Clean Cities Coalitions 2019 Activity Report

Mark Singer and Caley Johnson

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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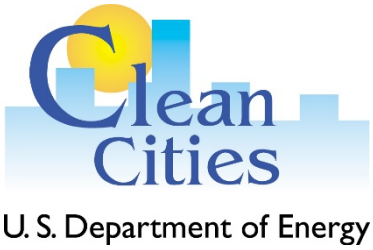
List of Acronyms

AFDC	Alternative Fuels Data Center
AFV	alternative fuel vehicle
BIM	Behavioral Impact Model
CNG	compressed natural gas
DOE	U.S. Department of Energy
E85	high-level ethanol blend
EUI	energy use impact
EV	all-electric vehicles
GGE	gasoline gallon equivalent
GHG	greenhouse gas
GREET model	Greenhouse gases, Regulated Emissions, and Energy use in Transportation model
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
NO_x	oxides of nitrogen
NREL	National Renewable Energy Laboratory
PEV	plug-in electric vehicle
RNG	renewable natural gas
VMT	vehicle miles traveled
VOCs	volatile organic compounds
VTO	Vehicle Technologies Office

Acknowledgements



The authors would like to acknowledge the efforts of thousands of Clean Cities coalition stakeholders and coordinators, who provided the basis for this analysis by reporting data from their alternative fuel and energy-saving transportation projects.

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This publication is part of a series. Past Clean Cities Coalitions Activity Reports and multiyear data compilations can be found at *www.afdc.energy.gov*.

Introduction

The U.S. Department of Energy's (DOE) Office of Energy Efficiency and Renewable Energy's Vehicle Technologies Office (VTO) works with local Clean Cities coalitions across the country as part of its Technology Integration Program. These efforts help businesses and consumers make smarter/more-informed transportation energy choices that can save energy, lower costs, reduce reliance on imported oil, and reduce air emissions. This report summarizes the success and impact of coalition activities based on data and information provided in their annual progress reports.

A national network of more than 75 active coalitions covering nearly every state and 80% of the U.S. population, brings together stakeholders in the public and private sectors to use alternative and renewable fuels, idle-reduction (IR) measures, fuel economy improvements, and new transportation technologies as they emerge. To ensure success, coalitions leverage a robust set of expert resources and tools provided by DOE and its National Laboratories. From technical assistance and handbooks to websites and targeted analysis, these resources contribute to every facet of coalition success. This strong national framework of resources, which facilitates consistent vision and informed coalitions, is a hallmark of the program.

Clean Cities coalitions use an online tool to report advanced vehicle technology activity, infrastructure development, and relevant energy/fuel use information for their regions.

Each year, Clean Cities coordinators submit annual reports of their activities and accomplishments for the previous calendar year. Data and information are submitted via an online reporting tool 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; use of alternative fuel vehicles (AFVs), electric vehicles (EVs), plug-in electric vehicles (PEVs), and hybrid electric vehicles (HEVs); IR initiatives; fuel economy improvement activities; and programs to reduce vehicle miles traveled (VMT).

This report compiles the accomplishments of all coalitions throughout the nation in calendar year 2019. Coalition leaders 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 coalition reports represents a subset of Clean Cities coalition activities. Taken together, they are an important indicator of how data, information, and resources can be effectively leveraged through the national network of Clean Cities coalitions and stakeholders to achieve significant results. Accomplishments from the National Clean Fleets Partnership (NCFP) are also reported directly by the national partners.

