Clean Cities 2014 Annual Metrics Report

Caley Johnson and Mark Singer
National Renewable Energy Laboratory

NREL is a national laboratory of the U.S. Department of Energy
Office of Energy Efficiency & Renewable Energy
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Technical Report
NREL/TP-5400-65265
December 2015

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List of Acronyms

AFDC	Alternative Fuels Data Center
AFV	alternative fuel vehicle
CNG	compressed natural gas
CO_2e	carbon dioxide equivalent
DOE	U.S. Department of Energy
E85	a high-level ethanol blend
EV	all-electric vehicles
GGE	gasoline-gallon equivalent
GHG	greenhouse gas
HDV	heavy-duty vehicle
HEV	hybrid electric vehicle
IR	idle reduction
LDV	light-duty vehicle
LNG	liquefied natural gas
MGGE	million GGE
NCFP	National Clean Fleets Partnership
NREL	National Renewable Energy Laboratory
ORNL	Oak Ridge National Laboratory
PEV	plug-in electric vehicle
PIM	Petroleum Impact Model
RNG	renewable natural gas
VMT	vehicle miles traveled
WPCC	Workplace Charging Challenge

Introduction

The U.S. Department of Energy's (DOE's) Clean Cities program advances the nation's economic, environmental, and energy security by supporting local actions to cut petroleum use in transportation. A national network of nearly 100 Clean Cities coalitions, whose territory covers 80% of the U.S. population, brings together stakeholders in the public and private sectors to deploy alternative and renewable fuels, idle-reduction (IR) measures, fuel economy improvements, and new transportation technologies as they emerge.

Each year, DOE asks Clean Cities coordinators to submit annual reports of their activities and accomplishments for the previous calendar year. Data and information are submitted via an online database that is maintained as part of the Alternative Fuels Data Center (AFDC) at the National Renewable Energy Laboratory (NREL). Coordinators submit a range of data that characterize the membership, funding, projects, and activities of their coalitions. They also submit data about sales of alternative fuels; deployment of alternative fuel vehicles (AFVs), plug-in electric vehicles (PEVs) and hybrid electric vehicles (HEVs); IR initiatives; fuel economy activities; and programs to reduce vehicle miles traveled (VMT). NREL analyzes the data and translates them into petroleum-use reduction impacts, which are summarized in this report.

Eighty-three of the 84 coalitions active throughout 2014 completed reports, representing a response rate of 98%. The coalitions that submitted 2014 annual reports are listed in Appendix A. Coalition coordinators assembled the data based on voluntary reports from their stakeholders —the private and public entities that are members of the coalitions. As such, each of these reports represents a subset of the Clean Cities activities throughout the nation, and taken together, they are an important indicator of the impact of the coalitions.

In addition to collecting data through the coordinator reports, NREL compiles metrics about activities funded by the Clean Cities program at NREL, Argonne National Laboratory, and Oak Ridge National Laboratory (ORNL). NREL and Argonne provide a range of technical data, tools, and resources to support coalitions in their efforts to accelerate the use of alternative fuels, advanced vehicles, and other technologies. ORNL produces the Fuel Economy Guide, the FuelEconomy.gov website, and other public information related to fuel economy. Metrics pertaining to the uses and impacts of these resources are presented in this report as estimated petroleum savings.

A compilation of data from this report, along with reports from previous years, can be accessed at www.eere.energy.gov/afdc/data/cleancities.html. Previous years' reports can be downloaded in their entirety at www.afdc.energy.gov.

Summary of Key Findings

Clean Cities activities saved over 1 billion gallons of gasoline[1] in 2014. Table 1 represents the combined results of all strategies of petroleum savings. In this table, "coalition-reported savings" resulted from activities reported by coalitions along with the quantity of fuel used or numbers that allow an easy conversion into fuel use (such as number of vehicles, average fuel economy, and average miles traveled). "National Partner" savings were reported by the National Clean Fleets Partners (NCFP) after the large overlap with the coalition-reported savings was removed and attributed to the coalitions. Likewise, the "Workplace Charging Challenge" (WPCC) reported savings with overlap removed. "Estimated outreach savings" resulted from coalition outreach, education, and training events, as estimated by NREL and ORNL via the methods outlined in the Estimated Outreach Savings section. NREL and ORNL also estimated the savings from two Clean Cities websites—fueleconomy.gov and the AFDC—using the same methods.

As shown in Table 1, savings from coalition-reported activities increased 17% in 2014, while estimated savings decreased 26%. The decrease in estimated savings is likely due to low gasoline prices throughout 2014. Savings from coalition-reported savings would have been even greater, but this year VMT-reduction projects were capped at 10% of any coalition's total savings. Total 2014 petroleum savings increased 1% compared to 2013, keeping the Clean Cities program on schedule to meet its goal of 2.5 billion gallons per year by 2020.

Table 1. Petroleum Savings of Each Portfolio Element

	Technology	Million GGEs Saved	Percent of Total Coalition-Reported Savings	Percent of Grand Total Savings	Increase from Last Year
Coalition-Reported Savings	Alt. Fuels and Vehicles	469.4	73%	46%	20%
	HEVs and PEVs	83.3	13%	8%	14%
	Idle Reduction	37.9	6%	4%	29%
	VMT Reduction	24.0	4%	2%	-35%
	Fuel Economy	21.0	3%	2%	37%
	Off-Road	9.4	1%	1%	20%
	Total Coalition-reported Savings	645.0	100%	63%	17%
National Partners[a]		37.3	na	4%	100%
Workplace Charging Challenge[b]		1.2	Na	0%	100%
Estimated Savings	ORNL Fuel Economy	168.0	na	16%	-17%
	Estimated Outreach Savings	116.0	na	11%	-39%
	AFDC	54.0	na	5%	-17%
	Total Savings from Estimates	338.0	na	33%	-26%
Grand Total[c]		1,021.5	na	100%	1%

[a] Any project reported by both NCFP and a collaborating coalition was attributed to the coalition in this report.
[b] Any project reported by both Workplace Charging Challenge and a collaborating coalition was attributed to the coalition in this report.
[c] Totals may differ from the sums of subcategories due to rounding.

[1] The petroleum saved includes both gasoline and diesel. Petroleum savings in this report are expressed in gasoline-gallon equivalents (GGEs), using the lower heating value ratio of the fuels.

Clean Cities was a major contributor to the U.S. climate protection efforts. As shown in Table 2, Coalition-reported activities prevented 3.2 million tons of carbon dioxide equivalent (CO_2e) from being emitted into the atmosphere. National partner-reported projects reduced another 78 thousand CO_2e from being emitted. Outreach events and tools kept another 3.3 million tons of CO_2e out of the atmosphere, for a total of 6.6 million tons CO_2e. This greenhouse gas (GHG) emissions reduction is equivalent to completely removing 1.5 million conventional cars from U.S. roads. The overall reduction in GHG emissions is 11% less than the overall reduction in 2013, most likely because low gasoline prices led to fewer drivers responding to outreach events and lab websites.

Table 2. GHG Emissions Reduced by Clean Cities in 2014

Technology	Tons of GHG Emissions Averted	Equivalent Cars Removed[a]	Percent of Coalition Total
Alt Fuels & Vehicles	1,356,225	298,428	42%
HEVs and PEVs	756,964	166,564	24%
IR	465,544	102,440	15%
VMT Reduction	296,329	65,205	9%
Fuel Economy Improvements	259,846	57,177	8%
Off-Road Vehicles	72,436	15,939	2%
Coalition Reported Total	3,207,345	705,753	100%
National Partners[b]	77,647	17,086	na
Workplace Charging Challenge[b]	5,723	1,259	na
ORNL Fuel Economy	2,081,347	457,986	na
AFDC	153,979	33,882	na
Outreach Events	1,105,785	243,320	na
Grand Total	6,631,826	1,459,286	na

[a] Calculated as total passenger car GHG emissions (Table 3–15 in the EPA's *Inventory of 2013 GHG Emissions and Sinks*) divided by total short wheelbase light-duty vehicles (Table VM-1 in the Federal Highway Administration's *Highway Statistics*, 2013).

[b] National Partner and Workplace Charging Challenge numbers exclude any projects that overlapped with the coalitions.

Coalitions were also remarkably successful in securing project awards from numerous sources, thereby leveraging DOE's investment in the program. In 2014, the coalitions won 116 new project awards (project-specific grants) worth a total of $44 million and another $267 million in leveraged funds from coalition members. This funding represents more than a 13:1 leveraging of the $24 million DOE Clean Cities program budget in Fiscal Year 2014.

Clean Cities coordinators spent more than 140,000 hours pursuing Clean Cities' goals in 2014, which is equivalent to having a national network of 70 full-time technical and sales professionals working in the field to reduce U.S. dependence on petroleum. Coordinators logged 2,184 outreach, education, and training activities in 2014, which reached an estimated 69 million people and saved an estimated 116 million GGEs of petroleum. Local government fleets were the most common audience at these events, followed by the general public.

Changes to the 2014 Annual Metrics Report

The 2014 Annual Report differs from its predecessors in a number of ways. Some of these indicate a change in the technologies now available, some indicate a change in the reporting process, and some indicate a change in the way the report was written. These changes include:

- VMT reduction projects were limited to 10% of each coalition's total petroleum reduction. This was done to align the reporting process with Clean Cities' priority to increase alternative fuel use.
- Projects done through the Clean Cities NCFP were reported directly by the Partners this year. Over half of their petroleum reduction was reported through a collaborating coalition, and the remainder was reported in a separate National Partners category.
- Accomplishments of the WPCC were reported for the first time this year.
- Additional questions are now asked for projects that are particularly large, unusual, or unique. These questions try to assess what the coalition did to enable the project, what the coalition did in 2014 to expand or sustain the project, what Clean Cities resources were used, and what the coalition is doing to enable other coalitions to do similar projects.
- Renewable natural gas (RNG) was accepted as a reportable technology for the first time this year. Coordinators reported if the source of the gas was landfill, wastewater, or animal waste, and the appropriate GHG emissions reductions were applied.
- Driver training, telematics, and hydraulic hybrid vehicles were added as new technologies available to improve fuel economy.
- Glow plugs were added as a technology in the IR section. These help diesel engines to start in cold temperatures so the engines do not need to idle as much.
- Coordinators can now report the brake horsepower-hour used in off-road vehicles if they do not know the quantity of fuel used.
- PEVs are reported instead of separate electric vehicle (EV) and plug-in HEV categories. This categorical merge was made because of an increase in charger-based projects where unknown groups of vehicles were mistakenly being categorized as either EVs or plug-in HEVs.

Attribution and Fuel Use Factors

To clarify the link between coalition activities and end results, the coalition annual report includes an attribution factor that accounts for the percentage of a project's outcome that may be due to coalition activities rather than to the activities of other project participants. This attribution factor was used in the estimates of impacts for fuel economy, VMT reduction, IR, alternative fuel use, and outreach projects. Coordinators estimated the percentage of the project's outcome their coalition was responsible for, and the project's overall outcome was multiplied by that percentage to determine the coalition's impact. Although subjective, this method attempts to address the issue of attribution where a coalition is one of several partners involved in a project. To reduce the subjectivity of this factor, NREL provides a tool to help a coalition estimate its contribution to a given project.

