

# American Recovery and Reinvestment Act

## *Clean Cities Project Awards*



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## Introduction

Clean Cities advances the nation’s economic, environmental, and energy security by supporting local actions to cut petroleum use in transportation. Clean Cities carries out this mission through a network of nearly 100 coalitions, which bring together stakeholders in the public and private sectors to deploy alternative and renewable fuels, idle-reduction measures, fuel economy improvements, and emerging transportation technologies. The program also administers the Alternative Fuels Data Center (AFDC) website ([afdc.energy.gov](http://afdc.energy.gov)) and contributes to the FuelEconomy.gov website ([fuelconomy.gov](http://fuelconomy.gov)).

Since 1993, Clean Cities has awarded nearly \$400 million in cumulative funding for hundreds of projects across the country that contribute to the program’s primary goal of reducing petroleum use in the U.S. by 2.5 billion gallons per year by 2020.

Clean Cities-funded projects have included:

- Introducing all-electric and hybrid electric vehicles into public and private fleets
- Converting conventional vehicles to run on natural gas and propane
- Installing idle-reduction equipment in school buses and tractor trailers
- Developing fueling stations for alternative and renewable fuels, including biodiesel, ethanol, electricity, natural gas, and propane.

Visit [cleancities.energy.gov/partnerships/](http://cleancities.energy.gov/partnerships/) to learn more about Clean Cities-funded projects.

## American Recovery and Reinvestment Act Project Awards

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million in federal government investment, a significant portion of the program’s cumulative funding. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

### Vehicles Deployed

Clean Cities efforts under the Recovery Act deployed 9,035 vehicles overall. These vehicles comprised roughly even numbers of light-duty vehicles (4,542 vehicles) and medium- and heavy-duty vehicles (4,493 vehicles).

The composition of light-duty vehicles by fuel type is displayed in Figure 1. The light-duty vehicles were dominated by liquefied petroleum gas (LPG) or propane vehicles and compressed natural gas (CNG) vehicles (51% and 28%, respectively). Significant numbers of hybrid electric vehicles (HEVs) and electric vehicles (EVs) were deployed (15% and 5%, respectively). Smaller numbers of neighborhood electric vehicles (NEVs) (1%) and plug-in hybrid electric vehicles (PHEVs) (0.1%) comprised the remainder of the deployed light-duty vehicles.

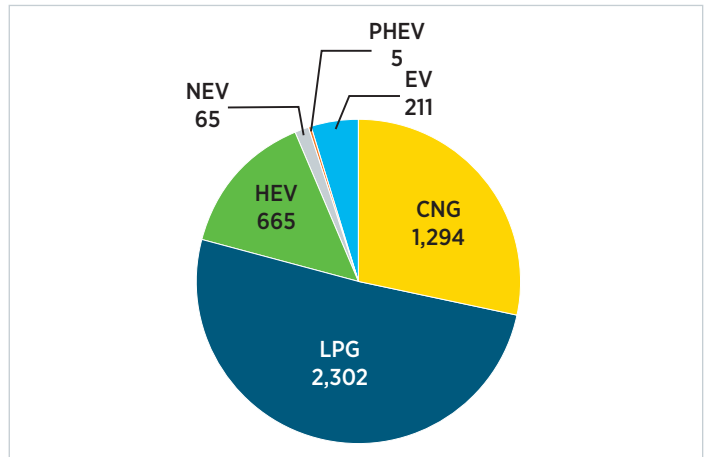


Figure 1. Light-Duty Vehicles Deployed

The composition of medium- and heavy-duty vehicles deployed by the Clean Cities Recovery Act effort is displayed in Figure 2. CNG and LPG dominated the medium- and heavy-duty vehicles deployed (45% and 29%, respectively), as they did in the light-duty segment. HEVs and liquefied natural gas (LNG) vehicles were deployed in significant numbers (16% and 8%, respectively). Smaller numbers of hydraulic hybrid vehicles (HHVs) (1%), PHEVs (1%), and EVs (0.4%) were deployed.

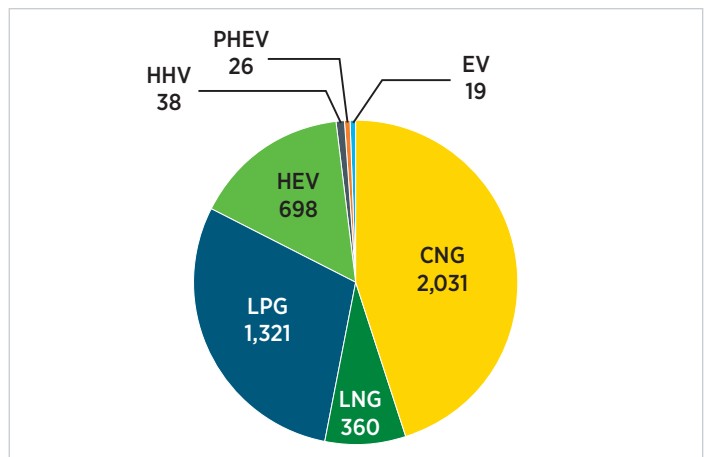


Figure 2. Medium- and Heavy-Duty Vehicles Deployed

Figure 3 displays the reduction of petroleum consumption by vehicle fuel type and weight class for Clean Cities Recovery Act projects through December 2014. The deployed advanced technology vehicles achieved more than a 56 million gasoline gallon equivalent (GGE) reduction in petroleum consumption. The large numbers of CNG and LPG vehicles in both the light-duty and medium- and heavy-duty weight classes were responsible for the largest reductions in petroleum use. The 360 LNG vehicles represented just 4% of the overall 9,035 vehicles, but the vehicles displaced more than 10 million GGEs of petroleum use or 18% of the total petroleum displacement.

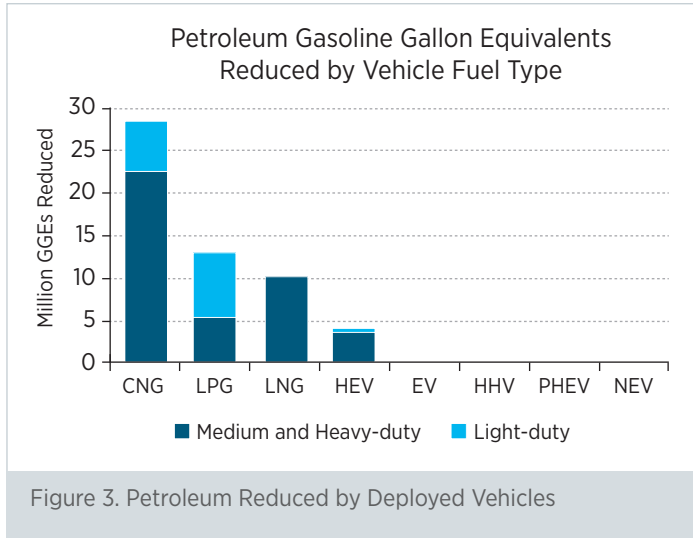


Figure 3. Petroleum Reduced by Deployed Vehicles

Medium- and heavy-duty vehicles typically use more fuel on a per vehicle basis than light-duty vehicles, and although there were nearly equal numbers of light-duty and medium- and heavy-duty vehicles deployed by the Recovery Act efforts, medium- and heavy-duty vehicles accounted for 75% of the petroleum displacement.

Figure 4 displays greenhouse gases (GHGs) reduced by vehicle fuel type and weight class through December 2014. In total,

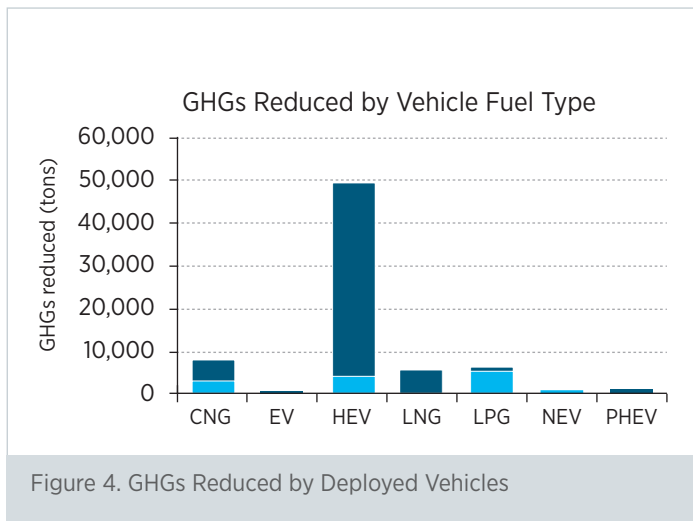


Figure 4. GHGs Reduced by Deployed Vehicles

vehicles reduced more than 69,000 short tons of GHGs, with medium- and heavy-duty HEVs having the greatest impact. Medium- and heavy-duty HEVs were responsible for 66% of vehicle GHG reductions, despite representing only 8% of vehicles deployed overall.

**Installed Infrastructure**

The Clean Cities Recovery Act efforts were responsible for the installation of 1,380 alternative fuel stations. Figure 5 displays the number of installed stations by fuel type. EV charging stations dominated with 62% of the installed stations. A significant number of LPG and CNG stations were installed (19% and 10% of stations, respectively). Smaller numbers of E85 (5%), biodiesel (3%), and LNG (1%) stations were installed.

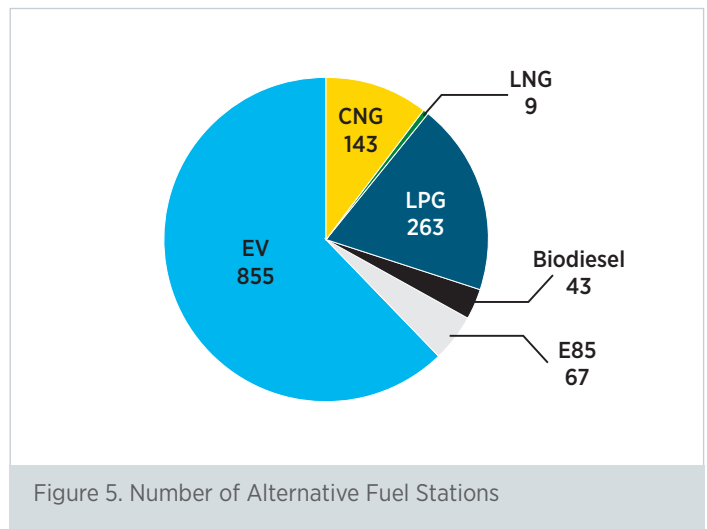


Figure 5. Number of Alternative Fuel Stations

The installed infrastructure was responsible for the avoidance of 98 million GGEs of petroleum use (Figure 6). Although representing just 10% of the stations, the CNG stations represented 65% of the petroleum displacement. E85 stations and LPG

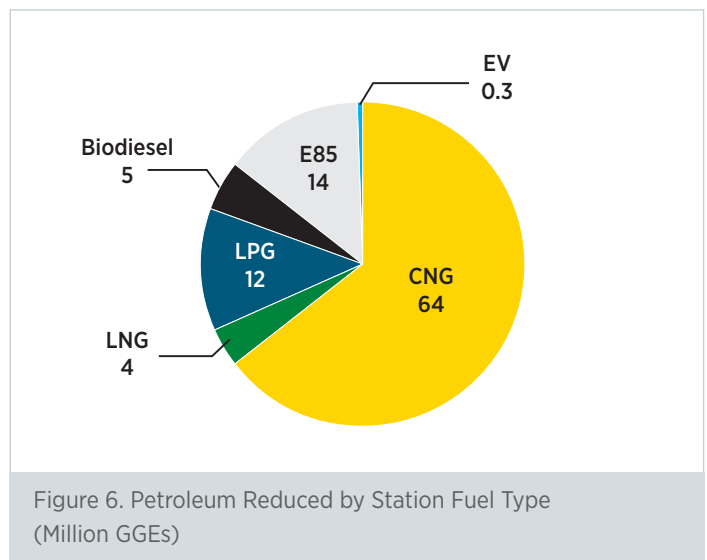


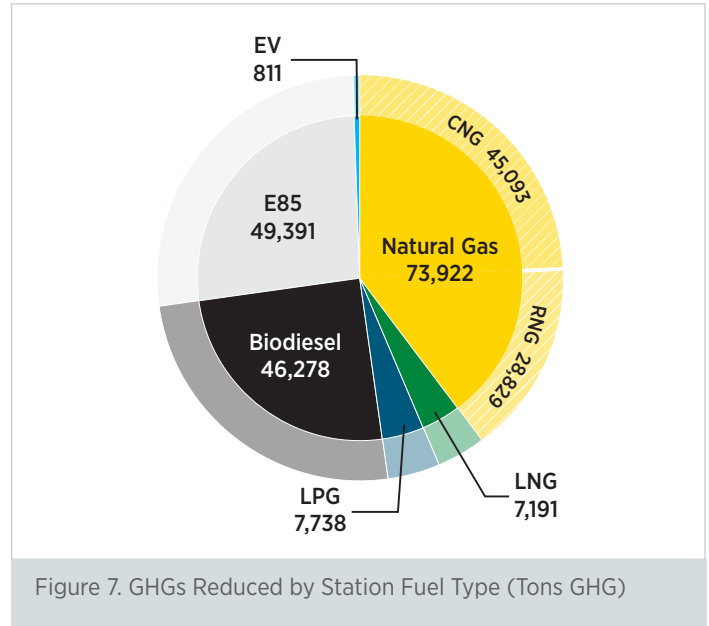
Figure 6. Petroleum Reduced by Station Fuel Type (Million GGEs)

stations displaced significant amounts of petroleum (14% and 12%, respectively). The biodiesel and LNG stations displaced lower amounts of petroleum (5% and 4%, respectively). The EV stations were responsible for less than 1% of the petroleum displacement due to installed infrastructure.

The installed infrastructure was responsible for reducing more than 185,000 tons of GHGs (Figure 7). CNG refueling stations represented 40% of infrastructure-related GHG reductions, while E85 and Biodiesel represented 27% and 25%, respectively. LNG and LPG stations each represented 4% of infrastructure GHG reductions. It should be noted that a single CNG station at the Fair Oaks Dairy Farm in Indiana using renewable natural gas (see page 21) accounted for nearly 40% of the CNG station reductions.

### Clean Cities Recovery Act Project Award Impacts

Each individual Clean Cities Recovery Act project award included a diverse group of stakeholders who worked together to lay the foundation for their communities to adopt alternative fuels and petroleum reduction strategies. Although each Recovery Act project benefited from large funding amounts, most projects included multiple sub-projects that met specific fleet and community needs. This document provides a snapshot of the impact of each project and highlights the partners and Clean Cities coalitions that helped transform local and regional transportation markets through 25 projects that impacted 45 states.




# Heavy-Duty Natural Gas Drayage Truck Replacement Program

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

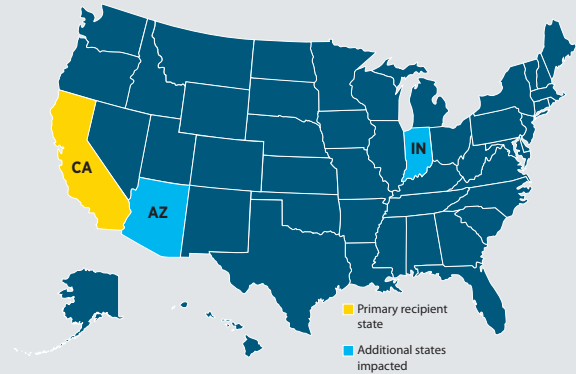
## Project Summary:

The South Coast Air Quality Management District (SCAQMD) Heavy-Duty Natural Gas Drayage Truck Replacement Program addressed a significant need to reduce diesel emissions and associated public health risks from goods movement at the Ports of Los Angeles and Long Beach. The two ports, located adjacent to one another, constitute America’s largest port complex and are ranked among the busiest container ports in the world. This project replaced 219 older, heavy-duty diesel trucks servicing the ports or other goods-movement operations in the region with new liquefied natural gas (LNG) and compressed natural gas (CNG) trucks powered by cleaner natural gas engines. The project also included education, outreach, and training activities to promote the use of alternative fuel vehicles. Learn more at [afdc.energy.gov/case/1203](http://afdc.energy.gov/case/1203).

## Technology Types:

 LNG and CNG

## States: Arizona, California, and Indiana



### Funding:

- \$9,408,389 Award
- \$24,331,611 Local matching funds

### Congressional Districts<sup>1</sup>:

- Arizona’s 4th Congressional District
- California’s 8th, 24th-53rd Congressional Districts
- Indiana’s 4th-7th and 9th Congressional Districts

## Lessons Learned and Impact

In the initial year of the project, maintenance issues and lack of qualified technicians resulted in long wait times for repairs. This proved problematic for small owner/operators without back-up trucks available. Over the course of the project, mechanic training workshops offered at community colleges and dealer training programs increased the number of qualified technicians to meet growing demand. In addition, once the 12L CNG engines became available, drivers reported fewer maintenance issues and less downtime because the engines were better matched to the trucks’ drayage duty cycle.

	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
<b>Infrastructure</b>	0	0	0	0	0	0	0	-	-		
	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
<b>Vehicles</b>	0	0	0	0	0	17	202	0	219	5,179,333.89	3,217.71
<b>Grand Total Petroleum Displacement</b>		<b>Grand Total GHG Reductions</b>									
				5,179,333.89      3,217.71							

<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line® Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.

**Partners:**

- California Air Resources Board
- California Energy Commission
- Clean Cities Coachella Valley Region
- Long Beach Clean Cities Coalition
- Los Angeles Clean Cities Coalition
- Port of Long Beach
- Port of Los Angeles
- South Coast Air Quality Management District
- Southern California Association of Governments Clean Cities Coalition
- Western Riverside County Clean Cities Coalition

**Case Studies:****Pacific 9 Transportation Success Story**

The drayage truck project helped Pacific 9 Transportation acquire its first 14 LNG trucks, which it uses to move shipping containers from the ports. When SCAQMD issued a later solicitation, the

company applied for funding to purchase an additional four heavy-duty LNG trucks. The funds covered about \$100,000 for each of the new vehicles, which each cost \$153,135. Pacific 9 obtained financing to cover the balance of the purchase price. Learn more at [afdc.energy.gov/case/1203](https://afdc.energy.gov/case/1203) and [www.pac9.com](http://www.pac9.com). ■



SCAQMD has helped deploy more than 700 LNG vehicles operating at the ports and along major goods-movement corridors in the region.

