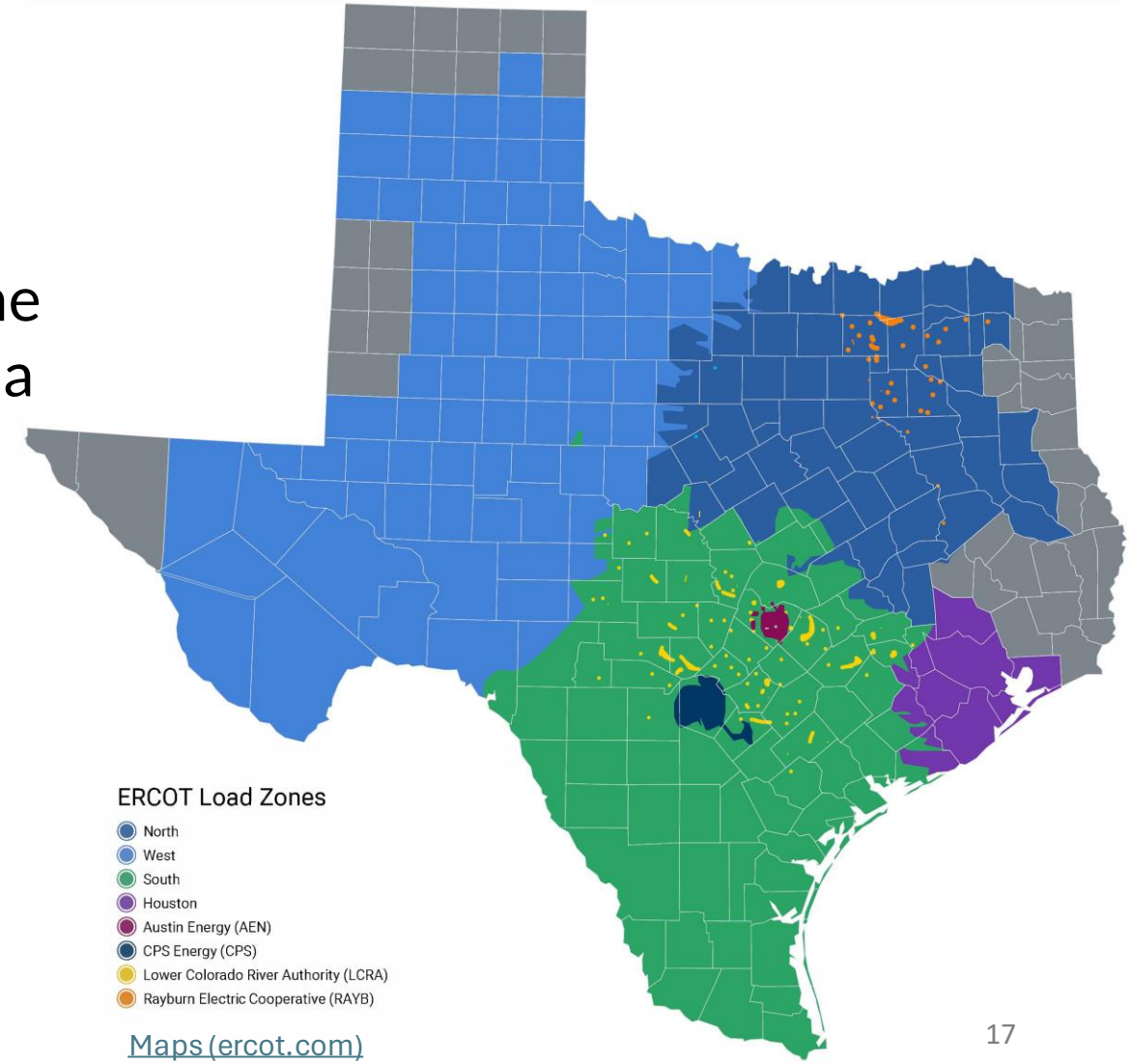
Joint Office of Energy and Transportation FY23 Ride and Drive Funding Opportunity

Planning Resilient EV Charging in Texas

Partnering with Oncor, DFW Airport, and the North Texas Innovation Alliance to develop a resilient EV charging plan for DFW area focused on power failure

30-month project

Awarded $1.5 million



Maps (ercot.com)

Federal Highway Administration EV Charger Reliability and Accessibility Accelerator Program

Repair or replace existing non-operational charging stations in or connecting travelers to the region