Coalition-Reported Petroleum Savings and Greenhouse Gas Emissions Reduction

Coordinators submitted information about their petroleum use reductions, broken down according to the technologies in the Clean Cities portfolio. NREL analyzed the data, converted it into a quantity of gasoline saved by each element of the portfolio, and reported in units of GGEs—the amount of energy contained in a gallon of gasoline. As shown in Table 1, about 658 million GGEs (MGGEs) were saved through coalition-reported Clean Cities coalition efforts in 2014—an average of 7.9 MGGEs per coalition. This is 19% higher than the total 2013 reported petroleum savings of 553 MGGEs.

Clean Cities' petroleum use reduction leads to a substantial reduction in GHG emissions, the pollutants responsible for global climate change. To estimate the GHG reductions resulting from Clean Cities activities, we used a variation of Argonne National Laboratory's Greenhouse Gas, Regulated Emissions, and Energy Use in Transportation (GREET) model. This model takes into account the fuel life cycle, or "well to wheels," GHG emissions for transportation fuels, which include fuel production, transport, and use in the vehicle. It does not take into account the emissions from indirect land use changes or vehicle manufacturing.

Alternative Fuels and Vehicles

As shown in Table 1, alternative fuels (used in AFVs and in biodiesel blends) and HEVs accounted for approximately 553 MGGEs, or 86% of the coalition-reported petroleum savings. This is an increase of 19% over the amount of petroleum that was saved by alternative fuels in 2013.

In 2014, coalitions reported a total inventory of just over 643,000 AFVs, split among nine fuel types (Figure 1). This represents a 9% increase from last year. PEVs were the fastest growing market segment, doubling between 2013 and 2014. The number of flexible fuel vehicles that can operate on E85 (a high-level ethanol blend) increased by 6%. The numbers of AFVs powered by biodiesel and hydrogen increased 33% and 7%, respectively. The number of AFVs powered by propane, compressed natural gas (CNG), and liquefied natural gas (LNG) decreased 51%, 14%, and 18%, respectively. RNG was included in the report for the first time in 2014.

Figure 1 also shows the percent of GGEs displaced by AFVs according to fuel type. CNG remains at the top of the list, accounting for 62% of the total AFV petroleum displacement, despite the fact that only 14% of the total AFVs use CNG. This is in stark contrast to E85, which accounts for only 11% of the AFV petroleum savings even though 56% of reported AFVs can use E85.

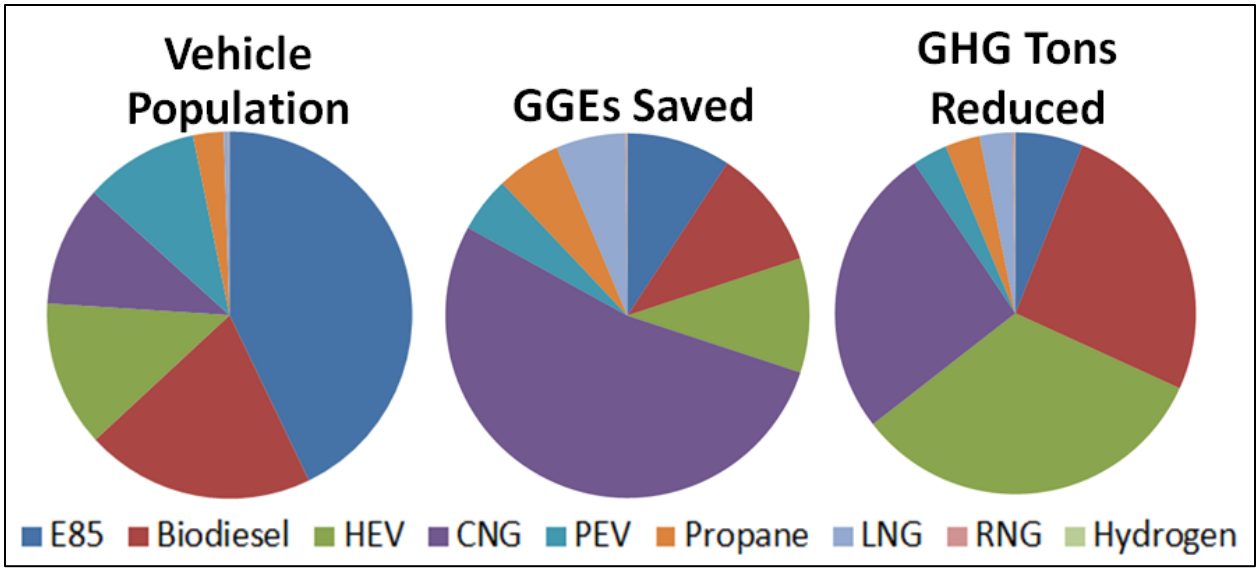

Figure 1. 2014 percent of AFVs, petroleum saving, and GHG reductions by fuel type

The amount of petroleum displaced by each fuel type increased from 2013 to 2014 for most fuel types. Displacements from LNG, PEVs, CNG, and propane increased the most (56%, 33%, 26%, and 16%, respectively). E85 and HEVs showed increased petroleum displacement of about 6% each, while biodiesel and hydrogen decreased by 3% and 4%, respectively.

The average number of GGEs displaced per vehicle, shown in Table 3, reveals some interesting trends. For a given vehicle, this number is influenced by four factors:

1. The frequency with which the AFV uses alternative fuel (dedicated AFVs tend to displace more petroleum than vehicles that can use petroleum-based fuels in addition to alternative fuels).
2. The number of miles per year the AFV travels (higher mileage displaces more petroleum).
3. The AFVs' fuel economy. Vehicles with lower fuel economy consume more fuel and therefore displace more petroleum. Therefore, Table 3 shows light-duty vehicles (LDVs) and heavy-duty vehicles (HDVs) separated to increase fidelity.
4. The amount of petroleum contained in the alternative fuel (ethanol and biodiesel blends contain significant quantities).

For example, LNG HDVs captured in the data save more petroleum per vehicle, on average, than other HDVs do—48% more than CNG vehicles and 23 times more than biodiesel HDVs. This is not surprising, given that LNG vehicles are primarily used in heavy-duty applications and travel relatively long distances. The number of vehicles is included in Table 3 to indicate how robust the data is for a given fuel/vehicle combination. For example, hydrogen LDVs might be skewed by their small sample size (of vehicles that drive long distances) to appear to reduce more GGEs per vehicle than they would if they had a larger sample size. In 2014, the average AFV saved 859 GGEs of petroleum and avoided 3.3 tons of GHG emissions. This is a 10% and 2% (respectively) increase from 2013.

Table 3. Average Annual Petroleum Displacement per Vehicle

Fuel	GGEs per HDV	# HDVs	GGEs per LDV	# LDVs
LNG	11,414	2,992	none reported	0
Hydrogen	9,135	32	1,639	17
PEV	8,724	1,625	205	63,417
CNG	7,735	33,343	989	35,136
HEV	3,124	7,577	430	75,257
Propane	2,917	7,068	1,056	10,336
RNG	2,366	293	499	20
Biodiesel	491	101,675	310	28,865
E85	398	1,213	184	274,295

Alternative fuels and AFVs were responsible for more GHG emissions reductions than any other coalition-reported activity. We calculated these reductions by subtracting the life cycle GHG emissions resulting from the use of an alternative fuel in a vehicle from the life cycle GHG emissions resulting from the use of gasoline or diesel fuel in an equivalent vehicle. For the purposes of these calculations, gasoline is considered the baseline fuel for all LDVs, except in the case of biodiesel, for which conventional diesel fuel is used as the baseline. Gasoline is considered the baseline fuel for HDVs using E85, CNG, LNG, and propane, because these vehicles are equipped with spark-ignition (gasoline-like) engines. For all other alternative fuel HDVs, we used conventional diesel fuel as the baseline.

As shown in Figure 1, the GHG emissions reductions are not necessarily proportional to the petroleum displacement because the various alternative fuels emit different levels of life cycle GHGs. RNG is a prime example of a fuel that has extremely low GHG emissions because it precludes the emission of methane from landfills, wastewater treatment facilities, and farms. It is also worth noting that VMT reduction, HEVs, IR, and fuel economy improvement projects have a disproportionately high reduction of GHGs relative to their petroleum displacement. This is because these technologies eliminate 100% of the GHG emissions per gallon of petroleum saved, while alternative fuels reduce GHG emissions by a lesser amount per gallon of petroleum saved.

Twenty-four percent of the reported AFVs were HDVs. These HDVs are responsible for 76% of the AFV petroleum savings. The majority of LDVs include a growing number of medium-duty vehicles. The average HDV displaces 7.7 times as much petroleum as the average LDV. The use of LNG is confined exclusively to HDVs. Likewise nearly all (99%) of RNG is used by HDVs. About 85% to 90% of the savings from CNG, biodiesel, and hydrogen comes from HDVs. Sixty-five percent of propane use and 52% from PEVs occurred in HDVs. The only technologies whose petroleum savings was dominated by LDVs was E85 (with only 1% used by HDVs) and HEVs (48%).

Fuel Economy

Petroleum savings and GHG reductions from non-HEV coalition-reported fuel economy projects increased 37% in 2014, to 21 MGGEs, making it the fastest-growing technology category. This savings resulted from nearly 44,000 vehicles, for an average displacement of 480 GGEs per vehicle. New categories for the 2014 report include “driver training,” “telematics,” and “hydraulic hybrid” vehicles. Figure 2 shows that some fuel economy improvement projects were

much more effective at reducing petroleum than others. While the "hydraulic hybrid vehicles" category provided one of the smaller fuel-use reductions overall, the category showed a significant opportunity for additional growth based on its fuel-use reduction per vehicle level.