*Photo from Port of Los Angeles*

# Low Carbon Fuel Infrastructure Investment Initiative (LCFI3)

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

### Project Summary:

The California Department of General Services (DGS) and Propel Fuels built 36 alternative fuel stations to provide public access to low-carbon alternative fuels for more than 600,000 flexible fuel vehicles (FFVs) statewide. The project included a comprehensive development program focused on identifying and establishing lease agreements for station locations; designing, engineering, and permitting plans for infrastructure and signage; engaging contractors to manage construction and build stations; and marketing the stations to the public and fleets to increase adoption of the fuels. These stations serve the public, as well as government and private fleets, by distributing fuels such as ethanol (E85) for use in FFVs and biodiesel. Learn more at [cleancities.energy.gov/partnerships/search?utf8=%E2%9C%93&project\\_search=california#arra-low](http://cleancities.energy.gov/partnerships/search?utf8=%E2%9C%93&project_search=california#arra-low).

### Technology Types:

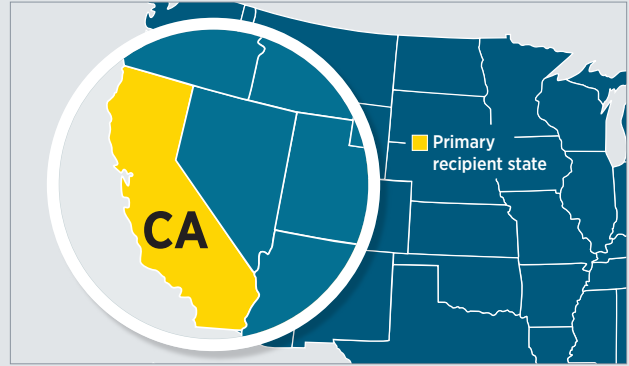
 Biodiesel and E85

	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
<b>Infrastructure</b>	0	0	0	0	27	36	63	10,486,323.07	52,455.51		
	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
<b>Vehicles</b>	0	0	0	0	0	0	0	0	0	-	-
<b>Grand Total Petroleum Displacement</b>							<b>Grand Total GHG Reductions</b>				
10,486,323.07							52,455.51				

### Partners:

- California Department of General Services
- CALSTART, Inc.
- East Bay Clean Cities
- Long Beach Clean Cities
- Propel Fuels, Inc.
- Sacramento Clean Cities
- San Diego Regional Clean Cities
- San Joaquin Valley Clean Cities
- Silicon Valley Clean Cities
- Western Riverside County Clean Cities

### State: California



#### Funding:

- \$6,917,200 Award
- \$14,488,844 Local matching funds

#### Congressional Districts<sup>1</sup>:

- California's 4th, 6th, 7th, 13th-17th, 19th, 27th, 29th, 33rd, 35th, 36th, 38th, 39th, 42nd, 43rd, 46th-50th, 52nd, and 53rd Congressional Districts

### Lessons Learned and Impact

This project doubled the number of biofuel stations available to California drivers. By leveraging available credits through the California Low Carbon Fuel Standard (LCFS) and RINS and by purchasing fuel under advance contracts to avoid spot-market pricing, project partner Propel Fuels was able to keep fuel prices low. Strong branding, communication, and education efforts resulted in the Propel Fuel stations having among the highest renewable fuel sales volumes in the country.

<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line® Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.



## Case Studies:

### California Ramps Up Biofuels Infrastructure

New Propel Fuels biodiesel and E85 fueling stations are cropping up across California as Clean Cities stakeholders work to expand the availability of biofuels. The stations have the potential to support the displacement of 39 million gallons of petroleum and 187,500 tons of carbon dioxide emissions per year, and they will create more than 450 green jobs. Learn more at [afd.energy.gov/case/1056](http://afd.energy.gov/case/1056). ■



One of 36 new alternative fuel stations is announced at an event at a new Propel Fuels station in Oakland, California, in August 2010. *Photo by Cara Wasilewski, NREL 18220*

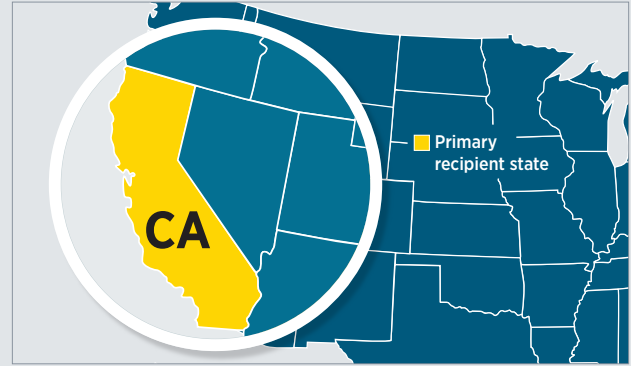
# San Bernardino Associated Governments Alternative Fuel Truck Project

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

## Project Summary:

San Bernardino Associated Governments (SANBAG) partnered with the California Energy Commission (CEC) and Ryder Systems, Inc., to deploy 204 state-of-the-art compressed natural gas (CNG) and liquefied natural gas (LNG) heavy-duty tractor-trailer trucks in leased service. The project demonstrated the feasibility of using cleaner-burning, lower-carbon natural gas in commercial trucking operations. It also supported the development of a low-carbon supply-chain transportation solution for Ryder customers seeking to displace petroleum diesel fuel with domestically produced natural gas. Ultimately, the project helped achieve a substantial, quantifiable reduction in ozone precursor and greenhouse gas air pollutant emissions within the jurisdiction of the South Coast Air Quality Management District. In addition to the deployment of the heavy-duty natural gas tractors, the project also constructed two publicly accessible fueling stations in Fontana and Orange, California, offering CNG and LNG, and a CNG/LNG maintenance facility in Rancho Dominguez, California. Learn more at [cleancities.energy.gov/partnerships/search?utf8=%E2%9C%93&project\\_search=sanbag#arra-sanbernardino](http://cleancities.energy.gov/partnerships/search?utf8=%E2%9C%93&project_search=sanbag#arra-sanbernardino).

## State: California



### Funding:

- \$9,950,708 Award
- \$9,308,000 Local matching funds

### Congressional Districts<sup>1</sup>:

- California's 8th, 27th, 31st, 35th, 39th, 41st, 45th, and 46th Congressional Districts

## Lessons Learned and Impact

Ryder successfully introduced a significant number of alternative fuel vehicles to national-scale trucking fleets and learned the importance of tailoring trucks to the specific needs of each user. Because tank space and weight play important roles in individual fleet operations, the company determined developing correct vehicle specifications for the customer is critical to success. CNG achieved economic parity with conventional fuel for the majority of participating fleets.

## Technology Types:

- 🔥 CNG and LNG
- ♿ Driver training
- 🏠 Facility modifications

	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
<b>Infrastructure</b>	0	2	2	0	0	0	4	320,990.97	164.10		
	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
<b>Vehicles</b>	0	0	0	0	0	169	35	0	204	4,144,133.85	1,675.42
<b>Grand Total Petroleum Displacement</b>							<b>Grand Total GHG Reductions</b>				
4,465,124.82							1,839.52				

<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line® Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.

**Partners:**

- California Energy Commission (CEC)
- San Bernardino Associated Governments (SANBAG)
- Southern California Clean Cities Coalition
- Ryder System, Inc.

**Case Studies:****Ryder Opens Natural Gas Vehicle Maintenance Facility**

Ryder opened its first natural gas vehicle maintenance facility in Rancho Dominguez, California, which meets the stringent industry and government safety standards for natural gas maintenance. The facility includes two natural gas fueling stations and three maintenance facilities. Ryder will deploy a total of 202 heavy-duty natural gas vehicles in the region and at completion, the Ryder/SANBAG project will displace more than 1.5 million gallons of diesel annually with 100% domestically produced low-carbon natural gas. Learn more at [afd.energy.gov/case/1063](http://afd.energy.gov/case/1063).



In Rancho Dominguez, California, Ryder opened its first natural gas vehicle maintenance facility. It meets the stringent industry and government safety standards for natural gas maintenance, including upgrades to electrical, lighting, air handling, and ventilation systems. *Photo from Ryder Systems, Inc.*

**Golden Eagle Distributors Inc. to Convert Entire Fleet to CNG**

Golden Eagle Distributors, Inc., in partnership with Ryder Systems, Inc., is converting its entire heavy-duty fleet in Tucson, Arizona, to CNG. To support distribution operations, Golden Eagle agreed to lease 23 CNG vehicles by the end of 2011. The vehicles are part of a strategic alternative fuel program focused on reducing transportation-generated emissions and fuel costs. The Tucson fleet conversion is the first step in a larger, multi-year CNG plan; Golden Eagle will convert all fleet vehicles to CNG in their six branch operations throughout the state. To service this growing fleet, Golden Eagle is working toward opening its own CNG fueling stations in Tucson and at several other branch locations, including Casa Grande and Buckeye. Learn more at [afd.energy.gov/case/1059](http://afd.energy.gov/case/1059).

# UPS Ontario—Las Vegas Corridor Extension—Bridging the Gap

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

## Project Summary:

The UPS Ontario—Las Vegas Corridor Extension—Bridging the Gap project provided funding to partially offset the cost to purchase liquefied natural gas (LNG) trucks and construct a publically accessible LNG fueling station in Las Vegas, Nevada, located adjacent to McCarran International Airport and the intersection of Interstates 215 and 15. As a result, UPS deployed 48 heavy-duty Class 8 LNG tractor trucks. The station also supports an additional 150 LNG vehicles in UPS’s California, Nevada, and Utah operations. The project also included an outreach effort to generate additional usage at the LNG station and ensure continued viability of the LNG corridor. Learn more at [cleancities.energy.gov/partnerships/search?utf8=ü&project\\_search=ontario#arra-ups](http://cleancities.energy.gov/partnerships/search?utf8=ü&project_search=ontario#arra-ups).

## Technology Types:

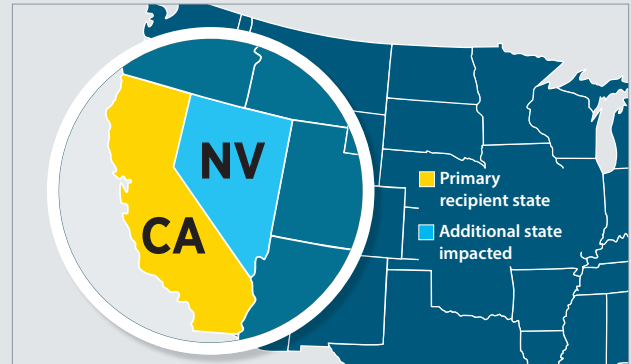
 LNG

	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
<b>Infrastructure</b>	0	1	0	0	0	0	1	1,052,967.91	1,050.93		
	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
<b>Vehicles</b>	0	0	0	0	0	0	48	0	48	2,112,936.21	347.10
<b>Grand Total Petroleum Displacement</b>		<b>Grand Total GHG Reductions</b>									
		3,165,904.12		1,398.03							

## Partners:

- Clean Energy Fuels, Inc.
- Eastern Sierra Regional Clean Cities Coalition
- South Coast Air Quality Management District (SCAQMD)
- Southern California Association of Governments Clean Cities Coalition
- United Parcel Service (UPS)

## States: California and Nevada



### Funding:

- \$5,591,611 Award
- \$10,721,968 Local matching funds

### Congressional Districts<sup>1</sup>:

- California’s 31st, 35th, 41st, and 42nd Congressional Districts
- Nevada’s 1st, 3rd, and 4th Congressional Districts

## Lessons Learned and Impact

Although the incremental cost of an LNG truck is expensive, UPS found the operational costs can be lower due to lower fuel and maintenance costs compared to diesel. UPS placed the LNG tractors on its highest mileage routes to ensure maximum savings.

<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line® Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.

**Case Studies:****Southern California Natural Gas Success Story**

The Southern California Clean Cities coalition is working to reduce emissions in the South Coast Air Basin region by converting heavy-duty truck fleets to clean-burning LNG. This project

helped UPS with the purchase of 48 new LNG tractor-trailer trucks, as well as the construction of a new LNG fueling station in Las Vegas, NV. The station supports a long-planned 700-mile regional LNG fueling corridor across the southwestern United States along one of the nations' most heavily traveled truck routes. Learn more at [youtube.com/watch?v=GA3uWS0zVuY](https://www.youtube.com/watch?v=GA3uWS0zVuY).



Shipping company UPS purchased 48 new LNG-powered heavy-duty tractor trailer trucks and constructed a new LNG fueling station in Las Vegas to serve these trucks. *Photo from UPS, NREL 12409*






# Connecticut Clean Cities Future Fuels Project

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

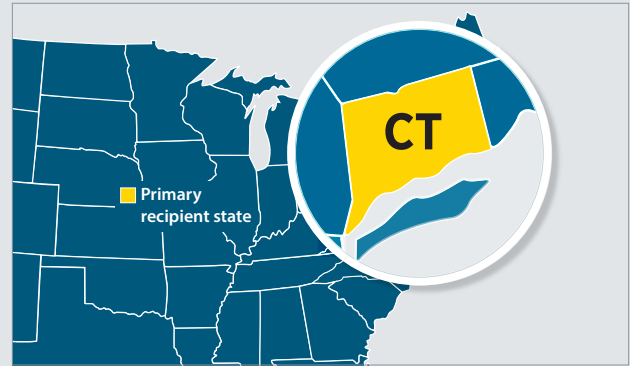
## Project Summary:

The Greater New Haven Clean Cities Coalition, together with its partners, developed and implemented a state-wide, fuel-neutral effort that deployed 276 alternative fuel vehicles and 18 public- and private-access fueling stations for fleets. The project deployed a diverse array of alternative fuels and advanced vehicles, including compressed natural gas (CNG), liquefied natural gas (LNG), hybrid electric vehicles, electric vehicle (EV) charging stations, and biodiesel. The Connecticut Clean Cities Future Fuels Project displaced more than 5.3 million gasoline gallon equivalents of petroleum and strengthened the availability of alternative fuels for fleets and commercial consumers along major corridors in the state. The effort also included a targeted outreach and education effort, which raised awareness and fostered greater understanding of alternative fuels and advanced vehicle technologies. Learn more at [www.ct-futurefuels.com/](http://www.ct-futurefuels.com/).

## Technology Types:

-  CNG and LNG
-  Biodiesel
-  Hybrid electric vehicles
-  Driver training
-  EV charging stations

## State: Connecticut



### Funding:

- \$13,195,000 Award
- \$16,054,106 Local matching funds

### Congressional Districts<sup>1</sup>:

- Connecticut's 1st-5th Congressional Districts

## Lessons Learned and Impact

While large fleets get a lot of attention, a majority of fleets across the country are small and often rely on other small fleets for inspiration and advice on the best ways to increase the efficiency of their operations. In this project, every partner fleet grew as a result of participation—with some purchasing as many as 70% more alternative fuel vehicles than they originally anticipated. During the process, partners also realized environmental benefits, public relations benefits, and reduced maintenance and fuel costs that have continued over time.

	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
<b>Infrastructure</b>	0	1	8	8	1	0	18	2,817,435.63	4,057.13		
	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
<b>Vehicles</b>	0	0	0	1	0	256	19	0	276	2,507,300.77	379.40
<b>Grand Total Petroleum Displacement</b>		<b>Grand Total GHG Reductions</b>									
				5,324,736.40							
				4,436.54							

<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line® Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.

**Partners:**

- Capitol Clean Cities of Connecticut
- City of Bridgeport
- City of Meriden
- Connecticut Southwestern Area Clean Cities
- CTTRANSIT
- Enviro Express, Inc.
- Greater New Haven Clean Cities Coalition
- JRC Services LLC
- Metro Taxi
- NANA Corporation (Ella Grasso Turnpike Shell Station)
- Norwich Clean Cities
- Norwich Public Utilities
- Russo Lawn & Landscape, Inc.
- The Yellow Cab Company
- Town of Fairfield
- Town of Glastonbury
- Yale University

**Case Studies:****Natural Gas Fueling Station Success Story**

In December 2010, Clean Cities coalitions in Connecticut, in partnership with Enviro Express, opened the first LNG transportation fueling center east of the Mississippi. The station also provided CNG fueling facilities. Learn more at [afdc.energy.gov/case/1048](http://afdc.energy.gov/case/1048) and [afdc.energy.gov/case/403](http://afdc.energy.gov/case/403).



In the LNG station's first five months of operation, Enviro Express solid-waste collection trucks used 110,000 diesel gallon equivalents of LNG. *Photo from Greater New Haven Clean Cities Coalition, NREL 19683*

**Norwich Public Utilities Success Story**

Norwich Public Utilities assembled the largest municipal fleet of natural gas vehicles in Connecticut, with 33 CNG vehicles, as well as a hybrid electric bucket truck, two hybrid SUVs, and 15 biodiesel vehicles. Learn more at [afdc.energy.gov/case/203](http://afdc.energy.gov/case/203).



Norwich Public Utilities operates 33 CNG vehicles, including this sewer-jet truck used to clean out sewer lines.

