



State Transportation Fleet Adoption of AFVs

Austin, TX

April 18, 2016

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DOE Clean Cities Co-Director

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Energy, Environment, and Economic Security

Driving Sustainability with Clean Fuels and Advanced Vehicles



Our Technologies

- Alternative fuels
 - Biodiesel
 - Compressed and liquefied natural gas (CNG/LNG)
 - Electricity
 - Ethanol (E85)
 - Hydrogen
 - Propane
- Fuel economy
 - Eco-driving
 - Hybrids
- Idle-reduction
- Smart Mobility



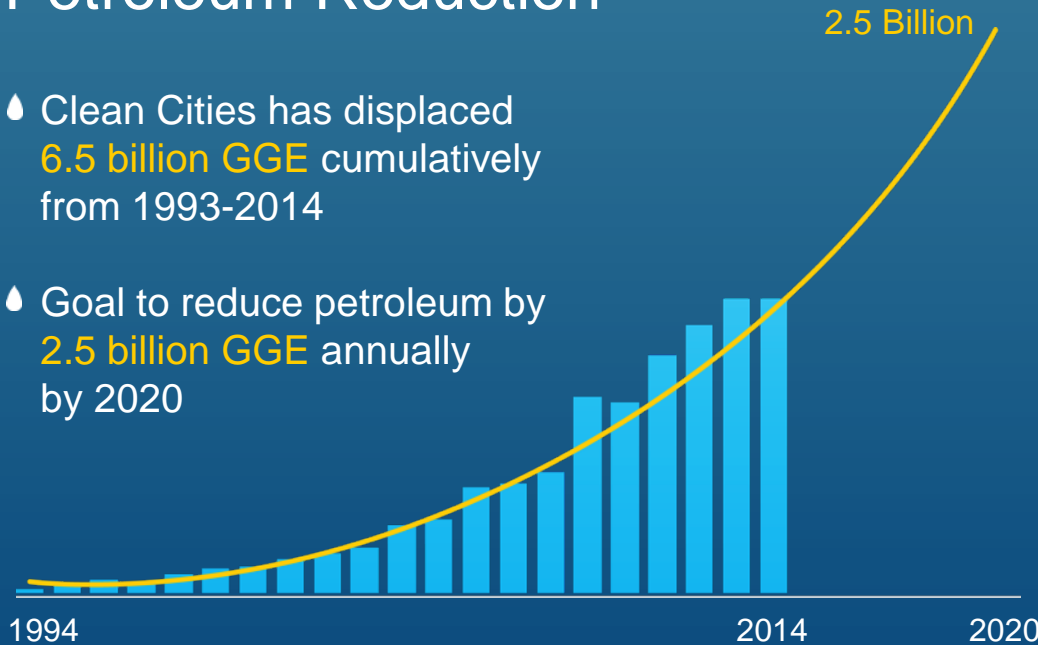
Photo courtesy of East Tennessee Clean Fuels

Clean Cities Goals and Accomplishments

1,000,000,000 Gallons Saved Annually

Annual Clean Cities Petroleum Reduction

- 🔹 Clean Cities has displaced **6.5 billion GGE** cumulatively from 1993-2014
- 🔹 Goal to reduce petroleum by **2.5 billion GGE** annually by 2020



In 2014 alone, the program:

🔹 Reduced petroleum use by **1 billion GGE**



🔹 Prevented **6.6 million tons** of greenhouse gas emissions (Equivalent to removing **1.5 million** cars from the road)



🔹 Put over **600,000** alternative fuel vehicles on the road



Clean Cities:

Reducing America's Oil Dependency
A Billion Gallons at a Time

National and Local Partnerships

National

Local



Building Partnerships to Cut Petroleum Use and GHG Emissions in Transportation

National Level – 5 Major Activities



Consumer Information, Outreach, & Education



Technical & Problem Solving Assistance



Coalition Training and Stakeholder Coordination



Identification & Tracking of Essential Program Metrics



Competitively-Awarded Financial Assistance



Fueleconomy.gov

49.7 million users (MY2014)
370 million users since 1999

Alternative Fuels Data Center

1.4 million users (2014)
6.3 million page views

AFDC: Case Studies

Alternative Fuels Data Center

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Case Studies

Find case studies and success stories about alternative transportation technologies and alternative fuels.




