



North Central Texas  
Council of Governments



Dallas-Fort Worth  
CLEAN CITIES



# **“EV-Ready” or Not!**

## **Electric Vehicles in Texas**

Kristina Ronneberg -- NCTCOG  
Sierra Club, Fort Worth Chapter  
March 22, 2017



# Presentation Contents

- NCTCOG: Who We Are
- Air Quality Basics: NAAQS and Ozone
- Benefits of EVs
- EV and EV Charging Basics
- North Texas Efforts and Resources

# The Basics: Who We Are

**North Central Texas Council of Governments (NCTCOG) is:**

## **Council of Governments**

- Regional Coordination



## **Metropolitan Planning Organization**

- Transportation Planning
- Air Quality

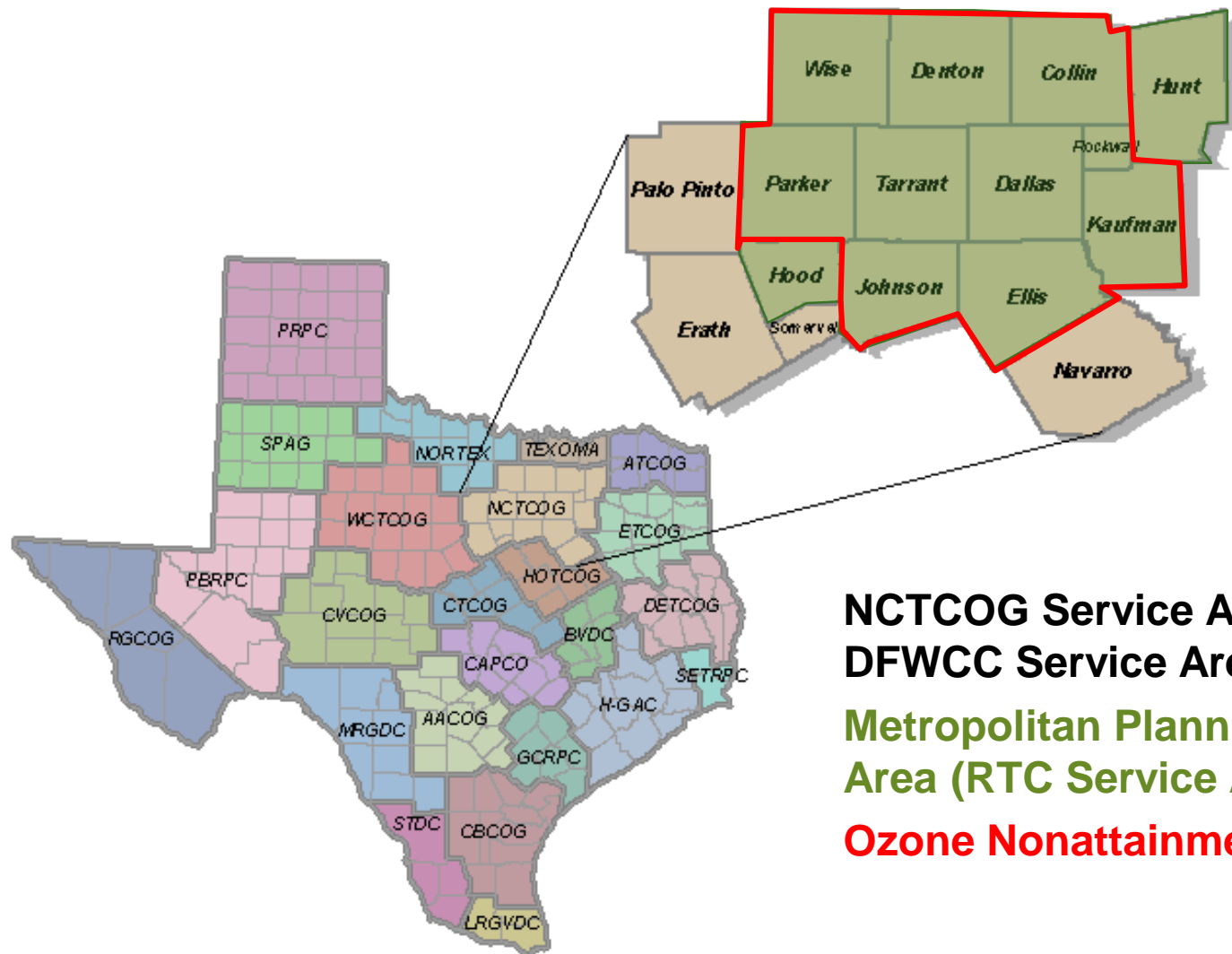


## **Dallas-Fort Worth Clean Cities Coalition (DFWCC)**

- Petroleum Reduction
- Alternative Fuels



# The Basics: Who We Are



# NAAQS and Ozone

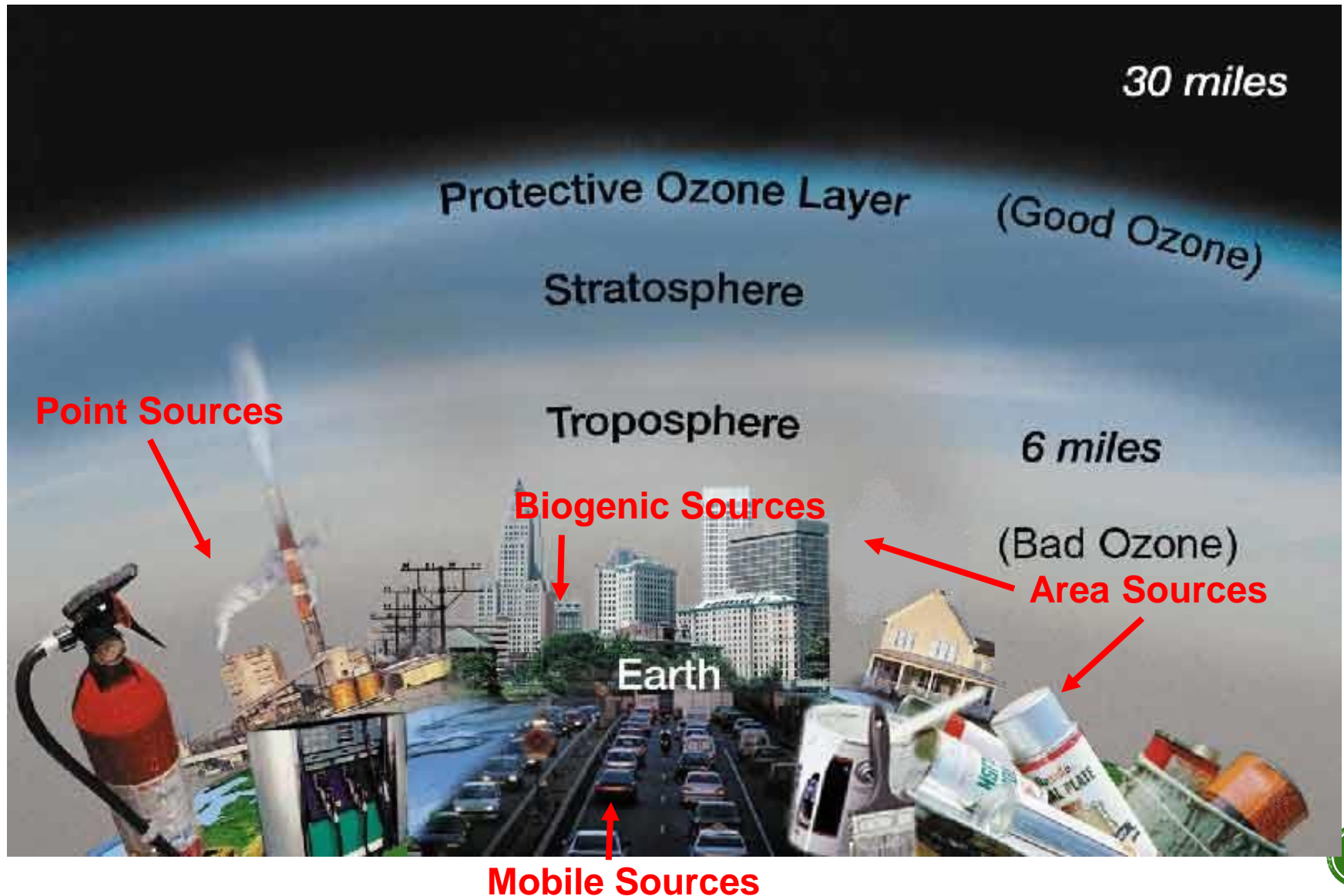
- National Ambient Air Quality Standards (NAAQS)
  - Established by the Environmental Protection Agency (EPA)
  - Address Six “Criteria” Pollutants:

Air Pollutant	Abbreviation	DFW Region Status
Carbon Monoxide	CO	In attainment
Lead	Pb	In attainment
Nitrogen Dioxide	NO <sub>2</sub>	In attainment
Ground-level Ozone	O <sub>3</sub>	<i>Nonattainment</i>
Particulate Matter	PM	In attainment
Sulfur Oxides	SO	In attainment