Awarded $3.6 million

Areas Affected by Project by County

Legend

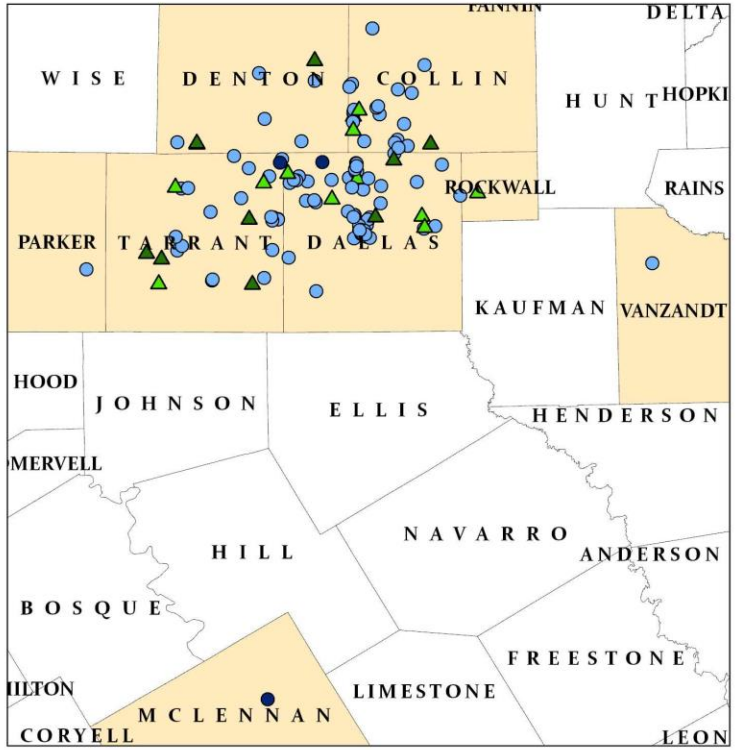
Unavailable Electric Vehicle Charging Station

Stations Anticipating Funding

- DC Fast Charge
- Level 2

Stations Not Anticipating Funding

- DC Fast Charge
- Level 2



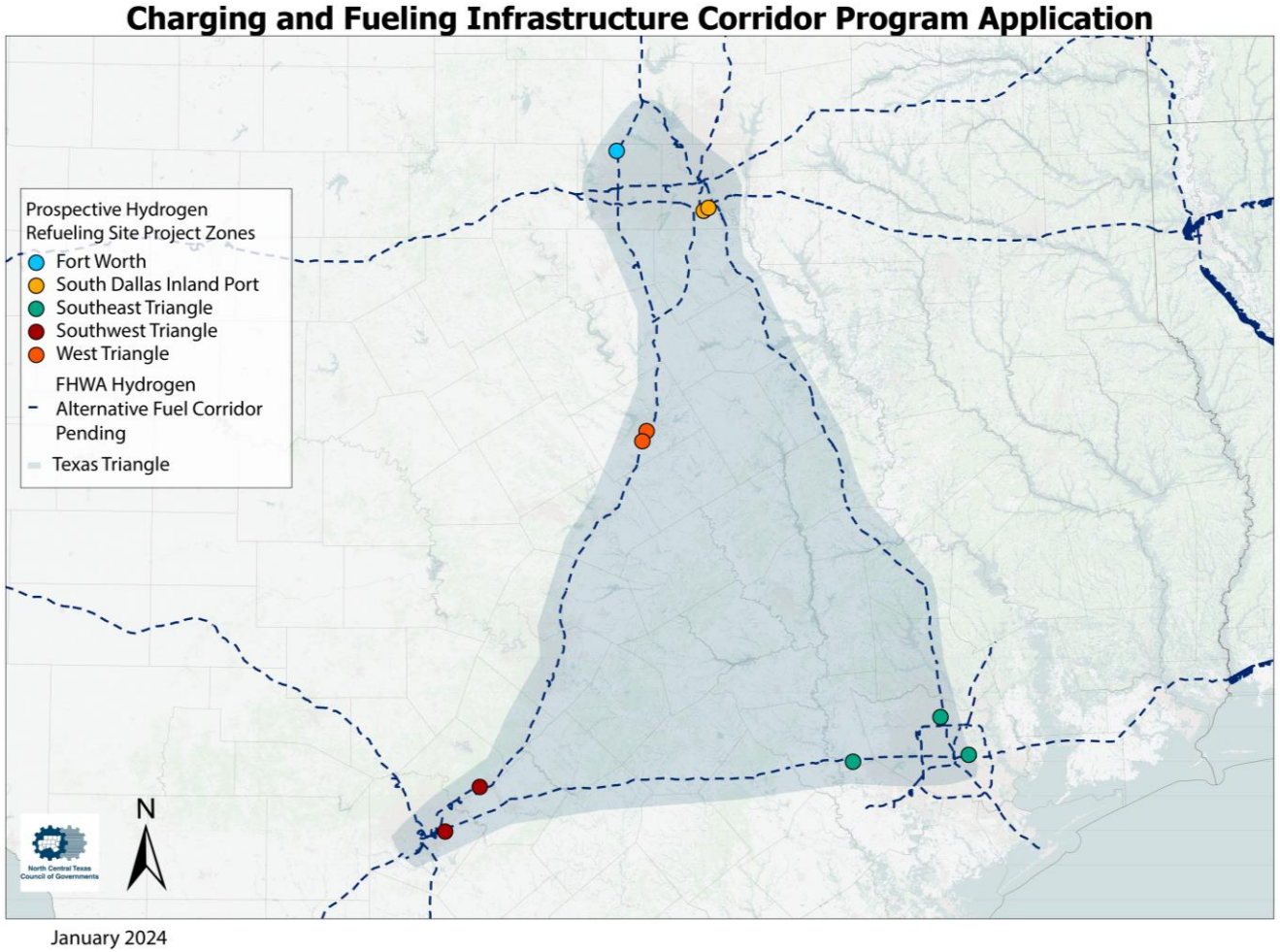
Charging & Fueling Infrastructure Corridor Program