NREL analyzes the submitted data to determine how broadly energy use in the United States has shifted as a result of coalition activities. The two main components of energy use tracked by NREL are (1) energy savings from efficiency projects, measured in gasoline gallon equivalents (GGE), and (2) alternative fuel use. The alternative fuel use numbers in this report have been adjusted to account for any gasoline or diesel content (e.g., with biodiesel or ethanol blends) as well as for any conventional fuels used upstream to produce, distribute, or deliver alternative

fuels. Efficiency differences between AFVs and conventional vehicles are also taken into account.[1] Ultimately, these two components are combined and reported as energy use impact (EUI) in GGE. EUI is a metric that measures combined progress in both energy savings from efficiency projects and increased fuel diversity, through use of domestic alternative fuels. Both these components provide consumers and businesses with more energy choices. When achieved at scale, these strategies support DOE's mission to pursue more secure, reliable, and affordable energy choices. This report summarizes EUI as well as the related greenhouse gas (GHG) emission reduction impacts of coalition activities.

A compilation of data from this report, along with reports from previous years, can be accessed on the AFDC's Maps and Data page (*afdc.energy.gov/data/categories/clean-cities*). Previous years' reports can be downloaded in their entirety at *www.afdc.energy.gov*.

Summary of Key Findings

Clean Cities coalition activities resulted in an EUI of over 1 billion GGE, comprised of net alternative fuels used and energy savings from efficiency projects, in 2019. Table 1 represents the combined results of all strategies to increase fuel diversity and energy efficiency in the nation's fleets. Participation in vehicle and infrastructure development projects remained strong, as did alternative fuel use and resulting overall EUI.

Coalitions maintained an EUI of over 1 billion GGEs and achieved the highest EUI since the coalitions began reporting in 1994.

Table 1. Energy Use Impact of Each Portfolio Element in 2019

Project Type	Coalition Impact (MGGE[a])	Percent of Total Coalition Impact[b]	Change from Last Year
Alt. Fuels and Vehicles	**764.3**	**72%**	**+3%**
HEVs	**51.9**	**5%**	**-0.1%**
EVs & PHEVs	**48.8**	**5%**	**+9%**
Idle Reduction	**47.4**	**4%**	**+11%**
Fuel Economy	**41.1**	**4%**	**-24%**
VMT Reduction	**35.3**	**3%**	**+13%**
Off-Road	**31.9**	**3%**	**+79%**
Estimated Outreach Impact	**42.5**	**4%**	**-39%**
Total EUI[c]	**1,063.2**	**100%**	**+0.7%**

[a] Million gasoline gallon equivalents

[1] Net alternative fuel used, and energy savings from efficiency projects, in this report are expressed in GGE, using the lower heating value ratio of the fuels.

[b] Totals and subtotals may differ from the sums due to rounding.
[c] The 2019 Clean Cities Coalitions Activity Report is focused on the impacts of coalition activities and projects and excludes related DOE-led efforts that were included in this report in years prior to 2016.

Clean Cities coalition activities reduce GHG emissions as they impact energy use. Table 2 shows that coalition-reported activities prevented nearly 5 million carbon dioxide-equivalent tons of emissions (only GHG emissions are reported here; criteria pollutants and other emissions are not included in this report).

Coalitions averted nearly 5 million tons of GHG emissions – the equivalent of removing over one million conventional cars from the roads.

Table 2. GHG Emissions Reduced by Clean Cities Coalitions in 2019

Project Type	Tons of GHG Emissions Averted	Equivalent of Conventional Cars Removed[a]	Percent of Coalition Total
Alternative Fuels and Vehicles	**2,178,267**	**487,575**	**44%**
HEVs	**639,083**	**143,050**	**13%**
Idle Reduction	**584,933**	**130,929**	**12%**
Fuel Economy Improvements	**509,518**	**114,049**	**10%**
VMT Reduction	**435,606**	**97,504**	**9%**
EVs and PHEVs	**231,130**	**51,735**	**5%**
Off-Road Vehicles	**106,112**	**23,752**	**2%**
Outreach Events Estimate	**210,472**	**47,111**	**4%**
Coalition Total	**4,895,122**	**1,095,705**	**100%**

[a] Calculated as total passenger car GHG emissions (Table 2–13 in the U.S. Environmental Protection Agency's *Inventory of GHG Emissions and Sinks:1990–2015*) divided by total short wheelbase light-duty vehicles (Table VM-1 in the Federal Highway Administration's *Highway Statistics*, 2015).

