

New Mexico Environment Department Air Quality Bureau

Truck Stop Electrification and
Anti-Idling



Executive Order 2006-069

New Mexico Climate Change Action

“NMED shall submit to the EIB a proposal to develop regulations and guidance for truck stop electrification for anti-idling capability by July 1, 2008.”



THE IDLING ISSUE

- ❑ About 2.3 million large diesel trucks in the US ⁽¹⁾
- ❑ About 600,000 have sleeper cabs⁽²⁾
- ❑ Drivers traditionally idle engines at rest
- ❑ A typical intercity tractor-trailer idles an estimated 1800 h/yr⁽³⁾
- ❑ A tractor trailer uses approximately gallon of fuel for every hour idling⁽³⁾.

(1) Sources: ATA's U.S. Freight Transportation Forecast to...2016; Highway Statistics 2004

(2) Source: US Census Bureau, 2002 Economic Census

(3) Argonne National Laboratory, US Department of Energy

MOTIVATION

- ❑ Drivers needs an appropriate resting environment
- ❑ The trucking industry is a growing industry
- ❑ Idling engines emit toxic substances and waste fuel (...and money)
- ❑ Need to reduce dependence from foreign oil

Vehicle Classification

I	6,000 lbs. or less
II	6,001 - 10,000 lbs.
III	10,001 - 14,000 lbs.
IV	14,001 - 16,000 lbs.
V	16,001 - 19,500 lbs.
VI	19,501 - 26,000 lbs.
VII	26,001 - 33,000 lbs.
VIII	33,001 lbs. or more

Source: Bureau of Transportation Statistics (Carrier Classification only)

Typical Five Axle Class VIII Truck With Sleeper Berth



Where Are the Problems?

- ❑ Truck stops/travel centers and rest areas
- ❑ Schools
- ❑ Bus terminals
- ❑ Large company terminals and distribution centers
- ❑ Rail yards
- ❑ Borders

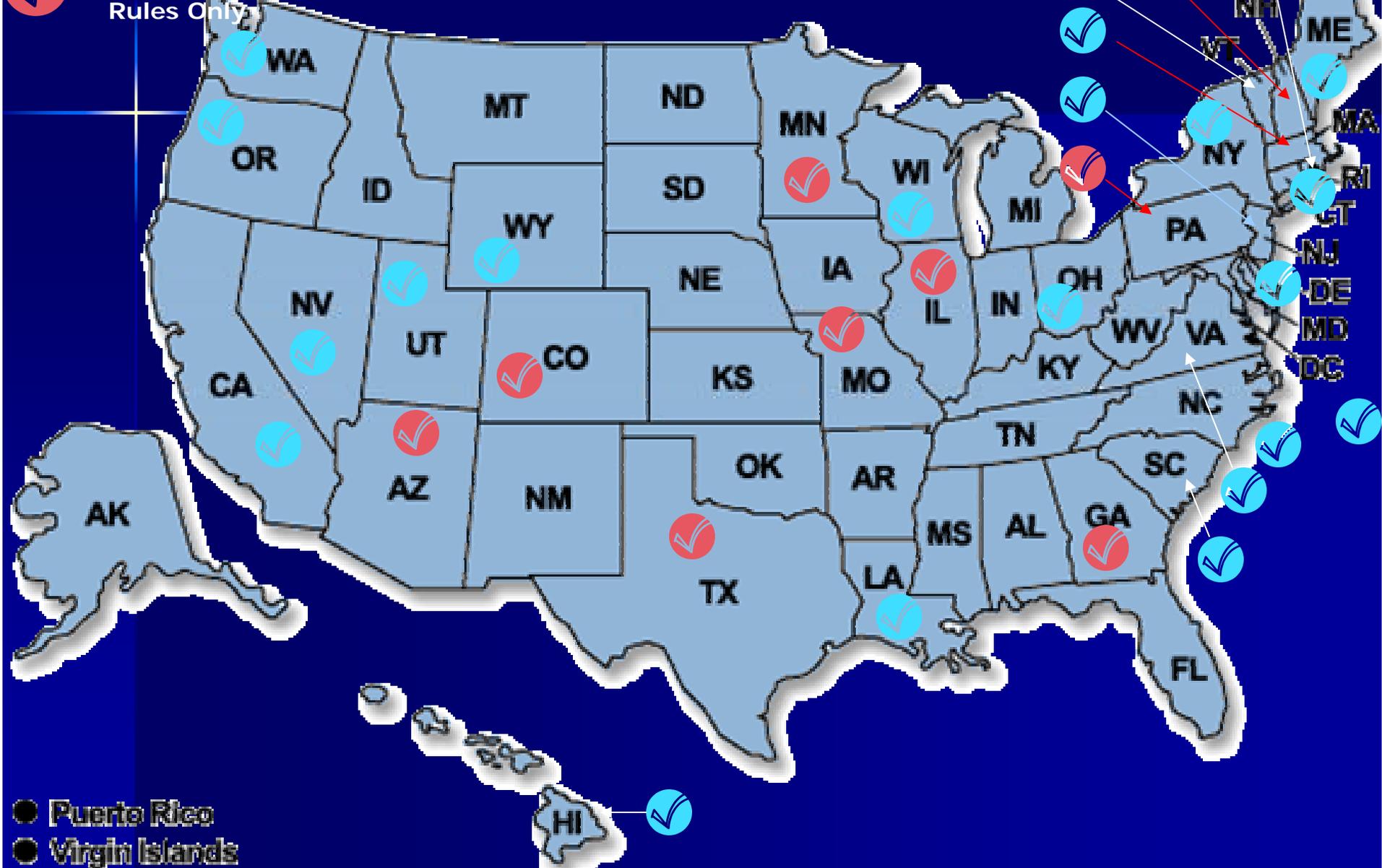


Statewide Anti Idle Rules



Jurisdictional Rules Only

States and Municipalities with Anti Idling Rules



Approximately 30 State and Local Jurisdictions

There is no single organization that keeps track of all the state, province and local regulations relating to extended idling.