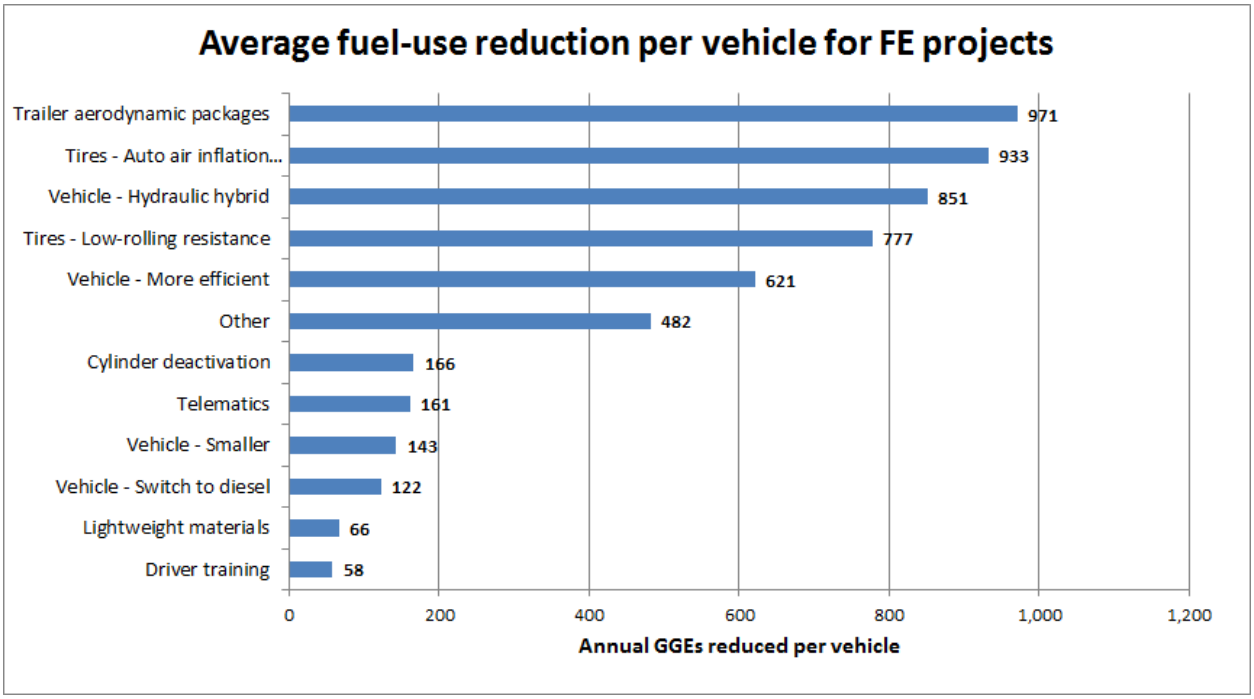

Figure 2. Average fuel-use reduction per vehicle for 2014 fuel economy projects

Vehicle Miles Traveled Reduction

VMT reduction projects save fuel and reduce GHG emissions by reducing the miles that vehicles travel. They include strategies such as carpooling, biking, teleworking, and public transportation. Sixty-five of the 83 (78%) reporting coalitions reported at least one VMT reduction project in 2014. The total number of projects increased in 2014 to 345. In the 2014 reporting cycle, coalitions had their petroleum savings claimed through VMT projects limited to 10% of their overall petroleum reduction. Even with this limit in place, coalitions saved 24 MGGEs of fuel, which is 35% less than what coalitions reported in 2013 prior to the limit. The project types, numbers, and sizes are shown in Table 4.

Table 4. VMT Reduction Project Types, Number, and Displacement

Project type	Number of Projects	Increase in # of Projects	GGEs per Project
Mass transit	76	19	388,967
Carpooling	68	4	185,254
Other	63	2	239,384
Non-motorized locomotion (e.g., bicycles)	61	14	19,737
Telecommute	31	8	35,367
Car sharing (e.g., Zipcar)	23	-5	37,073
Route Optimization	12	12	30,488
Compressed work week	11	5	7,491
Total[a]	345	59	176,351

[a]GGEs per project calculated before the 10% limit of coalition overall petroleum savings was implemented

Idle Reduction

IR strategies include truck-stop electrification amongst the broad approaches listed in Figure 3. The estimated fuel savings for IR technologies and policies was 38 MGGEs in 2014. The number of IR projects increased 15% in 2014, and the quantity of petroleum that these projects displaced increased 29%. As shown in Figure 3, auxiliary power units were responsible for the greatest percentage (37%) of petroleum displacement. IR programs, direct-fire heaters, and policies followed with significant percentages (23%, 14%, and 10%, respectively). The remaining methods combined for a total of 16% of the petroleum displacement.

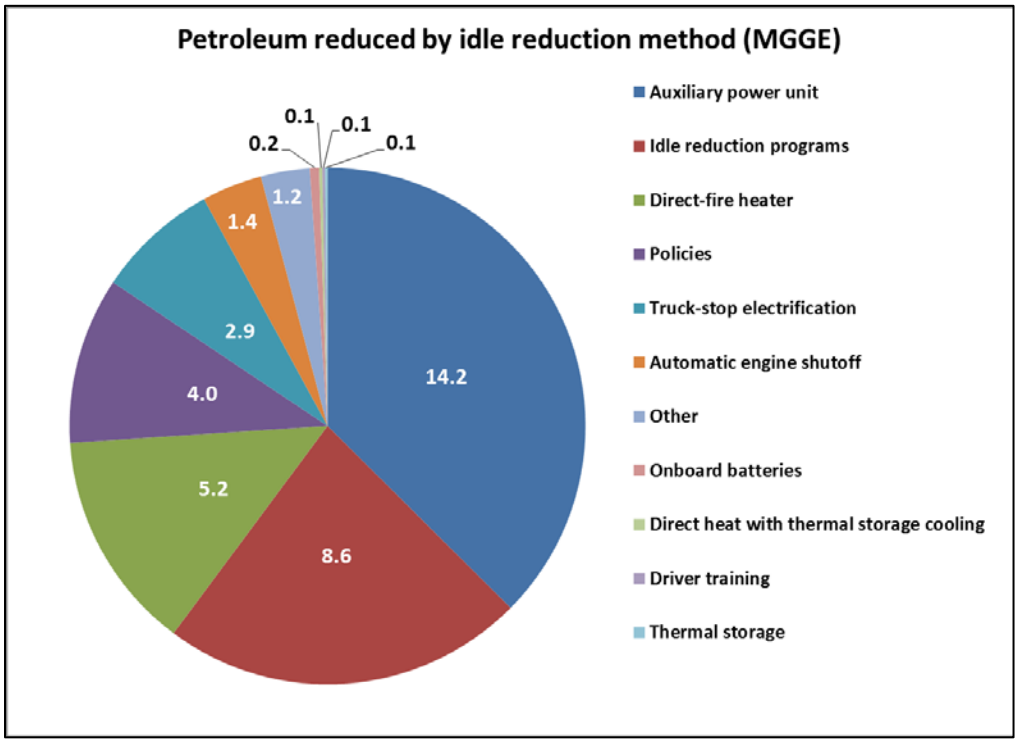

Figure 3. Fuel savings from IR projects (MGGE)

Off-Road Vehicles

Vehicles used in off-road applications contributed to the petroleum savings reported by coalitions. Petroleum savings occurred when these vehicles were AFVs and used alternative fuel or when fuel economy or VMT efforts were implemented. Table 5 shows the number of off-road vehicles (or pieces of equipment) reported by coalitions in 2014. These categories are self-descriptive, with the exceptions of "construction equipment," which includes cranes, earth movers, and similar equipment, and "recreation equipment," which includes jet skis, snowmobiles, and all-terrain vehicles. The number of off-road vehicles increased 26% from 2013 to 2014, and their overall petroleum displacement increased 20%. The largest growth in number of vehicles since 2013 was seen in mining equipment and "other" with 40% and 36% growth, respectively. The largest reduction was in the number of planes with an 85% reduction (although the baseline was very low).

Table 5. Number of Off-Road Vehicles or Equipment and Petroleum Saved

Application	Number of Vehicles	GGEs Saved	GGEs per Vehicle
Other	4,833	1,986,768	411
Construction Equipment	4,034	357,405	89
Forklifts	3,202	920,129	287
Landscaping Equipment	2,669	662,448	248
Mining Equipment	2,085	2,272,205	1,090
Recreational Equipment	595	58,451	98
Farm Equipment	119	173,821	1,461
Street Sweeper	68	34,570	508
Railroads	51	967,153	18,964
Ships	45	2,005,829	44,574
Planes	3	3,896	1,299
TOTAL	17,704	9,442,674	533

Overall savings from off-road vehicles totaled 9.4 MGGE. Vehicles using biodiesel accounted for 60% of the AFVs included in this category. Vehicles using other fuels in off-road applications included EVs (16%) and propane vehicles (17%). The other six fuels and technologies together accounted for just 6% of the total vehicles. Biodiesel use was focused in the mining equipment, construction equipment, ships, and other equipment applications. EVs were primarily used in railroads, "other equipment," and forklifts. Propane vehicles were primarily reported as "other equipment," forklifts, landscaping equipment, and farm equipment. Applications varied widely in the number of GGEs displaced per vehicle, as shown in Table 5.

National Partner Petroleum Savings and Greenhouse Gas Emissions Reduction

In April 2011, Clean Cities began partnering with large nationwide fleets that operate in areas larger than any given coalition. The NCFP grew to 26 fleets in 2014, and 14 of them reported their fuel use data directly to DOE headquarters. Over half of these data were already reported through local coalitions that the partners have been collaborating with. An average partner worked with 10 coalitions as they implemented new technologies across the nation. However, much of the National Partners' work was also done independently of local coalitions and was previously not reported. Of the 81 million GGEs petroleum saved by the National Partners, 37 million of them were not reported by any coalitions (as shown in Table 6). These Partners still benefitted from the expertise, tools, and other resources provided by the national Clean Cities program. It should be noted that all of the E85 and biodiesel were reported by coalitions, most likely because they worked to secure the fuel that these vehicles used.

Table 6. Vehicles and Petroleum Reduction from National Partners Not Already Reported by Coalitions

Fuel/Drivetrain	Vehicles	Petroleum Saved (GGE)	GHG Reduced (tons)
CNG	10,807	22,466,764	42,264
LNG	719	7,787,887	14,249
Propane	1,403	4,748,135	9,911
PEV	3,448	1,758,834	5,658
HEV	576	422,711	5,207
Hydrogen	40	79,720	358
E85	184	0	0
Biodiesel	0	0	0
Total	**17,177**	**37,264,051**	**77,647**

Workplace Charging Challenge Petroleum Savings and Greenhouse Gas Emissions Reduction

Clean Cities added the WPCC to its portfolio of strategies in in 2012 to help meet DOE's EV Everywhere campaign goals. Each year, the WPCC annual report highlights accomplishments of the initiative from June 1 to May 31. Table 7 weights the accomplishments from the 2014 and 2015 WPCC annual reports to provide an estimate of accomplishments in calendar year 2014 (the Clean Cities reporting period). WPCC projects that were already reported by coalitions were subtracted to avoid double counting them. In 2014, the WPCC efforts added 7,180 PEVs to Clean Cities' fleet. These PEVs saved 1.2 million gallons of gasoline and reduced GHG emissions by over 5,700 tons.

Table 7. WPCC 2014 Accomplishments

Year	PEVs	kWh (million)	GGE (million)	GHG (tons)
June 2013 to May 2014[a]	5,198	6.7	0.8	2,750
June 2014 to May 2015[a]	9,031	11.8	1.7	8,500
January to Dec 2014	7,434	9.7	1.3	6,104
Coalition Overlap	254	0.73	0.1	381
CY 2014 WPCC Accomplishments	7,180	8.9	1.2	5,723

[a] Numbers sourced from the *Workplace Charging Challenge Progress Update 2014: Employers Take Charge* [1] and *2015 Workplace Charging Challenge Mid-Program Review: Employee's Plug In* [2]

Estimated Petroleum Savings and Greenhouse Gas Emissions Reduction

Two categories comprise estimated petroleum savings: "estimated lab savings," which includes national lab activities, such as the *Fuel Economy Guide* and the AFDC website, and "estimated outreach savings," which includes coalition outreach activities. Both categories impact behaviors such as vehicle purchases, fuel choice, driving habits, vehicle maintenance, and transportation patterns. Calculating these petroleum savings involves a fair degree of uncertainty, but it is nevertheless important to quantify the impacts of educational and outreach activities as best we can. Not doing so would imply that these activities had no impact, which is inaccurate. This section outlines our approach and provides the results.