Propane Fuel

Many organizations face the challenges of converting their fleets to propane, including a school district. They are finding that propane offers both goals.

[Learn More](#)

May 30, 2015
Publications

Los Angeles Public Works Fleet Converts to Natural Gas



Learn how Los Angeles, California, has converted its fleet of diesel-powered, solid waste collection vehicles to alternative fuels.

For information about this project, contact [Los Angeles Clean Cities Coalition](#).

[QuickTime \(.mov\)](#)
[Windows Media \(.wmv\)](#)
[Video Download Help](#)

Text version

See more videos provided by [Clean Cities TV](#) and [FuelEconomy.gov](#).

MotorWeek
Television's Original Automotive Magazine
 Provided by Maryland Public

Category
Keyword

Choose one or more items from the following categories.

Fuel/Technology

- All Fuels
- Biodiesel
- Ethanol
- Hydrogen
- Propane
- Natural Gas

Applications

- All Applications
- Long-Haul Trucking
- Refuse Collection
- Taxi Services
- Airport
- Delivery Services

Search Results | 198 case studies

Date	Title	Type
June 6, 2015	Delaware Transit Corporation Adds Propane Buses to Its Fleet	Video
May 30, 2015	Los Angeles Public Works Fleet Converts to Natural Gas	Video
May 30, 2015	Yellowstone Park Recycles Vehicle Batteries for Solar Power	Video
May 16, 2015	Lancaster Co., Pennsylvania, Converts Trash to Energy	Video

Publications & Outreach

Hybrid and Plug-In Electric Vehicles fact sheet

Plug-In Electric Vehicle Handbooks

- Consumers
- Fleet Managers
- Station Owners
- Electrical Contractors
- Workplace

EV Deployment Case Studies

- Raleigh
- Oregon
- Los Angeles
- Many more in case study database

ENERGY Energy Efficiency & Renewable Energy

Hybrid and Plug-In Electric Vehicles

Hybrid and plug-in electric vehicles use electricity while on their powertrain that is to improve the efficiency of conventional vehicles design. The use of electric vehicles, either called electric drive vehicles, can be divided into two categories: hybrid electric vehicles (HEV), and plug-in electric vehicles (PHEV). Both have great potential to reduce CO₂ emissions.

Plug-In Electric Vehicles

PHEVs are powered by an internal combustion engine that can run on conventional or alternative fuel and an electric motor that uses energy stored in a battery. The main power provided by the electric motor can be used for a limited range, resulting in better fuel economy and lower emissions. PHEVs combine the benefits of high fuel economy and low emissions with the power of conventional vehicles.

PHEVs do not require a plug to charge. Unlike a hybrid, they have a separate system for recharging and are not designed to be used as a conventional vehicle. PHEVs have an internal combustion engine and an electric motor, which can be used to drive the vehicle.

Plug-In Hybrid Electric Vehicles

PHEVs are powered by conventional fuel and electricity stored in a battery. Using electricity from the grid to charge the battery means that PHEVs can reduce or eliminate conventional fuel consumption. Depending on the electricity source, PHEVs can also reduce emissions.

Electric Drive Vehicles at a Glance

BEV: BEVs are powered by conventional or alternative fuels.

Alternative Fuels Data Center

April 18, 2011

Raleigh, North Carolina's Paves the Way for Plug-In Vehicle Success

High-tech Raleigh, North Carolina, is paving the way for successful deployment of plug-in vehicles and electric vehicle supply equipment (EVSE) infrastructure.