Obstacles to Conforming to Sound Idling Practice

- They cross hundreds of legal jurisdictions
- Potential of different regulations and enforcement levels
- They are required to take extended rest breaks that typically lead to the long-term idling practices regulators now seek to outlaw

The Best Way to be Prepared

Adopt operating procedures that conform to the strictest known standards.

In practice, this means compliance with the California Air Resources Board (CARB) standards for Heavy-Duty Vehicle Idling Adopted: October 2005, Effective January 2008.

2008 CARB Requirements

2007 and newer trucks must be equipped with tamper-resistant automatic engine shut-down device that limits idling to five minutes. 2006 and older trucks are not required to have this installed, but must still meet the idling limitation.

All trucks with computerized engine management systems are capable of shutting down the engine after a preset time period. This requires manipulating the engine control module which can be done at very little cost by the truck dealer, engine manufacturer, or truck owner.

2008 CARB Requirements

Requires trucks with sleeper cabs use alternatives to idling the main truck engine for heating and cooling during rest periods

2008 CARB Requirements

Diesel-Fueled Auxiliary Power Units (APUs) operated on trucks with 2007 or newer engines must be fitted with a verified level 3 particulate trap (85% particulate reduction efficiency), or have its exhaust routed to the vehicle's exhaust system upstream of the particulate matter after-treatment device.

Truck Idle Reduction Technologies

- ❑ Automatic engine shut-down systems
- ❑ Diesel Fuel Fired Heaters
- ❑ Battery Electric APS
- ❑ Thermal Storage
- ❑ Auxiliary Power Units/Generator Sets (APU)
- ❑ Truck Stop Electrification (TSE) Shurepower[®]
- ❑ Advanced Truck Stop Electrification (ATS) (external unit only) IdleAire[®]

Two Primary Idle Reduction Technologies

Auxiliary Power Units (APU) small diesel-powered engines that are installed in the truck. Auxiliary power units can provide heat only, heat and air conditioning, and electric power.

Truck Stop Electrification involves modifying the truck stop parking space to provide electric power, heat, and air conditioning.

Auxiliary Power Units (APU)

A peripheral unit installed to provide comfort amenities to the operator while parked.

- Heating and Air conditioning
- Produce Electricity for Hotel Loads
- Charge Batteries
- Engine Preheating
- Cost ~ \$7,000
 - Pony Pack – 10.5 hp/.43 lt
 - Willis



Truck Stop Electrification

Allows truckers to "plug in" vehicles to operate necessary systems without idling the engine.

- ❑ In some cases, a stand-alone system can provide heating, ventilation, and air conditioning directly to the sleeper compartment.

Onboard or Shore Power Systems

Truck stop electrification (TSE), provides electrical outlets that the trucks can plug into (Shurepower®). The truck must be equipped with:

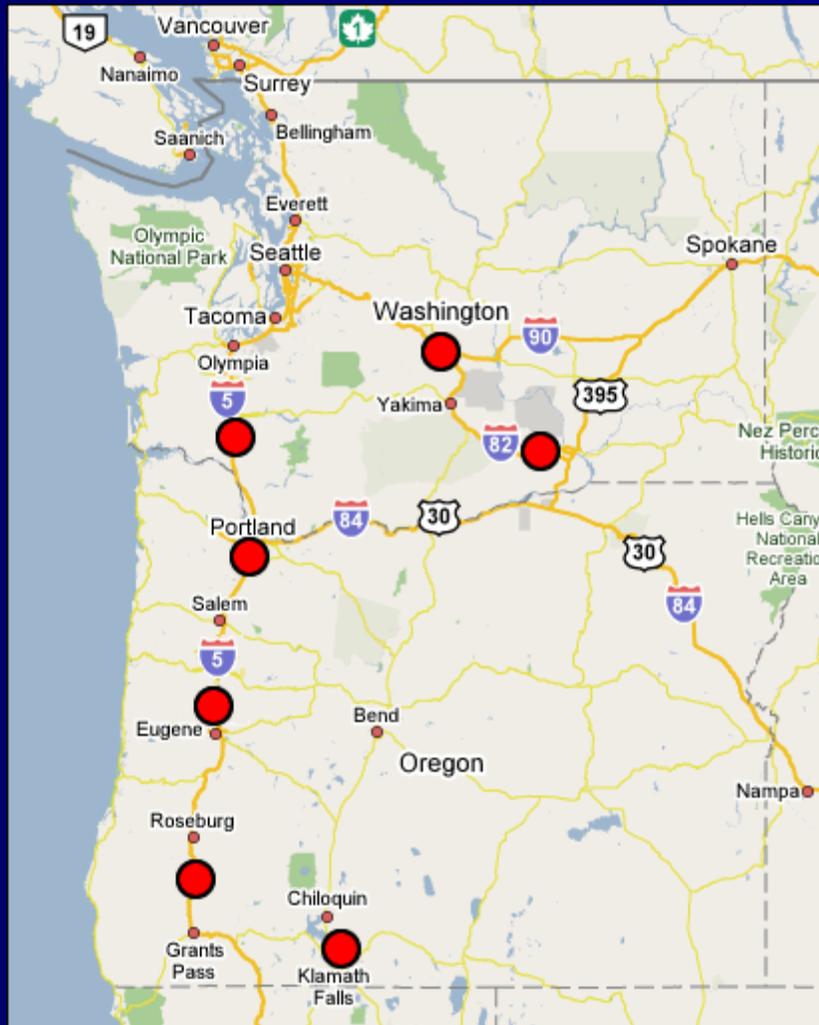
- ❑ Hardware to plug into the electrical outlet
- ❑ Electrical HVAC system
- ❑ Inverter to convert 120/240-VAC power to VDC to charge truck batteries

Shurepower System



SHUREPOWERTM

Proposed Shurepower® Network



Stand-Alone Systems

Advanced truck stop electrification (ATE), heating, ventilation, and air conditioning (HVAC) systems are contained in a structure above the truck parking spaces.