- Impacts of Nonattainment Status
  - Health
  - Economic



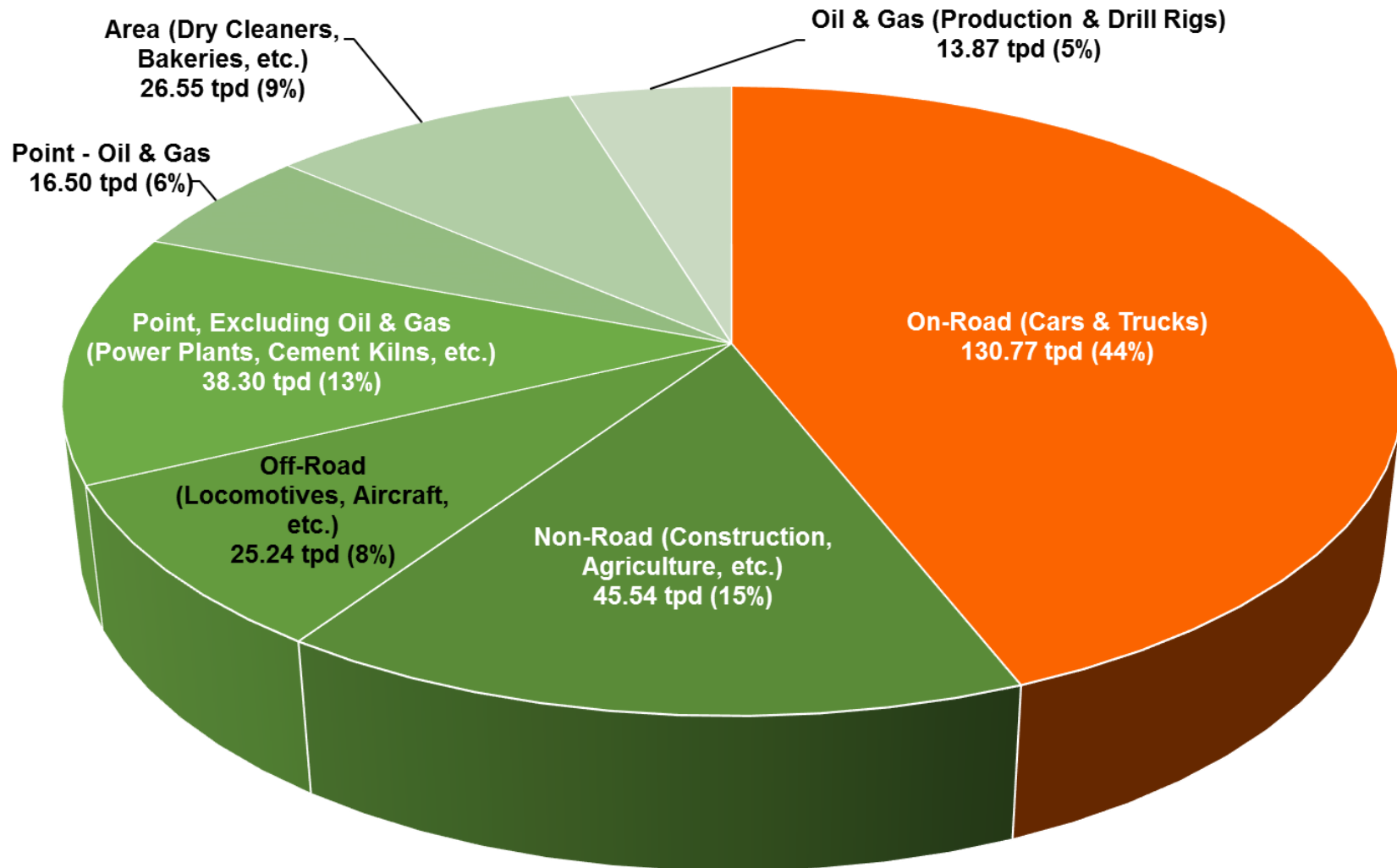
# Ground Level Ozone Formation



# DFW Nonattainment Area Inventory

## Estimated 2017 Nitrogen Oxides (NO<sub>x</sub>) Emissions Inventory

Source Category Estimates = 296.77 tons per day (tpd)

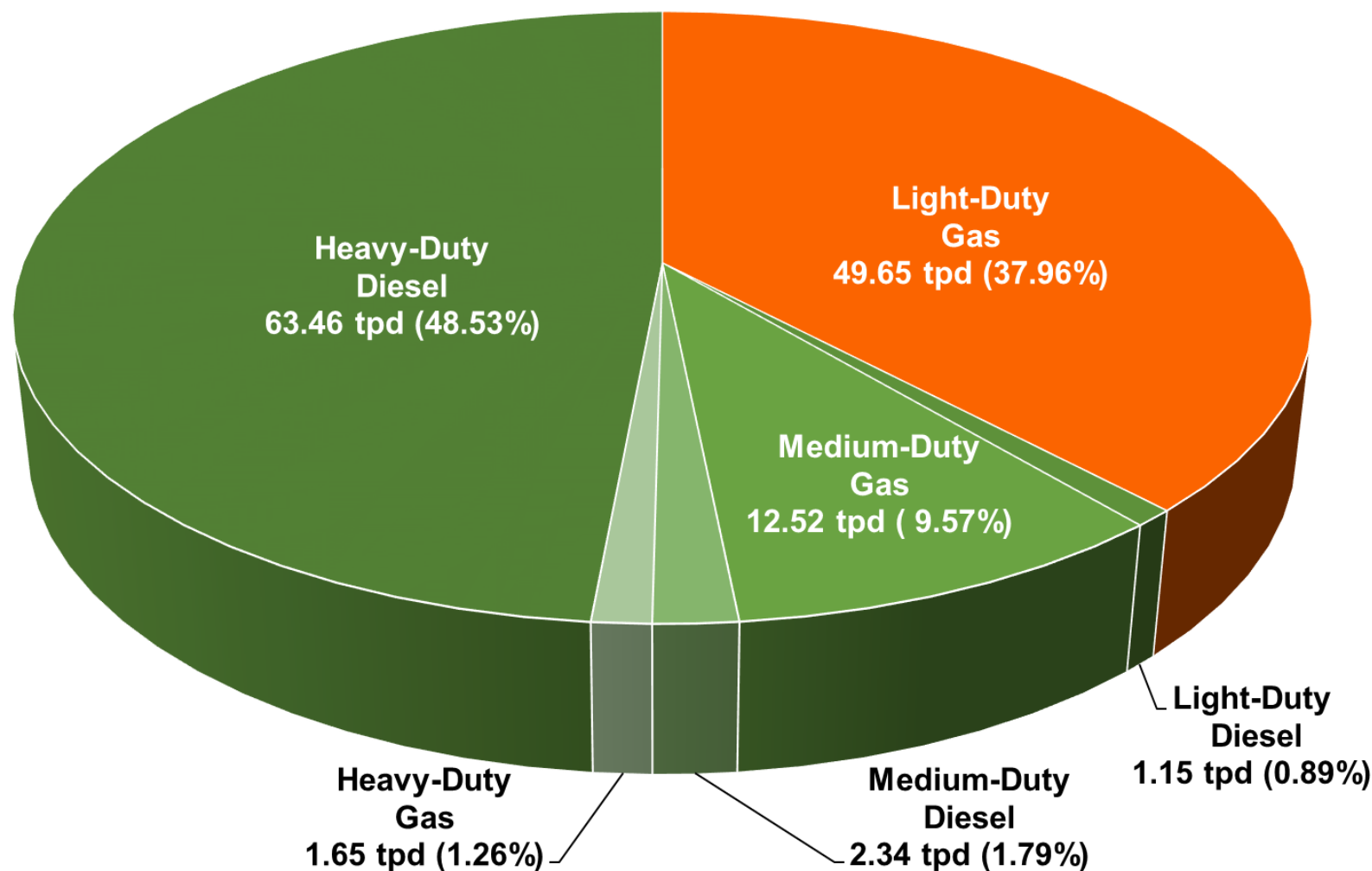




# DFW Nonattainment Area Inventory

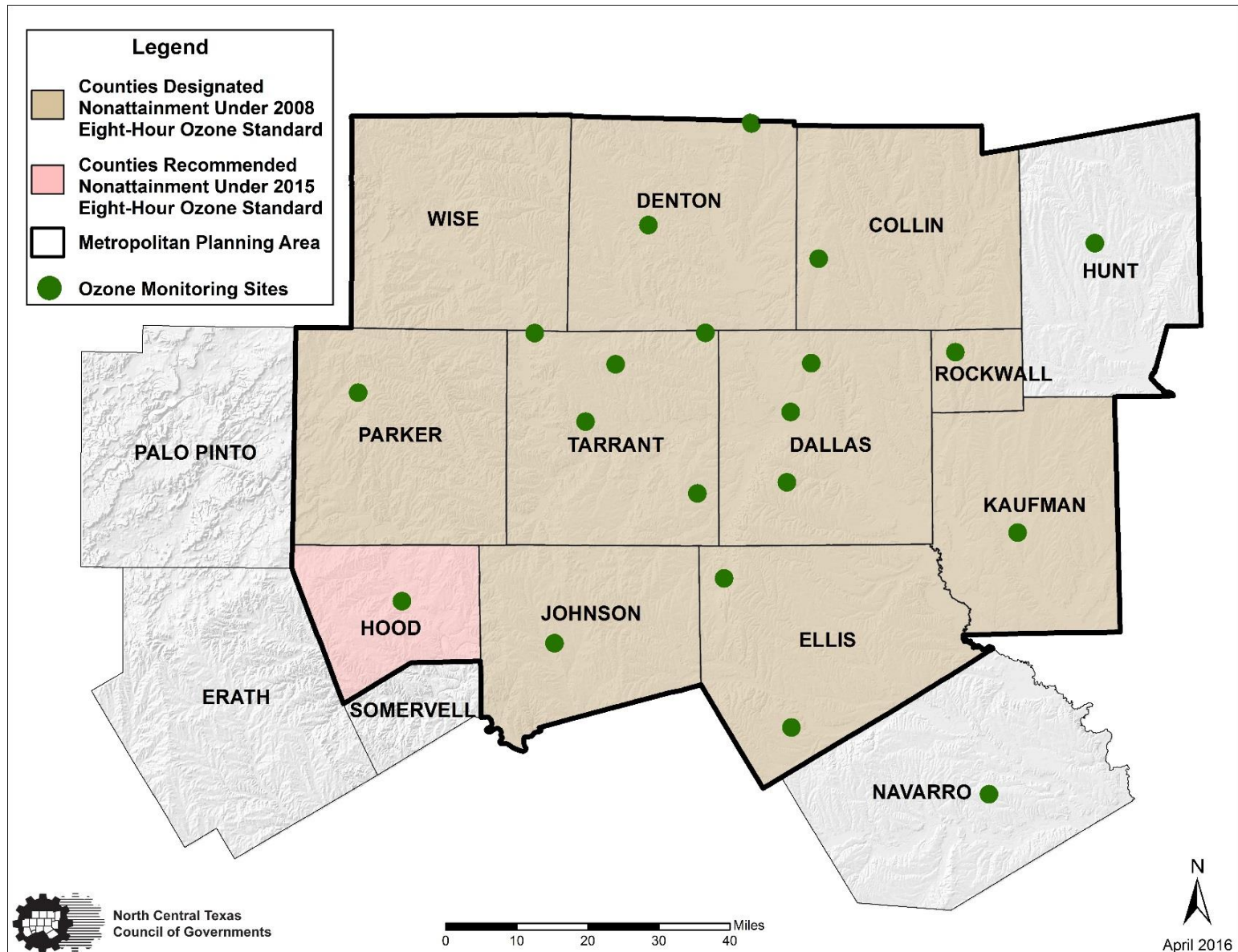
## Estimated 2017 Nitrogen Oxides (NO<sub>x</sub>) On-Road Emissions Inventory