Methods Used To Estimate Petroleum Use and Greenhouse Gas Emissions Reduction by Websites and Outreach Activities

In 2014, petroleum use reduction was attributed for the sixth year in a row to the program's online resources and to outreach events held by Clean Cities coalitions. To quantify these estimated savings, NREL and ORNL developed the Petroleum Impact Model (PIM), and NREL added related functionality to the Clean Cities annual report website.

Clean Cities coordinators reported the type of outreach event, the number of people reached by each event, the technologies presented, and the coalition's percent attribution. To determine the number of people reached by a given event, the annual report website multiplied the audience number by the percent attributed to the coalition. When multiple technologies were presented at a given event, the annual report assumed the number of people reached to be divided evenly among the technologies. These data are then entered into the PIM as "persons reached by the coalition about a given technology."

The PIM multiplies this persons-reached number by the probability a person will take action (defined as purchasing an AFV or more efficient vehicle, or as changing driving or fueling

[1] www.nrel.gov/docs/fy15osti/63230.pdf
[2] http://energy.gov/sites/prod/files/2015/12/f27/105313-5400-BR-0-EERE%20Charging%20Challenge-FINAL_0.pdf

behavior). This probability is derived by comparing the outreach event and technology to comparable marketing media and products. Eleven of these media-product combinations have a "customer conversion ratio" that is recorded by various marketing firms, as shown in Table 8. The customer conversion ratio is the ratio of purchases made (desired action) over the total number of people contacted through the outreach activity. The code in Table 8 is provided for continuity through the calculation process.

Table 8. Benchmark Customer Conversion Rates and Their Sources

Code	Benchmark Conversion Rate	Reference
1	0.6% for electronics (expensive, complicated) websites	Fireclick.com. Accessed June 16, 2011
2	1.3% for environmentally related, incremental cost purchase	Bird, Lori. 2004. *Utility Green Pricing Programs: Design, Implementation, and Consumer Response*
3	2% for common websites	Fireclick.com. Accessed June 16, 2011
4	2.5% for industry-specific mail	Direct Marketing Association (DMA). 2011
5	3.2% for email	Fireclick.com. Accessed June 16, 2011
6	7% for affiliates	Fireclick.com. Accessed June 16, 2011
7	(Rate not listed here due to copyright restrictions) AdMeasure product: LDVs	GfK Mediamark Research & Intelligence, LLC. 2011
8	(Rate not listed here due to copyright restrictions) AdMeasure product: Gasoline	GfK Mediamark Research & Intelligence, LLC. 2011
9	(Rate not listed here due to copyright restrictions) AdMeasure smoking cessation	GfK Mediamark Research & Intelligence, LLC. 2011
10	2% for direct mail to current customers	Eisenberg, B. "The Average Conversion Rate: Is it a Myth?" ClickZ. February 1, 2008

For activity-type/audience-action combinations that were not directly addressed by research, NREL adjusted the customer conversion ratios based on the Ostrow Model of Effective Frequency, Krugman's Three Exposure Theory, and the authors' assumptions. Table 9 lists a set of relationships that increase or decrease the impact of advertisements.

Table 9. Relationships for Media Effectiveness and Their Sources

Code	Relationships	Source
A	Degree of media interactivity increases impact	Ostrow Model of Effective Frequency
B	Brand recognition increases impact	Ostrow Model of Effective Frequency
C	Long purchase cycle increases impact	Ostrow Model of Effective Frequency
D	Less frequent usage of item increases impact	Ostrow Model of Effective Frequency
E	Affordability of item increases impact	Ostrow Model of Effective Frequency
F	Simple message increases impact	Ostrow Model of Effective Frequency
G	Media clarity (not cluttered) increases impact	Ostrow Model of Effective Frequency
H	Message in relevant environment increases impact	Ostrow Model of Effective Frequency
I	Audience attentiveness increases impact	Ostrow Model of Effective Frequency
J	More steps in processing the media increases impact	Krugman's Three Exposure Theory
K	Availability of item increases impact	Author's assumption
L	Length of vigilance required decreases impact	Author's assumption

We adjusted the benchmark conversion rates shown in Table 8 by the relationships for media effectiveness shown in Table 9. The direct application of these rates and relationships is shown in Table 10, where the number relates to the code in Table 8 and the letters relate to the code in Table 9. The final customer conversion ratios used are displayed in Table 11.

Table 10. Combination of Benchmarks and Relationships

Activity Type	Purchase New AFV	Use Alt. Fuel in Existing Vehicle	Use Biodiesel Blends in Diesel Vehicle	Purchase More Efficient Car	Operate Vehicle More Efficiently	Purchase HEV	Reduce Idling	IIR HDV (Equipment Purchase)	Reduce VMT
Advancing the Choice	6+H+I +J-E	6+H+I+ J	6+H+I+J	6+H+I +J	6+H+I+J	6+H+I +J-E	6+H+I +J	6+H+I+J-E	6+H+I+J
Advertisement	7-K	8-K-L	8-K-L	7+E	9-G-L	7-K	9-L	7+E	9-L
Conference	6+H+J-E	6+H+J	6+H+J	6+H+J	6+H+J	6+H+J -E	6+H+ J	6+H+J-E	6+H+J
Literature Distribution	4+B+H -E	4+B+H	4+B+H	4+B+H	4+B+H	4+B+H -E	4+B+ H	4+B+H-E	4+B+H
Media Event	7-E-G-H-K	8-G-H-K	8-G-H-K	7-G-H+E-K	9-G-H-K	7-E-G-H+B-K	9-G-H-K	7-E-G-H-K	9-G-H-K
Meeting	6+A+B +I-E	6+A+B+ I	6+A+B+I	6+A+B +I	6+A+B+I	6+A+B +I-E	6+A+ B+I	6+A+B+I-E	6+A+B+ I
Website	1+B+J	3+B+J	3+B+J	3+B+J	3+B+J	1+B+J	3+B+ J	1+B+J	3+B+J

Table 11. Customer Conversion Ratios Used in the PIM

Activity Type	Purchase New AFV	Use Alt Fuel in Existing Vehicle	Use Biodiesel Blends in Diesel Vehicle	Purchase More Efficient Car	Operate Vehicle More Efficiently	Purchase HEV	Reduce Idling	IR HDV (Equip Purchase)	Reduce VMT
Advancing the Choice	2.0%	6.0%	6.0%	5.0%	7.0%	2.0%	5.0%	4.0%	8.0%
Advertisement	0.6%	5.5%	5.5%	2.0%	10.0%	2.0%	10.0%	3.0%	4.0%
Conference	2.0%	6.0%	6.0%	5.0%	7.0%	2.0%	5.0%	4.0%	8.0%
Literature Distribution	2.0%	3.0%	3.0%	2.5%	3.0%	2.5%	3.0%	2.5%	5.0%
Media Event	0.6%	2.5%	3.0%	1.2%	3.0%	1.2%	4.0%	2.0%	2.0%
Meeting—Other	2.0%	7.0%	6.0%	5.0%	7.0%	2.0%	5.0%	4.0%	8.0%
Website	2.0%	4.0%	3.0%	3.0%	4.0%	3.0%	3.0%	3.0%	3.0%

The persons-reached multiplied by the appropriate customer conversion ratio (from Table 11) results in the number of people assumed to take the intended action. Please note that the decreased percentages for media events implemented last year were revised this year because the E15 media events were no longer a consideration. After the conversion factors have been applied, the PIM is similar to the Clean Cities annual reporting tool as it converts the estimated number of vehicles purchased or number of people changing their driving habits into petroleum saved. We make downward adjustments to the estimates to account for probable overlaps between audiences attending outreach events and entities reporting their own petroleum savings via a Clean Cities coalition. We apply the estimated petroleum savings only to the reporting year in question, even though many of the vehicle purchases and behavioral changes will likely last beyond that year.

We also used the PIM to estimate petroleum savings resulting from the AFDC. NREL gathers AFDC website statistics that allow us to estimate the number and characteristics of individual users. The PIM then uses inputs, defaults, and methodologies similar to those it employs in calculating the savings from coalition websites (including the website row of Table 11) to estimate the total petroleum savings attributable to the AFDC.

Estimated Lab Savings

Both NREL and ORNL use a variety of means to track the use of the information and resources they provide on behalf of the Clean Cities program. ORNL produces the *Fuel Economy Guide* based on fuel economy data from the U.S. Environmental Protection Agency. It also produces and maintains the FuelEconomy.gov website along with other print products and educational activities related to fuel economy. By tracking the number of new car buyers, used car buyers, and car drivers exposed to fuel economy products through their educational materials, and assuming a 1% to 3.3% improvement in fuel economy per customer, ORNL estimated that the fuel economy materials resulted in a savings of 168 MGGEs in 2014. This is a reduction of 17%

from 2013, most likely attributable to lower gasoline prices reducing interest in fuel economy and therefore visitors to fueleconomy.gov.

Online resources managed by NREL reached a large audience in 2014, as the Clean Cities and AFDC websites received a combined 6.6 million page views. The sites provide a range of resources to support coordinators, fleets, businesses, policymakers, and other transportation decision-makers in their efforts to implement the technologies and strategies in the Clean Cities portfolio. The sites' content includes technical data, case studies, and publications, along with databases of federal and state incentives and laws, fueling station locations, available vehicles, and other information and tools.

NREL estimates that the 6.3 million page views through 1.8 million sessions by 1.4 million users of the AFDC resulted in a petroleum savings of 54 MGGEs in 2014. When estimating petroleum savings, we assumed that 20% of the AFDC visitors were overlaps with activities reported by the coalitions so we did not count the activities of those 20%. Compared to 2013, this activity is a 7.1% reduction in page views and a 16.7% reduction in petroleum savings. The discrepancy is largely due to a reduction in visits to pages with a higher probability of displacement (such as the alternative fuel station locator) and an increase in visits to pages with a lower probability of displacement (such as fuel prices; data, analysis, and trends; and tools that help drivers and fleets determine the payback of investments in alternative fuel vehicles and infrastructure).

The Clean Cities website received 340,000 page views through 118,000 sessions from 63,000 visitors, and held the average visitor for nearly 3 minutes. We did not make petroleum use reduction estimates for the Clean Cities website because we assumed the majority of site visits were related to Clean Cities activities taking place through coalitions, and those activities were already reported by the coalitions. For the same reason, we did not make petroleum use reduction estimates for other Clean Cities activities performed by NREL, such as webinars, technical advice, presenting and exhibiting at conferences, and publications.