A hose/snorkel from the HVAC system is connected to the truck window and a computer touch screen enables payment. (IdleAire®)

IdleAire®



IdleAire Service Delivery Module

SECURITY LOCK
Rotate the external locking handle to engage the security locks

CARD READER
Slide a fleet card, major credit card, prepaid value card, or member card to activate services

TOUCH SCREEN COMPUTER
Easy-to-read, step-by-step instructions for system operation, thermostat controls, and Internet access

HELP
Press this Go button for on-screen help in using the IdleAire system. In addition, reach our 24/7 customer care center by dialing *611 from your in-cab phone or toll free 877-738-7024 from any phone

GO BUTTONS
Press for easy, one touch access to main and future services

USB PORTS
Plug in a keyboard and mouse to surf the Web. Connect other USB devices for enhanced functionality

120V AC
Plug in your own appliances inside the cab, or block/fuel heaters and shore power connections outside

INTERNET
High-speed Internet access is available; Ethernet interface required; additional service charges apply

TELEPHONE
Plug in your phone to make and receive in-cab calls just like a payphone

HEAT/AIR
Provides filtered multi-directional air flow throughout the cab

TELEVISION
Basic satellite cable TV included. Up-graded services available for additional fee

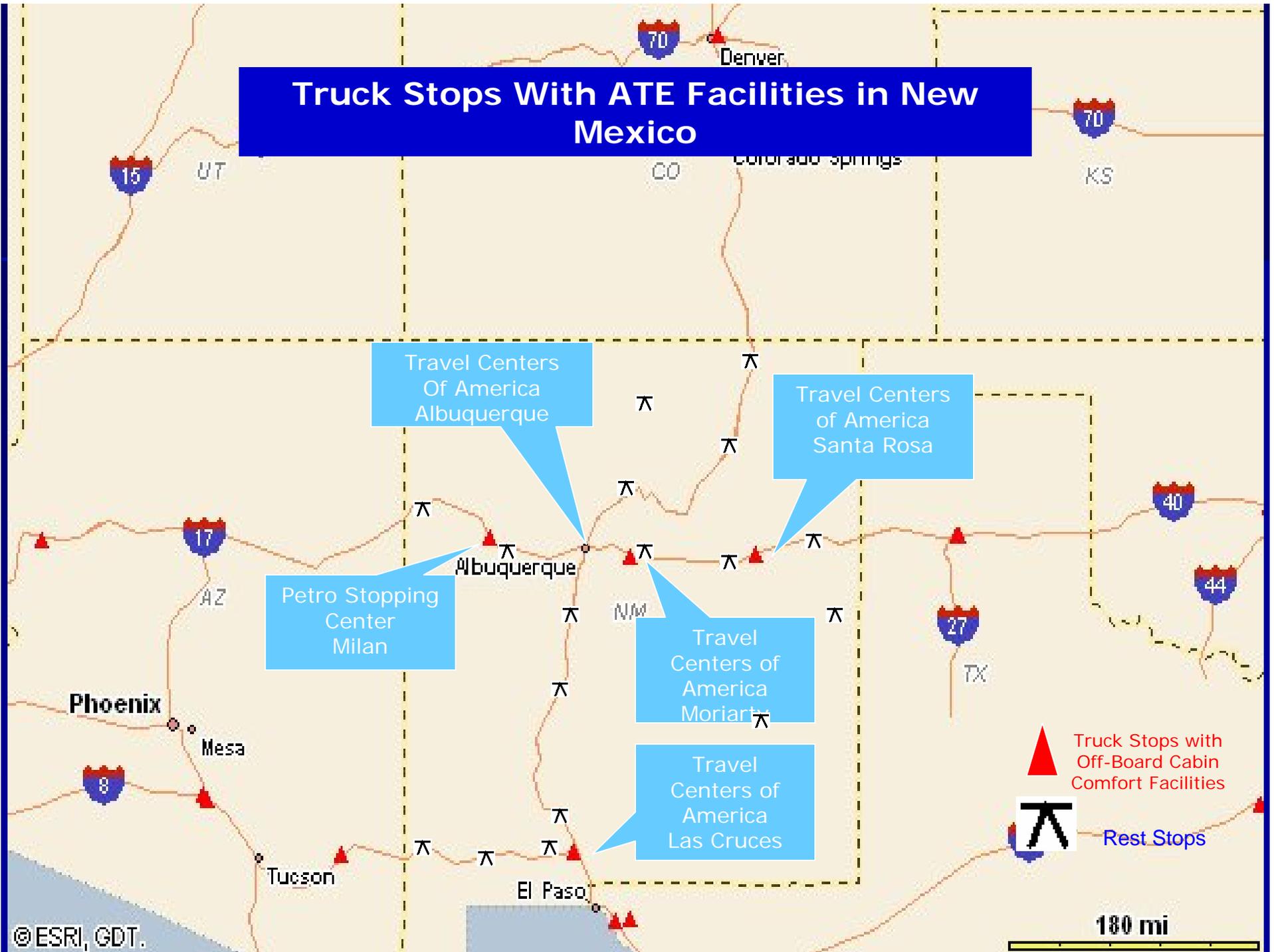


Front View

IdleAire[®] Network



Truck Stops With ATE Facilities in New Mexico



Travel Centers With ATE in New Mexico

A total of 315 ATE spaces in NM

Facility	Address	City	TSE	Number of Bays
Petro Stopping Center Num. 13	I-40 & Horizon Blvd	Milan	IA	78/200 Spaces
Travel Centers of America (TA)	I-40 Exit 277 (Hwy 66-54)	Santa Rosa	IA	63/116 Spaces
Travel Centers of America (TA)	1700 US Route 66 W	Moriarty	IA	63/245 Spaces
Travel Centers of America (TA)	202 N. Motel Blvd.	Las Cruces	IA	60/232 Spaces
Travel Centers of America (TA) (7/07)	I-25 and I-40	Albuquerque	IA	51/150 Spaces

1700 US Route 66 W. Moriarty, NM



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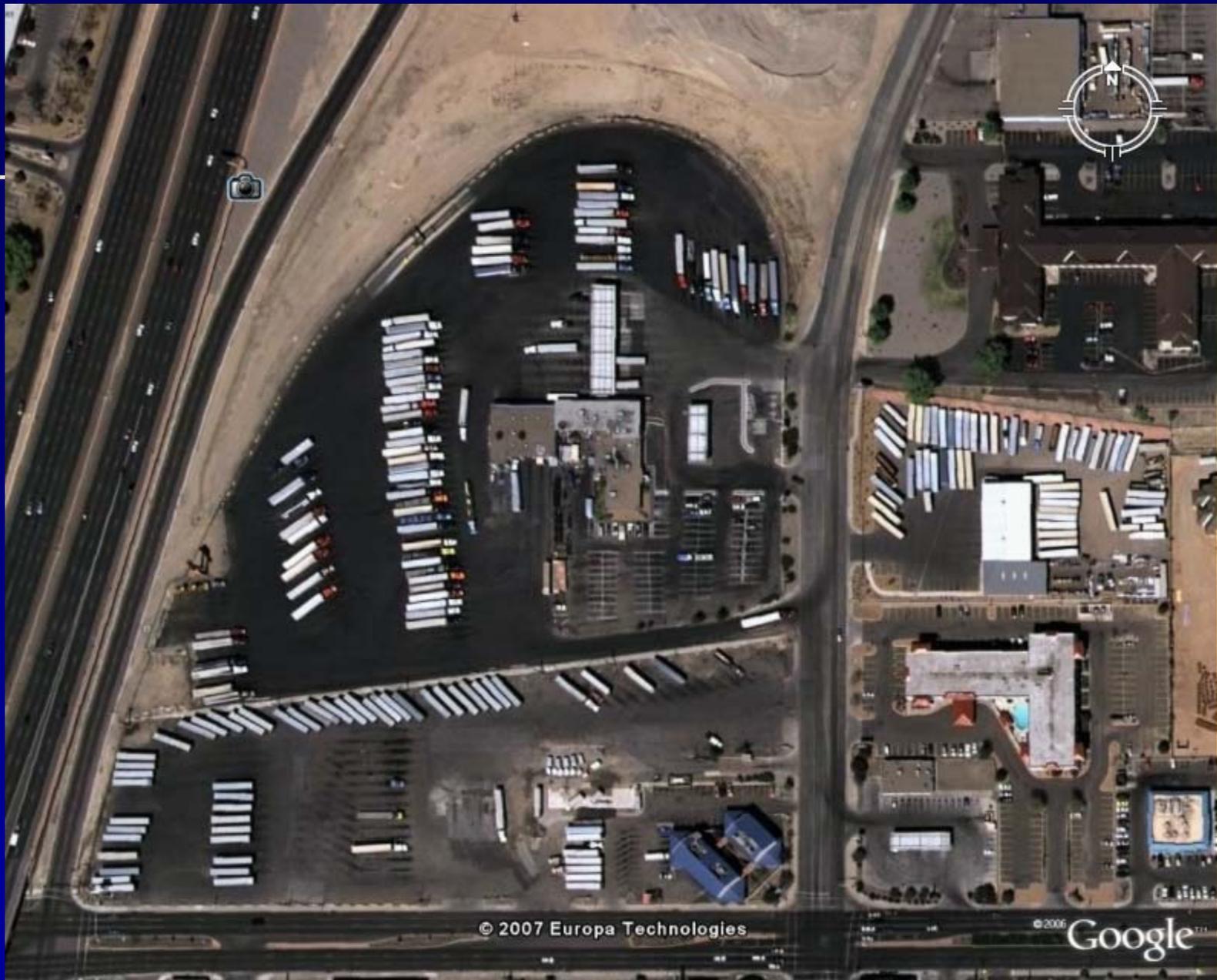
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Henry St

220 N. Motel Blvd. Las Cruces, NM



I-25 and I-40 Albuquerque, NM



ATE and TSE

- IdleAire - Installation cost per unit
\$16,000
 - There is no charge to parking facility is the facility meets manufacture's requirements and if installing more than 50 units (IdleAire)
 - \$10.00 Window template needed
- Shurepower – Installation cost per unit
\$4000
 - Is limited to Northwest United States at this time