Raleigh's Plug-In Vehicle Evolution

Raleigh is one of the fastest growing cities in the United States and one of the most high-tech. The Raleigh-Research Triangle Region hosts many powerful technology companies and research institutions, including IBM, Cisco, Lenovo, and Oracle as well as North Carolina State, Duke, and North Carolina Central 191 universities. Raleigh was designated "America's Most Wind City" in 2010 for its population's widespread access to high-speed internet connections.

It's no surprise that Raleigh is a leader in plug-in vehicle deployment as well. The efforts got started in 2009 when Raleigh and the Research Triangle Region joined [Project Drive](#), an initiative to help U.S. cities prepare for plug-in vehicles. The city assembled an interdisciplinary team to tackle issues, such as streamlining the EVSE permitting and installation process. The team included representatives from the city's departments of transportation, sustainability, development services, permitting, administration, and public affairs as well as from utility [Duke Energy](#) and energy advisor [Advanced Energy](#). This core group of stakeholders developed five key objectives:

- Facilitate stakeholder working groups in resolving issues related to plug-in vehicles
- Educate consumers about plug-in vehicles
- Establish convenient and grid-compatible plug-in vehicle charging infrastructure
- Develop relationships with plug-in vehicle and component manufacturers and ensure vehicle availability in the North Carolina market
- Explore opportunities for economic development related to plug-in vehicles

The team reviewed EVSE permitting and installation processes used by other cities and adopted a streamlined process (see section below and flow chart at the right). City permitting staff and inspectors, as well as private electricians, were then educated about the process. The team has also reached out to municipalities in the surrounding area to work toward building consistent permitting and installation processes within the region. In addition, partnerships are being explored with community colleges to provide EVSE installation training.

Progress Energy is another of Raleigh's plug-in vehicle leaders. Its efforts are structured around the Edison Electric Institute's [Industry White Paper: Plug-In Electric Vehicle Market Readiness \(EPDR 2\)](#), which it helped develop. The following are the elements of its people and resources of Progress Energy's initial activities:

- Infrastructure—working with the [Electric Power Research Institute \(EPRI\)](#) to model the effects of plug-in vehicle charging on the electrical grid
- Customer support—administering utility-service upgrades needed for EVSE installation and training customer service representatives to respond to plug-in vehicle inquiries
- Customer and stakeholder education—providing education, outreach, and technical advising through [Energy 24/7](#), [Energy 24/7](#), [Energy 24/7](#), [Energy 24/7](#), [Energy 24/7](#), and [Energy 24/7](#)

Raleigh's EVSE Installing and Permitting Process

- + Step 1: Identify
- + Step 2: Assess
- + Step 3: Permit
- + Step 4: Install
- + Step 5: Inspect
- + Step 6: Integrate

Search for another case study

Information Resources: AFDC Station Locator



Alternative Fuels Data Center

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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.

Find Stations

Plan a Route

Go

All Fuels

▼

[more search options](#)

20,221

alternative fuel stations
in the United States

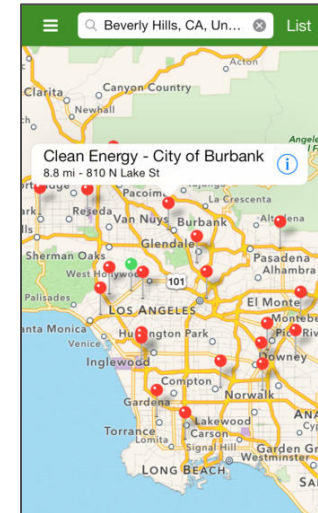
Excluding private stations

Location details are subject to change. We recommend calling the stations to verify location, hours of operation, and access.

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 Data last updated: 03/16/2016



Search
Station

Kohl's
 Electric
 15680 W 64th Ave
 Arvada, CO 80007

Directions

Call (888-758-4389)

Hours 24 hours daily

Access Public - see hours

ELECTRIC


Network ChargePoint Network

AC Level 2 2 chargers

Calculators



Vehicle Cost Calculator

Compare cost of ownership and emissions for most vehicle models.  [mobile](#)



Petroleum Reduction Planning Tool

Create a plan for your fleet to reduce petroleum consumption and emissions.