Source Category Estimates = 130.77 tons per day (tpd)



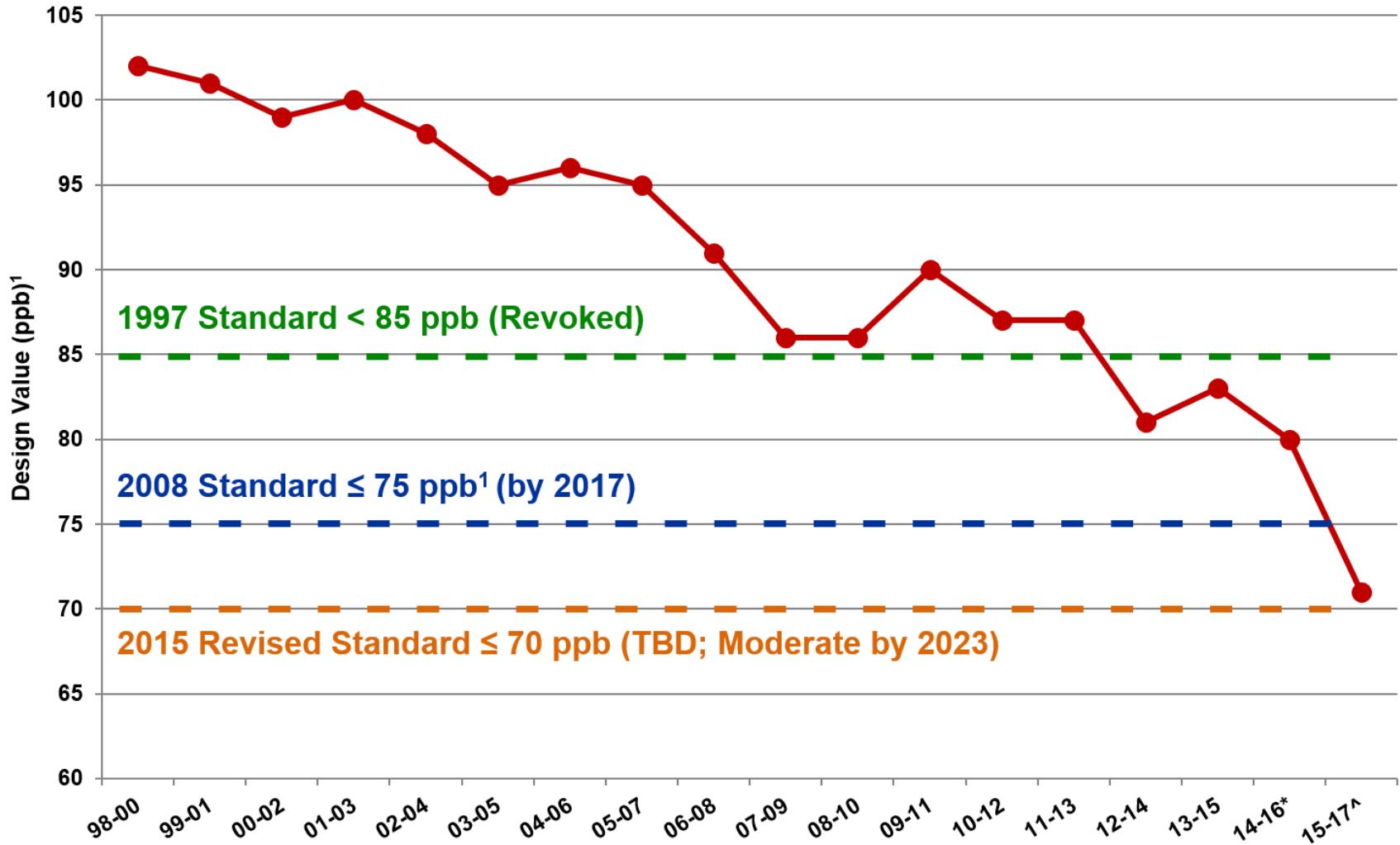


# North Texas Ozone Monitors



# 2017 Ozone Season

## Eight-Hour Ozone Historical Trends



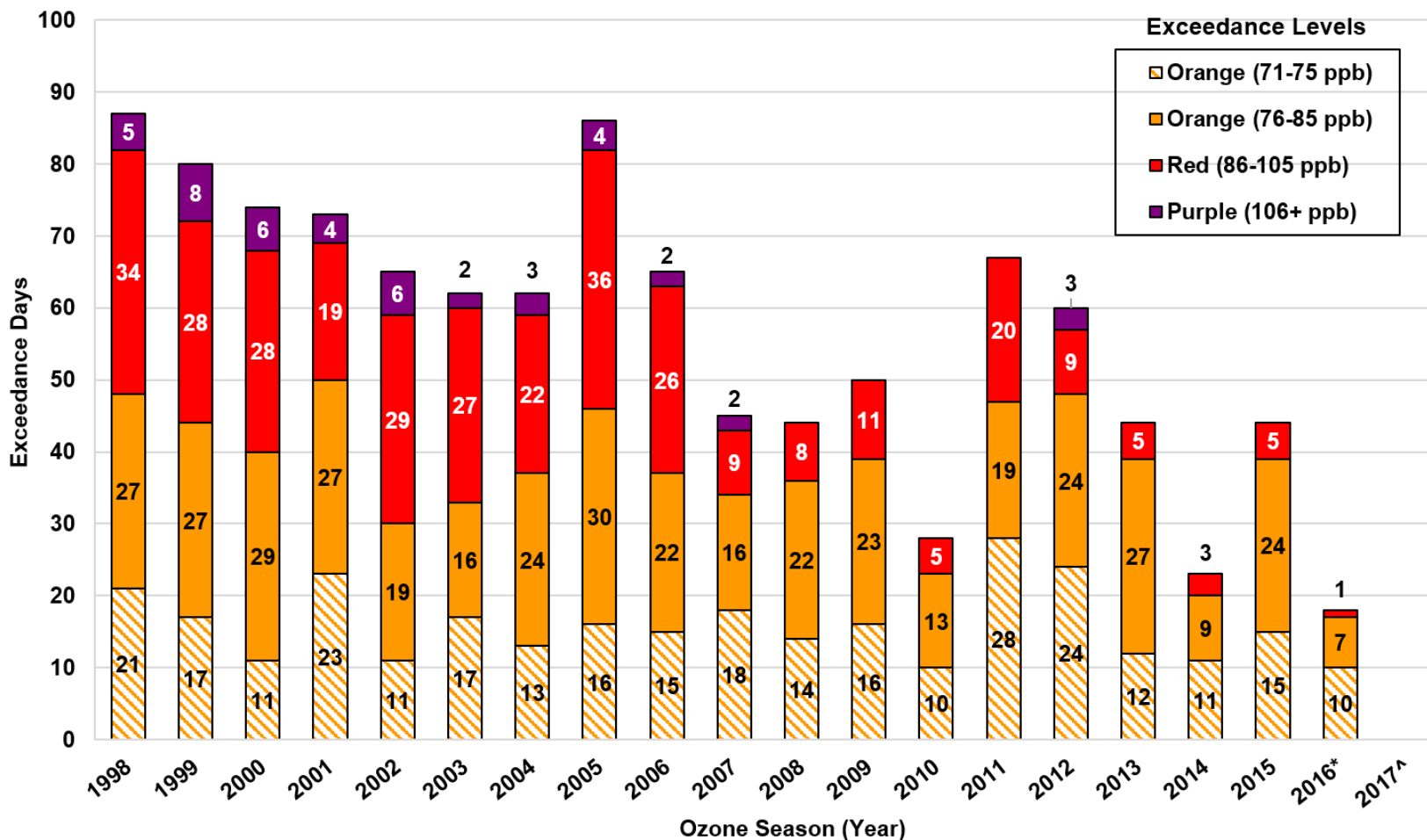
<sup>1</sup>Attainment Goal - According to the US EPA National Ambient Air Quality Standards, attainment is reached when, at each monitor, the *Design Value* (three-year average of the annual fourth-highest daily maximum eight-hour average ozone concentration) is equal to or less than 70 parts per billion (ppb).

\*2016 data not certified by the Texas Commission on Environmental Quality.


^Not a full year of data. Current as of 3/14/2017.

# 2016 Ozone Season Exceedance Days

## Eight-Hour Ozone Exceedance Days Based on <70 ppb



Exceedance Level indicates daily maximum eight-hour average ozone concentration. Exceedance Levels are based on Air Quality Index (AQI) thresholds established by the EPA for the revised ozone standard of 70 ppb.