Emissions From Idling

Emission*	Single Truck (g/hr)	Single Truck (MTons/yr)**	100 Spaces 14.4Hrs/Day (MTons/yr)	1.3 million trucks (MTons/yr)**
NO _x	135.00	0.46	70.96	590,733
PM	3.68	0.012	1.94	16,103
VOC	6.84	0.023	3.59	29,930
CO	56.14	0.19	29.51	245,657
CO ₂	10,397	34.99	5,464.66	45,495,193
	10,598.66	35.68	5,570.66	46,377,616

Estimated Emission Comparison (g/hr)

	Idling	DFH	TS	APU	TSE
VOC	12.6	0.174	0	0.45	0.054
CO	94.6	0.437	0	7.5	0.481
NO _x	56.7	0.264	4	11.6	6.04
PM ₁₀	2.57		0	0.69	0.035
CO ₂	10,397	1456	356	1871	3014

DFH – Direct Fired Heater (Diesel)

TS – Thermal Storage

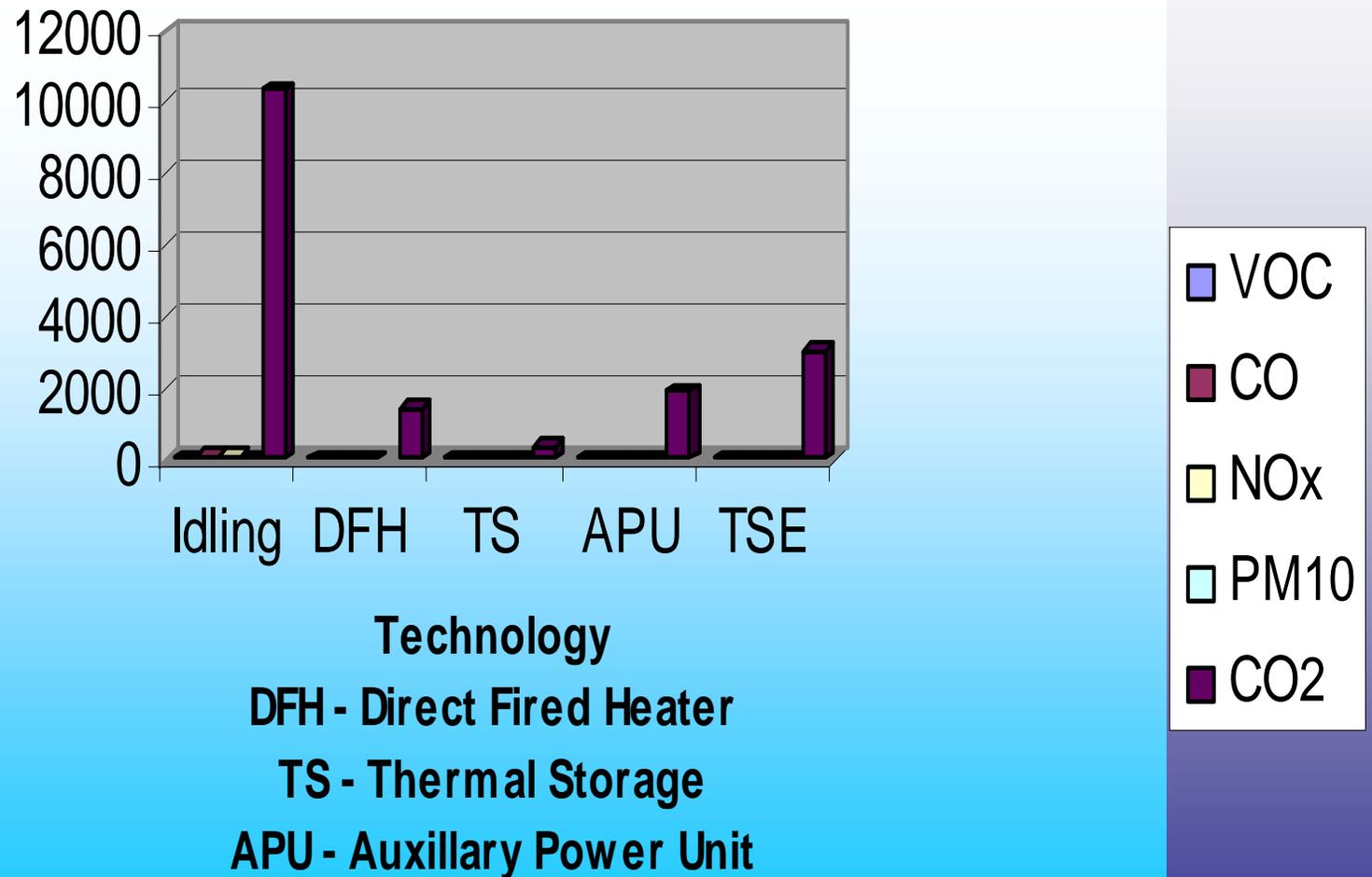
APU – Auxiliary Power Unit

TSE – Truck Stop Electrification

Data are not comparable; accuracy in doubt.

Analysis of Technology Options to Reduce the Fuel Consumption of Idling Truck, Argonne National Laboratory

Estimated Emissions Comparison(g/hr)



Energy Consumption

- ❑ An IdleAire® ATE unit consumes approximately 0.8 - 1.2 kWh per hour of use.
- ❑ A ShurePower® facility consumes approximately 1.5 kWh per hour of use.
- ❑ The average truck consumes 1 gallon of fuel per hour idling, this is dependant on engine size and idle speed.
- ❑ The average APU consumes approximately 0.2 gallons of fuel per hour of idling.