Coalitions were successful in securing project grant awards from numerous (non-DOE) outside sources. For other federal, state, and local agencies and private sector foundations, see the Funding section on page 24. The 82 project grant awards in 2019 generated $225 million in funds from coalition members and project partners in addition to $9.5 million in DOE grant funds. Coalitions also collected $1.2 million in stakeholder dues and $1.6 million in operational funds from host organizations. In macro terms, this supplemental funding represents a 6:1 leveraging of the $38 million that was included in the VTO Technology Integration budget in 2019.

Clean Cities coordinators spent nearly 136,000 hours pursuing their coalitions' goals in 2019. The average coordinator is quite experienced and has held their position for at least 8 years. Coordinators logged more than 3,525 outreach, education, and training activities in 2019, which reached an estimated nearly 23 million people.

Coalitions conducted 3,525 outreach, education, and training activities in 2019.

Attribution and Fuel Use Factors

To clarify the link between coalition activities and end results, this *Clean Cities Coalitions Activity Report* includes an attribution factor that accounts for the percentage of a project's outcome that may be a result of coalition activities, rather than 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 each project's outcome that the coalition was responsible for, then the project's overall outcome was multiplied by that percentage to determine the individual 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 Data

Coordinators submitted information about their stakeholders' alternative fuel use and energy savings, broken down according to the technologies in the Technology Integration portfolio, using an online reporting tool. NREL analyzed the data, converted it into an equivalent net quantity of gasoline for each element of the portfolio, and reported the data in units of GGE—the amount of energy contained in a gallon of gasoline. As shown in Table 1, Clean Cities coalition efforts impacted 1,063 million GGE (MGGE) of energy in 2019.

Clean Cities coalitions' work with local fleets led to a substantial reduction in GHG emissions. To estimate the GHG reductions resulting from coalition activities, NREL used a variation of the GREET model.[2] This model accounts for the fuel life cycle, or "well-to-wheels" factor of GHG emissions for transportation fuels, which includes fuel production, transport, and usage in the vehicle. It does not consider emissions from indirect land use changes or vehicle manufacturing.

Alternative Fuels and Vehicles

As shown in Figure 1, alternative fuels (used in AFVs and in biodiesel blends) and fuel savings from HEVs collectively accounted for approximately 865 MGGE, or 85% of the coalition-reported net alternative fuel use and energy savings from efficiency projects.

In 2019, coalitions reported a total inventory of 1,003,562 AFVs, split among 10 fuel and technology types. The total vehicles reported by coordinators increased by 6% from 2018.

[2] Argonne National Laboratory. 2015. The Greenhouse gases, Regulated Emissions, and Energy use in Transportation (GREET) Model.

Among the more common fuel types, compressed natural gas (CNG) vehicles grew by 23% to 100,938 vehicles, PEVs grew by 16% to 263,543, and HEVs decreased by 19% to 144,875. Large increases were reported for vehicle technologies with relatively low vehicle counts. Vehicles operating on renewable natural gas (RNG or bio-methane) grew by 194%, or nearly tripled to 4,922. The least common vehicle technology type, hydrogen vehicles, grew by 72% to 691. Propane vehicles increased by 26% to 31,985.

CNG vehicles grew by 23% and continue to account for the largest EUI across fuel types.

The EUI grew by 3% across vehicle technologies. The EUI increased most for propane vehicles at 18%, RNG vehicles at 17%, and PEVs at 9%. The EUI decreased for hydrogen vehicles by 72%, LNG vehicles by 18%, and HEVs by less than 1%.

Figure 1 shows the percentage of EUI according to fuel type. CNG remains at the top of the list, accounting for 49% of the EUI, even though only 10% of the total vehicle population uses CNG. This contrasts with E85, a high-level ethanol blend, which accounts for only 8% of the AFV EUI, although 27% of reported AFVs can use E85.