Estimated Outreach Savings

Coalitions' outreach, education, and training activities were classified into nine categories, as shown in Table 12. A total of 2,931 activities were reported, which were estimated to have reached nearly 70 million people. Compared to 2013, the number of events increased by 31%, while the number of persons reached decreased by 43%. This is because the average size of events decreased from last year—from 53,740 persons per event to 23,478. This average size is heavily influenced by large media events. The majority of people (89%) were reached through media events in 2014, even though only 10% of the outreach activities were media events. The overall decrease in people reached through media events was largely driven by a return from the abnormalities of 2013. These abnormalities were two high-profile media stories in Minnesota and Utah that gained national coverage and syndication. However, the number of people reached per conference and workshop was also drastically reduced in 2014, possibly because low gasoline prices resulted in lower interest in alternative fuels. Meetings with outside organizations were the most common type of outreach event (27%), but reached only 1% of the outreach audience. The number of people reached through meetings increased more than any other outreach event (89%), followed by websites (63% increase) and social media (51%).

Table 12. Outreach, Education, and Training Activities

Activity Type	Number of Activities	Share of Total Activities	Activities Increase Since 2013	Persons Reached	Share of Total Persons Reached	Persons Increase Since 2013
Media Event	285	9.7%	32%	61,545,646	89.4%	-45%
Advertisement	56	1.9%	87%	4,971,122	7.2%	19%
Meeting - Other	801	27.3%	4%	687,671	1.0%	89%
Literature Distribution	361	12.3%	66%	594,472	0.9%	54%
Conference participation	485	16.5%	27%	532,334	0.8%	-73%
Website	49	1.7%	250%	231,627	0.3%	63%
Social Media	166	5.7%	403%	124,769	0.2%	51%
Workshop Held by Coalition	341	11.6%	22%	107,025	0.2%	-82%
Meeting - Stakeholder	387	13.2%	33%	18,655	0.0%	22%
TOTAL	2,931	100.0%	31%	68,813,321	100.0%	-43%

Figure 4 illustrates the types of audiences reached through the 2,931 outreach activities. The coalitions could aim any one activity toward multiple audiences; in fact, each activity targeted an average of 2.4 different audiences. Government fleets were the most-cited target audience, followed by the general public, then private fleets. Entities with specialized applications—such as utility trucks, mass transit, delivery trucks, waste management, and airports—were identified as audiences in nearly 43% of the outreach activities. The composition of outreach activities was consistent with last year's.

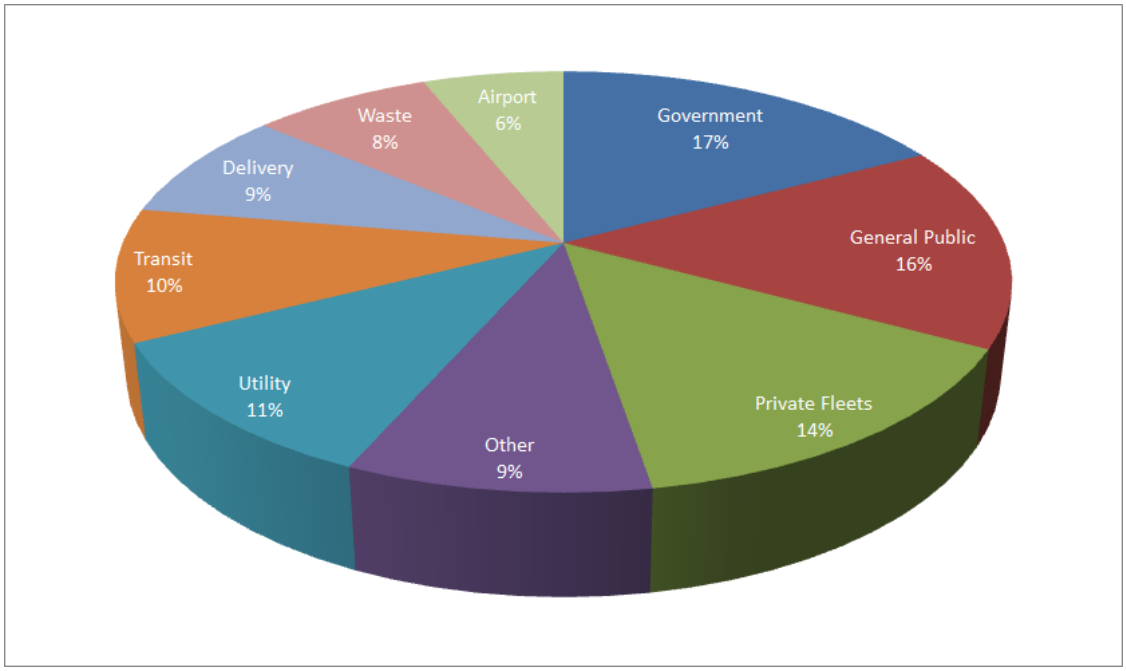

Figure 4. Percent of outreach activities split among audience types

Coalitions' outreach events featured a relatively even mix of technologies, as illustrated in Figure 5. No single technology dominated, but AFVs were covered more than any of the other technology types. Just as with audience types, any one activity could address more than one technology; each activity featured an average of 1.7 different technologies.

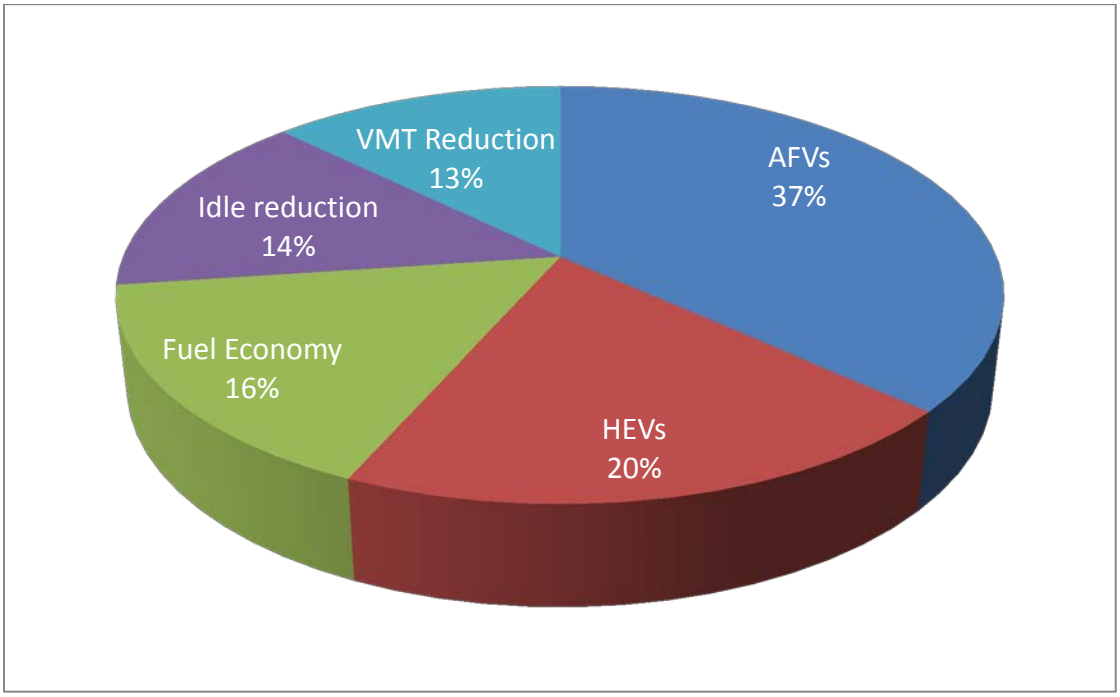

Figure 5. Percent of outreach activities by technology type

Using the PIM, NREL estimates that Clean Cities coalition outreach events prompted and enabled actions that saved 116 MGGEs of petroleum in 2014. This is a 39% reduction from 2013, which is slightly less than the 43% reduction in overall people reached (as examined in the first paragraph of this section).

Goal Tracking and Cumulative Petroleum Savings and Greenhouse Gas Emissions Reduction

In 2005, Clean Cities set a goal of displacing 2.5 billion GGEs per year by 2020. The data presented in this report show that Clean Cities is on schedule to meet this goal. Clean Cities' progress toward its petroleum use reduction goal is shown in Figure 6, where the path toward achieving the 2020 goal is represented by the blue dashed line and actual petroleum savings are tracked by the black solid line. When the goal was originally set in 2005, meeting it required a compounded annual growth rate of 16.6%. The average growth rate required henceforth to meet the 2020 goal has slightly dropped to 16.1%.

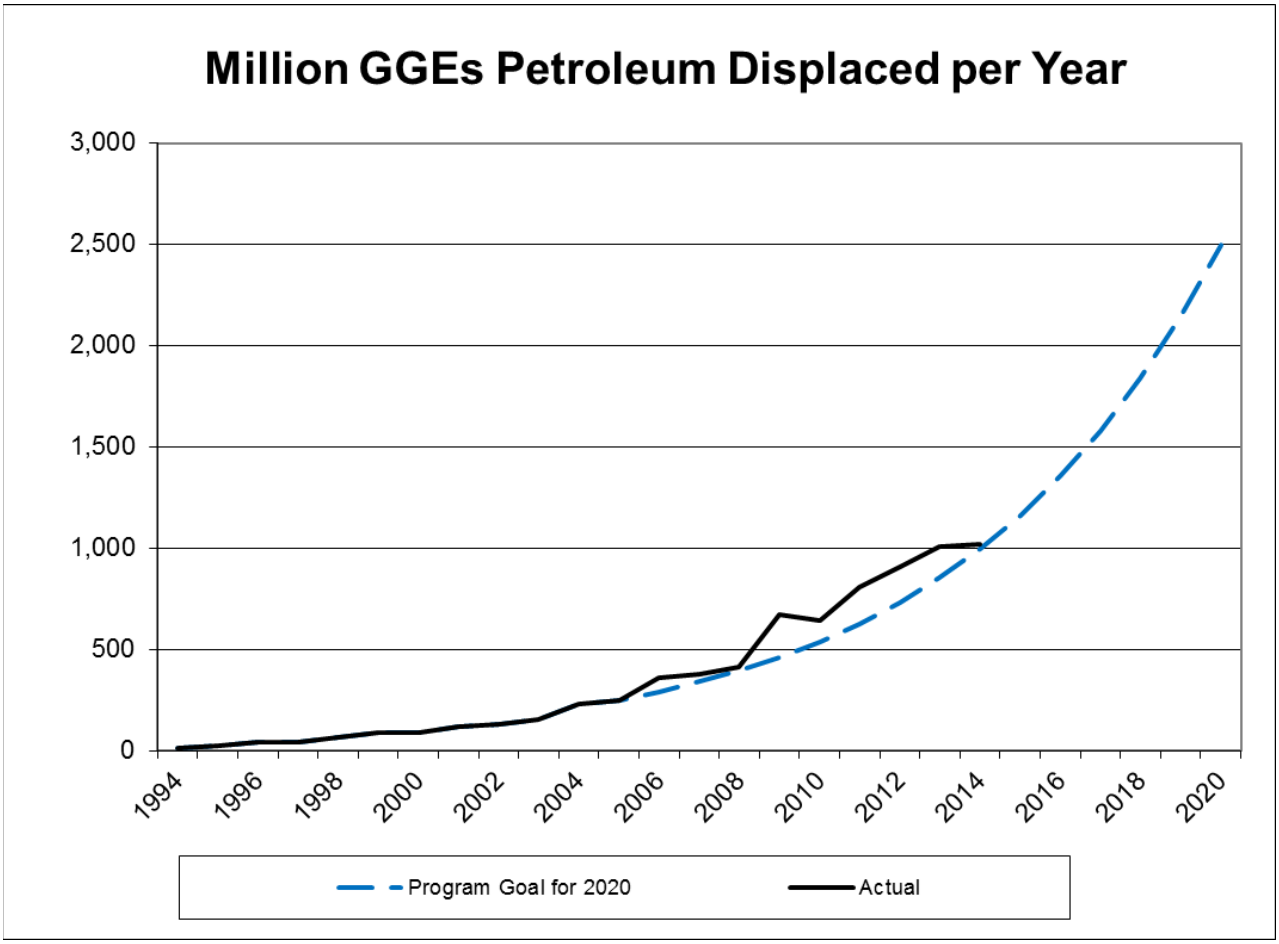

Figure 6. Annual petroleum savings trajectory to meet 2020 goal and actual progress

Clean Cities efforts have added up considerably over the years. When the annual savings shown in Figure 6 are aggregated to cumulative savings, the overall impact can be seen. This cumulative petroleum savings, shown in Figure 7, is now nearly 7.5 billion GGEs.