Initial Capital Investment

Shurepower – Basic Connection	\$189
Shurepower – with electric HVAC	\$2,500
APU	\$8,000
Off-board TSE	\$10

Hourly Costs (Does not include capital cost)

Shurepower TSE	\$1.00
APU (fuel & maintenance).....	\$0.79
Average Off-board TSE	\$2.00

Total 5-year Costs

Shurepower – with electric HVAC.....	\$10,500
APU	\$15,087
Off-board TSE	\$18,010
Idling	\$24,750

Total 5-year Savings

Shurepower – with electric HVAC	\$14,250
APU	\$9,662
Off-board TSE	\$6,740
Idling	\$0

Total Average Hourly Cost

Shurepower – with electric HVAC.....	\$1.17
APU	\$1.68
Off-board TSE	\$2.00
Idling	\$2.75

Trucks in New Mexico



According to the 2002 Vehicle Inventory and Use Survey there are 6900 heavy duty trucks registered in NM.

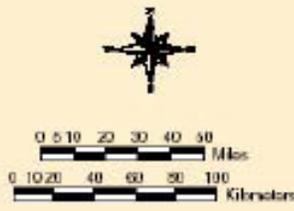
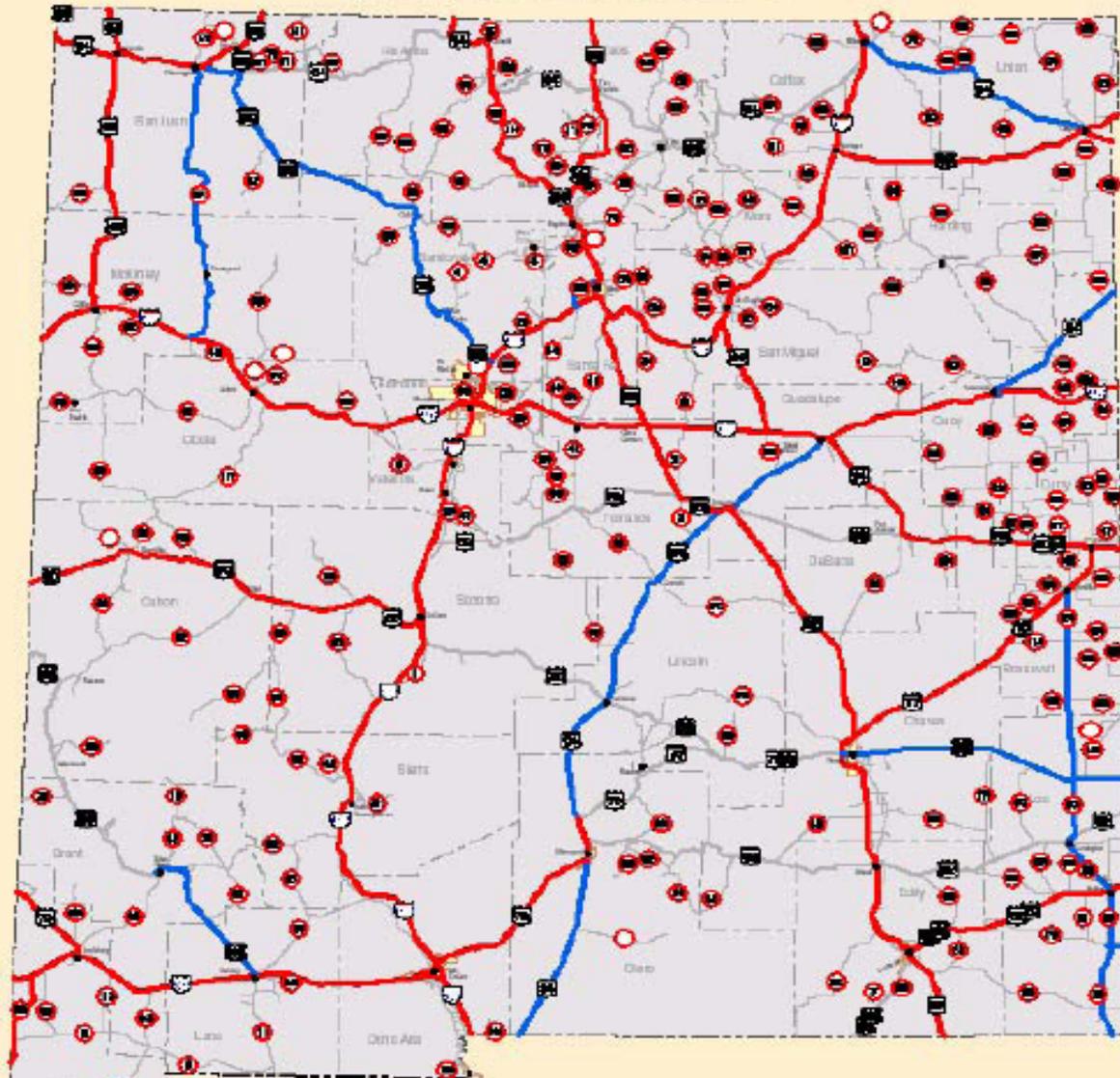
2400 of the 6900 are equipped with sleeper berths.

2002 Economic Census; Vehicle Inventory and Use Survey (VIUS)

New Mexico Truck Facts

- ❑ Trucking employs 46,800 people in New Mexico; one out of every 12 workers.
- ❑ \$1.4 billion in salaries with an annual average salary of \$30,742 for each employee in New Mexico.
- ❑ a typical five-axle tractor trailer pays \$11,544 in state and federal taxes. This includes \$5,967 paid directly to the State of New Mexico in the form of weight-distance tax, registration fees, fuel tax and sales tax.
- ❑ New Mexico truck operators pay \$292 million annually in state and federal taxes and fees. This equates to a weekly tax bill of \$5.6 million.
- ❑ A 2006 truck is 10 times cleaner than a 1988, with a 98% reduction in PM and NOx
- ❑ Trucks move 90% (41 million tons) of New Mexico's manufactured freight.