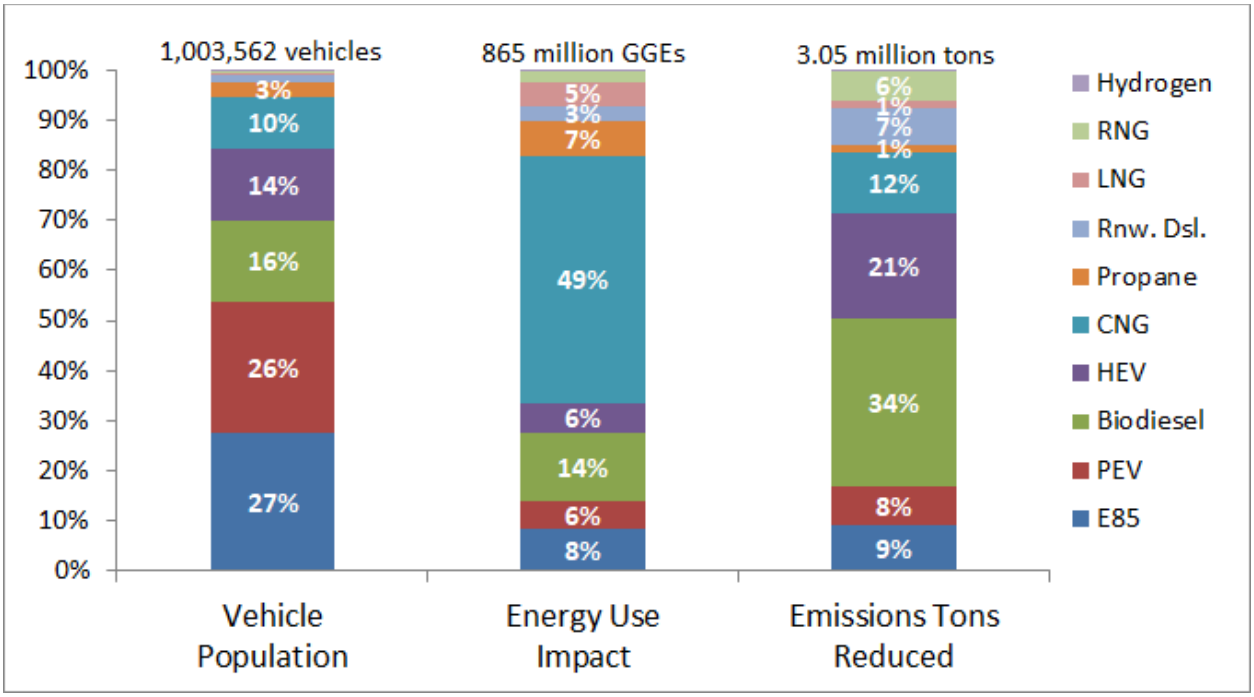

Figure 1. 2019 percentage of AFVs, EUI, and GHG emissions reductions by fuel type

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

1. Dedicated AFVs (those that can only operate on alternative fuel) have a higher EUI than flex-fuel, dual-fuel, or bi-fuel vehicles that can switch between fuels. Simply stated, dedicated AFVs use alternative fuel 100% of the time, while those with interchangeable fuel systems may only use alternative fuel some of the time.

2. The number of miles per year that the AFV travels (higher mileage uses more alternative fuel).
3. The AFV's fuel consumption. Large vehicles that are doing more work tend to consume more fuel. Therefore, Table 3 shows light-duty vehicles (LDVs) and heavy-duty vehicles (HDVs) separated to increase fidelity.
4. The amount of conventional fuel contained in an alternative fuel blend (e.g., B20 still contains 80% conventional diesel, so only a portion of the B20 fuel consumed counts toward the alternative fuel usage).
5. The amount of conventional fuel used to produce or transport the alternative fuel. For example, the diesel used to grow the corn that is turned into ethanol is subtracted from the EUI.