 = Additional level orange exceedance days under the revised standard that were not exceedances under the previous 75 ppb standard. (AQI level orange = 71-75 ppb)

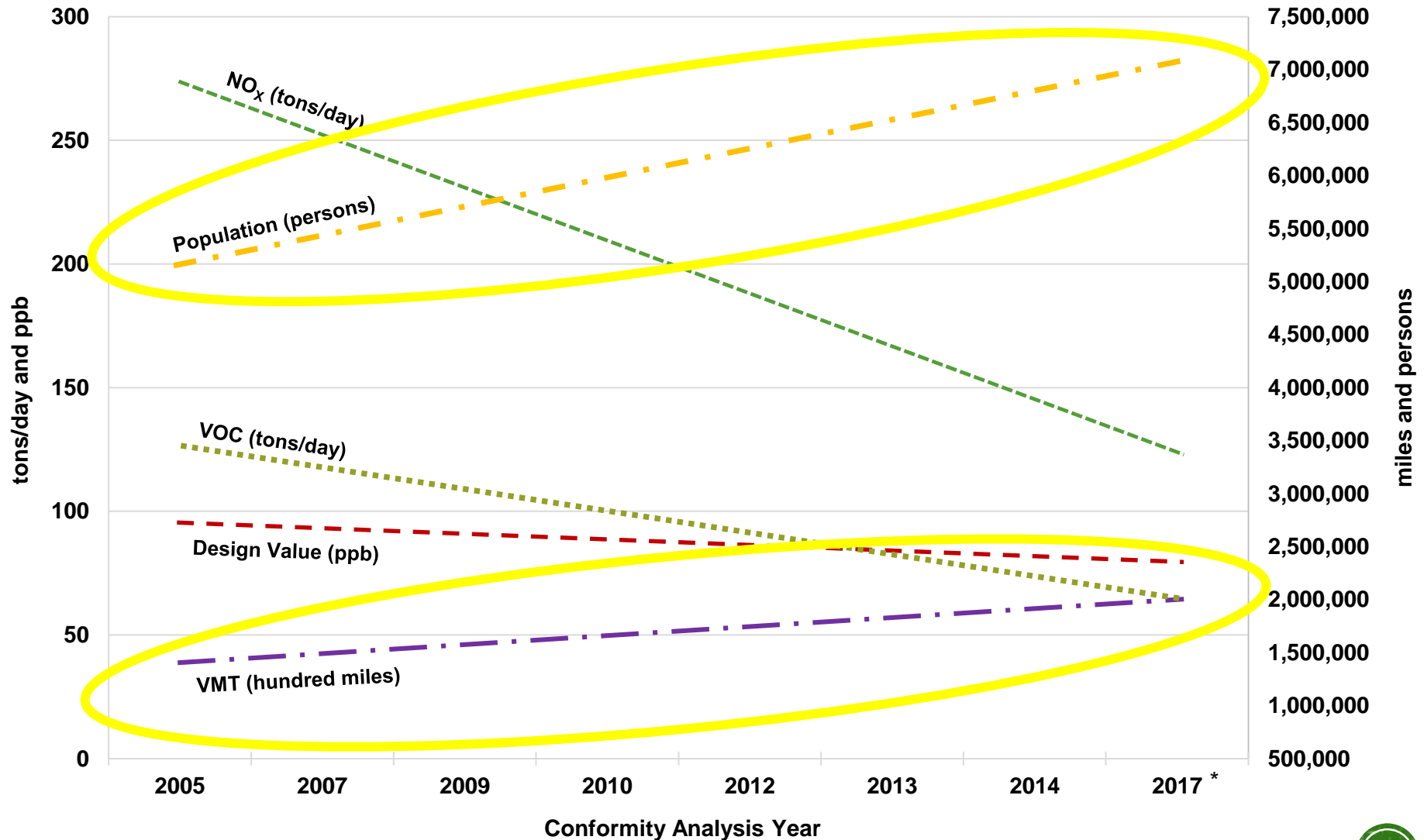
\*Data not certified by TCEQ.

^Not a full year of data. Current as of 3/1/2017.

Source: TCEQ, [http://www.tceq.state.tx.us/cgi-bin/compliance/monops/8hr\\_monthly.pl](http://www.tceq.state.tx.us/cgi-bin/compliance/monops/8hr_monthly.pl)  
ppb = parts per billion

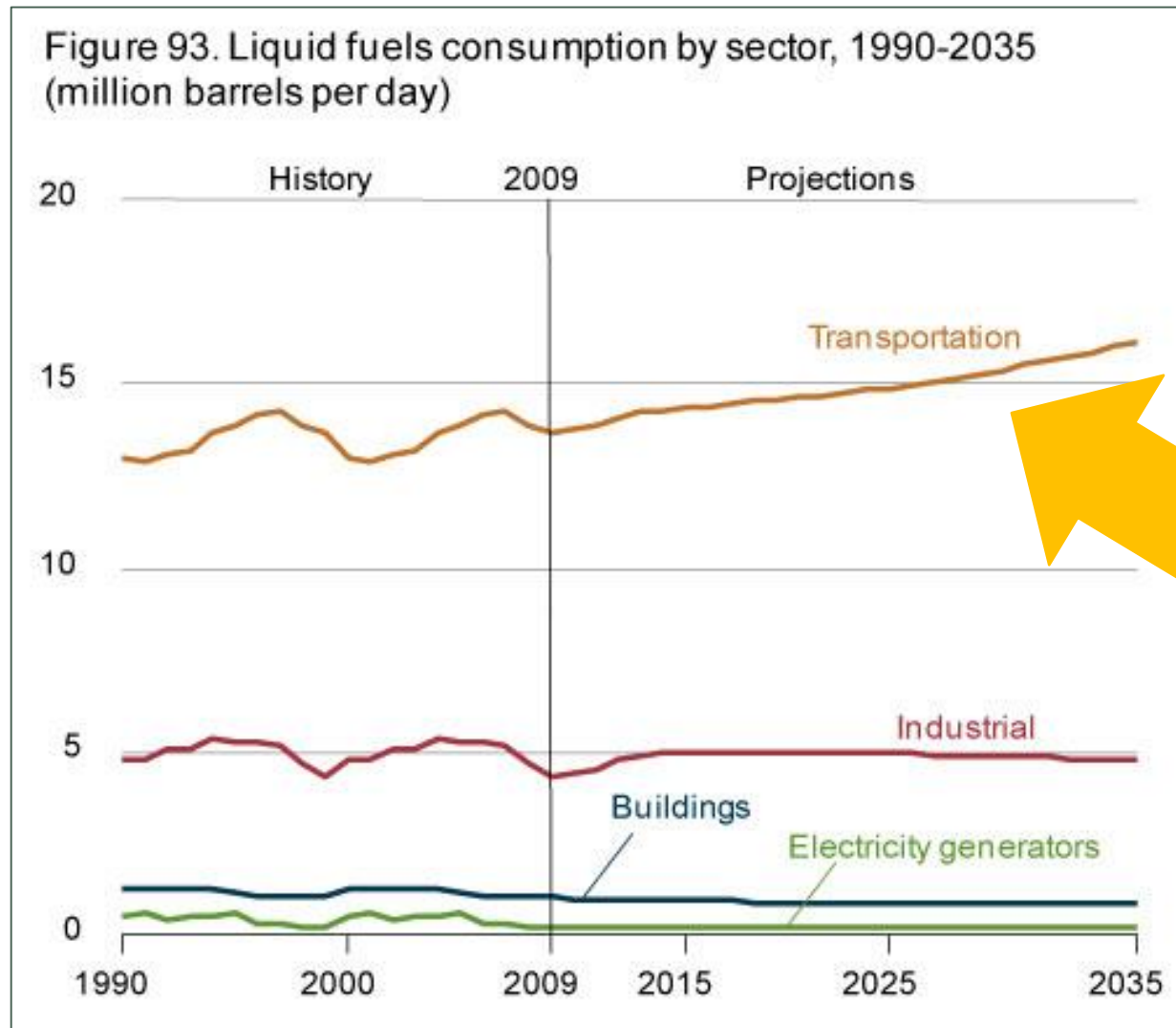
# End of Ozone Season

## Historical Design Value and Demographic Data



Design Value (DV) - three-year average of the annual fourth-highest daily maximum eight-hour average ozone concentration is less than or equal to 70 parts per billion (ppb).  
 \*2017 DV based on 2016 data, current as of 10/26/2016

# US Petroleum Use by Sector

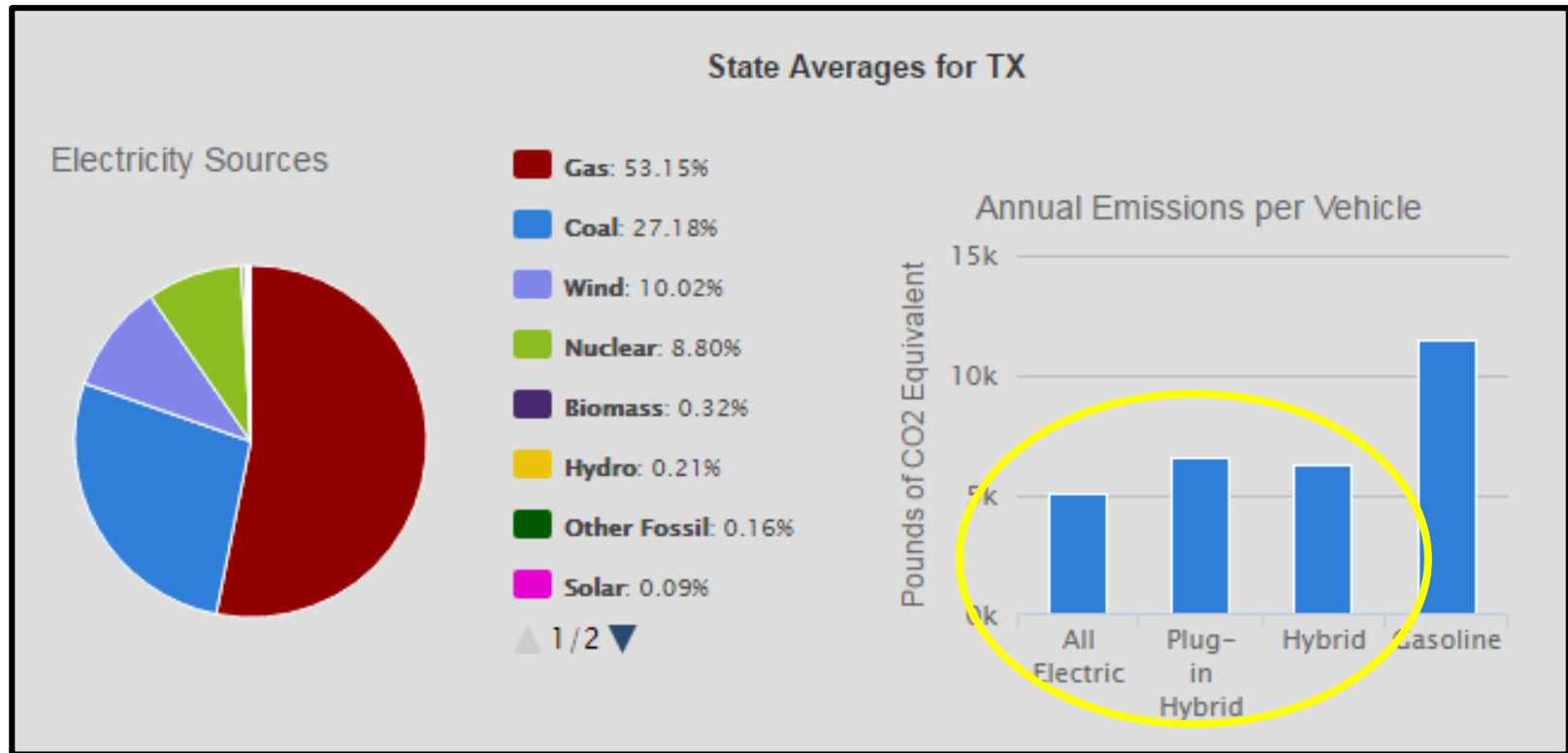


# Benefits of EVs

- Reduced Emissions
  - Zero Tailpipe Emissions & Lower Well-to-Wheels Emissions
- Energy Security
- Noise-free Driving Experience
- Local Economic Support
- Lower Fuel and Maintenance Costs
- Convenience of Charging at Home
- Smart Features