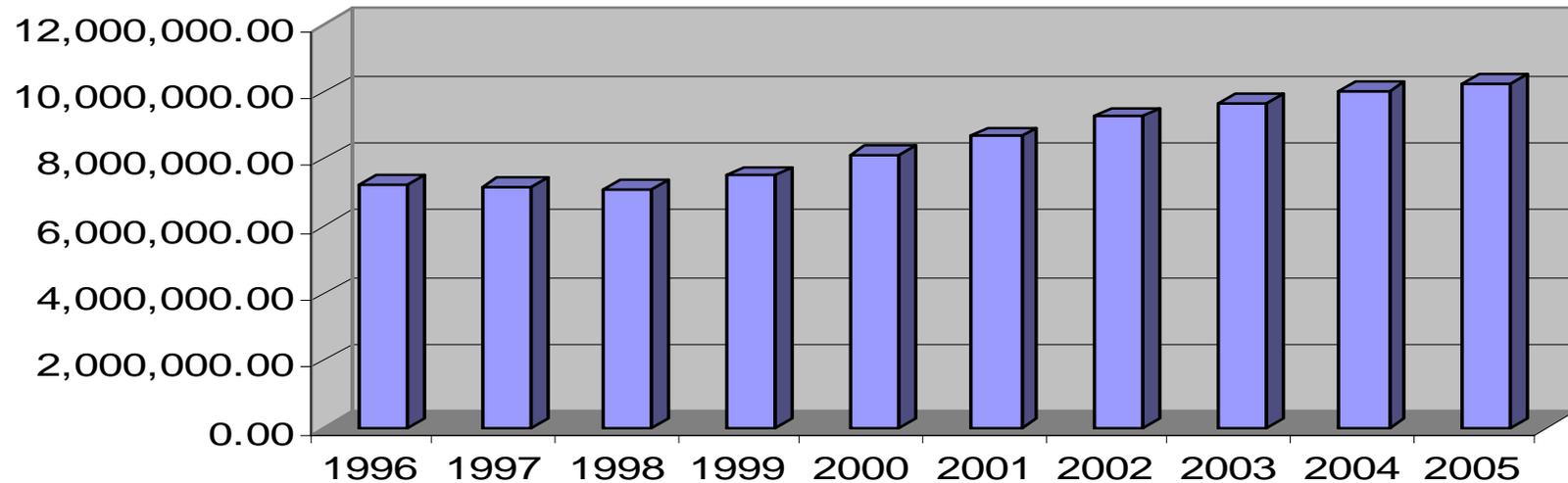
NM TRUCK ROUTES



LEGEND
Truck Routes
— Federal Designated
— State Designated



TRUCK MILES TRAVELED IN NEW MEXICO



I-40 is the most heavily used commercial freight facility with about 8,000 trucks a day, but I-10, US 54 and US 70 are also heavily-used routes. Some sections of US 54 experience more than 50% trucks in the traffic mix.

Scales and Ports-of-Entry in New Mexico

Route	Location
*I-10 EB, WB	Anthony-mile marker 159
*I-10/US 70 EB	Lordsburg-23 mi. east of Arizona state line, mile marker 23
*I-25/US 85 SB	Raton-0.3 mi. south of Colorado state line (joint POE with Colorado), mile marker 460
*I-40 EB	Gallup-15 mi. east of Arizona state line, mile marker 12
*I-40 WB	San Jon-east of village limits and 20 mi. west of Texas state line, mile marker 356
*US 54 WB	Nara Visa-5 mi. southwest of Texas state line, mile marker 349
*US 56 & US 64/87 WB	Clayton-south of city limits, 9 mi. northwest of Texas state line, mile marker 430
*US 60/70/84 WB	Texico-1.5 mi. west of Texas state line, mile marker 397
*US 62/180 WB	Carlsbad-6 mi. southwest, mile marker 26
*US 62/180 WB	Hobbs-1.5 mi. west of Texas state line, mile marker 107
*US 666 SB	Shiprock-6 mi. south of Colorado state line, mile marker 92.5

PrePass®

- ❑ Automatic vehicle identification (AVI) system
- ❑ Allows participating transponder equipped commercial vehicles to bypass designated weigh stations, port-of-entry facilities and agricultural interdiction facilities
- ❑ Cleared vehicles may proceed at highway speed, eliminating the need to stop
- ❑ Greater efficiency for shippers and improved safety for all highway users.

Saving Time, Fuel, & Money

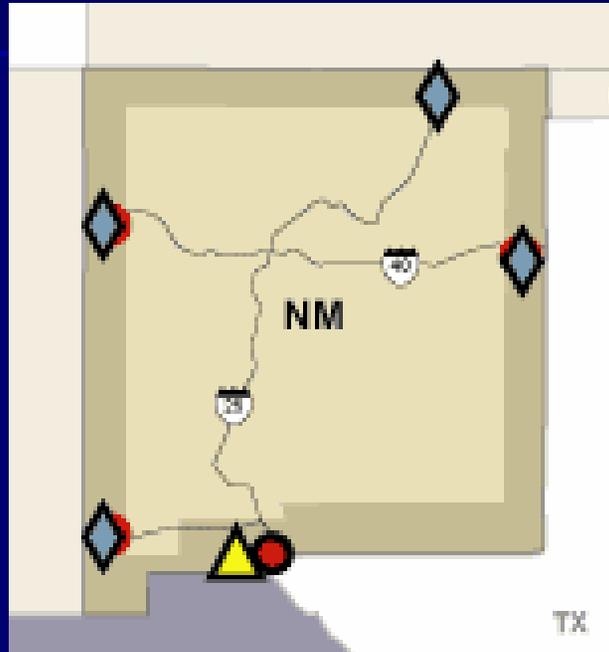
Iowa State University Center for Transportation Research and Education study found that approximately .55 gallons of fuel was being used per stop

