Idle Reduction Technologies for Ambulances





North Central Texas Council of Governments



Dallas-Fort Worth CLEAN CITIES

North Central Texas Council of Governments About



A voluntary association of, by and for local governments, established to assist in regional planning



Serves as the Metropolitan Planning Organization (MPO) in the DFW region



Houses the DFW Clean Cities Coalition, which works to improve air quality and reduce petroleum consumption in the transportation sector



Air Quality 101

Clean Air Act

Requires Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for six criteria pollutants:

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Carbon Monoxide (CO)
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Lead (Pb)

Nitrogen Dioxide (NO₂)

Ozone (O₃)

Particulate Matter (PM)

Sulfur Dioxide (SO₂)

DFW Ozone Non-Attainment Areas

Ozone Monitor	Monitor Location
Arlington Municipal Airport	1
Cleburne Airport	2
Corsicana Airport	3
Dallas Executive Airport	4
Dallas Hinton St.	5
Dallas North No. 2	6
Denton Airport South	7
Eagle Mountain Lake	8
Frisco	9
Ft Worth Northwest	10
Granbury	11
Grapevine Fairway	12
Greenville	13
Italy	14
Kaufman	15
Keller	16
Midlothian OFW	17
Parker County	18
Pilot Point	19
Rockwall Heath	20



8-Hour Ozone Historical Trends DFW Nonattainment Area



¹Attainment 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).

How is Ozone Formed? Emission Source Categories



Optimum conditions for the formation of ozone include high temperatures and low winds. Sections are not to scale and are for illustrative purposes only.

Nitrogen Oxides (NO_X) Emission Sources

Total NO_x = 296.77 tons per day (tpd)



Source: TCEQ, 2017 Dallas-Fort Worth 8-hour Ozone Attainment Demonstration State Implementation Plan

Air Quality Emphasis Areas

High-Emitting Vehicles/Equipment

Idling

Hard Accelerations

Low Speeds

Cold Starts

Vehicle Miles of Travel

Energy and Fuel Use

Idling Ambulances & Air Quality

Why do Ambulances Idle?

Must always be prepared for emergency calls

Medications require a controlledtemperature cabin environment

Medical and other onboard equipment require a certain charge level

HVAC provides a comfortable experience for patients and staff

A vehicle battery's charge level must be maintained to ensure reliable starting



Public Health & Environmental Costs

Idling ambulances is a common daily scenario

For every hour of idling, an ambulance emits 33 pounds of CO₂*

Increased exposure to toxic vehicle emissions for staff and sensitive populations.

Emissions can enter hospital facilities via air vents and open doors

Idling engines create noise pollution



*Source: <u>https://nextcity.org/daily/entry/nyc-smart-pedastals-fight-pollution-power-fire-trucks</u>

Costs of Idling Ambulances

Higher vehicle maintenance/operations costs

Burns **1.5 gallons** of fuel/idling hour*

Accelerates the expiration of warranty coverage due to excessive engine hours (warranty expires typically after 6 months)**

Contributes to *more frequent* oil/diesel filter changes—<u>costly</u>**

Example

- 1. Fuel/idling hour = 1.5 gallons*
- 2. AVG diesel price = \$3.04***

Idling Fuel Cost/hr: **1.5 x 3.04 = \$4.56**



*Source: <u>https://www.afdc.energy.gov/uploads/publication/idling_emergency-service_vehicles.pdf</u> **Source: <u>http://americancityandcounty.com/fleets-content/power-pack-aims-reduce-engine-idling-related-video</u> ***Data source: <u>https://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_r30_m.htm</u> (*Gulf Coast area, September 2018*)

Technology Solutions: Idle Reduction

a) Auxiliary Power Units (APUs): battery units that store power when engine is running, and supply electrical power when engine is off

b) Electrified Parking Space:

stationary systems that enable ambulances to plug in for power

c) Solar Panels:

can be installed on vehicle roof to provide extra power



Case Study: Austin-Travis County, TX (EMS)

First operational model was tested in 2012. As of October 2017, **40 EMS vehicles** are equipped with APUs

EMS has a contract with *Stealth Power* for **41 EMS vehicles**

The system uses a **daily average of 13.5 hours** of electrical distribution*

Saves approximately **18.9 gallons of** gasoline per vehicle (daily)*

Eliminates approximately **4,400 pounds** of CO₂ per vehicle (monthly)*



Case Study: Euless, TX (Fire Department)*

Two electrified poles installed in 2008 and 2010

Project Cost: **\$9,812.75**

Utilization: AVG 15-18 hours/week

The department achieved **29,963 hours of idle reduction** over a 7 year span

Features

- Automatic cord release if vehicle drives off
- Any vehicle can use it as long as it installs a connection port
- Powers multiple vehicles simultaneously



Case Study: New Orleans, LA (EMS)*

Six ambulances have been equipped with *ZeroRPM* idle mitigation systems, including roof-mounted solar panels (as of August 2018)

10 more ambulances are pending installation

Preliminary data (over 46 day period) on four vehicles show improvement:

- **280.6 gallons** of fuel saved (resulting in \$841.61 savings)
- **3.09 tons** of CO₂ emissions reduction



Other Projects Getting Started

Cedar Hill EMS partnered with **ZeroRPM** to build an ambulance equipped with *solar-panels* and a special cooling system (for temp. control)

Broken Arrow, OK installed a **Stealth Power** system on **1 ambulance**



For Additional Information

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