*Photo from MotorWeek*

**Metro Taxi Success Story**

Metro Taxi, operator of Connecticut's largest taxi fleet, launched 110 CNG-fueled Ford Transit Connects and Honda Civics into service. Learn more at [www.ct-futurefuels.com/2014/05/metro-taxi-fleet.html](http://www.ct-futurefuels.com/2014/05/metro-taxi-fleet.html) and [youtube.com/watch?v=aT3yaoRSesc](http://youtube.com/watch?v=aT3yaoRSesc). ■

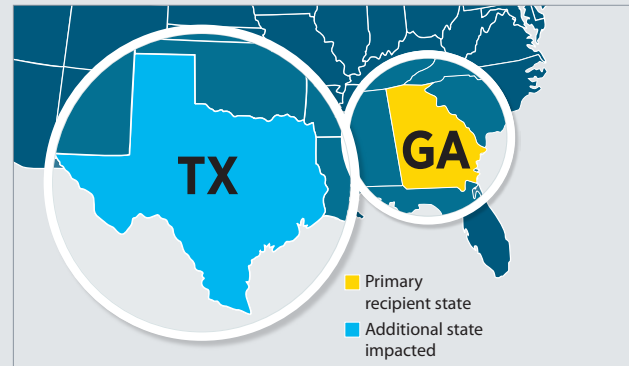
# DeKalb County / Metropolitan Atlanta Alternative Fuel and Advanced Technology Vehicle Project

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

## Project Summary:

Clean Cities-Georgia, along with its partners, collaborated on the DeKalb County / Metropolitan Atlanta Alternative Fuel and Advanced Technology Vehicle Project. The effort aimed to increase the use of alternative fuel and advanced technology vehicles in Metro Atlanta and bolster fueling infrastructure to reduce U.S. dependence on imported petroleum, increase fuel economy, and reduce emissions. As a result of the project, the region gained a landfill gas conversion facility capable of producing renewable natural gas (RNG) at a DeKalb County landfill, five publicly accessible compressed natural gas (CNG) fueling stations, and upgraded one station to accommodate additional CNG fueling capacity. More than 200 alternative fuel and advanced technology vehicles have also been deployed by Metro Atlanta-based companies, as well as city and county governments. In addition to the environmental and health benefits, this project has helped maintain Atlanta's competitiveness to attract new businesses and jobs. Learn more at [cte.tv/project/dekalb-countymetropolitan-atlanta-alternative-fuel-and-advanced-vehicle-project](http://cte.tv/project/dekalb-countymetropolitan-atlanta-alternative-fuel-and-advanced-vehicle-project).

## States: Georgia and Texas



### Funding:

- \$14,983,167 Award
- \$24,681,387 Local matching funds

### Congressional Districts<sup>1</sup>:

- Georgia's 4th-6th, 10th, 11th, and 13th Congressional Districts
- Texas' 3rd-5th, 24th, 30th, 32nd, and 33rd Congressional Districts

## Lessons Learned and Impact

The project was a catalyst for CNG growth in Georgia. Even though the project funded only seven stations, CNG availability grew from a single station in 2009 to nearly 30 public stations (nearly all of which were funded due to local market momentum and without government support)—either open or in the planning stages—by the conclusion of the project. Participating fleets have continued to grow their CNG fleets to take advantage of expanding infrastructure options and other fleets have also started deploying CNG vehicles.

## Technology Types:

- CNG and RNG
- Hybrid electric vehicles
- Hydraulic hybrid vehicles

	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
<b>Infrastructure</b>	0	0	7	0	0	0	7	1,238,737.60	1,232.04		
	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
<b>Vehicles</b>	0	0	0	50	0	179	0	0	229	1,382,752.82	2,293.77
<b>Grand Total Petroleum Displacement</b>							<b>Grand Total GHG Reductions</b>				
2,621,490.42							3,525.81				

<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line® Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.



**Partners:**

- American Fueling Systems
- Atlanta Airport Marriott
- Atlanta Airport Renaissance
- Atlanta Gas Light
- City of Atlanta
- Clean Cities-Georgia
- Coca-Cola Refreshments
- DeKalb County
- PS Energy Group
- Snapping Shoals EMC
- The Parking Spot
- United Parcel Service (UPS)

**Case Studies:****Clean Cities-Atlanta Success Story**

The goal of the Clean Cities-Atlanta Petroleum Reduction program is to increase the use of alternative fuels and alternative fuel vehicles in the Atlanta metro area. The project has tripled the number of natural gas refueling stations in the metro area and has funded 40 natural gas vehicles for the DeKalb County Sanitation Department, 36 shuttle buses that are used at Hartsfield-Jackson Atlanta International Airport, 30 vehicles for Coca-Cola Refreshments, as well as 70 vehicles for UPS. Learn more at [youtube.com/watch?v=qpP00682IZQ](https://www.youtube.com/watch?v=qpP00682IZQ).



The county sanitation trucks that unload solid waste at the Seminole Road Municipal Landfill in DeKalb County fuel up on renewable natural gas produced from landfill gas dispensed on-site. *Photo by Roberto Gordon/DeKalb County, NREL 26760*



Funding for this project increased the availability of alternative fuels with the development of six public-access, CNG fueling stations in the metropolitan Atlanta region. *Photo from Center for Transportation and the Environment*

**Snapping Shoals EMC Success Story**

Snapping Shoals Electric Membership Corporation first began adding alternative fuel vehicles to their fleet in 1998. The utility started by purchasing 23 CNG vehicles. The utility has saved an estimated \$550,000–\$600,000 in fuel costs since 1998 and has displaced 236,347 gallons of petroleum since mid-2002. Learn more at [afmi.cleancitiesgeorgia.org/images/Case%20Studies/NG%20Case%20Study%20-%20Snapping%20Shoals%20EMC.pdf](https://afmi.cleancitiesgeorgia.org/images/Case%20Studies/NG%20Case%20Study%20-%20Snapping%20Shoals%20EMC.pdf).

**Coca-Cola Success Story**

As part of their commitment to the environment, Coca-Cola has added more than 750 hybrid electric delivery trucks to their U.S. and Canadian fleets. The hybrid electric delivery trucks represent about 10 percent of Coca-Cola's overall North American fleet. Learn more at [youtube.com/watch?v=v9GlvJZEMco](https://www.youtube.com/watch?v=v9GlvJZEMco).

**The Parking Spot Success Story**

In 2012, the Parking Spot, an off-site airport shuttle bus company, began adding 31 compressed natural gas buses to their three lots near the Hartsfield-Jackson Atlanta International Airport. The project has fielded more than 200 alternative and advanced technology vehicles, six CNG refueling stations, and a landfill gas to renewable natural gas processing facility. Since then, the company estimates they have displaced more than 725,000 gallons of petroleum fuel. Learn more at [youtube.com/watch?v=3CDLMc77DTQ](https://www.youtube.com/watch?v=3CDLMc77DTQ). ■

# Idaho Petroleum Reduction Leadership Project

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

## Project Summary:

The Idaho Petroleum Reduction Leadership Project served to assist with establishing compressed natural gas (CNG) fuel availability and use throughout the state. To accomplish this, Treasure Valley Clean Cities and Republic Services worked together to achieve a significant reduction in diesel fuel use by converting a portion of Republic Services’ trash and recycling truck fleet in the Boise area to run on CNG. The effort also led to the installation of the first permanent, public CNG fueling stations in Idaho, which were located at the company’s fleet facilities in Boise and Nampa. Another component of the project included outreach efforts to encourage other fleet operators and the public in the Boise area to use CNG. Learn more at [shifftocng.com](http://shifftocng.com).

## Technology Types:

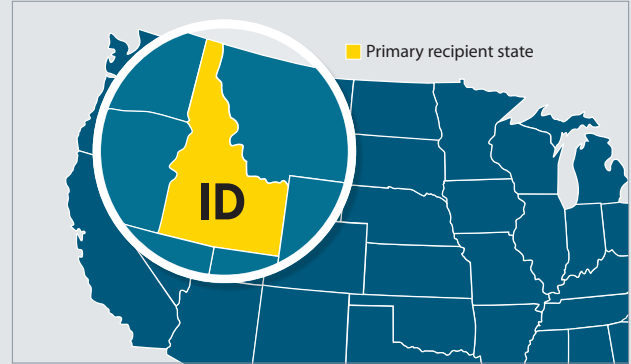
 CNG

	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
<b>Infrastructure</b>	0	0	4	0	0	0	4	2,966,005.99	2,145.83		
	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
<b>Vehicles</b>	0	0	0	0	0	40	0	0	40	1,117,959.84	-
<b>Grand Total Petroleum Displacement</b>							<b>Grand Total GHG Reductions</b>				
4,083,965.83							2,145.83				

## Partners:

- City of Boise
- City of Caldwell
- Republic Services
- Treasure Valley Clean Cities

## State: Idaho



### Funding:

- \$5,519,862 Award
- \$6,839,077 Local matching funds

### Congressional Districts<sup>1</sup>:

- Idaho’s 1st and 2nd Congressional Districts

## Lessons Learned and Impact

The success of this project resulted in a national commitment from Republic Services to transition their entire refuse fleet to CNG. The availability of public infrastructure and a prolonged and robust marketing campaign highlighting the benefits of shifting to CNG also led to a number of small, local fleets and private citizens also making the transition. Dealerships and conversion shops have since started training their technicians to meet growing demand.

<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line® Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.

**Case Studies:****Republic Services Success Story**

Clean Cities Recovery Act funding helped Republic Services, one of the largest waste and recycling companies in

the country, acquire 87 CNG refuse and recycling trucks, train maintenance technicians, and conduct community outreach. Learn more at [afdc.energy.gov/case/1425](http://afdc.energy.gov/case/1425) and [afdc.energy.gov/uploads/publication/casestudy\\_cng\\_refuse\\_feb2014.pdf](http://afdc.energy.gov/uploads/publication/casestudy_cng_refuse_feb2014.pdf).



Republic Services hauls more than 100 million tons of refuse annually for 13 million customers. *Photo from Republic Services, NREL 25212*

# Chicago Area Alternative Fuels Deployment Project

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

## Project Summary:

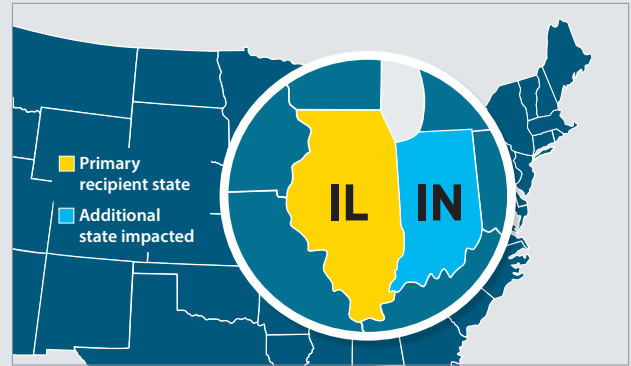
The Chicago Area Alternative Fuels Deployment Project increased the number of alternative fuel and hybrid vehicles on the road and installed alternative fueling and electric vehicle charging stations throughout the Chicago region. The project brought together a wide variety of project partners representing large and small private companies, municipalities, nonprofits, and utilities. Together, they deployed a diverse array of alternative fuels and advanced vehicles, including electric vehicles (EVs), compressed natural gas (CNG), propane, E85, and hybrid technologies. By embracing all types of partners and fuels, Chicago’s transportation landscape was transformed through the addition of green vehicles and fueling stations that helped promote energy security, reduce transportation costs, and improve air quality. In total, the project deployed more than 400 clean vehicles and 235 alternative fueling stations. Learn more at [chicagocleancities.org/success-stories/planting-the-seed](http://chicagocleancities.org/success-stories/planting-the-seed).

## Technology Types:

- EVs and EV charging stations
- E85
- CNG
- Hybrid electric vehicles
- Propane
- Driver training

	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
<b>Infrastructure</b>	1	0	17	206	0	11	235	9,587,039.66	14,814.75		
	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
<b>Vehicles</b>	0	0	1	97	0	314	0	0	412	3,312,413.11	1,621.85
<b>Grand Total Petroleum Displacement</b>		<b>Grand Total GHG Reductions</b>									
		12,899,452.77									
		16,436.60									

## States: Illinois and Indiana



### Funding:

- \$14,999,658 Award
- \$24,625,322 Local matching funds

### Congressional Districts<sup>1</sup>:

- Illinois’ 1st-11th and 14th Congressional Districts
- Indiana’s 1<sup>st</sup> Congressional District

## Lessons Learned and Impact

Project partners with a motivated and educated internal champion were able to achieve successful deployments of AFVs throughout their respective organizations—from management to maintenance shop. Some of the most successful projects were also tied to high volume fuel users. Non-financial incentives like HOV lane access were also deemed important tools for building AFV markets.

<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line® Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.

**Partners:**

- Chicago Area Clean Cities
- Chicago Area Electric Vehicle Charging Station Project
- City of Chicago, Department of Fleet and Facility Management
- City of Chicago, Department of Transportation
- Clean Energy
- ComEd
- Doreen’s Pizza
- DuPage County – Division of Transportation
- Exel-Diageo
- Foodliner
- Forest Preserve District of DuPage County
- Gas Technology Institute
- GO Airport Express
- Green Taxi Program
- Groot Industries
- I-Go Car Sharing
- Ozinga Ready Mix
- Peoples Gas
- SCR Medical Transportation
- Village of Downers Grove
- Waste Management

**Case Studies:**

**Ethanol Flex Fuel Success Story**

Chicago funded the purchase of E85 flex fuel vehicles. The City now has 1,861 E85 vehicles, representing more than 25% of its 7,000 vehicle fleet. Learn more at [chicagocleancities.org/success/ethanol-flex-fuel/](http://chicagocleancities.org/success/ethanol-flex-fuel/) and <http://www.afdc.energy.gov/case/1844>.



Chicago has three fueling stations for E85 flex fuel vehicles that help fuel a fleet of 1,861 E85 vehicles. *Photo by Heather Proc, NREL 19956*

**Ozinga Success Story**

Ozinga worked with Chicago to purchase 14 CNG concrete mixer trucks. The critical first-hand experience gained through these grant vehicles allowed them to quickly expand their alternative fuel plans using their own funds. Learn more at [chicagocleancities.org/success/ozinga/](http://chicagocleancities.org/success/ozinga/).



Chicago used \$100,000 of its Recovery Act Funding to help Foodliner purchase six CNG vehicles for the fleet at its Franklin Park, IL, facility. *Photo from Chicago Area Clean Cities*

**Green Taxi Program Success Story**

Chicago’s Green Taxi Incremental Cost Allowance Program put 120 new taxis on the road, including 49 new hybrids and 71 CNG vehicles. The program helped the taxi industry purchase cost-effective hybrid and alternative fuel vehicles, which moved the City closer to reaching carbon emission goals set out in the Chicago Climate Action Plan. Learn more at [www.chicagocleancities.org/success-stories/green-taxi-program](http://www.chicagocleancities.org/success-stories/green-taxi-program).



Chicago’s Department of Business Affairs and Consumer Protection implemented the successful Green Taxi Incremental Cost Allowance Program using \$1 million of its Recovery Act funding. Thanks to this effort, 120 new taxis were put on the road, including 49 new hybrids and 71 CNG vehicles. *Photo from Chicago Area Clean Cities*

**Foodliner Success Story**

Foodliner, a national carrier of bulk food products, had been considering a move to CNG. Recovery Act funding spurred the company to action and helped them purchase six dedicated CNG Class 8 Freightliner chassis trucks (M2-112) equipped with Cummins Westport (CWI ISL-G) 9-liter heavy-duty natural gas engines. Learn more at [chicagocleancities.org/success/foodliner/](http://chicagocleancities.org/success/foodliner/). ■

# No One Silver Bullet, But a Lot of Silver Beebees

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

## Project Summary:

Through the No One Silver Bullet, But a Lot of Silver Beebees project, the Indiana Office of Energy Development and the Greater Indiana Clean Cities Coalition partnered with nine public- and private-sector organizations to implement a comprehensive alternative fuels plan for their state. The initiative focused on developing a plan designed to assist with the creation and retention of jobs, as well as growing Indiana’s alternative fuels market. To accomplish this, the effort focused on fuel neutrality—implementing the right fuel with the right fleet—based on fleet function, budgetary needs, and desired results. The involvement of Sysco Food Distribution expanded the reach of the project well beyond Indiana. The project resulted in the deployment of 19 compressed natural gas (CNG) vehicles, 250 propane vehicles, and 88 hybrid vehicles, along with 115 propane stations, three CNG stations, and three E85 stations. Learn more at [cleancities.energy.gov/partnerships/search?utf8=&project\\_search=beebees](http://cleancities.energy.gov/partnerships/search?utf8=&project_search=beebees).

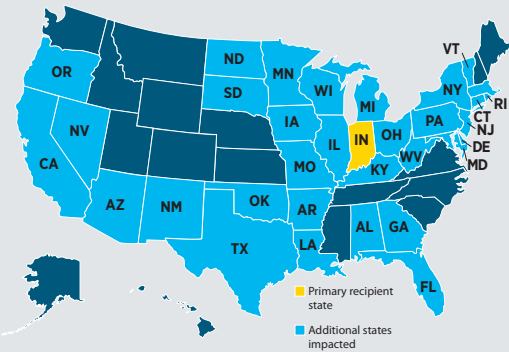
### Lessons Learned and Impact

This project focused on matching the right fuel with the right fleet based on function, budget, and desired results. Maintaining an open dialogue between fleets and the local Clean Cities coalition, along with fostering strong relationships with technical experts and manufacturers allowed any issues to be addressed quickly. This resulted in not only a resolution for the fleet with the issue, but in many cases, an improvement to future product offerings from the manufacturer. The coalition continues to receive inquiries about how to replicate successful projects from this award with other fleets.