Enrolled Trucks

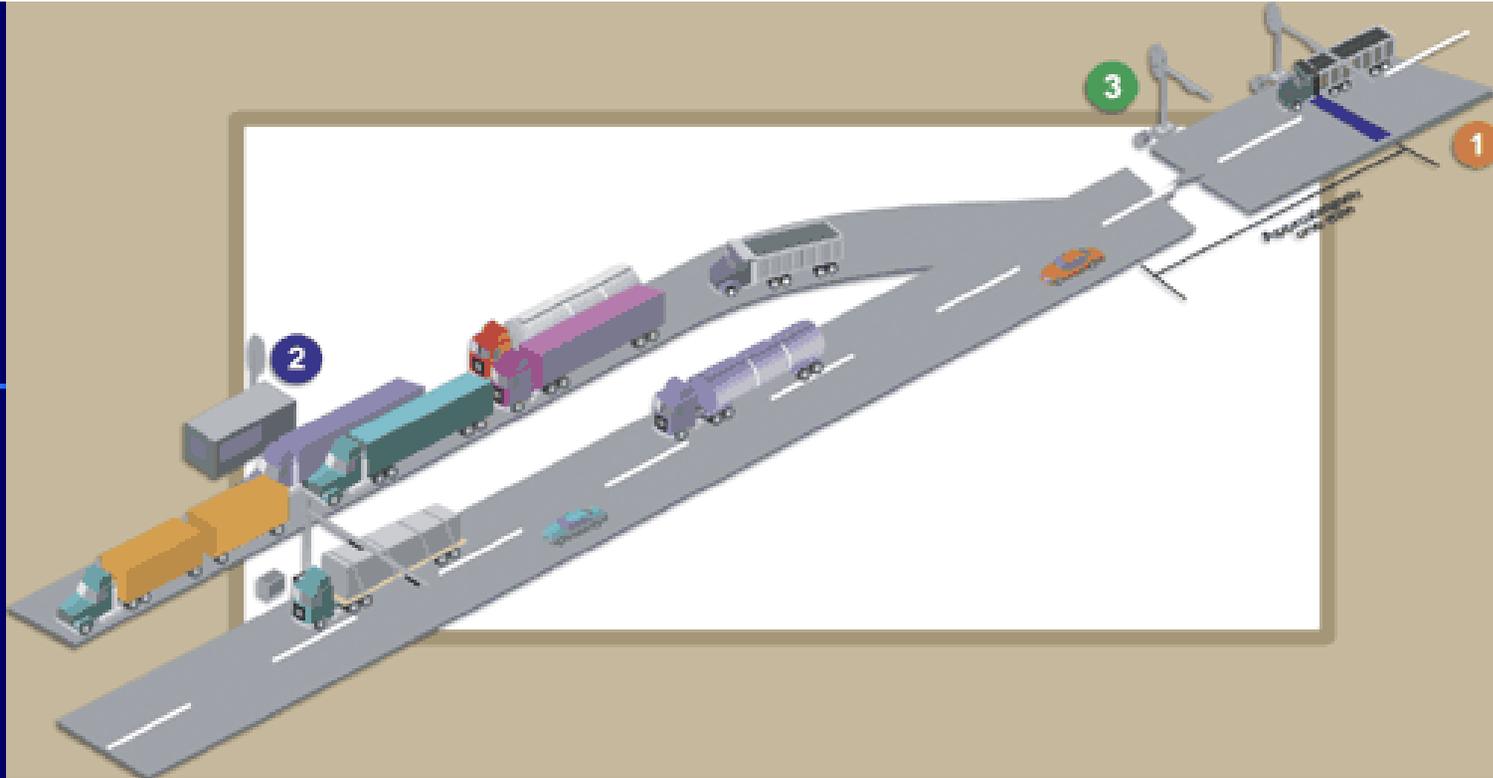
Total Number as of
August 6, 2007

414,479

PrePass[®] Locations In New Mexico



Location	Route	Current Status
Anthony (near NM/TX border)	I-10 WB	Site Open
Gallup (near NM/AZ border)	I-40 EB	Site Open
Lordsburg (near NM/AZ border)	I-10 EB	Site Open
Raton (near NM/CO border)	I-25 SB	Site Open
San Jon (near NM/TX border)	I-40 WB	Site Open
Santa Teresa (near US/Mexico border)	I-25 NB	Committed Site



- 1** Approximately one mile before a weigh station, the PrePass transponder sends a signal. The truck is then electronically identified and weighed.
- 2** A PrePass system computer located in the weigh station verifies truck credentials.
- 3** A green light and audible signal from the truck's wind-shield mounted transponder give the go-ahead to bypass. If weight or credentials cannot be verified, the driver is signaled to pull into the station.

Reducing the idling time of heavy-duty trucks reduces

- Petroleum consumption
- Fuel costs
- Engine wear
- Maintenance costs
- Diesel emissions
- Noise.

For more information regarding the proposed rule:

Go online to http://www.nmenv.state.nm.us/aqb/prop_regs.html, or contact Bob Spillers at NMED's Air Quality Bureau at (505) 955-8046 or robert.spillers@state.nm.us