# Benefits of EVs

- Well-to-Wheels Emissions Comparison



- Tailpipe Emissions

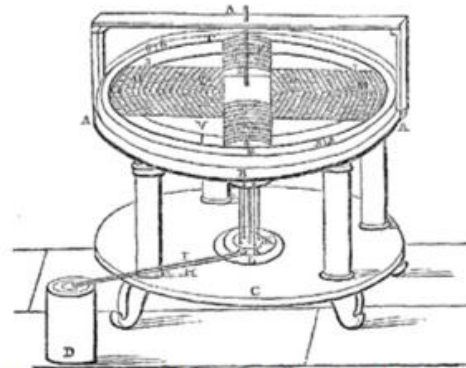


# Benefits of EVs, Costs

	Mileage	Internal Combustion Engine		Electric Vehicle	
		\$	Trips	\$	Trips
Tires	Every 7,500 miles	\$400	13	\$400	13
Oil Change	Every 5,000 miles	\$400-\$800	20	\$0	0
Automatic Transmission Fluid	At 100,000 miles	\$30-\$100	1	\$0	0
Fuel <sub>7</sub>	varies	\$7,142	400	\$3,500	166
Park Plugs & Wires	within first 100,000 miles	\$200	1	\$0	0
Muffler	within first 100,000 miles	\$100-\$250	1	\$0	0
Brakes <sub>8</sub>	2x within first 100,000 miles	\$400	2	\$200	1
Big 100,000	100,000 miles				
	Timing Belt	\$600-\$800	1	\$0	0
	Water Pump	\$300 (if combined with timing belt service)	1	\$0	0

# Basics of EVs, History

- EVs Were First Invented in the 1830s
- First Road-Ready EV – 1890
- First Electric Taxi Cabs – New York City, 1897

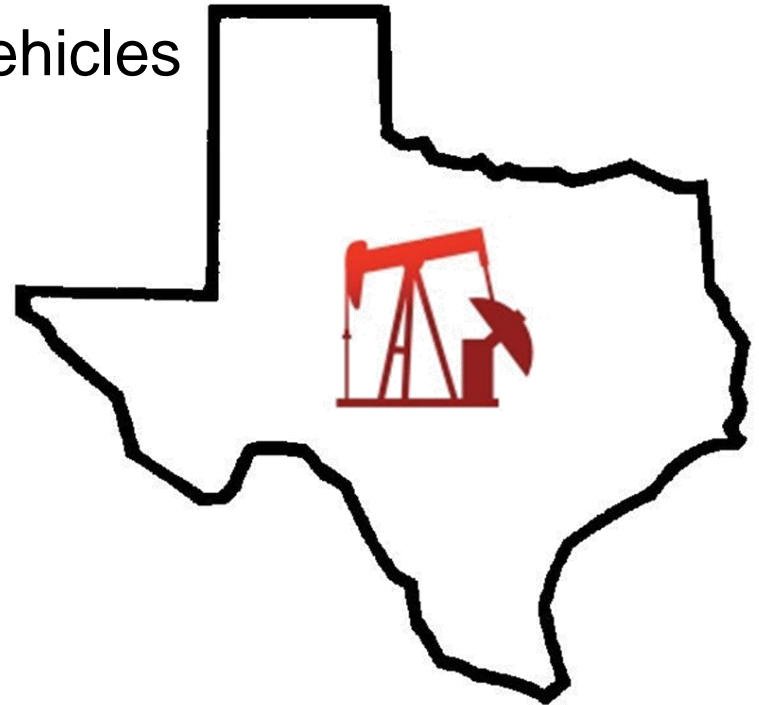


Davenport's patented motor, February 1837



# Basics of EVs, History

- Downfall of the Early EV
  - 1908 – Model T
  - Desire for Longer-Distance Vehicles
  - Lack of Horsepower
  - Discovery of Texas Crude Oil
  - Electric Starter



# Basics of EVs, The Vehicles



Hybrid  
Electric  
Vehicle (HEV)



Plug-In  
Hybrid  
Electric  
Vehicle  
(PHEV)



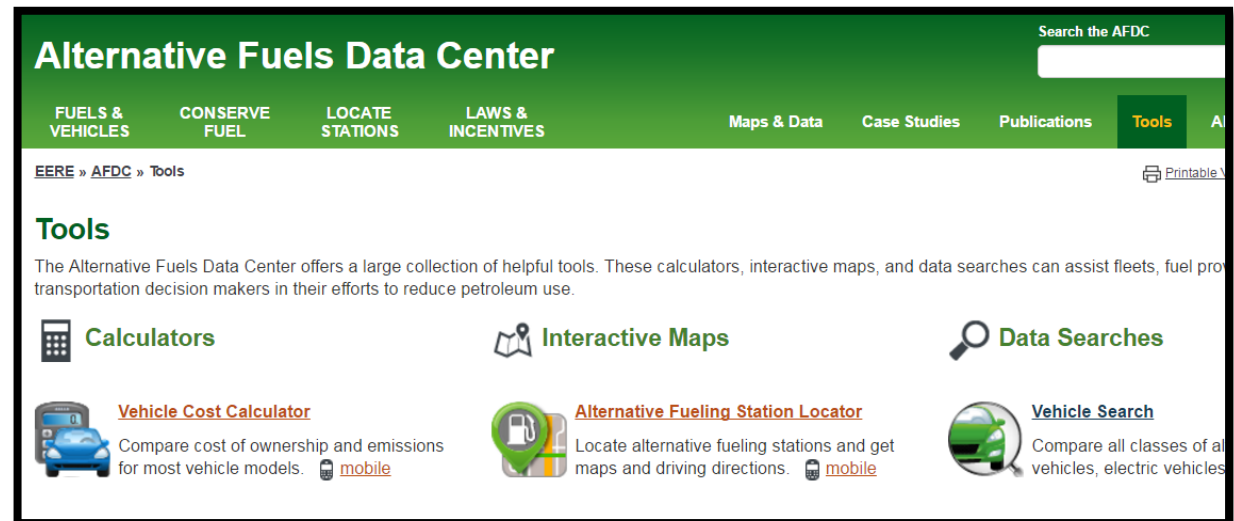
All-Electric  
Vehicle (EV)  
or Plug-In  
Electric  
Vehicle (PEV)

# Basics of EVs, The Vehicles

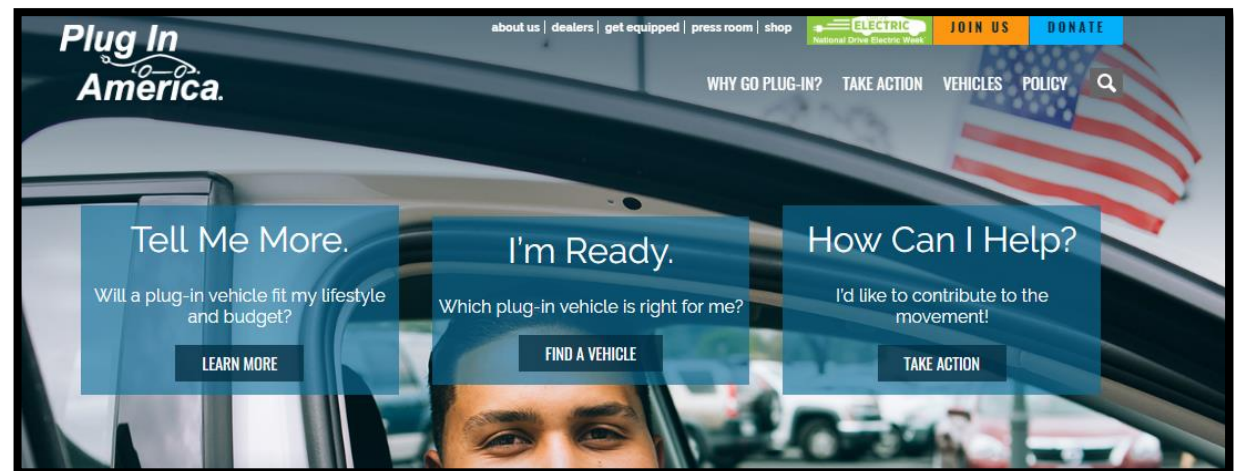


# Resources

- **Alternative Fuels Data Center (US DOE)** <http://www.afdc.energy.gov/>



- **Plug In America** <https://pluginamerica.org/>





# Resources

## Alternative Fuels Data Center

[FUELS & VEHICLES](#)[CONSERVE FUEL](#)[LOCATE STATIONS](#)[LAWS & INCENTIVES](#)[Maps & Data](#)[Case Studies](#)[Publications](#)[Tools](#)[About](#)[Home](#)

Search the AFDC

[EERE](#) » [AFDC](#) » [Tools](#) » Vehicle Search

[Printable Version](#)

[Share](#)



## Alternative Fuel and Advanced Vehicle Search

Find and compare alternative fuel vehicles (AFVs), engines, and hybrid systems. Some of the light-duty AFVs in this tool may count toward vehicle-acquisition requirements for [federal fleets](#) and [state and alternative fuel provider fleets](#) regulated by the Energy Policy Act (EPAAct).