## Technology Types:

-  CNG and RNG
-  E85
-  Propane
-  Hybrid electric vehicles

States: Alabama, Arizona, Arkansas, California, Connecticut, Delaware, Florida, Georgia, Iowa, Illinois, Indiana, Kentucky, Louisiana, Massachusetts, Maryland, Michigan, Minnesota, Missouri, North Dakota, Nevada, New Jersey, New Mexico, New York, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Dakota, Texas, Vermont, Wisconsin, and West Virginia



## Funding:

- \$10,125,000 Award
- \$12,046,731 Local matching funds

## Congressional Districts<sup>1</sup>:

- Alabama’s 1st and 2nd Congressional Districts
- Arizona’s 3rd and 4th Congressional Districts
- Arkansas’ 4th Congressional District
- California’s 1st-53rd Congressional Districts
- Connecticut’s 1st-5th Congressional Districts
- Delaware’s At Large Congressional District
- Florida’s 1st-27th Congressional Districts
- Georgia’s 1st, 2nd, and 8th Congressional Districts
- Iowa’s 1st, 2nd, and 4th Congressional Districts
- Illinois’ 1st-18th Congressional Districts
- Indiana’s 1st-9th Congressional Districts
- Kentucky’s 1st-4th Congressional Districts
- Louisiana’s 3rd and 4th Congressional Districts
- Massachusetts’ 1st and 2nd Congressional Districts
- Maryland’s 1st and 6th-8th Congressional Districts
- Michigan’s 6th and 7th Congressional Districts
- Minnesota’s 1st-8th Congressional Districts
- Missouri’s 1st-3rd, 6th, and 8th Congressional Districts
- North Dakota’s At Large Congressional District
- Nevada’s 2nd-4th Congressional Districts
- New Jersey’s 1st, 3rd-5th, 7th-9th, and 12th Congressional Districts
- New Mexico’s 2nd and 3rd Congressional Districts
- New York’s 1st-27th Congressional Districts
- Ohio’s 1st, 5th, 6th, 8th, 13th, and 14th Congressional Districts
- Oklahoma’s 2nd-4th Congressional Districts
- Oregon’s 2nd, 4th, and 5th Congressional Districts
- Pennsylvania’s 1st-18th Congressional Districts
- Rhode Island’s 2nd Congressional District
- South Dakota’s At Large Congressional District
- Texas’ 1st-36th Congressional Districts
- Vermont’s At Large Congressional District
- Wisconsin’s 1st-3rd and 7th Congressional Districts
- West Virginia’s 1st Congressional District

<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line® Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.

	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
<b>Infrastructure</b>	115	0	3	0	0	3	121	7,108,745.66	32,354.79		
	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
<b>Vehicles</b>	0	250	0	88	0	19	0	0	357	911,223.25	1,557.61
<b>Grand Total Petroleum Displacement</b>		<b>Grand Total GHG Reductions</b>									
8,019,968.91		33,912.40									

**Partners:**

- Citizens Energy Group
- City of Ft. Wayne
- City of Indianapolis
- Greater Indiana Clean Cities Coalition
- Indiana Department of Transportation
- Indiana Office of Energy Development
- KACKO
- Lassus Brothers
- Renewable Dairy Fuels
- Sysco Food Distribution
- Tippecanoe School Corporation

**Case Studies:**

**Natural Gas Powers Milk Delivery Trucks in Indiana**

The 15,000-acre Fair Oaks farm built a public-access CNG station to service its fleet of 42 CNG milk-delivery trucks. The majority of the fuel comes from a 4.5-mile pipeline that transports renewable natural gas (RNG) to an underground anaerobic digester. The digester breaks down waste from the farm’s 11,000 cows into methane gas. Learn more at [afdc.energy.gov/case/503](http://afdc.energy.gov/case/503).



Fair Oaks’ waste-to-wheels fueling effort is helping the farm reach its goal of reducing its long-haul carbon footprint by 25%. The fuel is used in Class 8 trucks that deliver milk to processing plants in Indiana, Tennessee, and Kentucky. *Photo from MotorWeek*



The City of Indianapolis is using alternative fuels and advanced vehicles to save taxpayer dollars, lower emissions, and bolster energy security. The city joined forces with the Greater Indiana Clean Cities Coalition to implement a host of fleet-efficiency measures. *Photo from Motorweek/Maryland Public TV, NREL 17176*

**Alternative Fuels Save Money in Indy**

The City of Indianapolis pooled \$1.43 million of its money with \$318,000 in Recovery Act funds to convert 11 prisoner-transport vans to bi-fuel propane systems, retrofit 8 Ford F-150 trucks with dedicated propane systems, and purchase 25 Ford Fusion hybrids. Learn more at [afdc.energy.gov/case/1066](http://afdc.energy.gov/case/1066).

**Indianapolis CNG Fueling Station Attracts Local Fleets, Turns into Profit Center**

When an Indianapolis business owner converted his 50-vehicle fleet to CNG to reduce fuel costs, he also constructed a new CNG station with support from an infrastructure grant that stipulated the station be open to the public. Along with his own vehicles, CNG fleet vehicles from AT&T and the Indiana Department of Transportation fill up at the station, making this business owner’s foray into alternative fuels a lucrative one. Learn more at [afdc.energy.gov/case/1823](http://afdc.energy.gov/case/1823).



Business is booming at this CNG station in Indianapolis. An Indiana income tax credit for commercial natural gas vehicles weighing more than 33,000 pounds has spurred interest in CNG. *Photo by Kris Kyler, NREL 29104*






# Midwest Region Alternative Fuels Project

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

## Project Summary:

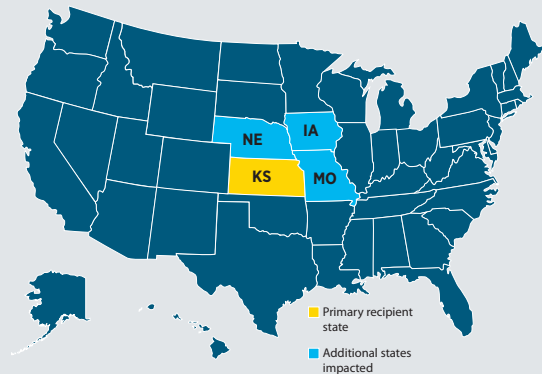
Metropolitan Energy Center (MEC) and the Kansas City Regional Clean Cities Coalition, along with 19 sub-recipients, received funding support to build alternative fuel stations, purchase alternative fuel vehicles, and convert conventionally fueled vehicles to an alternative fuel. The project included metropolitan areas in four states: Missouri, Kansas, Iowa, and Nebraska. Together, the project partners deployed 376 alternative fuel and advanced technology vehicles, including electric (EVs), compressed natural gas (CNG), propane, hybrid, biodiesel, and E85. The project also included 29 fueling station installations. The stations encourage fleets in the area to further invest in alternative fuel vehicles and create CNG travel corridors between and within the target metropolitan areas. The project also used success stories to educate the public about alternative fuels. Learn more at [cleancities.energy.gov/partnerships/search?utf8=%E2%9C%93&project\\_search=missouri#arra-midwest](http://cleancities.energy.gov/partnerships/search?utf8=%E2%9C%93&project_search=missouri#arra-midwest).

## Technology Types:

-  CNG
-  EVs and EV charging stations
-  Hybrid electric vehicles
-  Propane
-  Biodiesel and E85

	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
<b>Infrastructure</b>	0	0	11	15	1	2	29	1,156,345.22	2,097.68		
	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
<b>Vehicles</b>	1	2	0	42	0	325	0	6	376	1,925,139.47	1,140.48
<b>Grand Total Petroleum Displacement</b>		<b>Grand Total GHG Reductions</b>									
		3,081,484.69		3,238.16							

## States: Iowa, Kansas, Missouri, and Nebraska



### Funding:

- **\$14,999,905** Award
- **\$17,707,232** Local matching funds

### Congressional Districts<sup>1</sup>:

- Iowa's 3rd Congressional District
- Kansas' 2nd-4th Congressional Districts
- Missouri's 4th-7th Congressional Districts
- Nebraska's 1st and 2nd Congressional Districts

## Lessons Learned and Impact

This project built workable CNG travel corridors with grant funds, which were later expanded through private investments. Upgrades to aging CNG equipment, including the installation of additional compressors, and new dispensers and credit card readers were found to be particularly successful. The upgraded stations experienced improved performance and less time was required to achieve a full fill, resulting in a 400% increase in fuel sales.

<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line® Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.



**Partners:**

- Black Hills Energy
- City of Kansas City
- City of Lawrence
- City of Lee’s Summit
- City of Wichita
- Happy Cab Co.
- Johnson County Government
- Kansas City, Kansas School District
- Kansas City Regional Clean Cities Coalition
- Kansas Gas Service
- KCP&L
- Lee’s Summit R-7 School District
- Lincoln Airport Authority
- Margo Leasing
- Metropolitan Community Colleges of Omaha
- Metropolitan Utilities District
- New Bern-Pepsico
- O’Daniel Honda
- University of Missouri at Kansas City
- Zarco 66

**Case Studies:**

**Kansas City, Kansas Public Schools Invests in CNG Buses**

Kansas City, Kansas Public Schools (KCKPS) received 47 new CNG school buses in March 2011. The project has spurred interest in CNG use by other fleets in Kansas and Missouri. In the face of looming budget cuts, this project is saving KCKPS thousands of dollars. Learn more at [afdc.energy.gov/case/1016](http://afdc.energy.gov/case/1016).



Kansas City, Kansas Public Schools is powering its buses with CNG and is saving saving thousands of dollars in the process. *Photo from Kansas City Public Schools*

**Lee’s Summit R-7 School District Delivers with Electric Trucks**

In a years-long effort to reduce costs and its environmental footprint, Lee’s Summit R-7 School District embarked on a path to become the first U.S. public school district to operate an all-electric distribution fleet. In 2010, the district purchased four all-electric Smith Newton delivery trucks. The fleet of trucks is used to transport items such as school supplies and cafeteria food products from the district’s warehouse to schools and other facilities. The all-purpose delivery trucks also provide in-district mail delivery among all R-7 facilities. Each truck travels about 500 miles per month. From July 2010 through May 2012, the four trucks logged a combined 42,700 miles, and electricity was their fuel. Learn more at [afdc.energy.gov/case/1009](http://afdc.energy.gov/case/1009).



A Happy Cab Co. taxi fuels up with CNG at a new fueling station in Omaha, Nebraska. *Photo from MotorWeek*



# Hybrid Horsepower for Kentucky Schools

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

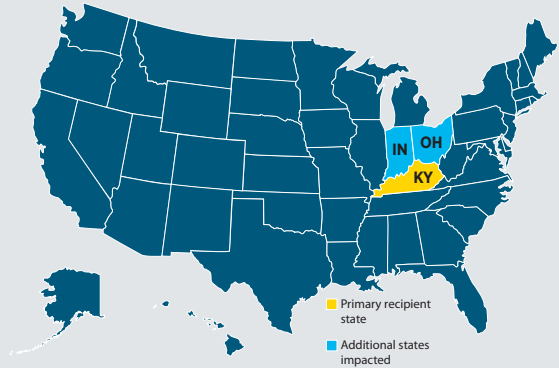
## Project Summary:

Through the Hybrid Horsepower for Kentucky Schools project, the Kentucky Clean Fuels Coalition and The Kentucky Department of Education worked together to incorporate hybrid electric technology as a specification in the bus procurement process available to all 174 school districts in the state. This resulted in the purchase of 157 hybrid electric school buses during the course of the project. In addition, the project supported education and outreach targeting the general public, teachers, local officials, first responders, local media, and others. Learn more at [afdc.energy.gov/case/1045](http://afdc.energy.gov/case/1045).

## Technology Types:

-  Hybrid electric vehicles
-  Driver training

## States: Indiana, Kentucky, and Ohio



### Funding:

- **\$12,980,000** Award
- **\$15,336,000** Local matching funds

### Congressional Districts<sup>1</sup>:

- Indiana's 9th Congressional District
- Kentucky's 1st-6th Congressional Districts
- Ohio's 1st Congressional District

## Lessons Learned and Impact

Utilizing a master purchase agreement streamlined paperwork and allowed many districts to order hybrid school buses. The districts observed the hybrid buses performed at their peak with an appropriate route selection and driver training. A friendly rivalry between districts encouraged further petroleum reduction as drivers competed to see who could get the best fuel economy with their buses.

	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
<b>Infrastructure</b>	0	0	0	0	0	0	0	-	-		
	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
<b>Vehicles</b>	0	0	0	157	0	0	0	0	157	283,333.16	2,652.32
<b>Grand Total Petroleum Displacement</b>		<b>Grand Total GHG Reductions</b>									
		283,333.16		2,652.32							

## Partners:

- Kentucky Clean Fuels Coalition
- Kentucky Department of Education

<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line® Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.

**Case Studies:****Hybrid Electric School Buses  
Success Story**

The Kentucky Clean Fuels Coalition and its partners replaced 156 aging diesel school buses across Kentucky with new hybrid electric school buses that average

35% greater fuel efficiency. Learn more at [kentuckycleanfuels.org/projects/hybrid-horsepower/](http://kentuckycleanfuels.org/projects/hybrid-horsepower/), [kentuckycleanfuels.org/wp-content/uploads/2013/10/Hybrid-Horsepower-for-KY-Schools-Summary-2014.pdf](http://kentuckycleanfuels.org/wp-content/uploads/2013/10/Hybrid-Horsepower-for-KY-Schools-Summary-2014.pdf) and [youtube.com/watch?v=phADd-nyGC7c](http://youtube.com/watch?v=phADd-nyGC7c). ■

**HYBRID HORSEPOWER  
FOR KENTUCKY SCHOOLS**

Kentucky students were active participants in the project, benefiting from hands-on learning experiences.

*Illustration from Kentucky Clean Fuels Coalition*

# Maryland Hybrid Truck Goods Movement Initiative

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.




## Project Summary:

Maryland Energy Administration and Maryland Clean Cities, along with their partners, joined together to implement the nation’s largest deployment of heavy-duty hybrid trucks in goods-movement applications under the Maryland Hybrid Truck Goods Movement Initiative. This project provided financial and technical assistance to fleets from ARAMARK, Efficiency Enterprises, Nestle Waters of North America, Sysco Corporation, and United Parcel Service (UPS) to facilitate the implementation of the largest collaborative hybrid truck project in the nation. The project resulted in the purchase and deployment of 143 Freightliner hybrid electric vehicles and hydraulic hybrid vehicles across 29 states.

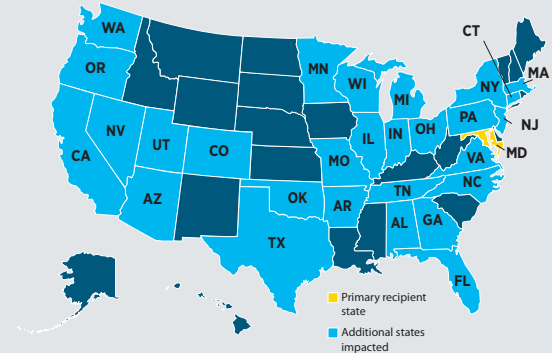
### Lessons Learned and Impact

Training programs designed for a variety of audiences proved essential to the success of deploying significant numbers of hybrid electric vehicles during the course of this project. Training for fleet staff focused on providing education about hybrid technology to determine optimal operating environments for the vehicles based on route type, duty cycle, and product mix. Thorough and sustained driver training programs were necessary to maximize fuel economy and promote on-going correct usage of the vehicles. The addition of a comprehensive maintenance program also ensured an efficient process for addressing maintenance issues and repairs.

## Technology Types:

-  Hybrid electric vehicles
-  Driver training
-  Hydraulic hybrid vehicles

States: Alabama, Arizona, Arkansas, California, Colorado, Connecticut, Florida, Georgia, Illinois, Indiana, Kentucky, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nevada, New Jersey, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Tennessee, Texas, Utah, Virginia, Washington, and Wisconsin



### Funding:

- \$5,924,190 Award
- \$10,075,175 Local matching funds

### Congressional Districts<sup>1</sup>:

- Alabama’s 4th and 5th Congressional Districts
- Arizona’s 1st, 3rd, and 6th-9th Congressional Districts
- Arkansas’ 4th Congressional District
- California’s 2nd, 3rd, 6th-8th, 10th, 11th, 15th-19th, 21st, 22nd, 25th-35th, 37th, 38th, 40th, and 43rd-53rd Congressional Districts
- Colorado’s 1st, 6th, and 7th Congressional Districts
- Connecticut’s 3rd Congressional District
- Florida’s 3rd-7th, 9th, and 10th Congressional Districts
- Georgia’s 5th, 6th, 11th, and 13th Congressional Districts
- Illinois’ 1st-10th and 15th Congressional Districts
- Indiana’s 1st, 4th-7th, and 9th Congressional Districts
- Kentucky’s 4th Congressional District
- Maryland’s 1st-5th and 7th Congressional Districts
- Massachusetts’ 3rd, 5th, and 6th Congressional Districts
- Michigan’s 11th Congressional District
- Minnesota’s 1st and 3rd-6th Congressional Districts
- Missouri’s 7th Congressional District
- Nevada’s 1st, 3rd, and 4th Congressional Districts
- New Jersey’s 1st, 6th-8th, 10th, and 12th Congressional Districts
- New York’s 3rd, 17th, 24th, and 25th Congressional Districts
- North Carolina’s 6th and 12th Congressional Districts
- Ohio’s 1st-3rd, 9th, 11th, 12th, 15th, and 16th Congressional Districts
- Oklahoma’s 3rd-5th Congressional Districts
- Oregon’s 1st and 3rd-5th Congressional Districts
- Pennsylvania’s 6th and 16th Congressional Districts
- Tennessee’s 4th-7th Congressional Districts
- Texas’ 1st, 3rd-6th, 12th, 20th, 21st, 23rd-26th, 28th-30th, 32nd, 33rd, 35th, and 36th Congressional Districts
- Utah’s 2nd and 4th Congressional Districts
- Virginia’s 6th, 8th, 10th, and 11th Congressional Districts
- Washington’s 1st-3rd, 5th, 8th, and 9th Congressional Districts
- Wisconsin’s 1st, 3rd, and 4th Congressional Districts

<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line® Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.