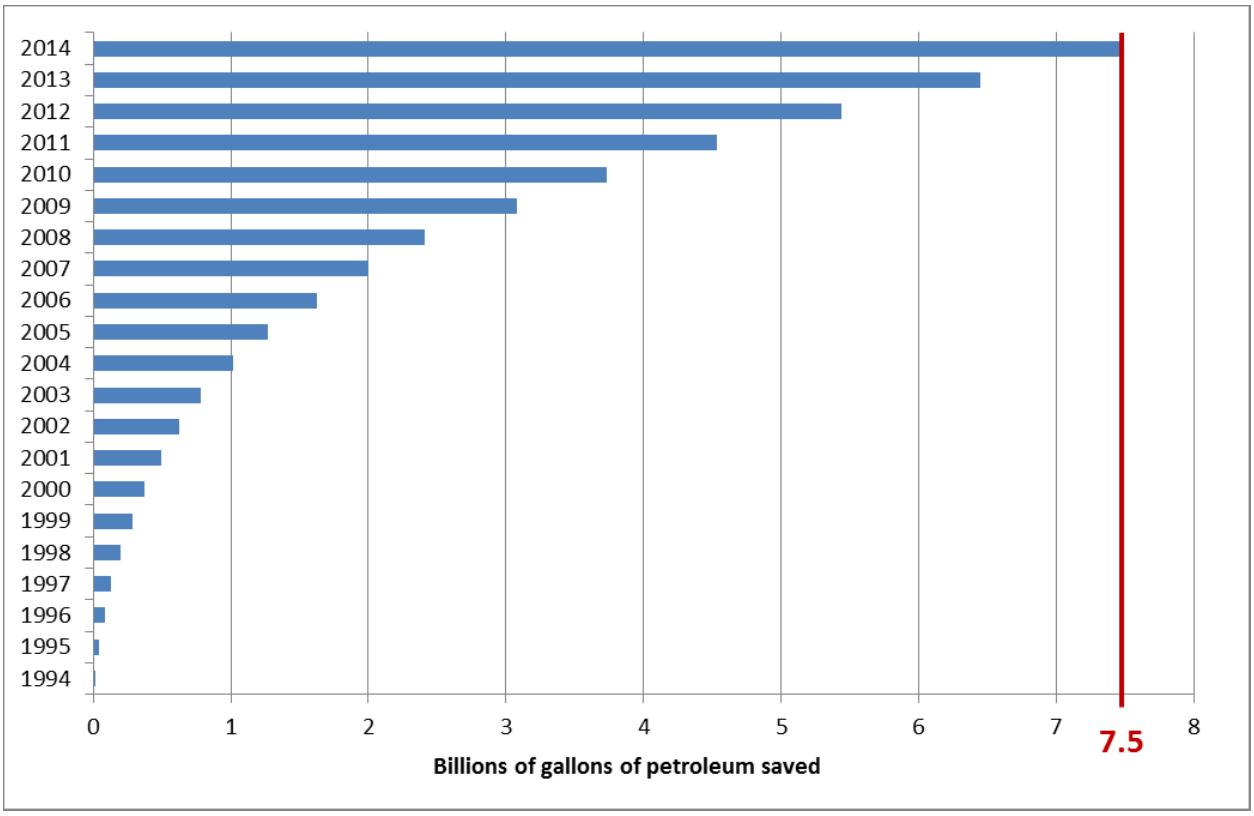

Figure 7. Cumulative petroleum savings of all Clean Cities activities

These petroleum savings have led to a cumulative of over 48 million tons of GHG emissions reductions over the years as well, as shown in Figure 8. The relationship between the two has not always been consistent, since different technologies can be more effective at either petroleum savings or GHG reductions (see Figure 2) and the Clean Cities technology portfolio changes over time. Therefore, Figures 7 and 8 do not reflect one another exactly.

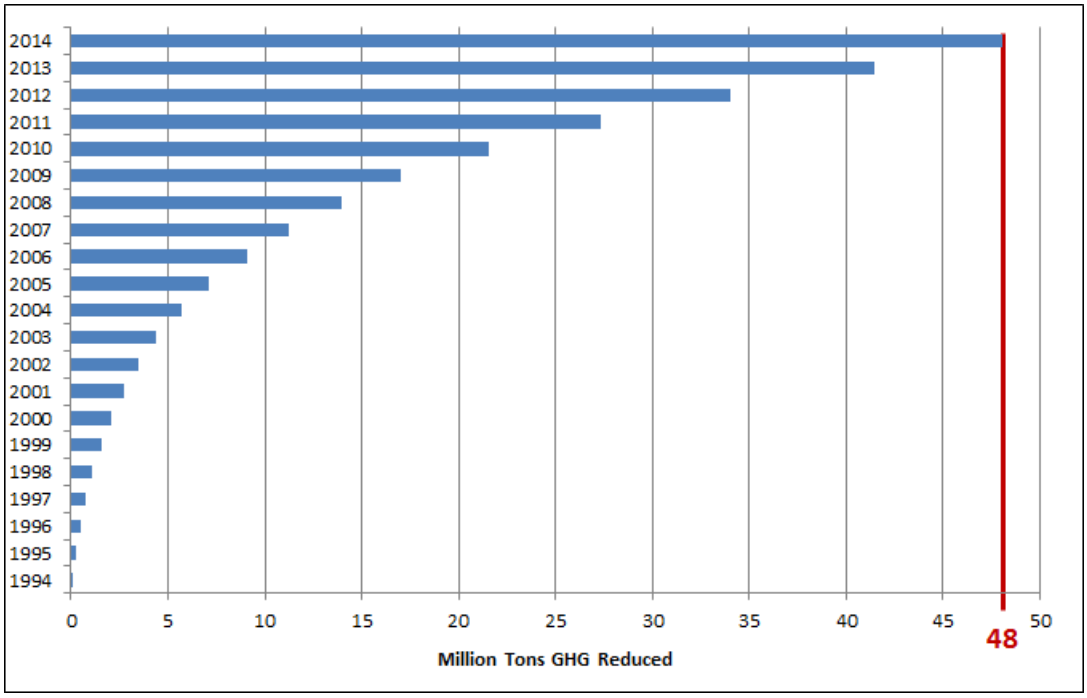

Figure 8. Cumulative GHG reductions from all Clean Cities activities

Alternative Fuel Vehicle Types and Markets

The online reporting tool asked coordinators to categorize their AFVs into key vehicle types and niche market fleets. Figure 9 shows that the largest portion (32%) of AFVs was cars. "Unknown/other" LDVs were the second most common AFV (at 30% of total). These are usually vehicles reported in conjunction with a Clean Cities-supported fueling station. Light trucks/vans/sport utility vehicles comprised the third-largest category, which accounted for 11% of the AFVs. Heavy trucks without trailers along with "unknown" or "other" HDVs, which were mostly reported in conjunction with biodiesel public fueling stations, accounted for 8% and 7% of the vehicles, respectively. All remaining categories accounted for fewer than 4% of the vehicle population.

E85 LDVs were the most popular fuel/vehicle combination. E85 vehicles in the "unknown/other" light-duty segment (157,000 vehicles), the light trucks/vans/sport utility vehicles segment (40,000 vehicles), and the car segment (69,000 vehicles) together comprised 41% of all vehicles.

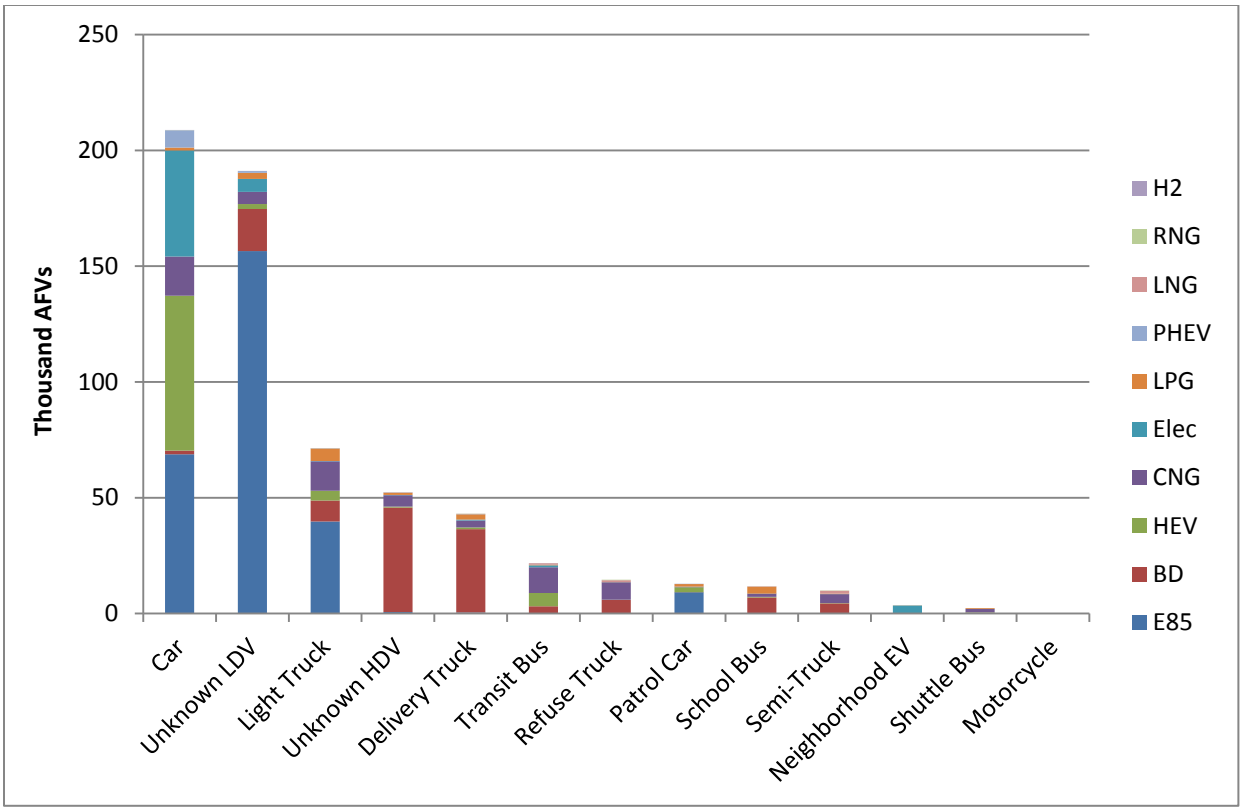

Figure 9. AFVs by vehicle and fuel type

Neighborhood EVs are small EVs only allowed on low-speed roads

In addition to reporting vehicle types, coordinators also provided information about vehicle ownership and the markets served by reported vehicles. As shown in Figure 10, half of the reported vehicles were owned by the general public or an unknown entity. Many of these vehicles were reported through fuel retailers. This category grew substantially in 2014, possibly due to re-categorization from other vehicle types. The next two largest ownership groups of AFVs are local governments and state governments at 22% and 15%, respectively.