Table 3. Average Annual EUI per Vehicle in 2019

Fuel	GGE per HDV	# of HDVs	GGE per LDV	# of LDVs
LNG	8,670	4,917	NA	0
CNG	6,768	58,287	737	42,651
RNG	4,235	4,364	646	558
PEV	3,633	5,223	116	258,320
HEV	2,963	9,466	176	135,409
Hydrogen	2,871	76	475	615
Propane	2,649	17,372	1,087	14,613
Renewable Diesel	2,528	9,307	585	3,802
Biodiesel	1,075	98,819	164	64,547
E85	469	2,705	259	272,511

Alternative fuels and AFVs were responsible for more GHG emissions reductions than any other coalition-reported activity. These reductions were calculated 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 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 fuel. Gasoline is considered the baseline fuel for HDVs using E85, CNG, liquefied natural gas (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.

VMT Reduction, HEVs, IR, and fuel economy improvement projects have a disproportionately high emissions reduction.

As shown in Figure 1, the emissions reductions are not necessarily proportional to the alternative fuel used, because the various alternative fuels emit different levels of life cycle emissions. RNG is a prime example of a fuel that has extremely low life cycle emissions because it has the net effect of reducing methane (a GHG) emissions 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 emissions reduction compared to their EUI because these conservation measures "eliminate" 100% of the emissions that would have resulted from the fuel they save.

AFVs generally demonstrate a net "reduction" in emissions compared to vehicles that use conventional fuels.

The average EUI of an HDV in the Technology Integration Program is nearly 14 times as much as an LDV.

High Impact Fleets and Vehicle Segments – Although HDVs represented only 21% of the reported AFVs, these HDVs are responsible for 79% of the alternative fuel use. The average HDV that operates on alternative fuels impacts 13.8 times as much fuel use as the average LDV. Likewise, the overwhelming majority of RNG, CNG, renewable diesel, and biodiesel, and is used by HDVs (98%, 93%, 91%, and 91%, respectively). The use of LNG is confined exclusively to HDVs, and HDVs accounted for 74% of all propane use. Technologies with contributions more evenly split between LDVs and HDVs include PEVs, hydrogen vehicles, and HEVs where LDVs accounted for 61%, 57%, and 46%, respectively. The only technology whose contributions were dominated by LDVs was E85 (with only 2% from HDVs).

Idle Reduction

Savings from onboard batteries grew by 71% from 2018 to 2019.

The estimated energy savings in 2019 for IR technologies and policies was 47.4 MGGEs. The number of IR projects increased 5% in 2019, and the quantity of energy that these projects saved increased 11%. As shown in Figure 2, at 13.2 MGGE, auxiliary power units were responsible for the greatest percentage (28%) of energy savings. Automatic engine shutoff, at 9.7 MGGE; IR policies, at 5.5 MGGE; on-board batteries at 4.7 MGGE; direct-fire heaters, at 4.1 MGGE; and the "other" category, at 3.9 MGGE; followed with significant percentages (20%, 12%, 10%, 9%, and 8% respectively). Driver training, at 2.8 MGGE; truck-stop electrification, at 1.9 MGGE; and thermal storage, at 1.6 MGGE represented 6%, 4%, and 3% respectively of the IR energy savings. The remaining methods combined to represent less than 1% of the total savings.