	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
<b>Infrastructure</b>	0	0	0	0	0	0	0	-	-		
	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
<b>Vehicles</b>	0	0	0	123	20	0	0	0	143	354,073.27	3,523.16
<b>Grand Total Petroleum Displacement</b>		<b>Grand Total GHG Reductions</b>									
		354,073.27									
		3,523.16									

**Partners:**

- ARAMARK
- Efficiency Enterprises
- Maryland Clean Cities
- Maryland Energy Administration
- Nestle Waters
- Sysco
- United Parcel Service (UPS)

**Case Studies:**

**Hybrid Trucks Success Story**

In 2012, five big-name fleets hit the roads across the country with cutting-edge vehicles to demonstrate the cost benefits of hybrid electric and hybrid hydraulic technologies. The 143 trucks are highly efficient and have demonstrated a 20% to 60% reduction in fuel consumption, engine noise, and less greenhouses gases emitted into the air. Learn more at [youtube.com/watch?v=YFBuuXppZMg](http://youtube.com/watch?v=YFBuuXppZMg).



ARAMARK is one of five fleets that switched to highly efficient hybrid electric vehicles. Photo from CleanCitiesTV



The fuel savings for the companies, which includes hybrid trucks from the Nestle Waters fleet, is estimated at nearly 140,000 gallons a year. Photo from CleanCitiesTV

# Michigan Green Fleets

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

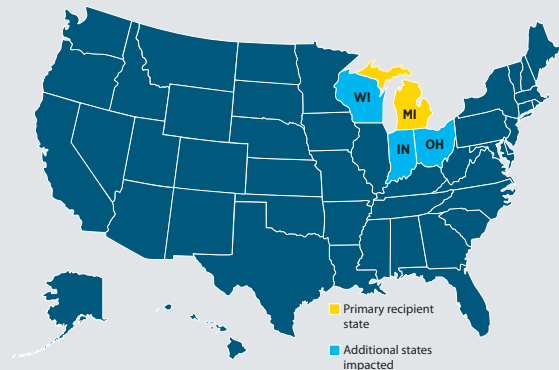
## Project Summary:

The Clean Energy Coalition—including the Ann Arbor Clean Cities Coalition, Detroit Area Clean Cities, and Greater Lansing Area Clean Cities—collaborated with its partners on The Michigan Green Fleets program to promote advanced transportation technologies and alternative fuel solutions to fleets throughout the state. The effort resulted in a diverse cross-section of fleets choosing to adopt more than 500 electric (EVs), hybrid, propane, liquefied natural gas (LNG), and compressed natural gas (CNG) vehicles and install 60 new alternative fueling stations. In addition to improved air quality and reduced dependency on imported petroleum, the program supported the commercialization of cutting-edge technology and manufacturing capabilities, which led to the creation of new jobs throughout Michigan. Learn more at <http://cec-mi.org/mobility/programs/green-fleets/>.

## Technology Types:

- 🔥 CNG and LNG
- 🚗 Hydraulic hybrid vehicles
- 🚚 Propane
- 🔋 Hybrid electric vehicles
- 🔌 EVs and EV charging stations
- 👤 Driver training

## States: Indiana, Michigan, Ohio, and Wisconsin



### Funding:

- \$12,715,756 Award
- \$27,984,711 Local matching funds

### Congressional Districts<sup>1</sup>:

- Indiana's 1st-3rd Congressional Districts
- Michigan's 1st-14th Congressional Districts
- Ohio's 5th and 9th Congressional Districts
- Wisconsin's 1st, 4th, and 6th-8th Congressional Districts

## Lessons Learned and Impact

Support networks among alternative fuel users, coupled with feedback mechanisms from fleets to manufacturers, proved to be critical to the success of deploying AFVs in a way that was sustainable and made sound business sense during this project. In addition to fueling infrastructure availability, project partners also recognized the importance of having access to capable service and maintenance technicians.

	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
<b>Infrastructure</b>	5	0	16	39	0	0	60	2,902,414.56	2,030.34		
	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
<b>Vehicles</b>	0	247	2	37	11	210	0	5	512	4,045,451.83	2,149.67
<b>Grand Total Petroleum Displacement</b>		<b>Grand Total GHG Reductions</b>									
		6,947,866.39									4,180.01

<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line® Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.

**Partners:**

- Ann Arbor Clean Cities Coalition
- Ann Arbor Downtown Development Authority
- Clean Energy Coalition
- City of Ann Arbor
- City of Detroit
- Detroit Area Clean Cities
- DTE Energy
- Frito Lay
- Greater Lansing Area Clean Cities
- Metro Cars
- Schwan's Home Service
- UBCR
- University of Michigan
- Western Michigan University
- Wright & Filippis

**Case Studies:****Hydraulic Hybrids: A Success in Ann Arbor**

Recovery Act funding helped the City of Ann Arbor purchase four hydraulic hybrid recycling trucks at the launch of its single-stream recycling program. The vehicles, which feature regenerative braking, save the city nearly 1,800 gallons of fuel each year. Learn more at [afdc.energy.gov/case/1055](http://afdc.energy.gov/case/1055).



The City of Ann Arbor was one of the first municipalities in the country to deploy hydraulic hybrid technology, which uses hydraulic tanks to store energy that would otherwise be lost to braking. The stored energy is then used to power the vehicle when it moves again. *Photo from Government Fleet*

**Michigan Converts Vehicles to Propane, Reducing Emissions**

Detroit-based Metro Cars, which offers limo and shuttle services, leveraged local dollars with a federal grant to expand its propane operations to Grand Rapids. The company installed additional propane stations and converted 90 vehicles—including luxury sedans, SUVs, and shuttle buses—to run on propane. Learn more at [afdc.energy.gov/case/623](http://afdc.energy.gov/case/623).



Metro Cars' alternative fuel fleet displaces more than 520,000 gallons of petroleum annually. As a leading transporter of passengers, they are also leading the way in green fuel use in the Motor City and beyond. *Photo from MotorWeek*

**Clean Energy Coalition Powers Up Local Utility Fleet**

Michigan Consolidated Gas, a unit of DTE Energy, received \$5.4 million in Recovery Act funding to convert more than 170 gasoline-powered utility vehicles to CNG and to build two new CNG fueling stations and refurbish 13 others across Michigan. Learn more at [cec-mi.org/clean-energy-coalition-powers-up-local-utility-fleet/](http://cec-mi.org/clean-energy-coalition-powers-up-local-utility-fleet/).



Through this Recovery Act investment, DTE displaces about 250,000 gallons of petroleum each year. *Photo from Clean Energy Coalition*

**UBCR Reduces Fuel Costs 37% by Adopting CNG**

UBCR, a third-party logistics provider for the Michigan Soft Drink Association and the Michigan Beer and Wine Wholesalers Association, operates CNG vehicles throughout lower Michigan. By adopting CNG, the company reduced its greenhouse gas emissions by 29% and annually displaces 285,698 gallons of diesel fuel. Learn more at [cec-mi.org/ubcr-reduces-fuel-costs-37-by-adopting-cng/](http://cec-mi.org/ubcr-reduces-fuel-costs-37-by-adopting-cng/). ■



UBCR's use of CNG has led to a 37% reduction in fuel costs and a 29% reduction in greenhouse gas emissions, with 285,698 gallons of diesel displaced a year. *Photo from UBCR*



# New Jersey Compressed Natural Gas Refuse Trucks, Shuttle Buses, and Infrastructure Project

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

## Project Summary:

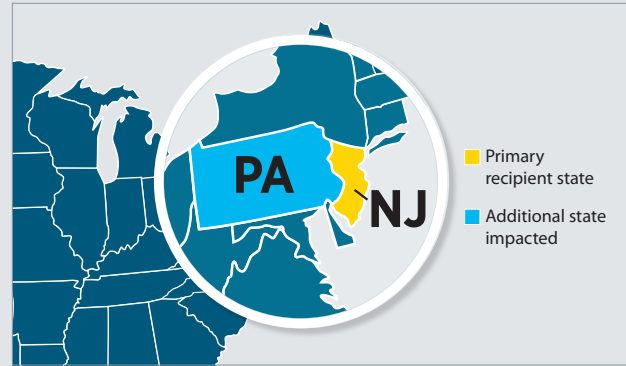
The New Jersey Clean Cities Coalition, along with its partners, led The New Jersey Compressed Natural Gas (CNG) Refuse Trucks, Shuttle Buses, and Infrastructure Project, the first state-wide alternative fuel vehicle deployment program in New Jersey. The project deployed more than 300 CNG refuse haulers and shuttle buses belonging to 15 public and private fleets. The effort also supported the installation of six new CNG fueling stations throughout the state—in Newark, Camden, Trenton, Morris County, and Egg Harbor Township. In addition to the deployment activities, the initiative aimed to educate the public and other fleets about the benefits of using domestically produced natural gas in vehicles. Learn more at [cleancities.energy.gov/partnerships/search?utf8=&project\\_search=new+jersey](http://cleancities.energy.gov/partnerships/search?utf8=&project_search=new+jersey).

## Technology Types:

-  CNG
-  Facility modifications

	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
<b>Infrastructure</b>	0	0	6	0	0	0	6	5,247,636.69	3,328.11		
	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
<b>Vehicles</b>	0	0	0	0	0	306	0	0	306	3,186,677.50	101.35
<b>Grand Total Petroleum Displacement</b>							<b>Grand Total GHG Reductions</b>				
8,434,314.19							3,429.46				

## States: New Jersey and Pennsylvania



### Funding:

- \$14,997,240 Award
- \$33,677,650 Local matching funds

### Congressional Districts<sup>1</sup>:

- New Jersey's 1st-4th and 7th-12th Congressional Districts
- Pennsylvania's 1st and 8th Congressional Districts

## Lessons Learned and Impact

Although this project focused on deploying CNG for refuse and shuttle fleets, participating fleets were also inspired to transition to CNG for other vehicles within their operations. In addition, outreach events and marketing efforts generated significant interest from outside fleets and municipalities seeking to pursue alternative fuels. As a result, the project stimulated an ongoing conversation about alternative fuels in New Jersey and placed the Clean Cities coalition as the go-to resource for these efforts.

<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line® Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.



**Partners:**

- Atlantic City Jitney Association
- Atlantic County Utilities Authority
- Blue Diamond Disposal
- Casworth Enterprises
- Central Jersey Waste & Recycling
- City of Linwood
- Clean Energy
- Courtyard by Marriot Newark Airport
- Franklin Township
- Giordano Companies
- New Jersey Clean Cities Coalition
- Regional Industries
- Suburban Disposal
- The Parking Spot Group
- Voorhees Township
- Wally Park
- Waste Management

**Case Studies:**

**Natural Gas Minibuses Help New Jersey Recover from Hurricane Sandy**

Jitney operators in Atlantic City replaced their aging fleet of 190 minibuses with new models running on CNG with help from Recovery Act funding. When Hurricane Sandy hit in 2012, the jitneys were pressed into action for the evacuation. Because CNG stations are typically fed by underground pipelines, the fuel supply was uninterrupted. Learn more at [afdc.energy.gov/case/1323](http://afdc.energy.gov/case/1323).



Atlantic City relied on CNG-powered jitney minibuses for its evacuation and recovery efforts during and after Hurricane Sandy. *Photo from MotorWeek*



Through its portfolio of green projects, the Atlantic County Utilities Authority has significantly reduced its greenhouse gas emissions and saved more than \$2 million a year in operating costs. *Photo from Atlantic County Utilities Authority*

**New Jersey Utility Saves with Alternative Fuel**

The Atlantic County Utilities Authority is a strong proponent of alternative fuels. Many of its fleet vehicles run on bio-diesel. It also operates a CNG station used by its 15 CNG refuse trucks as well as the 190 private jitney buses that transport visitors around Atlantic City. Learn more at [afdc.energy.gov/case/384](http://afdc.energy.gov/case/384). ■



# Long Island Regional Energy Collaborative “Promoting a Green Economy through Clean Transportation Alternatives”

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

## Project Summary:

The Greater Long Island Clean Cities Coalition, along with its partners, promoted the use of a variety of alternative fuels for vehicles through the Long Island Regional Energy Collaborative “Promoting a Green Economy through Clean Transportation Alternatives” initiative. The effort has spurred the low-carbon vehicle industry to grow and expand throughout Long Island by offering businesses and municipalities the flexibility to use alternatives that meet specific business needs. The project supported the installation of five compressed natural gas (CNG) stations and the deployment of 157 alternative fuel vehicles throughout Nassau and Suffolk counties. [Learn more at cleancities.energy.gov/partnerships/search?project\\_search=American+Recovery+and+Reinvestment+Act+Project+Awards#arra-long](http://cleancities.energy.gov/partnerships/search?project_search=American+Recovery+and+Reinvestment+Act+Project+Awards#arra-long).

## Technology Types:

-  CNG
-  Facility modifications

	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
<b>Infrastructure</b>	0	0	5	0	0	0	5	856,386.30	617.91		
	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
<b>Vehicles</b>	0	0	1	0	0	156	0	0	157	1,161,466.77	288.62
<b>Grand Total Petroleum Displacement</b>		<b>Grand Total GHG Reductions</b>									
		2,017,853.07		906.53							

## State: New York



### Funding:

- \$14,994,183 Award
- \$20,114,580 Local matching funds

### Congressional Districts<sup>1</sup>:

- New York’s 1st-4th Congressional Districts

## Lessons Learned and Impact

Because CNG fueling stations require ongoing maintenance, participants in this project learned that a key factor to ensuring success from the beginning is to provide training on how to service and maintain the fueling equipment for fleets that operate stations. To prevent prolonged downtime if fueling equipment is in need of repair, it’s also important to have an established agreement in place that outlines who (ideally a local resource) will provide station repair and maintenance service.

<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line® Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.

**Partners:**

- Engineered Energy Solutions
- Family Essential Enterprises
- Greater Long Island Clean Cities
- Manhattan Beer Distributors
- National Grid
- Rides Unlimited of Nassau/Suffolk
- Suffolk County
- Town of Hempstead
- Town of Huntington
- Town of Oyster Bay
- Town of Smithtown
- V. Garofalo Carting, Inc.
- Village of East Rockaway

**Case Studies:**

**V. Garofalo Carting Cleans up New York with Natural Gas Trucks**

V. Garofalo Carting, a family-owned waste and recycling company in Long Island, successfully transitioned to CNG. The company made the clean-fuel switch thanks in part to \$600,000 in Recovery Act funding. Learn more at [afdc.energy.gov/case/167](http://afdc.energy.gov/case/167).



In operation since 1958, the eco-friendly waste and recycling company V. Garofalo Carting has invested \$6.5 million to green its fleet with alternative fuels. *Photo from MotorWeek*



One of 21 CNG fueling stations in Oyster Bay available to local fleets of CNG vehicles. The CNG station was funded with help from the Recovery Act. *Photo from Greater Long Island Clean Cities, NREL 23853*

**CNG Fleets Aid in Superstorm Recovery**

When Superstorm Sandy hit the East Coast in 2012, it flooded streets, cut power, and stranded vehicles. Many drivers—including first responders—struggled to find diesel fuel or gasoline. With its underground pipelines, however, CNG supply was uninterrupted and many CNG fuel stations remained operational. On Long Island, fleets of CNG trucks and cars kept operating in the storm’s aftermath, helping with recovery efforts. Learn more at [afdc.energy.gov/case/1426](http://afdc.energy.gov/case/1426).

**CNG Refuse Haulers Do Heavy Lifting in New York**

In 2006, the City of Smithtown turned to CNG for its trash haulers to combat the rising cost of fuel. Since then, federal funding has helped the city purchase a variety of natural gas and electric vehicles—adding to Long Island’s fast-growing, municipal alternative fuel fleet. Learn more at [afdc.energy.gov/case/223](http://afdc.energy.gov/case/223). ■



After testing out a CNG vehicle, the City of Smithtown made it mandatory for all contracted trash haulers to use the alternative fuel. The switch helped lock in cheaper fuel prices and led to construction of a new CNG station. *Photo from MotorWeek*

# New York State Alternative Fuel Vehicle and Infrastructure Deployment Program

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

## Project Summary:

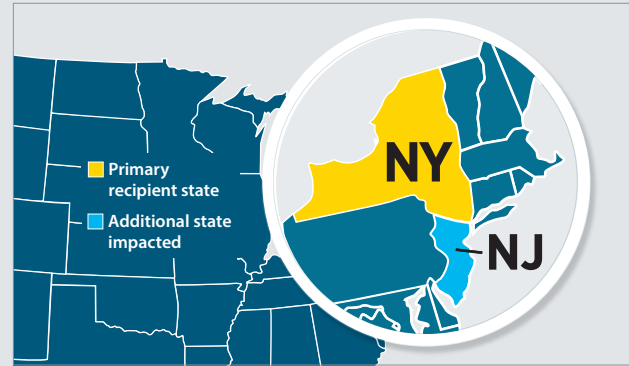
The New York State Energy Research and Development Authority’s (NYSERDA’s) Alternative Fuel Vehicle and Infrastructure Deployment Project expanded the use of many different alternative fuels to a wide variety of fleets across New York. NYSERDA worked with sub-recipients in the public and private sectors that used vehicles ranging from small electric vehicles (EVs), such as neighborhood electric vehicles (NEVs), to long-haul, heavy-duty compressed natural gas (CNG) trucks. In total, project partners purchased 395 alternative fuel vehicles. The large majority of light-duty vehicles were CNG-fueled, thanks in large part to a major initiative by Verizon to convert much of its New York fleet to natural gas. Heavy-duty vehicles were split between CNG, propane, hybrid electric, and hydraulic hybrid. The project also supported the installation of 100 new fueling locations, which consisted primarily of electric vehicle charging stations, but also included four large CNG fueling stations and three propane fueling stations. Learn more at [cleancities.energy.gov/partnerships/search?utf8=%E2%9C%93&project\\_search=new+york+state+alternative+#arra-newyork](http://cleancities.energy.gov/partnerships/search?utf8=%E2%9C%93&project_search=new+york+state+alternative+#arra-newyork).