CNG VICE Model 2.0

Evaluate ROI and payback period for natural gas vehicles and infrastructure.



AFLEET Tool

Calculate a fleet's petroleum use, cost of ownership, and air pollutant and GHG emissions.




JOBS Model

Estimate economic impacts of natural gas, hydrogen, or fuel cell infrastructure.

Interactive Maps



Alternative Fueling Station Locator

Locate alternative fueling stations and get maps and driving directions.  [mobile](#)



TransAtlas

Analyze vehicle densities and locations of fueling stations and production facilities.




BioFuels Atlas

Compare feedstocks and analyze biofuel production by location.



Truck Stop Electrification Sites

Locate truck stops with electrification sites to reduce the need for idling.  [mobile](#)



Coalition Locations

Find Clean Cities coalitions and contact information for coordinators.

Data Searches



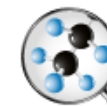
Vehicle Search

Compare all classes of alternative fuel vehicles, electric vehicles, and hybrids.



Laws and Incentives Search

Search for laws and incentives related to alternative fuels and advanced vehicles.




Fuel Properties Comparison

Compare alternative fuel properties and characteristics.



Find a Car

Compare fuel efficiency, costs, carbon footprints, and emissions.  [mobile](#)



State Information

Find state information about alternative fuels and advanced vehicles.

www.afdc.energy.gov/tools

Calculators



Vehicle Cost Calculator

Compare cost of ownership and emissions for most vehicle models. [mobile](#)



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JOBS Model

Estimate economic impacts of natural gas, hydrogen, or fuel cell infrastructure.



Interactive Maps



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TransAtlas

Analyze vehicle densities and locations of alternative fueling stations.



Data Searches



Vehicle Search

Compare all classes of alternative fuel vehicles, electric vehicles, and hybrids.



Laws and Incentives Search

Search for laws and incentives related to advanced vehicles.



Petroleum Reduction Planning Tool

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Locate truck stops with electrification sites to reduce the need for idling. [mobile](#)



Compare fuel efficiency, costs, carbon footprints, and emissions. [mobile](#)



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AFLEET Tool

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Comparison

Compare fuel properties and

efficiency, costs, carbon

footprints, and emissions. [mobile](#)



to reduce the need for idling. [mobile](#)



footprints, and emissions. [mobile](#)



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Petroleum Reduction Planning Tool

Create petroleum



TransAtlas



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CNG VI

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TransAtlas

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CNG V

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www.afdc.energy.gov/tools

Financial Assistance: other recent Clean Cities awards

36 Community Readiness Projects

- Plug-in electric vehicle projects
 - \$8.5 million (FY11-12)
 - 16 projects across 24 states and DC
 - Publicly releasable and *replicable* community plans
 - Lessons learned report
- Addressing all alternative fuels
 - \$11.1 million (FY12-13)
 - 20 projects
 - Policy implementation, barrier reduction, safety and training, market development

11 Clean Cities Alternative Fuel Vehicle deployment projects (\$6M – FY14-15)

- ***Driver Experience/Demonstration projects*** - Improve potential buyers' experiences with alternative fuel and plug-in electric vehicles
- ***Safety and Technical Training projects*** for first responders, public safety officials, and critical service providers
- Integrate alternative fuels into ***emergency response, resiliency plans, and preparedness operations***



Financial Assistance: 2016 Announcements

2 Aggregate Purchasing Project awards (\$ 3.0M) – FY15 announced Jan 2016

- CALSTART – (focus on ZEV/MOU states)
 - Develops a cooperative EV purchasing process for state and local government fleets
 - Goal of facilitating 10,000 EV sales annually
- National Assn. of Regional Councils
 - Develops national and regional group contracting agreements
 - Includes multiple EPACT defined alternative fuel vehicle types

FY16 broad FOA – Two Deployment topics (out of 11);

- ***EV Everywhere Plug-In Electric Vehicle Local Showcases (\$ 2.5M)*** – seeks to establish local demonstration centers that will provide a hands-on consumer experience and in-depth education for commercially available PEVs and EVSE.
- ***Alternative Fuel Vehicle Workplace Safety Programs (\$ 1.5M)*** – to provide safety training and workshops related to garage facility/building upgrades that are required for gaseous fuels (natural gas, propane, and hydrogen).