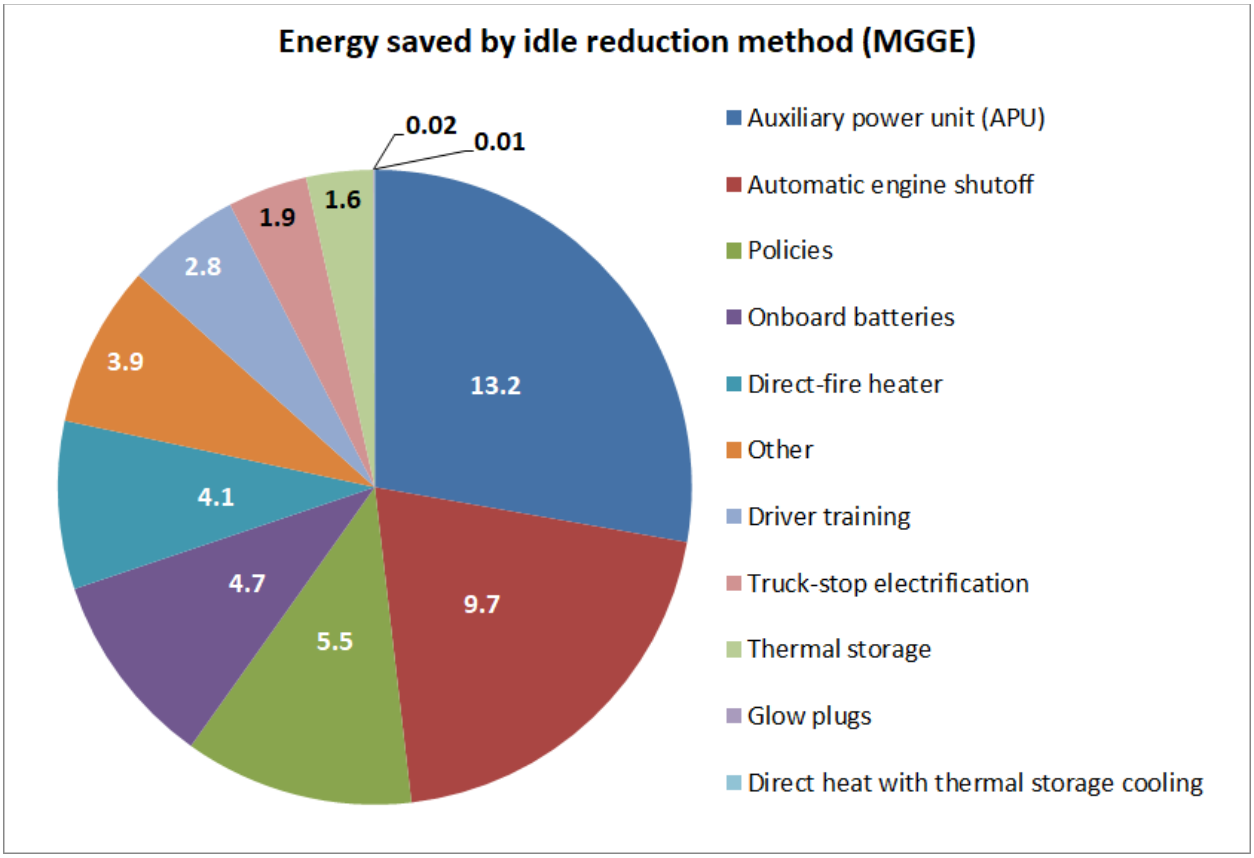

Figure 2. Energy savings measured in MGGE from IR projects, 2019

Fuel Economy

Coalitions completed a range of fuel economy projects aimed at using energy more efficiently. Non-HEV coalition-reported fuel economy projects accounted for a total savings of over 41 MGGE, which was as decrease of 24% from the reported 2018 savings. Figure 3 includes the range of fuel economy technologies advanced by coalitions. There were 92,577 vehicles in the non-HEV fuel economy technology category, equating to an average annual EUI of 444 GGE per vehicle. Figure 3 shows the fuel economy improvement projects with the largest improvements were those involving automatic tire inflation systems, hydraulic hybrid vehicles, cylinder deactivation, and replacing vehicles with more efficient vehicles (including diesel vehicles). Large fuel economy improvements can be made with a range of efforts including low-rolling resistance tires, trailer aerodynamic packages, and driver training among others.