## Technology Types:

- 🔥 CNG
- 🚗 Hydraulic hybrid vehicles
- 🔋 Hybrid electric vehicles
- 🚚 Propane
- 🔌 EVs and EV charging stations
- 🚗 Driver training

	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
<b>Infrastructure</b>	3	0	4	93	0	0	100	859,379.04	589.37		
	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
<b>Vehicles</b>	6	46	3	72	1	265	0	2	395	1,380,434.84	1,746.59
<b>Grand Total Petroleum Displacement</b>		<b>Grand Total GHG Reductions</b>									
				2,239,813.88      2,335.97							

## States: New Jersey and New York



### Funding:

- \$13,299,101 Award
- \$20,648,882 Local matching funds

### Congressional Districts<sup>1</sup>:

- New Jersey’s 5th, 8th, and 9th Congressional Districts
- New York’s 1st-27th Congressional Districts

## Lessons Learned and Impact

Alternative fuels can provide great opportunities for petroleum reductions, emissions reductions and cost savings. However, this project proved that a technology that makes sense for one fleet may not make sense for another. Similar fleets using the same technology often experienced very different outcomes based on infrastructure availability, driving routes, duty cycles, driver behavior, and climate. Fleets that experienced the greatest success often attributed the outcome to providing the right support for the technology they chose, such as training drivers and mechanics, providing a well-designed route based on the traits of the vehicle and ensuring proper maintenance.

<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line® Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.

**Partners:**

- AAA of Western and Central New York
- Albany International Airport Authority
- Ballston Spa Central School District
- Bard College
- Capital District Clean Communities
- Casella Waste Systems
- Cayuga County
- Central Hudson Gas and Electric
- Charlotte Valley Central School District
- City of Albany
- City of Rochester
- City of Syracuse
- City of White Plains
- Clean Communities of Central New York
- Clean Communities of Western New York
- Coca-Cola Enterprises
- CuseCar, Inc.
- Demon Logistics
- East Greenbush Central School District
- Empire Clean Cities
- Fairport Central School District
- Ferrario Ford, Inc.
- Genessee Region Clean Communities
- Gilboa-Conesville Central School District
- Harbec Plastics
- Hoosic Valley Central School District
- Malone Central School District
- Manhattan Beer Distributors
- Modern Disposal
- Monroe County
- National Grid
- New York Power Authority
- New York State Energy Research and Development Authority (NYSERDA)
- NYS Department of Environmental Conservation
- NYS Division of Homeland Security and Emergency Services
- Palmyra-Macedon Central School District
- SUNY Albany
- Town of Dobbs Ferry
- Town of Mamaroneck
- Tompkins County
- Trumansburg Central School District
- Verizon
- Village of Minoa
- Village of Warwick
- Wayne Central School District
- Westchester Ambulette
- Willow Run Foods

**Case Studies:**

**Leadership Drives Alternative Fuel Success at National Grid**

National Grid has established itself as a leader in the energy sector, but this utility company is also proving to be a leader in the alternative fuels arena through its investment in natural gas vehicles (NGVs); the company’s inventory has grown to approximately 425 as of early 2012. Currently, the fleet includes propane forklifts, hybrid electric vehicles, and EVs in addition to CNG vans, sedans, dump trucks, and crew trucks. But National Grid’s commitment to alternative fuels doesn’t stop at the corporate level—the company also enables customers to adopt beneficial transportation alternatives by developing infrastructure for public use. Learn more at [afdc.energy.gov/case/1004](http://afdc.energy.gov/case/1004).



National Grid began using NGVs in their fleets in the 1970s. Since then, the company’s inventory of NGVs has grown to approximately 425 as of early 2012. *Photo from National Grid*

**Green Fueling Station Powers Fleets in Upstate New York**

Monroe County in upstate New York has a Green Alternative Fueling Station that dispenses a variety of fuels—B20, E20, E85, CNG, propane, and hydrogen. The county’s entire fleet of vehicles—including those driven by workers at the county’s public safety department, public works department, and airport—all use the station. Major support for this project



Through its portfolio of green projects, the Atlantic County Utilities Authority has significantly reduced its greenhouse gas emissions and saved more than \$2 million a year in operating costs. *Photo from Atlantic County Utilities Authority*

came from the American Recovery and Reinvestment Act, the Voluntary Airport Low Emissions Program (VALE), the Congestion Mitigation and Air Quality Improvement Program (CMAQ), and NYSERDA. Learn more at [afdc.energy.gov/case/1082](http://afdc.energy.gov/case/1082). ■







# Carolina Blue Skies and Green Jobs Initiative

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

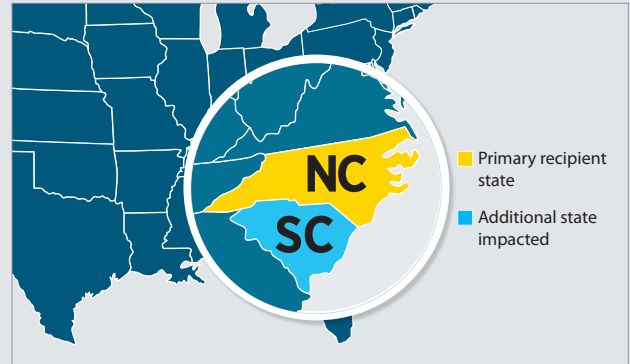
## Project Summary:

Palmetto State Clean Fuels Coalition and Land-of-Sky Clean Vehicles Coalition, along with their partners, led the Carolina Blue Skies and Green Jobs Initiative. The Initiative was a two-state effort aimed at increasing the availability and use of alternative fuels, while simultaneously deploying alternative fuel vehicles and advanced technology vehicles in North and South Carolina. The project successfully deployed a total of 519 alternative fuel vehicles, including 389 propane vehicles, 81 compressed natural gas (CNG) vehicles, 40 hybrid vehicles, and nine neighborhood electric vehicles (NEVs). The project also supported the installations of 141 alternative fueling stations, including 111 EV charging stations, 11 ethanol stations, 8 biodiesel stations, 6 CNG stations, and 5 propane stations. Learn more at [cleancities.energy.gov/partnerships/search?utf8=&project\\_search=carolina+blue+skies](http://cleancities.energy.gov/partnerships/search?utf8=&project_search=carolina+blue+skies).

## Technology Types:

-  EVs and EV charging stations
-  Propane
-  Hybrid electric vehicles
-  Biodiesel
-  CNG
-  Driver training

## States: North Carolina and South Carolina



### Funding:

- **\$12,004,175** Award
- **\$19,509,710** Local matching funds

### Congressional Districts<sup>1</sup>:

- North Carolina's 1st, 2nd, 4th, and 6th-13th Congressional Districts
- South Carolina's 1st-7th Congressional Districts

## Lessons Learned and Impact

Project leaders were able to effectively tailor training to the needs of each partner thanks to performing training assessments at the start of this project. Although workshop-style training proved beneficial for influencing a fleet's transition to alternative fuels, once a decision to adopt alternative fuels was made, project partners saw the most success through more direct and intensive training. This approach allowed training programs to address the unique idiosyncrasies and policies of each fleet's location. First-responder training was also vital to fostering trust between first responders and the alternative fuel community.

	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
<b>Infrastructure</b>	5	0	6	111	8	11	141	2,438,378.02	15,697.99		
	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
<b>Vehicles</b>	9	389	0	39	1	81	0	0	519	2,052,136.40	2,521.13
<b>Grand Total Petroleum Displacement</b>		<b>Grand Total GHG Reductions</b>									
				4,490,514.42      18,219.12							

<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line® Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.

**Partners:**

- Biogen Idec
- BuildSense
- Centralina Council of Governments – Centralina Clean Fuels Coalition
- Charlotte Mecklenburg Utilities
- Charlotte Solid Waste Services
- City of Asheville
- City of Charlotte
- City of Charlotte Airport
- City of Fayetteville
- City of Greensboro
- City of Hendersonville
- City of Raleigh
- City of Rock Hill
- City of Rocky Mount
- City of Winston-Salem
- County of Chatham
- County of Durham
- County of Greenwood
- County of Guilford
- County of Henderson
- County of Orange
- Duke Energy
- FL Transportation, Inc.
- Forest Foundation
- Garvin Oil
- God Bless the USA, Inc.
- Land-of-Sky Regional Council – Land-of-Sky Clean Vehicles Coalition
- Mainor Legacy
- Midlands Biofuels
- Mission Healthcare Foundation, Inc.
- Monroe Oil
- North Carolina Advanced Energy Corporation
- North Carolina Propane Gas Association
- North Carolina State University – North Carolina Solar Center
- OM Biofuels
- Palmetto Gas
- Pentair Aquatic Systems
- Piedmont Biofuels
- Plug-In Carolina
- South Carolina Energy Office – Palmetto State Clean Fuels Coalition
- Spinx Company
- Time Warner Cable
- Town of Cary
- Town of Knightdale
- Triangle J Council of Governments – Triangle Clean Cities Coalition
- University of South Carolina – South Carolina Research Foundation
- York County Natural Gas

**Case Studies:**

**Asheville Success Story**

Asheville, North Carolina, built on its decade-long history of working to green its fleet by adding 25 CNG vehicle conversions, a first-responder alternative fuel training, and CNG fueling station upgrades. This resulted in significant progress toward meeting a municipal carbon-footprint reduction goal of 80% by 2050. Learn more at [afd.energy.gov/case/2084](http://afd.energy.gov/case/2084) and [afd.energy.gov/case/1945](http://afd.energy.gov/case/1945).



Asheville's CNG vehicles reduced greenhouse gas emissions by about 41 tons. *Photo by Bill Eaker, NREL 32063*



These 35-foot plug-in hybrid buses at Charlotte Douglas International Airport run in full-electric, zero-emissions mode over a third of the time. *Photo from MotorWeek*

**Charlotte Douglas International Airport Success Story**

At North Carolina's Charlotte Douglas International Airport, plug-in hybrid buses lowered diesel use, maintenance costs, and pollution. Learn more at [afd.energy.gov/case/103](http://afd.energy.gov/case/103). ■





# The Ohio Advanced Transportation Partnership

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

## Project Summary:

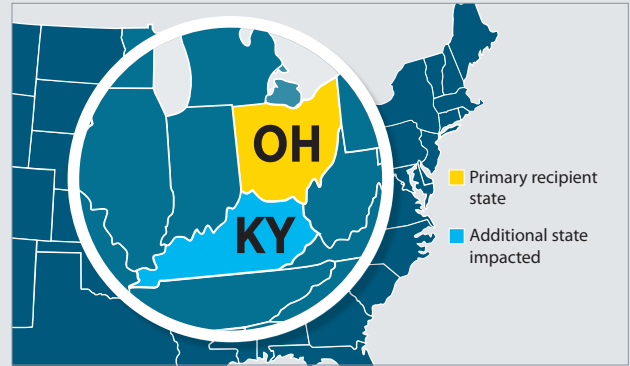
The Ohio Advanced Transportation Partnership involved Clean Fuels Ohio and a diverse array of partners from across the state, including city and county government, private and non-profit fleets, and other industry partners in a broad-based project to help transform Ohio’s transportation sector. Funds for this project were used for the purchase or conversion of 314 alternative fuel vehicles including compressed natural gas (CNG), liquefied natural gas (LNG), propane, hybrid electric, and all-electric vehicles (EVs). The project also helped to support the construction of 74 alternative fueling stations. These included EV charging stations, CNG stations, propane stations, and a renewable natural gas (RNG) station that processes organic waste into a vehicle fuel. Learn more at [cleanfuelsohio.org/](http://cleanfuelsohio.org/).

## Technology Types:

-  EVs and EV charging stations
-  Hybrid electric vehicles
-  CNG, LNG, and RNG
-  Propane

	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
<b>Infrastructure</b>	6	1	8	59	0	0	74	3,872,730.42	2,454.14		
	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
<b>Vehicles</b>	0	159	2	23	4	111	10	5	314	1,222,602.51	529.84
<b>Grand Total Petroleum Displacement</b>		<b>Grand Total GHG Reductions</b>									
				5,095,332.93							
				2,983.97							

## States: Kentucky and Ohio



### Funding:

- \$11,041,500 Award
- \$20,860,429 Local matching funds

### Congressional Districts<sup>1</sup>:

- Kentucky’s 4th Congressional District
- Ohio’s 1st-5th, 7th-13th, 15th, and 16th Congressional Districts

## Lessons Learned and Impact

This project was intentionally broad in scope in order to leverage as many resources as possible. Despite being a challenge to manage, the project resulted in significant alternative fuel market growth. By funding one alternative fueling station and identifying an anchor fleet to fuel there, the overall station network was able to grow and benefit a wider variety of local and national fleets. Smaller fleets also made significant strides once they were able to acquire a couple of vehicles and access fueling without an issue.

<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line® Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.



**Partners:**

- 350Green/Car Charging
- Ansonia Local School District
- Bowling Green State University
- Capitol Square Review and Advisory Board
- City of Akron
- City of Bowling Green
- City of Centerville
- City of Cincinnati
- City of Columbus
- City of Dayton
- City of Dublin
- City of Hamilton
- City of Logan
- City of Tipp City
- Clean Energy
- Clean Fuels Ohio
- Cleveland Ace Taxi Service
- Columbus Green Cabs
- Columbus Regional Airport Authority
- Dillon Transport
- The Electrical Trades Center
- FirstEnergy
- Franklin County
- Franklin County Board of Developmental Disabilities
- Friends Business Source
- Frito-Lay
- Findlay Machine and Tool, Inc.
- Heritage Day Health Center
- Mayer
- Melink
- Northwest State Community College
- Ohio Agricultural and Research and Development Center
- Ohio State University
- Peabody Landscape Group
- Pike-Delta-York Local Schools
- Rumpke
- Sharp Community Resources (Bexley Beat)
- Stark Area Regional Transit Authority
- Vectren
- Vermont Energy Investment Corp. (VEIC)
- Zanesville Energy (quasar)

**Case Studies:****Frito-Lay Success Story**

Snack food giant and National Clean Fleets partner Frito-Lay launched a fleet of Smith Newton electric trucks with zero tailpipe emissions and a virtually silent drive to make deliveries in Columbus, Ohio. Learn more at [afdc.energy.gov/case/404](https://afdc.energy.gov/case/404) and [youtube.com/watch?v=IRy3BsLt434](https://youtube.com/watch?v=IRy3BsLt434).



Smith Newton electric trucks feature two lithium-ion battery packs, a three-phase induction motor, a 160-horsepower rating, and a 100-mile range. *Photo from MotorWeek*



The quasar facility in Columbus, Ohio, generates its own electrical power and routinely fuels 30 trucks at its on-site CNG fueling station. *Photo from MotorWeek*

**quasar Biogas Conversion Success Story**

quasar energy, an Ohio-based waste-to-energy company, developed an innovative anaerobic digestion system to break down organic materials and convert them into about 3,600 gasoline gallon equivalents of RNG each day. Learn more at [afdc.energy.gov/case/1443](https://afdc.energy.gov/case/1443).

**Melink Success Story**

Melink Corp. added a fleet of electric vehicles along with solar-powered charging stations to its LEED-certified, net zero-energy building. Learn more at [youtube.com/watch?v=q-0o58HpTsw&list=PLWAT-EvB9T1-PKrlESydzdDiCJscdk-htop](https://youtube.com/watch?v=q-0o58HpTsw&list=PLWAT-EvB9T1-PKrlESydzdDiCJscdk-htop). ■




# Texas Alternative Fuels Pilot Project

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

## Project Summary:

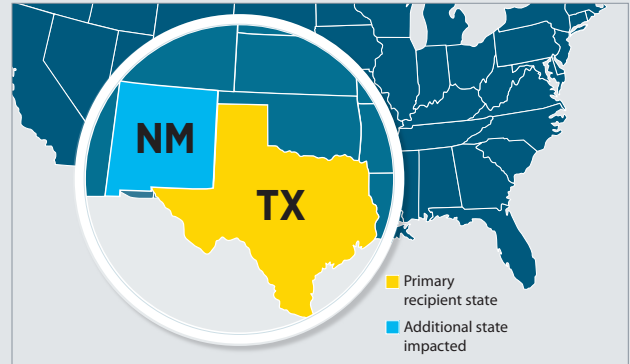
The Texas Alternative Fuels Pilot Project was led by the Railroad Commission of Texas and its partners. The Commission partnered with 45 school districts and other public entities across the state of Texas to fund the deployment of 608 alternative fuel vehicles, including propane and compressed natural gas (CNG) school buses, medium-duty trucks and vans, and light-duty vehicles. To enhance the project’s sustainability, the Commission also awarded grants to install or upgrade 30 propane fueling stations on properties owned by partner fleets. The stations allowed the fleets to lower their costs by buying fuel in bulk, receive federal motor fuel excise tax credits, and refuel at the times most convenient to their schedules. Concurrently, the Commission designed and implemented a two-part public education program for Clean Cities stakeholders, fleet operators, and the general public, which involved all of the Clean Cities coalitions in Texas. Learn more at [cleancities.energy.gov/partnerships/search?utf8=&project\\_search=texas#arra-texas](http://cleancities.energy.gov/partnerships/search?utf8=&project_search=texas#arra-texas).

## Technology Types:

-  CNG
-  Propane
-  Driver training

	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
<b>Infrastructure</b>	30	0	0	0	0	0	30	4,322,585.60	2,981.32		
	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
<b>Vehicles</b>	0	565	0	0	0	43	0	0	608	2,937,322.85	329.20
<b>Grand Total Petroleum Displacement</b>								<b>Grand Total GHG Reductions</b>			
								7,259,908.45		3,310.52	

## States: New Mexico and Texas



### Funding:

- **\$12,633,080** Award
- **\$38,654,911** Local matching funds

### Congressional Districts<sup>1</sup>:

- New Mexico’s 2nd Congressional District
- Texas’ 1st-12th, 14th-18th, and 20th-36th Congressional Districts

## Lessons Learned and Impact

School bus drivers accustomed to driving diesel buses were educated on how to modify their driving habits to maximize the fuel economy of propane buses. A key strategy was training drivers to avoid using heavy pressure on the pedal when accelerating from a dead stop. The project led to the development of a driver training video and an innovative tachometer cling to install on the propane buses. This served to remind drivers to stay within the optimum revolutions per minute (RPM) range. School districts that took advantage of these tools reported better fuel economy.