### Vehicles by Type



[Sedan/Wagon](#)



[Truck](#)



[SUV](#)



[Van](#)



[Step Van](#)



[Vocational/Cab Chassis](#)



[Street Sweeper](#)



[Refuse](#)



[Tractor](#)



[Shuttle Bus](#)



[Transit Bus](#)



[School Bus](#)

### Vehicles by Manufacturer

#### Light-Duty

All

#### Medium- and Heavy-Duty

All

### Engines and Hybrid Systems

For medium- and heavy-duty vehicles:

ENGINE & POWER  
SOURCES

HYBRID PROPULSION  
SYSTEMS

[ABOUT THE DATA](#)



# Resources



## Alternative Fuel and Advanced Vehicle Search

Find and compare alternative fuel vehicles (AFVs), engines, and hybrid systems. Some of the light-duty AFVs in this tool may count toward vehicle-acquisition requirements for [federal fleets](#) and [state and alternative fuel provider fleets](#) regulated by the Energy Policy Act (EPAct).

Search Results



78



New Search | Download | Print

Filter by: **Fuel/Technology:** Electric, Plug-in Hybrid Electric, Hybrid Electric | **Class/Type:** Sedan/Wagon |

**Manufacturer:** All

View:  

Refine Your Search

Vehicle	Fuel Type	Fuel Economy	Compare (up to 5)
+ Acura RLX Hybrid 2016	Hybrid Electric	28 mpg city / 32 mpg hwy	<input type="checkbox"/>
+ Acura RLX Hybrid 2017	Hybrid Electric	<i>no data</i>	<input type="checkbox"/>
+ Audi A3 e-tron 2017	Plug-in Hybrid Electric	<i>no data</i>	<input type="checkbox"/>
+ Audi A3 Sportback e-tron 2016	Plug-in Hybrid Electric	<i>no data</i>	<input type="checkbox"/>
+ BMW 330e 2017	Plug-in Hybrid Electric	<i>no data</i>	<input type="checkbox"/>
+ BMW 740e xDrive 2017	Plug-in Hybrid Electric	64 Mpge city	<input type="checkbox"/>
+ BMW ActiveHybrid 5 2016	Hybrid Electric	23 mpg city / 30 mpg hwy	<input type="checkbox"/>
+ BMW i3 2016	Electric	137 Mpge city / 111 Mpge hwy	<input type="checkbox"/>
+ BMW i3 BEV 2017	Electric	129 Mpge city / 106 Mpge hwy	<input type="checkbox"/>
+ BMW i3 BEV 2017	Electric	137 Mpge city / 111 Mpge hwy	<input type="checkbox"/>
+ BMW i3 REX 2016	Plug-in Hybrid Electric	117 Mpge Electric city	<input type="checkbox"/>
+ BMW i3 REX 2017	Plug-in Hybrid Electric	<i>no data</i>	<input type="checkbox"/>
+ BMW i8 Plug-in Hybrid 2016	Plug-in Hybrid Electric	76 Mpge Combined Gas + Electric city	<input type="checkbox"/>
+ Cadillac ELR 2016	Plug-in Hybrid Electric	85 Mpge Electric city	<input type="checkbox"/>

### Fuel/Technology

- ☐ All Fuels
- ☐ Biodiesel (B20)
- ☐ Ethanol (E85)
- ☐ Hydrogen Fuel Cell
- ☐ LNG - Liquefied Natural Gas
- ☐ CNG - Compressed Natural Gas
- ☐ Propane
- ☒ Electric
- ☒ Plug-in Hybrid Electric
- ☒ Hybrid Electric
- ☐ Hybrid - Hydraulic
- ☐ Hybrid - CNG
- ☐ Hybrid - Diesel

### Class/Type

- ☐ All Classes/Types
- ☒ Sedan/Wagon
- ☐ Truck
- ☐ SUV
- ☐ Van
- ☐ Step Van
- ☐ Vocational/Cab Chassis
- ☐ Street Sweeper
- ☐ Refuse

# Resources



## Alternative Fuel and Advanced Vehicle Search

Find and compare alternative fuel vehicles (AFVs), engines, and hybrid systems. Some of the light-duty AFVs in this tool may count toward vehicle-acquisition requirements for [federal fleets](#) and [state and alternative fuel provider fleets](#) regulated by the Energy Policy Act (EPAct).


Search Results - 1 - 25 of 78 vehicles






[New Search](#) | [Download](#) | [Print](#)

Filter by: **Fuel/Technology:** Electric, Plug-in Hybrid Electric, Hybrid Electric | **Class/Type:** Sedan/Wagon |

**Manufacturer:** All

View:  

Vehicle	Fuel Type	Fuel Economy	Compare (up to 5)
— Acura RLX Hybrid 2016	Hybrid Electric	28 mpg city / 32 mpg hwy	<input type="checkbox"/>
<b>Acura RLX Hybrid 2016</b>  <div>Hybrid Electric Sedan/Wagon</div> <div> <b>Fuel Economy:</b> 28 mpg city / 32 mpg hwy  <b>Emission Certification:</b> LEV III SULEV30, Tier 2 Bin 3  <b>Engine:</b> 3.5L V6  <b>Transmission:</b> Auto                 </div> <a href="#">Find a Dealer</a>			
— Acura RLX Hybrid 2017	Hybrid Electric	<i>no data</i>	<input type="checkbox"/>
<b>Acura RLX Hybrid 2017</b>  <div>Hybrid Electric Sedan/Wagon</div> <div> <b>Fuel Economy:</b> <i>no data</i>  <b>Emission Certification:</b> Tier 3 Bin 30, LEV-III SULEV30  <b>Engine:</b> 3.5L V6  <b>Transmission:</b> Auto                 </div> <a href="#">Find a Dealer</a>			
— Audi A3 e-tron 2017	Plug-in Hybrid Electric	<i>no data</i>	<input type="checkbox"/>
<b>Audi A3 e-tron 2017</b>  <div>Plug-in Hybrid Electric Sedan/Wagon</div> <div> <b>Fuel Economy:</b> <i>no data</i>  <b>Emission Certification:</b> Tier 3 Bin 30, LEV-III SULEV30/PZEV  <b>Engine:</b> 1.4L I4 80 kW electric motor  <b>Transmission:</b> Auto                 </div> <a href="#">Find a Dealer</a>			
— Audi A3 Sportback e-tron 2016	Plug-in Hybrid Electric	<i>no data</i>	<input type="checkbox"/>

Refine Your Search

### Fuel/Technology

- ☐ All Fuels
- ☐ Biodiesel (B20)
- ☐ Ethanol (E85)
- ☐ Hydrogen Fuel Cell
- ☐ LNG - Liquefied Natural Gas
- ☐ CNG - Compressed Natural Gas
- ☐ Propane
- ☒ Electric
- ☒ Plug-in Hybrid Electric
- ☒ Hybrid Electric
- ☐ Hybrid - Hydraulic
- ☐ Hybrid - CNG
- ☐ Hybrid - Diesel

### Class/Type

- ☐ All Classes/Types
- ☒ Sedan/Wagon
- ☐ Truck
- ☐ SUV
- ☐ Van
- ☐ Step Van
- ☐ Vocational/Cab Chassis
- ☐ Street Sweeper
- ☐ Refuse
- ☐ Tractor
- ☐ Shuttle Bus
- ☐ Transit Bus

# Resources, Calculators



## Vehicle Cost Calculator

This tool uses basic information about your driving habits to calculate total cost of ownership and emissions for makes and models of most vehicles, including alternative fuel and advanced technology vehicles. Also see the cost [calculator widgets](#).

ASSUMPTIONS

### Choose vehicles to compare

Select up to eight vehicles to compare from the makes and models below or [create your own custom vehicle](#).

2017 ▼

Make ▼

Model ▼

ADD >>

[Create Custom Vehicle](#)

### Tell us how you use your car

Because vehicle efficiencies vary depending on how you use your car, this information allows the tool to more accurately calculate fuel usage.