Texas Hydrogen and Electric Freight Infrastructure Project (Tx-HEFTI)

Construct 5 publicly accessible medium/heavy-duty hydrogen refueling stations

- AllianceTexas Mobility Innovation Zone
- Southern Dallas County Inland Port
- West, Southwest, and Southeast Texas Triangle

Awarded $70 million



Charging & Fueling Infrastructure Community Program

North Texas Equitable Electric Vehicle Infrastructure Project (NTx-EEVI)

Build EV charging stations to provide up to 100 charging ports regionwide

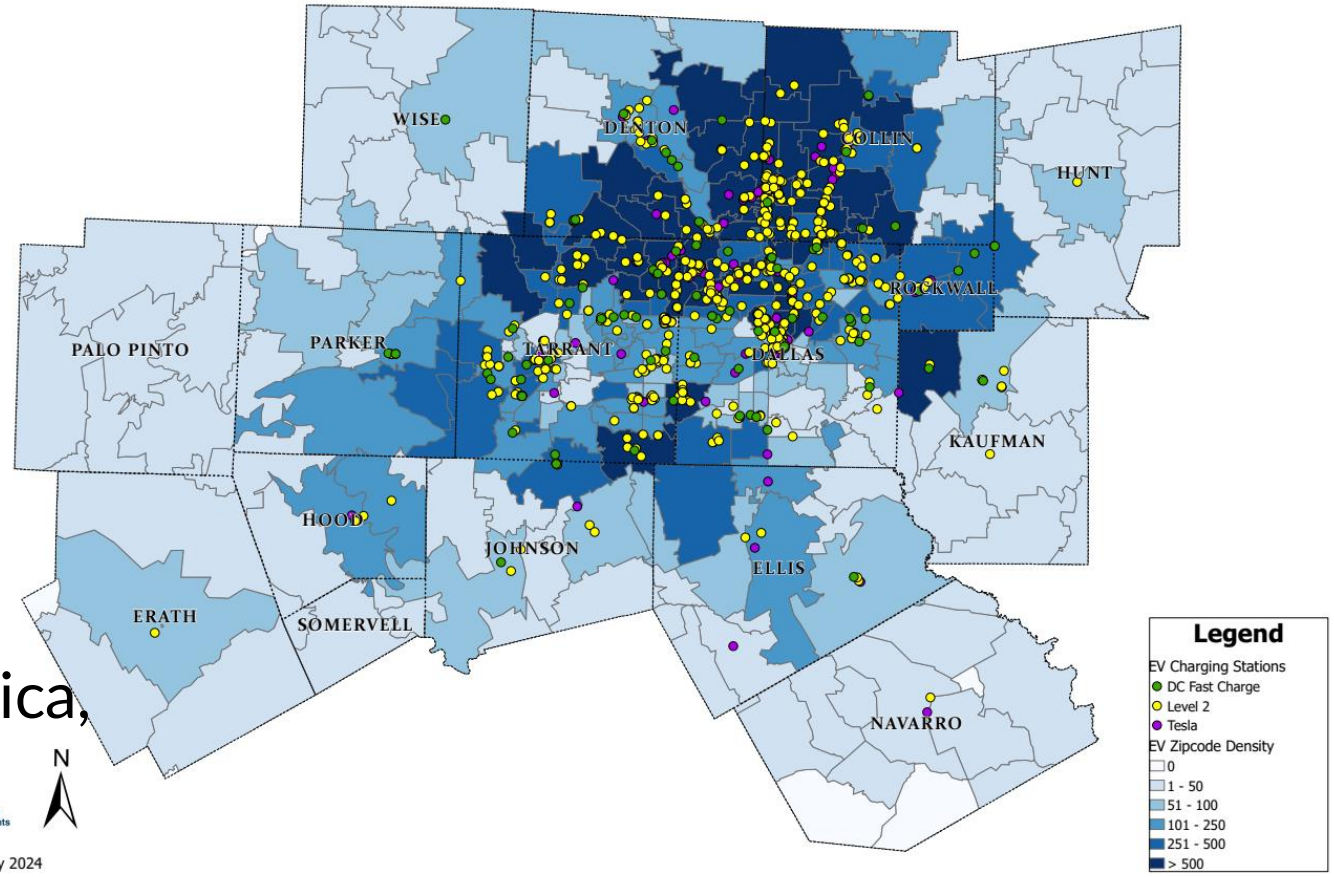
- At least 50% in Justice40 Areas
- Emphasizing Focus Areas