<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line® Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.

**Partners:**

- Alamo Area Clean Cities (San Antonio)
- Alvin Independent School District (ISD)
- Angleton ISD
- Arlington ISD
- Austin ISD
- Barbers Hill ISD
- Capitol Area Rural Transportation System
- City of Arlington
- City of Cedar Park
- City of El Paso
- City of Garland
- City of Haltom City
- City of Lake Jackson
- City of Laredo
- City of San Antonio
- City of Temple
- City of Tyler
- Conroe ISD
- Dallas County
- Dallas County Schools
- Dallas-Fort Worth Clean Cities
- Dickinson ISD
- Eanes ISD
- Friendswood ISD
- Grapevine-Colleyville ISD
- Greater East End Management District
- Gregory-Portland ISD
- Houston-Galveston Clean Cities
- Houston Gateway Academy
- Houston ISD
- Humble ISD
- Leander ISD
- Lone Star Clean Fuels Alliance (Central Texas)
- Manor ISD
- Midland ISD
- New Braunfels ISD
- Northside ISD
- Orange County
- Prosper ISD
- Railroad Commission of Texas
- Ramirez Common School District
- Sheldon ISD
- Silsbee ISD
- South Texas ISD
- Southwest ISD
- Splendora ISD
- Texas Department of Transportation
- Williamson County
- Ysleta ISD

**Case Studies:****Propane School Bus Fleets  
Success Story**

Four school districts in Texas now use propane-fueled school buses. Some of the school districts save nearly 50% on a cost per mile basis for fuel and maintenance relative to diesel. The total petroleum displacement was 212,000 diesel gallon equivalents per year for 110 buses, while greenhouse gas reductions were approximately 770 tons per year. Learn more at [afdc.energy.gov/uploads/publication/case-study-propane-school-bus-fleets.pdf](https://afdc.energy.gov/uploads/publication/case-study-propane-school-bus-fleets.pdf). ■



Alvin ISD upgraded its on-site propane fueling station with a higher-volume pump and dispenser to save time and money refueling their 28 buses. Photo credit: Texas Railroad Commission. *Photo from Texas Railroad Commission*

# Development of a National Propane Refueling Network, Clean School Bus/Vehicle Incentive, and Green Jobs Outreach Program

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

## Project Summary:

The Development of a National Propane Refueling Network, Clean School Bus/Vehicle Incentive, and Green Jobs Outreach Program brought together several partners including Texas State Technical College and the Lone Star Clean Fuels Alliance in central Texas. The effort helped advance the installation of propane fueling infrastructure in metropolitan areas throughout the United States. The effort also supported the purchase of new and retrofitted propane buses, vans, and trucks. Finally, the project provided an innovative outreach program designed specifically for veterans and out-of-work, or at-risk service technicians, to provide training to work in the alternative fuels industry. The program resulted in the opening of 85 operational fueling stations, the purchase and deployment of 677 propane vehicles, and many successful training sessions.

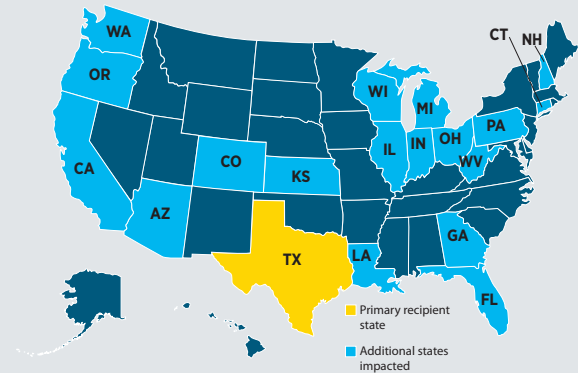
## Lessons Learned and Impact

The objective for each fleet that participated in this project was to primarily save money on fuel costs. As fuel cost savings accumulate over time, many fleets have since been able to purchase more propane vehicles. Fuel providers welcomed the opportunity to provide propane refueling options to meet demand. Clean Cities coalitions were instrumental in facilitating these partnerships. As a result of this project and others like it in Texas, propane school buses have become mainstream additions to school district fleets.

## Technology Types:

-  Propane
-  Driver training

States: Arizona, California, Colorado, Connecticut, Florida, Georgia, Illinois, Indiana, Kansas, Louisiana, Michigan, New Hampshire, Ohio, Oregon, Pennsylvania, Texas, Washington, West Virginia, and Wisconsin



## Funding:

- **\$12,333,940** Award
- **\$42,151,401** Local matching funds

## Congressional Districts<sup>1</sup>:

- Arizona's 3rd and 5th-8th Congressional Districts
- California's 1st, 3rd, 6th, 7th, 10th, 24th-35th, 37th, 39th-48th, 50th, 52nd, and 53rd Congressional Districts
- Colorado's 1st, 2nd, 6th, and 7th Congressional Districts
- Connecticut's 1st and 5th Congressional Districts
- Florida's 16th Congressional District
- Georgia's 2nd, 5th, 6th, 9th, 11th, and 13th Congressional Districts
- Illinois' 1st-4th, 6th, 8th, 10th-18th Congressional Districts
- Indiana's 2nd and 3rd Congressional Districts
- Kansas' 1st Congressional District
- Louisiana's 3rd Congressional District
- Michigan's 2nd, 3rd, and 12th Congressional Districts
- New Hampshire's 2nd Congressional District
- Ohio's 3rd Congressional District
- Oregon's 1st and 3rd-5th Congressional Districts
- Pennsylvania's 5th-7th, 12th, 14th, and 18th Congressional Districts
- Texas' 2nd, 4th, 7th-11th, 17th, 18th, 20th-23rd, 25th, 28th-31st, 35th, and 36th Congressional Districts
- Washington's 1st, 3rd, 4th, 7th, 9th, and 10th Congressional Districts
- Wisconsin's 3rd Congressional District
- West Virginia's 2nd and 3rd Congressional Districts

<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line® Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.

	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
<b>Infrastructure</b>	85	0	0	0	0	0	85	3,824,706.08	2,168.99		
	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
<b>Vehicles</b>	0	677	0	0	0	0	0	0	677	672,160.62	188.87
<b>Grand Total Petroleum Displacement</b>					<b>Grand Total GHG Reductions</b>						
4,496,866.70					2,357.85						

**Partners:**

- CleanFUEL Holdings
- Lone Star Clean Fuels Alliance (Central Texas)
- Public Solutions Group
- Texas State Technical College – Waco

**Case Studies:**

**Menards Success Story**

Propane vehicle drivers are now able to refuel at 32 new locations throughout Illinois and Wisconsin, thanks to collaboration among CleanFUEL USA, Ferrellgas, and Menards home improvement stores. Menards plans to convert 140 new pickups to propane operation for these stores, which will also receive propane forklifts to replace their existing diesel equipment. Learn more at [afd.energy.gov/case/1428](http://afd.energy.gov/case/1428). ■



Menards store manager Kyle Krause fuels one of the company's new propane pickup trucks. Photo by Greg Zilberfarb, NREL 24347





# North Central Texas Alternative Fuel and Advanced Technology Investments

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

## Project Summary:

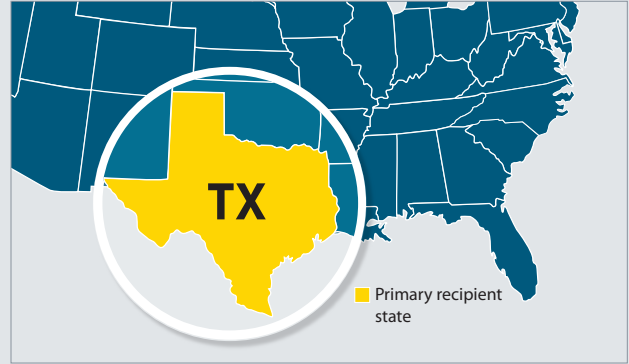
The North Central Texas Council of Governments, along with its partners, worked to deploy hundreds of alternative fuel and advanced technology vehicles, and install a variety of alternative fueling stations in the Dallas-Fort Worth area via the North Central Texas Alternative Fuel and Advanced Technology Investments project. Together, they developed a strategy to deploy a variety of different technologies and fuels, including biodiesel, ethanol, compressed natural gas, and electricity. In total, the project deployed 290 vehicles and 13 refueling stations across 17 fleets, including those operated by cities, independent school districts, a major commercial airport, private fleets, and a faith-based nonprofit. Learn more at [cleancities.energy.gov/partnerships/search?utf8=&project\\_search=north+central+texas](http://cleancities.energy.gov/partnerships/search?utf8=&project_search=north+central+texas).

## Technology Types:

-  Biodiesel and E85
-  CNG
-  EVs and EV charging stations
-  Hybrid electric vehicles

	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
<b>Infrastructure</b>	0	0	3	5	3	2	13	1,723,535.21	5,763.68		
	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
<b>Vehicles</b>	25	0	1	144	1	112	0	7	290	3,495,260.98	31,125.41
<b>Grand Total Petroleum Displacement</b>		<b>Grand Total GHG Reductions</b>									
		5,218,796.19		36,889.09							

## State: Texas



### Funding:

- **\$13,181,171** Award
- **\$23,197,585** Local matching funds

### Congressional Districts<sup>1</sup>:

- Texas' 3rd-6th, 12th, 24th-26th, 30th, 32nd and 33rd Congressional Districts

## Lessons Learned and Impact

This project proved that even a single fueling station placed in the right location can have an enormous impact on regional use of a particular alternative fuel. For example, one publicly-accessible CNG fueling station utilized by an anchor fleet that was constructed during this project has since grown to regularly serve 27 local and national fleets at this critical location. State grant programs continue to support the purchase of natural gas vehicles and this station will continue to be a key resource.

<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line® Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.

**Partners:**

- Canteen Vending
- City of Dallas
- City of Denton
- City of Fort Worth
- City of Garland
- City of Richardson
- City of Southlake
- Coca-Cola Refreshments USA
- Dallas-Fort Worth Clean Cities
- Dallas/Fort Worth International Airport
- Fort Worth Independent School District (ISD)
- Frito-Lay North America
- Highway of Hope
- Mansfield ISD
- New Bern Transport
- North Central Texas Council of Governments
- PAM Transport Inc.
- Splash Transport
- Sysco Corporation

**Case Studies:****Clean Energy Station Opening**

The number of alternative fuel vehicles and stations in the Dallas-Fort Worth area grew considerably with the influx of \$13.2 million in Recovery Act funding. The North Central Texas Council of Governments used the grant money to help fund a portfolio of different technologies and fuels, including three biofuel (B20) stations, two E85 stations, three compressed natural gas (CNG) stations, and five electric charging sites, along with 112 CNG vehicles, 32 (EVs), 145 hybrid electric vehicles, and one plug-in hybrid electric vehicle. Learn more at [youtube.com/watch?v=FFrfg5V0nbM](https://www.youtube.com/watch?v=FFrfg5V0nbM).



As part of an array of Recovery Act projects in the North Texas region, the Dallas-Fort Worth International Airport purchased 28 new compressed natural gas shuttle buses. *Photo from Dallas-Fort Worth Clean Cities*






# Utah Clean Cities Transportation Sector Petroleum Reduction Technologies

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

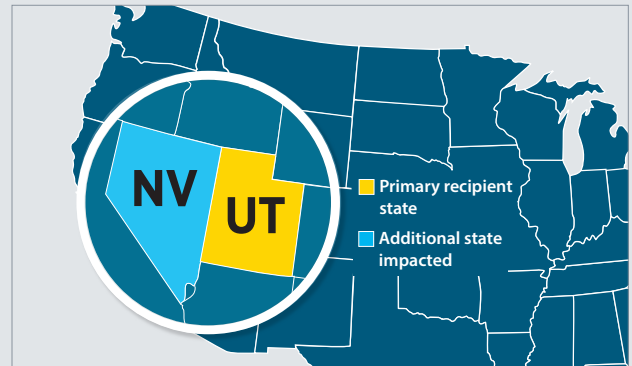
### Project Summary:

The Utah Clean Cities Transportation Sector Petroleum Reduction Technologies project aimed to increase the use of alternative fuel and advanced technology vehicles throughout the state to increase U.S. energy security, benefit local air quality, and install alternative fueling infrastructure. As a result of the effort, 568 new alternative fuel vehicles were purchased and deployed in Utah fleets, 36 new alternative fueling stations were installed, and 18 fueling stations were upgraded to accommodate alternative fuels. Learn more at [utahcleancities.org/uccc-grant](http://utahcleancities.org/uccc-grant).

### Technology Types:

-  EVs and EV charging stations
-  CNG and LNG
-  Driver training
-  Hybrid electric vehicles
-  Biodiesel

### States: Arizona and Utah



### Funding:

- \$14,908,648 Award
- \$42,458,715 Local matching funds

### Congressional Districts<sup>1</sup>:

- Arizona's 4th Congressional District
- Utah's 1st-4th Congressional Districts

### Lessons Learned and Impact

A culture of peer-to-peer exchanges contributed to the overwhelming success of this project. Fleets with alternative fuel experience were able to successfully mentor other fleets during their transition. In turn, those fleets served as mentors to others and created a vast network of groups with first-hand alternative fuel experience. Vehicle conversion shops that diversified their business to provide services for multiple fuel types, in addition to standard automotive repairs, have also thrived since the project's completion.

Infrastructure	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
	0	4	38	11	1	0	54	33,464,737.25	34,175.53		
Vehicles	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
	0	0	1	194	0	327	46	0	568	4,362,611.40	5,651.78
<b>Grand Total Petroleum Displacement</b>			<b>Grand Total GHG Reductions</b>								
37,827,348.65			39,827.31								

<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line<sup>®</sup> Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.



**Partners:**

- Carbon Cutter
- CNG America
- Go Natural Towing CNG
- Iowa Tanklines
- Jordan School District
- Kennecott Copper Mines
- Kenworth – PacLease/Associated Foods
- Ogden City
- Questar Gas Company
- Robinson Waste Services
- Salt Lake City
- Semi Service
- St. George Express
- State of Utah
- Student Movement
- Syracuse City
- Sysco Intermountain
- TransFuels
- Uintah Basin School District
- United Parcel Services (UPS)
- University of Utah – Commuter Services
- Utah Clean Cities Coalition
- Utah Paper Box
- Utah State University
- Utah Transit Authority
- Washakie Renewable Energy
- Washington City
- Waste Management
- Williams Northwest Pipeline

**Case Studies:****Utah Paperbox Success Story**

In 2012, Utah Paperbox installed five electric vehicle (EV) charging stations and added three plug-in electric vehicles to its fleet. In just one example of the fuel savings gained, the company's vice president of finance drove more than 18,000 miles and only purchased 58 gallons of gas. Learn more at [afdc.energy.gov/case/1569](http://afdc.energy.gov/case/1569).



With the installation of five electric vehicle charging stations, Utah Paperbox is committed to sustainability and renewable energy technologies. *Photo from Utah Clean Cities, NREL 26567*



Utah's Salt Lake City natural gas refueling station provides both liquefied and compressed natural gas, allowing more fuel to be stored in a smaller tank, which is important for the big rigs that need to drive long distances. *Photo from MotorWeek*

**Salt Lake City Success Story**

Utah's first liquefied natural gas (LNG) refueling station, located in Salt Lake City, can fill a wide variety of vehicles that run on either liquefied or compressed natural gas (CNG). The station has been joined by five others in Utah and two in Idaho to form a continuous long-haul truck alternative fuel corridor from the region all the way to the Southern California coast. Learn more at [afdc.energy.gov/case/383](http://afdc.energy.gov/case/383).

**Utah Idle Reduction and Natural Gas Success Story**

Utah Clean Cities launched Idle Free Awareness Month and the Clear the Air Challenge to educate drivers regarding their impact to air quality. From large fleets to school districts to individual drivers, Utah has saved millions of dollars in fuel costs, millions of dollars in maintenance costs, and thousands of tons of emissions. In addition, the state instituted the Clean Bus program to replace older school buses with alternative or hybrid buses, as well as encouraged organizations to switch their fleets to natural gas vehicles. Learn more at [youtube.com/watch?v=3vRYr7eITvg](http://youtube.com/watch?v=3vRYr7eITvg).

# Southeast Propane Autogas Development Program

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

## Project Summary:

Multiple Clean Cities coalitions—including Alabama Clean Fuels Coalition, Clean Cities Atlanta, Georgia Clean Fuels Coalition, Gold Coast Clean Fuels Coalition, Maryland Clean Cities, Palmetto State Clean Cities, and Tennessee Clean Fuels Coalition—along with their partners, worked together under the Southeast Propane Autogas Development Program. The effort was a large-scale alternative fuel project aimed at building propane infrastructure in the Southeast United States and encouraging public and private fleets to adopt propane. The program converted 1,189 vehicles from conventional gasoline to run on propane, and opened 11 propane fueling stations in 10 states. This resulted in millions of gallons of petroleum displacement. In addition, the project included a wide-ranging communications campaign to increase awareness and usage of propane in the Southeast. Learn more at [cleancities.energy.gov/partnerships/search?utf8=&project\\_search=southeast#arra-southeast](http://cleancities.energy.gov/partnerships/search?utf8=&project_search=southeast#arra-southeast).

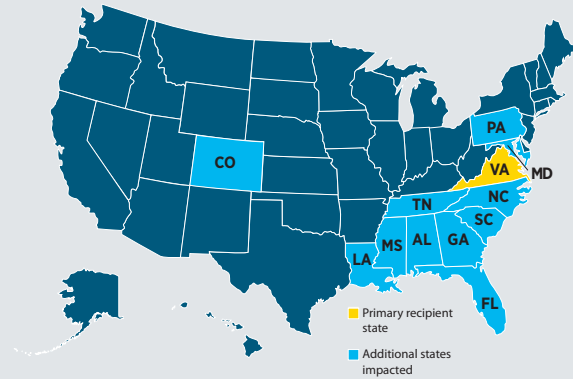
## Lessons Learned and Impact

Converted vehicles experienced safety and performance issues because of a lack of qualified conversion personnel and ineffective quality control mechanisms early in the project. A combination of technical assistance and partners who were committed to finding a solution led to a more robust and successful process. The wide variety of fleets involved in the project demonstrated the viability of propane in multiple vehicle applications. The propane market in Virginia has continued to grow largely due to personal testimonials among fleet managers.