Cong. Dir. FOA (\$ 10M) – Alt-Fuel Vehicle Community Partner Projects

- *Planned for FY16 FOA - Final project scope and details TBD*

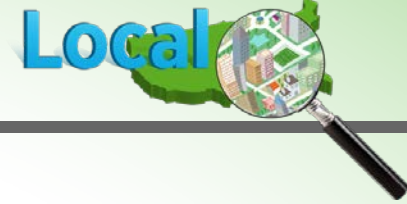




Funding Assistance

Coalitions help fleets find funding for purchasing alternative fuel vehicles or installing fueling infrastructure. Northern California Coalitions work together to host a Funding Workshop that educates fleet managers about financial assistance opportunities and best practices for writing grants.





Advising Fleets on Petroleum Reduction Strategies

Through Wisconsin Clean Cities' Smart Fleet program, the coalition provides fleets a planning tool for reducing their carbon footprint and outlines different options available specific to the fleet's needs.



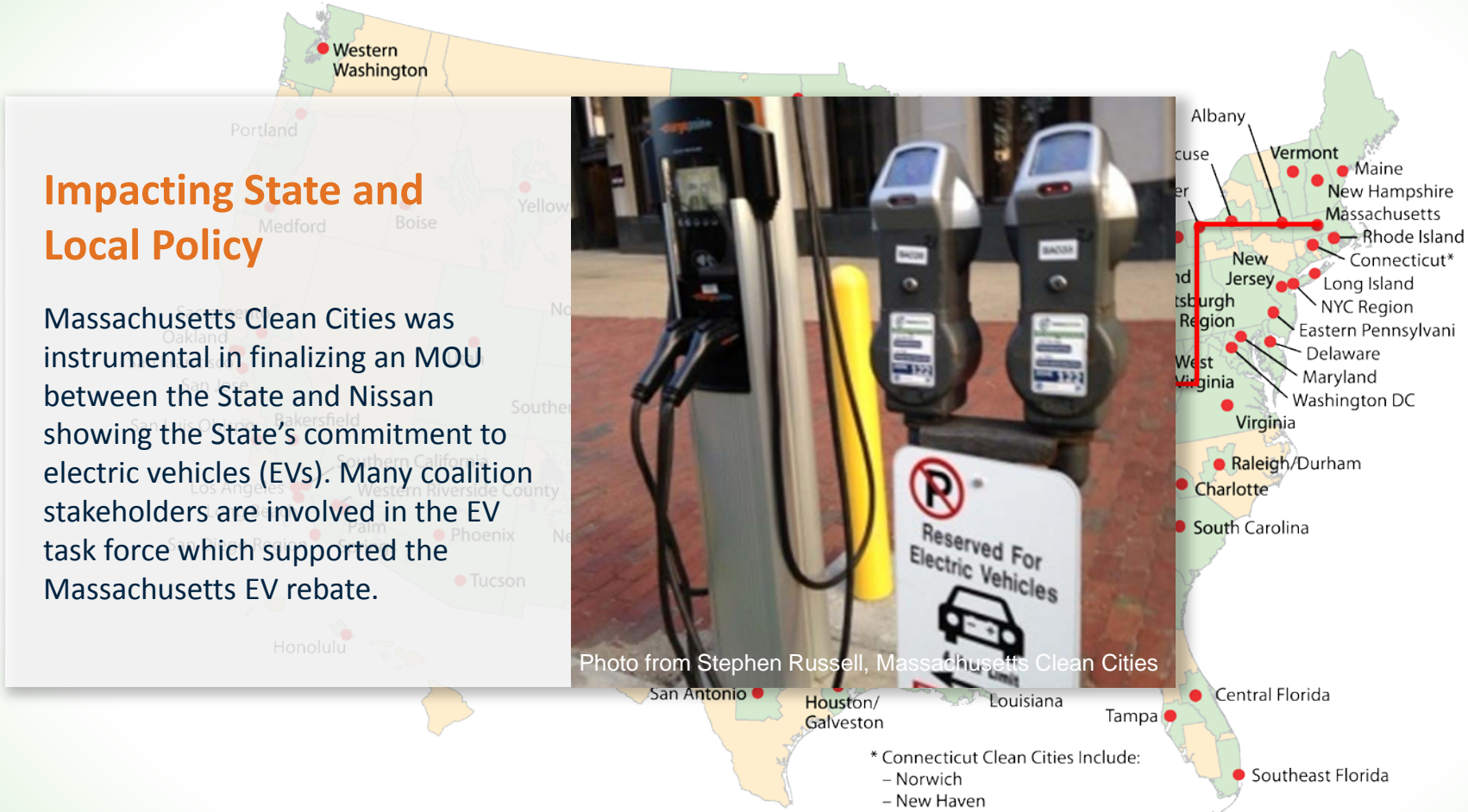
- NORWICH
- New Haven
- Connecticut Southwestern Area
- Capitol Clean Cities (Hartford area)