#### Normal Daily Use

Average daily driving distance  miles

Days per week

Weeks per year  ▼

Percent highway

#### Other Trips

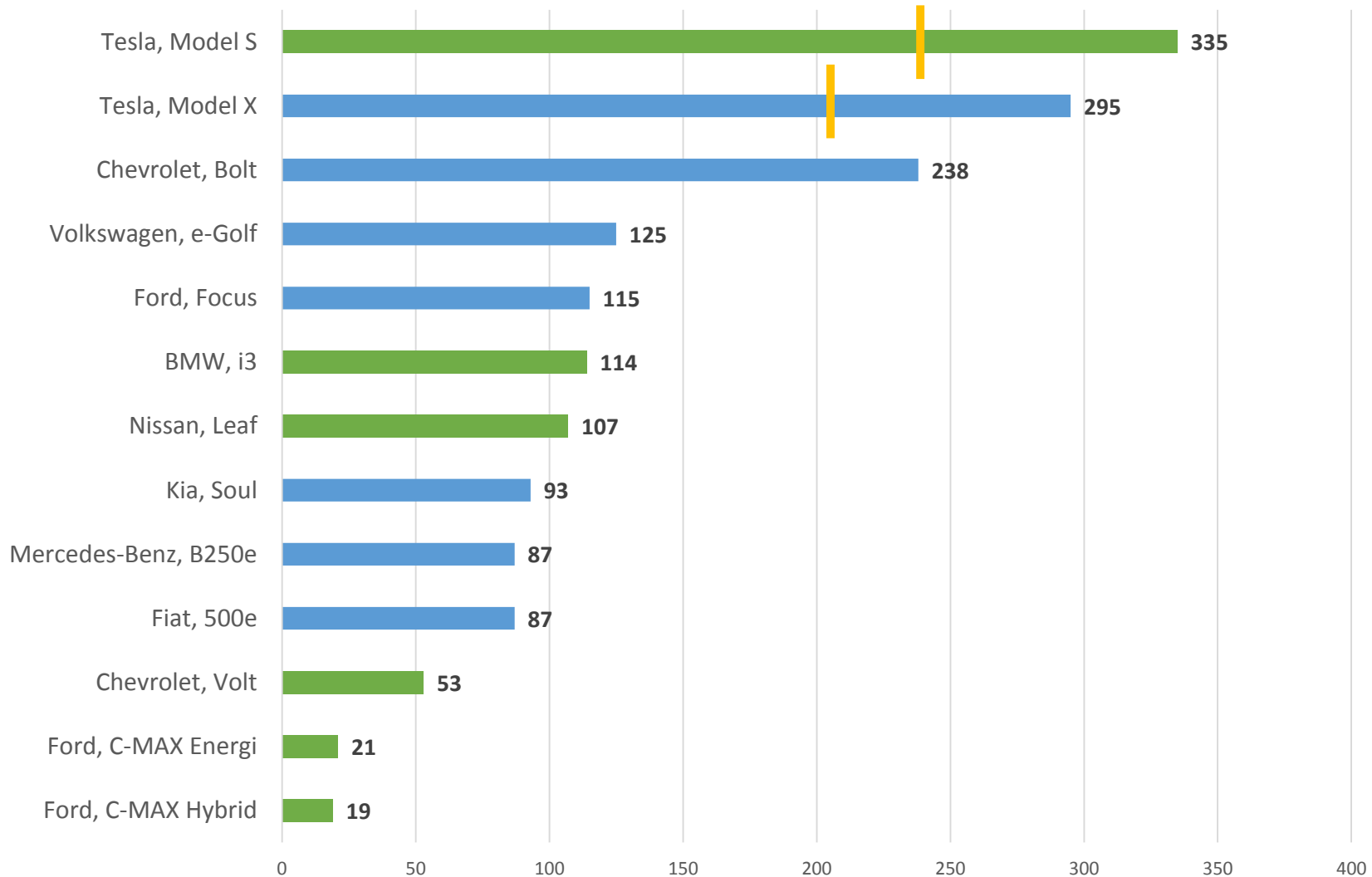
Annual mileage  miles

Percent highway

Annual Driving Distance **11926 miles**  
City Distance **5301 miles**  
Highway Distance **6625 miles**

# Basics of EVs, Range

Electric Range per Model (all 2017)



Data Source: Plug In America

Indicates range minimum

Indicates models common to the DFW area

# Basics, EVSE

- Electric Vehicle Supply Equipment (EVSE)



Type	Specifications	Time Needed to Charge 10 Miles
Level 1	AC 110–120 V 12 or 16 amps 1.44, 1.92 KW	1h 40 min
Level 2	AC 208–240 V 16 - 80 amps 3.3 - 19.2 KW	~ 30 min
Fast Charging	DC 200–450 V ≤ 200 amps ≤ 90 KW	< 5 min

# Alternative Fuels Data Center Tools: Station Locator & Route Planner

## Alternative Fueling Station Locator

Find alternative fueling stations near an address or ZIP code or along a route in the United States. Enter a state to see a station count or see [stations data by state](#).

Find Stations

Plan a Route

Electric

▼

[more search options](#)

303 Electric stations along the route

Excluding private stations

[Download spreadsheet of matching stations](#)

Location details are subject to change. We

Embed

Submit New Station

+

<http://www.afdc.energy.gov/>



# Regional EV Efforts and Resources

## Dallas-Fort Worth Clean Cities

*Clean Transportation, Made Easy*



**Dallas-Fort Worth**  
**CLEAN CITIES**

### Subcommittees

- Natural Gas Working Group
- Biofuels Subcommittee
- Propane Subcommittee
- Electric Vehicles North Texas



# Regional EV Efforts and Resources



**Website:** <https://www.dfwcleancities.org/evnt>

**Contact:** Kristina Ronneberg, [kronneberg@nctcog.org](mailto:kronneberg@nctcog.org)


# National Drive Electric Week (NDEW)

## NATIONAL DRIVE ELECTRIC WEEK

*Save the Date!*

 September 9th, 2017

 Grapevine Mills Mall

 Activities, giveaways, ride  
& drives, and more!

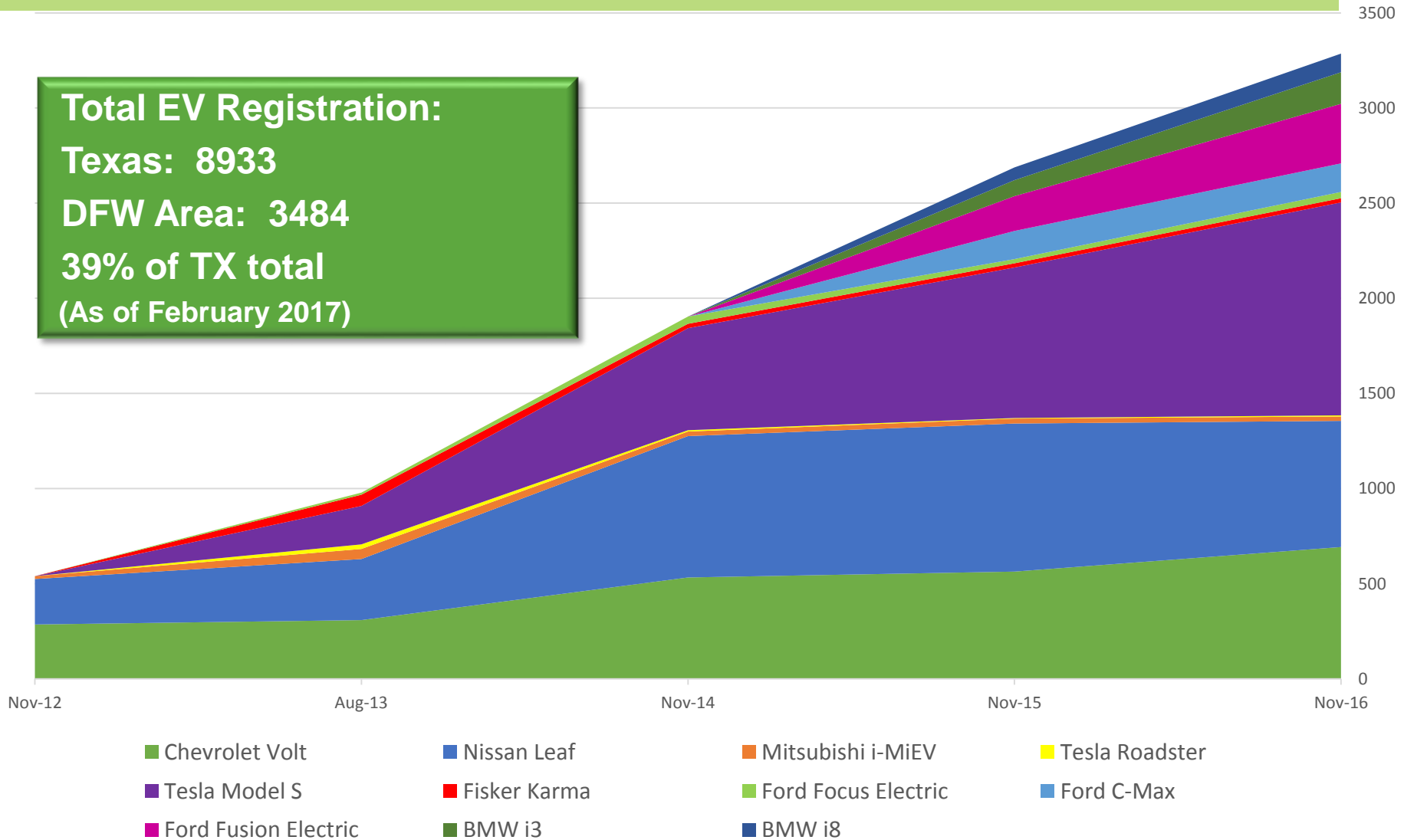
Be part of the TX  
record for the most  
EVs in one place.