The number of vehicles in airport fleets increased by 31%, which showed the most growth for any market in 2014. Most of these airport vehicles were E85-capable vehicles. The number of utility vehicles, postal service vehicles, and local government vehicles all increased significantly (28%, 16%, and 10%, respectively). The most popular fuels for these markets were biodiesel for utility vehicles and local government vehicles, while E85 was popular for postal service vehicles. The number of National Parks vehicles, corporate fleets, and taxis shrank by 37%, 6%, and 4%, respectively. The remaining fleet segments grew by 7% to 9%.

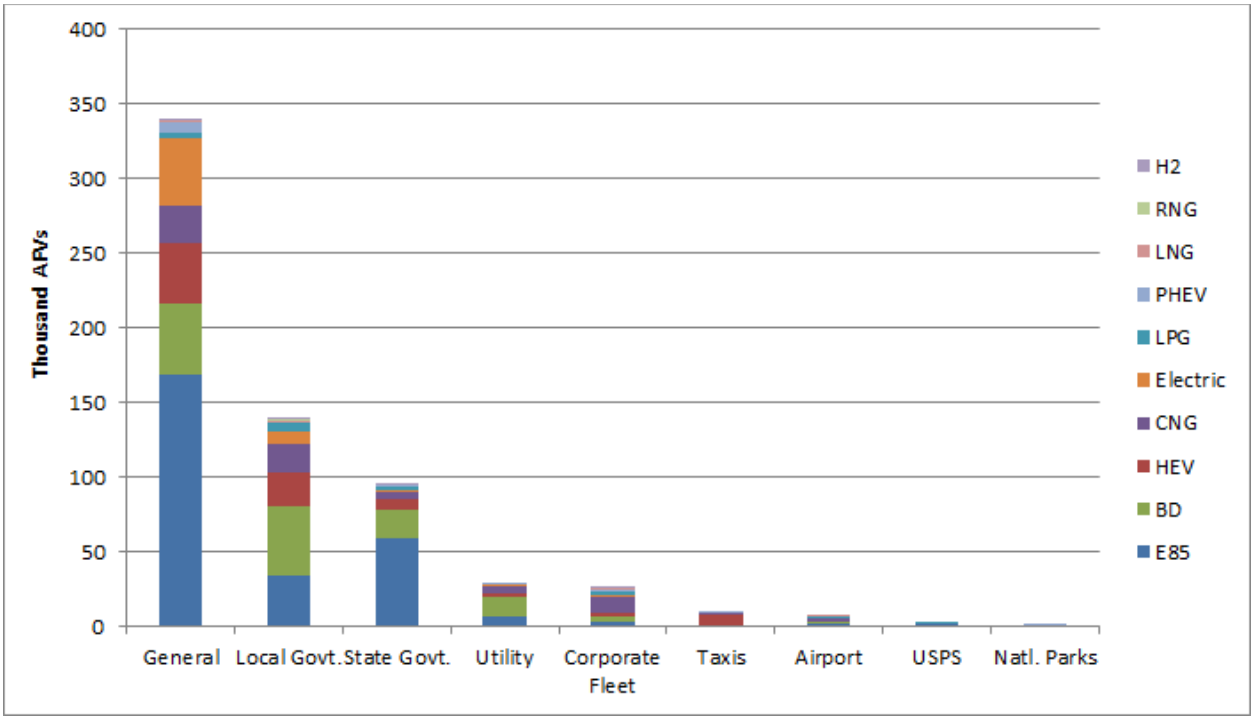

Figure 10. AFVs by market and fuel type

Emerging Technologies—Experimental, Prototype, and Demonstration Vehicle Projects

A small number of Clean Cities coalitions have worked with fleets and stakeholders who have an interest in field-testing advanced vehicle technologies (e.g., hydrogen and fuel cell vehicles). This subset of vehicles represents less than 0.01% of the total number of alternative fuel or advance technology vehicles reported by coalitions. Some of these projects involve limited production, experimental, or prototype/demonstration models that are made available from vehicle manufacturers under special lease arrangements. This is a way for the manufacturers to gather in-use performance data, evaluate durability, and refine engineering designs for future vehicle models that may be under development. Data reported to Clean Cities for some of these vehicles show the extraordinary potential they have for both energy and environmental benefits, but no significant market trends could be drawn from this limited data set.

Coordinators and Coalition Types

Collectively, coordinators reported spending a total of 2,814 hours per week on Clean Cities tasks, or more than 140,000 total hours over the course of the year.[2] This translates into 70 full-time, experienced technical professionals working to reduce U.S. dependence on petroleum. For an individual coalition, the average amount of time spent coordinating Clean Cities business per week was 34 hours, and the median was 30 hours. The average increased from 33 hours in 2013, while the median remained consistent. The reporting website also gathered information on coordinator experience. Coordinators have been on the job for an average of 7.5 years. Half of

[2] Assuming 50 work weeks per year.

coordinators have more than six years of experience as of 2014, and half have had six or fewer years of experience. Twenty-six coordinators have been with Clean Cities for at least 10 years.

Coalition types were tracked, and the relationships between coalition type and general metrics were analyzed. The coalition types correspond to their host organization (which generally pays the coordinator's salary) and are listed in the first column in Table 13 and defined in Appendix B. Standalone nonprofits and independent businesses are coalition types that are self-sustaining and do not operate as part of a larger host organization.

The number of coalitions in each grouping is listed in the second column of Table 13, followed by metrics such as the average number of stakeholders, average funds (including grants and dues) received in 2014, the average GGEs of petroleum saved, and the average number of persons reached through outreach events. The range of all metrics overlaps heavily between groups, and the low sample size precludes statistical significance. Furthermore, many variables affecting the metrics in this table were not controlled for, so no cause/effect relationships can be inferred between coalition type and specific metrics. Coalitions that reported the highest number of stakeholders tended to be hosted in nonprofits, while those reporting the fewest stakeholders were hosted by city and county governments. Coalitions that raised the most funds on average were hosted by regional governing coalitions. A single coalition (Valley of the Sun Clean Cities Coalition) was hosted by an independent business and drove the segment to the highest average petroleum consumption. Otherwise coalitions hosted by city and county governments saved the most petroleum consumption on average. Coalitions that reached the most people in outreach events were generally hosted in a nonprofit. Coalitions that brought in the least amount of funding were generally hosted by universities aside from the single coalition hosted by an independent business. Coalitions hosted by state governments saved least amount of petroleum, and coalitions hosted by universities reached the fewest people.

Table 13. Coalition Metrics by Coalition Type

Coalition Type[a]	# of Coalitions	Average # of Stakeholders	Average Funds In	Average GGE Saved	Average # of Persons Reached
Nonprofit - Standalone	32	162	$3,938,080	6,715,451	87,202
Regional Governing Coalition	15	135	$16,522,614	8,563,464	341,445
Nonprofit - Hosted	12	333	$5,551,499	9,067,356	4,075,768
Government - State	10	208	$4,335,339	4,505,341	1,159,697
Government - City or County	8	73	$9,567,564	11,487,963	47,546
University	5	118	$954,299	5,431,418	2,181
Independent Business	1	255	$67,000	65,563,671	3,718
Total/Overall Weighted Average	83	177	$6,809,737	8,214,850	829,076

[a]Coalition types are defined in Appendix B.

Project Funding

In 2014, 51 coalitions reported receiving 116 new project awards (project-specific grants) worth a total of $44 million. These coalitions also reported garnering $267 million in leveraged or matching funds for a combined total of $310.8 million. This funding represents nearly a 13:1 leveraging of the $24 million program budget in Fiscal Year 2014. The value of 13 of the 116 awards exceeded $1 million each. Table 14 presents a breakdown of the number and value of awards reported by the coalitions.

Table 14. Breakdown of 2014 Project Awards by Number and Value

Grant Range	Number of Grants	Share of Total Number	Total Value	Share of Grand Total Value
< $50,000	51	44%	$1,013,605	2%
$50,000 - $99,999	12	10%	$742,859	2%
$100,000 - $499,999	35	30%	$8,236,802	19%
$500,000 - $999,999	5	4%	$2,850,000	7%
$1,000,000 +	13	11%	$30,895,932	71%
Grand Total	116	100%	$43,739,198	100%

In addition to new 2014 awards, coordinators reported the portions of previous multiyear awards spent during the calendar year. If a coordinator failed to report the amount spent during 2014, we assumed it to be the total amount of the award divided by the number of years of award duration. Coalitions reported already spending 86% of the funds they were awarded in 2014, suggesting that projects start quickly. In 2014, coalitions helped utilize a total of $325 million in project funds that were awarded and matched from 2007 to 2014.

Of the $311 million in project awards and leveraged funds awarded to coalitions in 2014, $1.9 million (0.6%) was listed as coming from DOE. $14.6 million (4.7%) came from Congestion Mitigation and Air Quality funding, and $19 million (6.2%) from state governments. A total of $221 million (71%) came from the Federal Transit Administration, mostly for one large CNG project with the Dallas coalition. DOE funds distributed in 2014 and previous years totaled $9 million of the $325 million (3%) utilized for projects in 2014. Funding from Clean Cities coalition support contracts was not included among the project awards because those funds are intended to enable certain coalition operations rather than specific projects.

About the Stakeholders

In 2014, 83 coalitions reported a total of more than 14,700 stakeholders, for an average of 177 stakeholders per coalition. The data indicate that the average coalition was of similar size compared to the 174 stakeholders in 2013.

Participation in Clean Cities is voluntary, and coalitions draw local stakeholders from the public and private sectors. Stakeholders include local, state, and federal government agencies, large and small businesses, auto manufacturers, car dealers, fuel suppliers, public utilities, and professional associations. Coalitions reported that 53% of the total stakeholders were from the private sector. This composition is up slightly from 52% in 2013 and shows a steady balance between public and private stakeholders in 2014.