Impacting State and Local Policy

Massachusetts Clean Cities was instrumental in finalizing an MOU between the State and Nissan showing the State's commitment to electric vehicles (EVs). Many coalition stakeholders are involved in the EV task force which supported the Massachusetts EV rebate.



Photo from Stephen Russell, Massachusetts Clean Cities



- * Connecticut Clean Cities Include:
- Norwich
 - New Haven
 - Connecticut Southwestern Area
 - Capitol Clean Cities (Hartford area)

Clean Cities Coalitions

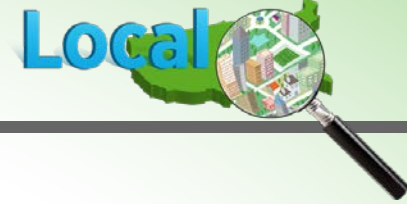


Photo from Stephanie Weisenbach, Iowa Clean Cities

Technical Assistance

Iowa Clean Cities provided technical assistance to stakeholders, Sioux Per Center Shell Station and its anchor fleet Meerdink Trucking, as they developed a new public CNG station. Clean Cities helped them make key contacts at the state level and get approvals in a timely manner.

Public Outreach

East Tennessee Clean Fuels participated in National Drive Electric Week by hosting a vehicle display at the University of Tennessee. They raised awareness of the availability of plug-in vehicles and promoted the benefits of driving electric.



Photo from Jonathan Overly, East Tennessee Clean Fuels

- Maine
- New Hampshire
- Massachusetts
- Rhode Island
- Connecticut*
- Long Island
- NYC Region
- Eastern Pennsylvania
- Delaware
- Maryland
- Washington DC



Clean Cities Coalitions



Networking and Stakeholder Education

Coalitions host events that provide opportunities for stakeholders to network, learn about petroleum reduction strategies, and form project partners. This Tulsa Clean Cities stakeholder meeting was hosted by a local CNG equipment manufacturer so the coalition stakeholders can work together to advance the CNG market.



Photo from Daniel Jeffries, Tulsa Clean Cities



* Connecticut Clean Cities Include:
 - Norwich
 - New Haven
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 - Capitol Clean Cities (Hartford area)

- Browse resources
- Get in touch- contact your local coalition
- Become a stakeholder
 - Join email list
 - Attend an event
 - Membership
- Co-host an event
 - Vehicle displays
- Partner on a project
 - EV Infrastructure



Important Web Sites and Resources

Clean Cities

cleancities.energy.gov

Alternative Fuels Data Center

afdc.energy.gov

FuelEconomy.gov

Clean Cities' Technical Response Service

Phone: 800-254-6735

Email: technicalresponse@icfi.com



U. S. Department of Energy