Calling all EV owners:  
come show off your  
electric vehicle!  
*#texasEV*



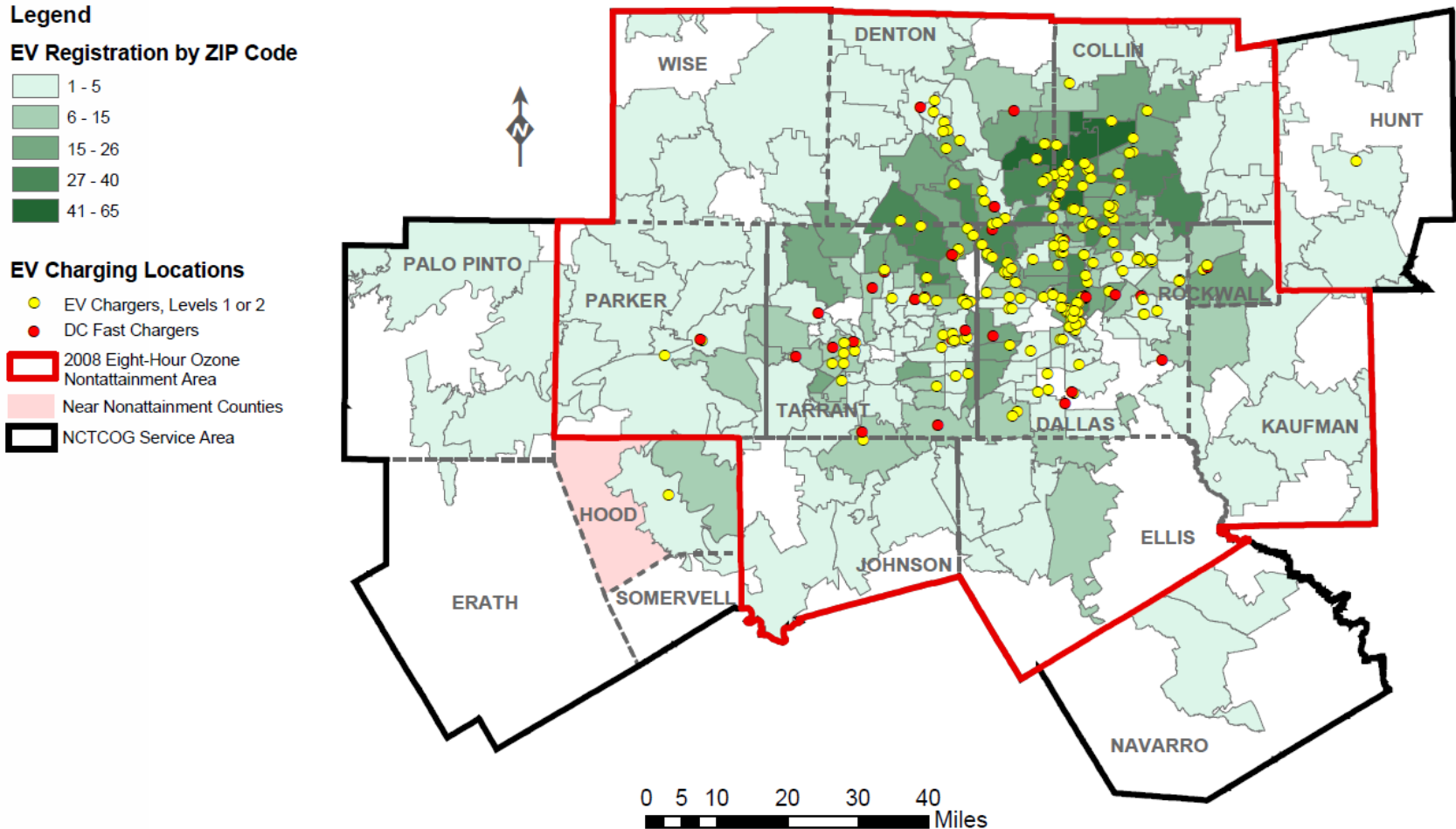
# Registration by EV model

**Total EV Registration:**  
**Texas: 8933**  
**DFW Area: 3484**  
**39% of TX total**  
**(As of February 2017)**



\*NCTCOG staff plans to include additional models including: Cadillac ELR, Chevrolet Spark, Fiat 500e, Honda Accord Plug-In & Fit EV, Toyota Plug In Prius, & RAV4 EV

# EV Registration Density by ZIP Code



January 2017

# Alternative Fuel Corridors

## Recently Designated Corridors

Clean Cities 2017 OEPT Cooperative Agreements: Sub-task 3.3



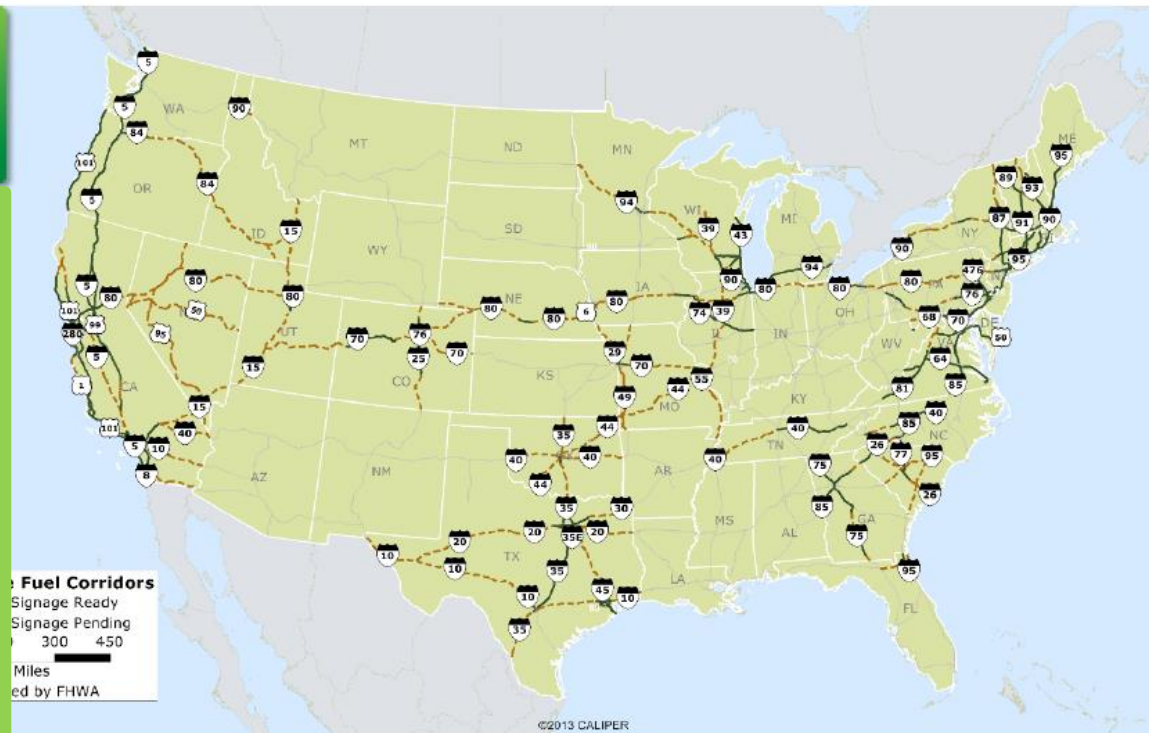
Electricity

Includes DCFC  
and Level 2

50 miles  
between  
stations

5 miles from  
highway

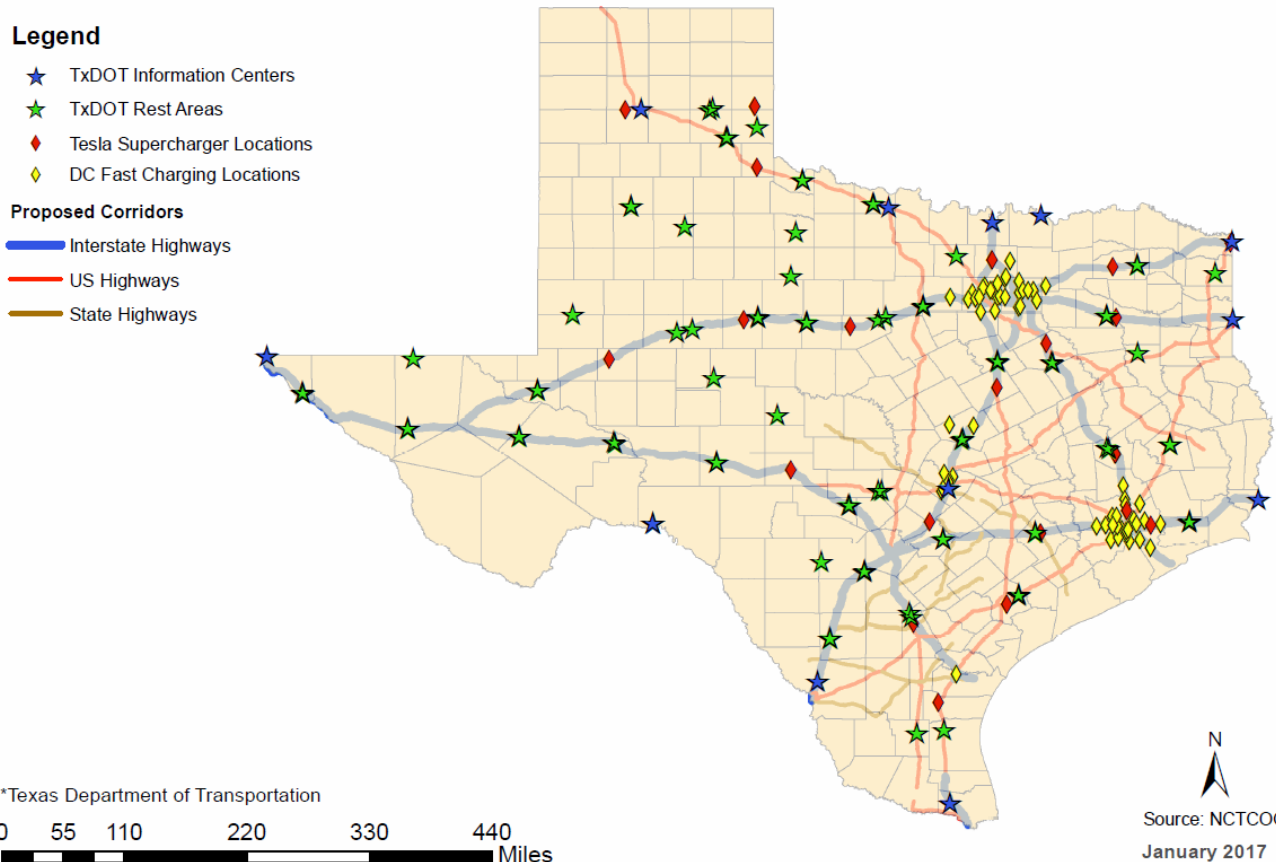
Public stations  
only (no Tesla)



# Volkswagen Settlement Impacts: Zero Emission Vehicle Investments

As part of the Volkswagen Settlement, \$1.2 Billion Available to Fund Zero Emissions Vehicles Projects Outside of California.

Map 2: Locations of TxDOT\* Rest Areas and Information Centers, Electric Vehicle Fast Charging





# Available Incentives

## ▪ Existing Vehicle Incentives

- Federal: Qualified Plug-In Electric Drive Motor Vehicle Tax Credit
  - Ranges from \$2,500 - \$7,500
  - IRS Form 8936
- Regional: Air Check Texas a Clean Machine
  - Voucher of \$3,500 to replace a vehicle unable to meet state air quality inspections with an EV
- Regional: Nissan FleetTail Offer, in partnership with EVgo
  - \$10,000 off a new Nissan Leaf

## ▪ Potential State Incentives

- Up to \$2,500 Rebate on Electric Vehicle Purchase/Lease
  - Senate Bill 26
- Up to 50% Grant for Public-Access Infrastructure through Texas Emissions Reduction Plan Alternative Fueling Facilities Program
  - Senate Bill 26, House Bill 1979, House Bill 3479



# Questions?

# Contact Us

Kristina Ronneberg

Air Quality Planner

(817) 695-9226

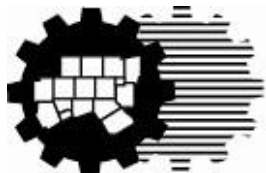
[KRonneberg@nctcog.org](mailto:KRonneberg@nctcog.org)

Lori Clark

Principal Air Quality Planner

(817) 695-9232

[LClark@nctcog.org](mailto:LClark@nctcog.org)



North Central Texas  
Council of Governments