## Technology Types:

 Propane

States: Alabama, Colorado, Florida, Georgia, Louisiana, Maryland, Mississippi, North Carolina, Pennsylvania, South Carolina, Tennessee, Virginia



## Funding:

■ \$8,605,100 Award   ■ \$10,449,184 Local matching funds

## Congressional Districts<sup>1</sup>:

- Alabama's 3rd, 6th, and 7th Congressional Districts
- Colorado's 1st, 6th, and 7th Congressional Districts
- Florida's 3rd-6th, 12th-14th, 18th, 20th, and 22nd Congressional Districts
- Georgia's 2nd, 3rd, 5th-7th, 9th, 11th, and 13th Congressional Districts
- Louisiana's 1st and 2nd Congressional Districts
- Maryland's 2nd, 3rd, and 7th Congressional Districts
- Mississippi's 1st-4th Congressional Districts
- North Carolina's 10th and 11th Congressional Districts
- Pennsylvania's 12th, 14th, and 18th Congressional Districts
- South Carolina's 3rd and 4th Congressional Districts
- Tennessee's 1st Congressional District
- Virginia's 1st-4th and 6th-10th Congressional Districts



<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line® Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.

	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
<b>Infrastructure</b>	11	0	0	0	0	0	11	628,783.08	438.70		
	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
<b>Vehicles</b>	0	1189	0	0	0	0	0	0	1189	3,120,475.11	2,108.62
<b>Grand Total Petroleum Displacement</b>		<b>Grand Total GHG Reductions</b>									
		3,749,258.19		2,547.32							

**Partners:**

- Airport Shuttle
- Alabama Clean Fuels Coalition
- Alliance Autogas (Blossman)
- American Alternative Fuels
- Augusta County
- Baker Equipment
- Brooks Chevrolet
- Buncombe County
- Bus Group
- Carroll County, GA
- Carrollton
- City of Vestavia Hills
- Clean Cities Atlanta
- Community Counseling
- County of Greenville, SC
- Culpeper
- Force 911
- Frederick County
- Georgia Clean Fuels Coalition
- German Motor Works
- Gold Coast Clean Fuels Coalition
- Groome Transportation
- Jackson County
- Keystone
- Kingsport
- Lee County
- Lewis Pest Control
- Light N Up
- Limousine Livery
- Maryland Clean Cities
- Mississippi Economic Development Partnership
- Muscogee County Sheriff
- Newport News
- Palmetto State Clean Cities
- Pearl River
- Peninsula Propane, LLC
- Pickins County, SC
- Propane Education and Research Council (PERC)
- Red Top Cab
- Sandy Springs
- Southeast Louisiana Clean Fuels Partnership
- Spotsylvania
- Tennessee Clean Fuels Coalition
- Veolia Transportation
- Villa Rica
- Virginia Clean Cities at James Madison University
- Virginia Department of Mines Minerals and Energy
- Virginia Premier

**Case Studies:**

**Veolia Transportation Success Story**

In Baltimore, Maryland, Veolia Transportation converted 300 Checker and Yellow Cab taxis from gasoline to propane. Learn more at [afdc.energy.gov/case/1122](http://afdc.energy.gov/case/1122).

**Spotsylvania Vehicle Conversion Success Story**

Virginia’s Spotsylvania County converted 20 sheriff’s cruisers and four school district trucks to run on propane. The county also has five school buses that run exclusively on propane. Learn more at [usepropaneautogas.com/wp-content/uploads/2014/03/06\\_Spotsylvania-County-Case\\_-Study.pdf](http://usepropaneautogas.com/wp-content/uploads/2014/03/06_Spotsylvania-County-Case_-Study.pdf).

**Ethanol Flex Fuel Success Story**

Community Counseling Services, a comprehensive community mental health center that operates in seven Mississippi counties, acquired 29 propane vans to transport hundreds of clients each week. Learn more at [usepropaneautogas.com/fleet-resources/case-studies/](http://usepropaneautogas.com/fleet-resources/case-studies/).



Using its own propane fueling station, Veolia Transportation is saving up to \$1.50 per gallon over regular gas and cutting maintenance costs. *Photo from MotorWeek*






# Puget Sound Clean Cities Coalition Petroleum Reduction Project

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

## Project Summary:

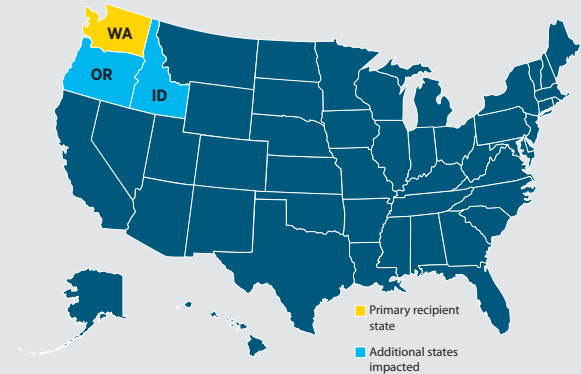
The Puget Sound Clean Cities Coalition Petroleum Reduction Project was an ambitious and multi-faceted effort led by many partners to generate lasting petroleum displacement across Washington. The project allowed for the deployment of more than 650 alternative fuel and advanced technology vehicles and the development of infrastructure for biodiesel, E85, compressed natural gas (CNG), and electric vehicles (EVs). The effort also helped deploy more than 200 light-duty CNG taxis and supported a large roll-out of electrified ground-support equipment and corresponding charging infrastructure at the Seattle-Tacoma International Airport. Additionally, the project included multiple efforts to inform audiences in the Puget Sound region about strategies to further reduce petroleum use. Learn more at [cleancities.energy.gov/partnerships/search?utf8=&project\\_search=puget+sound](http://cleancities.energy.gov/partnerships/search?utf8=&project_search=puget+sound).

## Technology Types:

-  CNG
-  Biodiesel and E85
-  EVs and EV charging stations
-  Propane
-  Hybrid electric vehicles

	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
<b>Infrastructure</b>	0	0	1	294	1	1	297	155,310.36	380.70		
	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
<b>Vehicles</b>	4	34	0	176	0	244	0	204	662	2,265,494.91	2,438.33
<b>Grand Total Petroleum Displacement</b>		<b>Grand Total GHG Reductions</b>									
		2,420,805.27		2,819.02							

## States: Idaho, Oregon, and Washington



### Funding:

- \$14,999,770 Award
- \$22,317,164 Local matching funds

### Congressional Districts<sup>1</sup>:

- Idaho's 1st Congressional District
- Oregon's 1st-3rd Congressional Districts
- Washington's 1st-10th Congressional Districts

## Lessons Learned and Impact

While the high mileage of CNG taxi cabs resulted in significant petroleum reductions, the CNG market in Washington continues to struggle amid inconsistent incentives. In contrast, while EVs didn't displace much petroleum during the course of the project, the installation of EV charging stations for pool car and commuter vanpool applications has allowed many people to experience EVs firsthand. This factor, coupled with the state's EV purchase incentives, has influenced a significant number of personal EV purchases.

<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line® Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.

**Partners:**

- Alaska Airlines/Horizon Air
- City of Bellevue
- City of Everett
- City of Issaquah
- City of Kirkland
- City of Mercer Island
- City of Olympia
- City of Renton
- City of Sammamish
- City of Seattle
- City of Tacoma
- CleanScapes
- CNG for Hire
- East Side for Hire
- First Pass Driving School
- Flat Rate for Hire
- King County
- Low Fare for Hire
- MVP Parking
- Ocean Beauty Seafoods
- Orange Cab
- Pierce County
- Port of Seattle – Seattle Tacoma International Airport
- Puget Sound Clean Air Agency
- Seatac Parking
- Shuttle Express
- Snohomish County
- Tacoma Public Utilities
- United Translation & Transportation
- University of Washington
- Waste Management
- Western Washington Clean Cities
- Western Washington University
- WorldCNG
- WSU Extension Energy
- Yellow Cab

**Case Studies:**

**Clean Air Taxi**

Taxi drivers in the Puget Sound region tapped into Recovery Act funding to convert their cabs to run on CNG or to switch to more fuel-efficient hybrid electric cabs. To reduce air pollution and encourage cleaner transportation options in the area, Western Washington Clean Cities created



Taxi companies that join the Clean Air Taxi program have made a voluntary commitment and investment in cleaner cars. *Photo from Clean Air Taxi*

the Clean Air Taxi program, which allows any cab company to opt in if at least 20 percent of its vehicles are hybrid electric, fully electric, CNG, and/or propane vehicles. Learn more at [cleanairtaxi.org](http://cleanairtaxi.org) and [youtube.com/watch?v=qAJPQDROm\\_k](https://youtube.com/watch?v=qAJPQDROm_k).

**Seattle’s Waste Haulers are Going Green**

Together, the cities of Seattle and Issaquah spurred a green revolution in Washington’s waste-hauling industry. In the Puget Sound region, most



Since Waste Management made the switch to CNG, related fuel infrastructure in the Puget Sound region has grown. *Photo from Western Washington Clean Cities, NREL 19681*

municipalities contract out waste-hauling services to private companies. Eager to win the Seattle contract, which required bidders to demonstrate “cleaner than diesel” fuel use, two leading waste-hauling companies—Waste Management and CleanScapes—integrated CNG vehicles into their fleets. Learn more at [afdc.energy.gov/case/1053](http://afdc.energy.gov/case/1053).

**Seattle Rideshare Fleet Adds Electric Vehicles, Enjoys Success**

Since 1979, Seattle-based King County Metro Rideshare Operations has managed the largest publicly owned and operated commuter van program in the nation. In 2011, the organization acquired its first all-electric fleet vehicles—20 Nissan Leafs—and soon after added five more. Recovery Act funding supported the deployment with the installation of three electric vehicle charging stations. Learn more at [afdc.energy.gov/case/1843](http://afdc.energy.gov/case/1843).



When Seattle Rideshare added 25 electric vehicles to its fleet, it reduced its greenhouse gas emissions by about 24 metric tons per month. *Photo by Jessie Lin/Washington State DOT, NREL 29160*

**SeaTac Airport Goes Green**

Recovery Act funding supported the installation of hundreds of electric charging stations throughout the Seattle-Tacoma International Airport (Sea-Tac) for ground-support equipment such as baggage tugs, bag ramps, and pushback vehicles. The bright yellow charging corrals feature fast-charging vehicle plug-ins. Learn more at [youtube.com/watch?v=luPWQ62cQtw](https://youtube.com/watch?v=luPWQ62cQtw). ■



Sea-Tac converted baggage tugs, bag ramps, and pushback vehicles from fossil fuels to electricity and added nearly 600 electric charging stations throughout the airport. *Photo from Western Washington Clean Cities*







# Wisconsin Clean Transportation Program

In 2009, the American Recovery and Reinvestment Act (Recovery Act) funded 25 cost-share projects under the Clean Cities program totaling nearly \$300 million. These projects have advanced the transformation of vehicle fleets across the nation by establishing 542 alternative fueling stations and putting more than 9,000 alternative fuel and advanced vehicles on the road. Together, these projects support U.S. energy independence, contribute to regional economic development, and reduce harmful vehicle emissions.

## Project Summary:

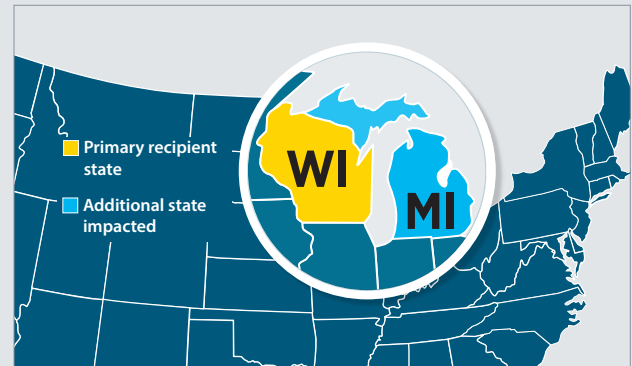
The Wisconsin Clean Transportation Program (WCTP) was a four-year initiative aimed to significantly reduce petroleum consumption and emissions in Wisconsin. The initiative focused on increasing the use of alternative fuel or advanced technology vehicles, including compressed natural gas (CNG), propane, biodiesel, E85, electric vehicles (EVs), and hybrid electric vehicles, and installing supporting infrastructure. The WCTP also aimed to maximize the preservation and creation of jobs by investing in the technology and training necessary to maintain a strong alternative fuels industry. The project deployed 177 light-duty vehicles, 200 medium- and heavy-duty vehicles, and installed three publicly accessible and 19 private alternative fuel stations. Learn more at [www.wicleancities.org/about\\_us/wctp.php](http://www.wicleancities.org/about_us/wctp.php).

## Technology Types:

-  Propane
-  Hybrid electric vehicles
-  CNG
-  Biodiesel and E85
-  Driver training
-  EVs and EV charging stations

	LPG	LNG	CNG	EV	Biodiesel	E85	Total Infrastructure Installations	Total Petroleum Displacement	Total GHG Reductions		
<b>Infrastructure</b>	2	0	4	14	1	1	22	1,345,371.01	4,331.73		
	NEV	LPG	PHEV	HEV	HHV	CNG	LNG	EV	Total Vehicles Deployed	Total Petroleum Displacement	Total GHG Reductions
<b>Vehicles</b>	20	65	20	120	0	151	0	1	377	2,876,629.23	1,734.77
<b>Grand Total Petroleum Displacement</b>		<b>Grand Total GHG Reductions</b>									
		4,222,000.24		6,066.50							

## States: Michigan and Wisconsin



### Funding:

- \$15,000,000 Award
- \$17,047,478 Local matching funds

### Congressional Districts<sup>1</sup>:

- Wisconsin's 1st-8th Congressional Districts
- Michigan's 1st Congressional District

## Lessons Learned and Impact

The involvement of a variety of partners and fuel types in this project demonstrated that alternative fuels can be used in any application and growth in one alternative fuel market can lead to growth in others. By raising awareness of a particular fuel, the project team encouraged greater conversation about the availability of all alternative fuel options. As a result, fleets selected the fuel that best suited their needs and budget, in many cases opting for propane because of its low implementation cost.

<sup>1</sup> Congressional district information was generated using United States Census Bureau TIGER/Line® Shapefiles. Districts for infrastructure projects are listed based upon the physical address of the refueling location. For vehicles, they are listed based upon the census places and congressional districts that intersect a limited driving radius from the garage location of the vehicle.

**Partners:**

- Barnes Inc.
- Barnes Power Equipment
- Bayfield County
- Bestway Limousine, LLC
- Brown County
- Chippewa County Highway Department
- City of Bayfield
- City of Durand
- City of Madison
- City of Milwaukee
- City of Monona
- City Utilities of Richland Center
- Contract Transport Services, LLC
- Dane County
- Dart Transit Co.
- Florence Utilities
- Fox Valley Metro Police Department
- Fun Times Bounces
- GO Riteway
- Great Lakes Community Conservation Corps
- Hribar Transport, LLC
- Jefferson County Sheriff's Office
- Kaukauna Utilities
- Kenosha County
- Lake Mills Water & Light
- Lamers Bus Lines Inc.
- Madison Gas & Electric
- Marquette University
- Marshfield Utilities
- Menasha Utilities
- Milwaukee County
- Milwaukee County General Mitchell Airport
- Milwaukee Metro Sewerage District
- New Richmond Utilities
- Oconomowoc Transport Company
- Oconomowoc Utilities
- Paper Transport, Inc.
- Pope Transport
- Remy Battery Co., Inc.
- Roehl Transport, Inc.
- Sheehy Mail Contractors, Inc.
- Stoughton Utilities
- SunPower Biodiesel, LLC
- Time Transport
- Transit Express
- University of Wisconsin – Madison
- University of Wisconsin – Oshkosh
- Veriha Trucking
- Waste Management of Wisconsin, Inc.
- We Energies
- Wisconsin Clean Cities
- Wisconsin Department of Administration
- Wisconsin Department of Corrections
- WPPI Energy

**Case Studies:****Leadership in CNG Propels Paper Transport Inc.**

Paper Transport Inc., a 350-truck regional freight company out of Green Bay, Wisconsin, recently began a transition from diesel fuel to CNG to help cut its petroleum use and emissions. The transition also helped the company meet U.S. Environmental Protection Agency ozone standards along its main shipping corridor. Each of the 15 trucks currently in the fleet travel about 100,000 miles per year. Learn more at [afdc.energy.gov/case/1006](http://afdc.energy.gov/case/1006).



Paper Transport Inc., a 350-truck regional freight company based in Green Bay, Wisconsin, recently began a transition from diesel fuel to CNG. Photo from Paper Transport, Inc., NREL 22257

**Compressed Natural Gas Refuse Fleets**

Three organizations used heavy-duty refuse trucks fueled by CNG to explore the potential for saving money on fuel while taking advantage of other benefits, such as low-criteria pollutant emissions, lower greenhouse gas emissions, and quieter operation. Republic Services, a national

waste and recycling services company; Groot Industries, Inc. a smaller residential trash pick-up and disposal company operating regionally in northern Illinois; and the City of Milwaukee's Department of Public Works (DPW), a municipal agency, all share lessons learned in this case study. Learn more at [afdc.energy.gov/uploads/publication/casestudy\\_cng\\_refuse\\_feb2014.pdf](http://afdc.energy.gov/uploads/publication/casestudy_cng_refuse_feb2014.pdf).



Republic Services is one of the largest waste and recycling companies in the country, and it is increasingly fueling its collection trucks with CNG. Photo from Republic Services, NREL 18287

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