Create specialized technical teams to streamline implementation

- Zoning, permitting, codes, Buy America, NEPA, etc.

Awarded $15 million

Currently Available Electric Vehicle Chargers in the NCTCOG Region



Charging & Fueling Infrastructure Community Program Details

All chargers built on publicly owned property

Stations will comply with NEVI standards

Built to fill gaps from other public or private sector infrastructure investment

- Underserved communities
- Rural counties not in the ozone nonattainment area
- Prioritize projects that serve public community

Issue competitive request for proposals to select any goods or services

Establish charging station "Deployment Dream Teams" to lower soft costs and streamline implementation

Charging & Fueling Infrastructure Community Program Next Steps

Will need input from local governments to assist with:

- Public engagement to aid final site selection, especially in rural counties and identified potential project areas
- Developing gap analysis and site selection methodology
- Creation of Deployment Dream Teams

Funding for Infrastructure

Program/Incentive	Eligible Activities	Funding Amount	Deadline to Apply
Alternative Fuel Infrastructure Tax Credit	Installation of qualified fueling equipment, such as EV charging infrastructure in eligible locations	Up to 30% tax credit	December 31, 2032
TERP Alternative Fueling Facilities Program	Funds new construction or the expansion of existing alternative or natural gas fueling facilities	Up to $400,000 for a compressed natural gas CNG or LNG project Up to $600,000 for a combined CNG and LNG project Up to 50% or maximum of $600,000, whichever is less, for fuels other than natural gas	March 22, 2024
Rural Business Development Grants	EV charging stations can be funded through this grant if local small businesses can provide Letters of Support that state the charging stations will support job growth/retention	There is no maximum grant amount; however, smaller requests are given higher priority. There is no cost sharing requirement. Opportunity grants are limited to up to 10 percent of the total Rural Business Development Grant annual funding.	Closed; Expected to open Spring 2024
Charging and Fueling Infrastructure Discretionary Grant Program	Funds publicly accessible EV charging infrastructure and other alternative fueling infrastructure projects	Up to 80% of project costs	Closed; Expected to open 2024

Research more funding here: www.nctcog.org/aqfunding

2023 DFWCC Annual Survey

Annual Survey for local fleet managers to report alternative fuel usage and other efforts to reduce emissions

Adoptees of the NCTCOG Clean Fleet Policy who submit a survey are eligible for Fleet Recognition Awards

Survey form, instructions, and webinar available: dfwcleancities.org/annualreport

Working Group Check-In Survey

forms.office.com/r/vTAWhqqA1e

Contact Us

Next Working Group Meeting: **March 20 from 2:00 -3:30pm** via Zoom

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