Data Sources and Quality

Gathering data is always challenging for coordinators, because they rely on voluntary reporting from their numerous stakeholders. Therefore, the annual report website contains some questions related to data sources and quality. In these questions, coordinators were asked to rate the quality of their data as excellent, good, fair, or poor. The "cumulative" bar in Figure 11 presents the response breakdown for the 83 coordinators who answered the question. Thirty-three percent of the respondents classified their data as excellent, 62% as good, 4% as fair, and 1% as poor. Relative to 2013, the poor category increased one percentage point, the fair category decreased four percentage points, the good category decreased by two percentage points, and the percentage of coordinators who felt their data was excellent increased five percentage points.

We also asked coordinators how they obtained their data. They could choose one or more of the following: online questionnaires (e.g., Survey Monkey), written (paper or electronic) questions to stakeholders, phone interviews with stakeholders, coalition records, or coalition estimates. Phone interviews were the most used method of data gathering, accounting for 27%. The second most common method was written questions (25%), then coalition records (20%), estimates (16%), and finally online questionnaires (12%). There were only minor shifts in this breakdown since 2013. Figure 11 shows that all collection methods resulted in similar levels of reliability.

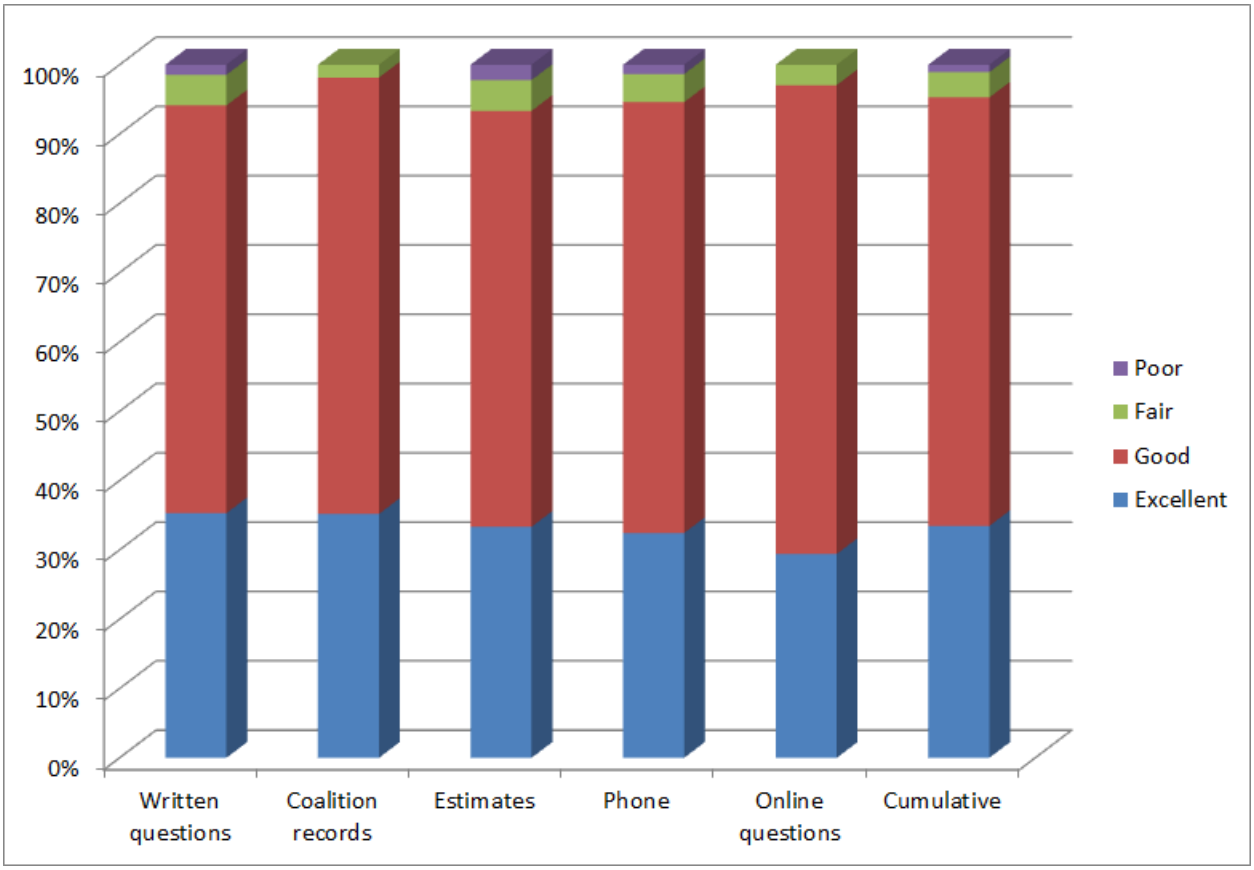

Figure 11. Data quality responses by data source

Conclusion

This Clean Cities 2014 Annual Metrics Report helps quantify the impact of the program as a whole and of the activities of individual coalitions. The report shows that Clean Cities coalitions had a year of many successful projects. The data that they reported showed a 17% increase in petroleum savings from 2013. However, outreach through coalitions and lab-run websites was down, with a 26% reduction in estimated petroleum savings. These outreach events were likely less successful due to low gasoline prices throughout 2014. Petroleum reductions from the NCFP and WPCC were accounted for this year. Overall, Clean Cities' petroleum savings increased slightly from last year and is still on schedule to meet the 2020 goal of 2.5 billion GGEs per year. Clean Cities increased the number and diversity of AFVs and advanced vehicles on U.S. roads in 2014. The program decreased its overall GHG savings, largely because low gasoline prices led to fewer drivers responding to outreach events and lab websites. The combined efforts of local Clean Cities coalitions, DOE, and its national laboratories bring together otherwise disparate groups and funding sources to accelerate the nation's progress toward petroleum savings and thereby toward improved energy independence, economic security, and environmental protection.

Appendix A: Clean Cities Coalitions That Completed 2014 Annual Reports

State	Coalition
AL	Alabama Clean Fuels Coalition
AR	Arkansas Clean Cities
AZ	Tucson Clean Cities
AZ	Valley of the Sun Clean Cities Coalition (Phoenix)
CA	Central Coast Clean Cities
CA	Clean Cities Coachella Valley Region
CA	East Bay Clean Cities Coalition (Oakland)
CA	Long Beach Clean Cities
CA	Los Angeles Clean Cities Coalition
CA	Sacramento Clean Cities Coalition
CA	San Diego Regional Clean Cities Coalition
CA	San Francisco Clean Cities Coalition
CA	San Joaquin Valley Clean Cities
CA	Silicon Valley Clean Cities (San Jose)
CA	Southern California Clean Cities Coalition
CA	Western Riverside County Clean Cities Coalition
CO	Denver Metro Clean Cities Coalition
CO	Northern Colorado Clean Cities Coalition
CO	Southern Colorado Clean Cities Coalition
CT	Capitol Clean Cities of Connecticut
CT	Connecticut Southwestern Area Clean Cities
CT	Greater New Haven Clean Cities Coalition
CT	Norwich Clean Cities
DC	Greater Washington Region Clean Cities Coalition
DE	State of Delaware Clean Cities
FL	Central Florida Clean Cities Coalition
FL	Southeast Florida Clean Cities Coalition
FL	Tampa Bay Clean Cities Coalition
GA	Clean Cities-Georgia
HI	Honolulu Clean Cities
IA	Iowa Clean Cities Coalition
ID	Treasure Valley Clean Cities
IL	Chicago Area Clean Cities
IN	Greater Indiana Clean Cities Coalition
IN	South Shore Clean Cities
KS	Kansas City Regional Clean Cities
KY	Kentucky Clean Cities Partnership
LA	Louisiana Clean Fuels
LA	Southeast Louisiana Clean Fuel Partnership
MA	Massachusetts Clean Cities
MD	State of Maryland Clean Cities
ME	Maine Clean Communities
MI	Ann Arbor Clean Cities Coalition
MI	Detroit Area Clean Cities

State	Coalition
MI	Greater Lansing Area Clean Cities
MN	Twin Cities Clean Cities Coalition
MO	St. Louis Clean Cities
NC	Centralina Clean Fuels Coalition
NC	Land of Sky Clean Vehicles Coalition (Western North Carolina)
NC	Triangle Clean Cities (Raleigh, Durham, Chapel Hill)
ND	North Dakota Clean Cities
NH	Granite State Clean Cities Coalition
NJ	New Jersey Clean Cities Coalition
NM	Land of Enchantment Clean Cities (New Mexico)
NY	Capital District Clean Communities Coalition (Albany)
NY	Clean Communities of Central New York (Syracuse)
NY	Clean Communities of Western New York (Buffalo)
NY	Empire Clean Cities
NY	Genesee Region Clean Communities (Rochester)
NY	Greater Long Island Clean Cities
OH	Clean Fuels Ohio
OH	Northeast Ohio Clean Cities Coalition (Cleveland)
OK	Central Oklahoma Clean Cities (Oklahoma City)
OK	Tulsa Clean Cities
OR	Columbia-Willamette Clean Cities
OR	Rogue Valley Clean Cities
PA	Eastern Pennsylvania Alliance for Clean Transportation
PA	Pittsburgh Region Clean Cities
RI	Ocean State Clean Cities
SC	Palmetto State Clean Fuels Coalition
TN	East Tennessee Clean Fuels Coalition
TN	Middle Tennessee Clean Fuels
TX	Alamo Area Clean Cities (San Antonio)
TX	Dallas-Fort Worth Clean Cities
TX	Houston-Galveston Clean Cities
TX	Lone Star Clean Fuels Alliance (Central Texas)
UT	Utah Clean Cities
VA	Virginia Clean Cities
VT	Vermont Clean Cities
WA	Western Washington Clean Cities
WI	Wisconsin Clean Cities
WV	State of West Virginia Clean Cities
WY	Yellowstone-Teton Clean Energy Coalition

Appendix B: Definition of Clean Cities Coalition Types

Coalitions have categorized themselves into seven different types, depending on their organizational structures and relationship to hosts.[3] Some coalitions fit within multiple types. These types are as follows.

1. "Government—City or County" coalitions are hosted by a city or county government such as a city department of transportation or municipally owned utility.
2. "Government—State" coalitions are hosted by a state government. This is generally in the state department of energy or department of environment. Coalitions hosted by a state university are not included in this category.
3. "Independent Business" coalitions are their own (not hosted), stand-alone for-profit companies. They are typically registered as a corporation or a limited liability corporation.
4. "Hosted in a Nonprofit" coalitions are hosted within a larger nonprofit or community service organization with 501c3 status. The host organization's activities are broader in scope than the Clean Cities coalition, such as the American Lung Association.
5. "Standalone Nonprofit" coalitions are nonprofits typically with 501c3 status and operate without the overhead support of a host organization.
6. "Regional Governing Coalition" coalitions are hosted in a multi-governmental body such as a Council of Governments, Municipal Planning Organization, or Regional Planning Commission.
7. "Hosted in a University" coalitions are hosted by a university (public or private).

[3] The relationship between a host organization and the coalition varies across the country. Typically, the coordinator of the coalition is an employee of the host organization, and the coalition benefits from the resources available at the host organization.