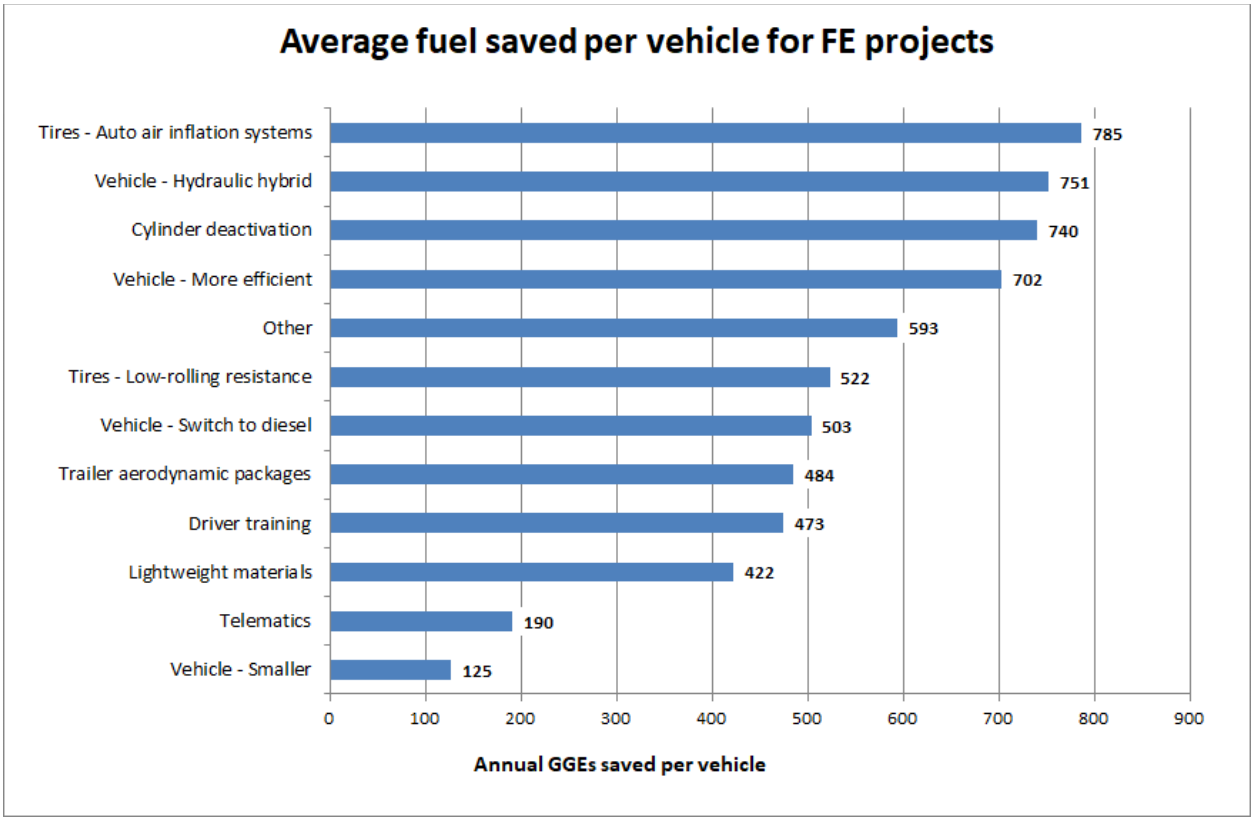

Figure 3. Average energy saved per vehicle for 2019 Clean Cities coalition fuel economy projects

Vehicle Miles Traveled Reduction

VMT-reduction projects save fuel and therefore money, while simultaneously curbing emissions. These types of projects include strategies such as carpooling, biking, teleworking, and public transportation. Of the 80 reporting coalitions, 61 (76%) reported at least one VMT-reduction project in 2019, with a total of 389 projects reported. VMT projects are generally outside the scope of advanced vehicle, fuel, and systems research addressed by VTO. Since the primary purpose of this report is to analyze and document the impact of Clean Cities coalition efforts related to VTO technologies, the contribution of VMT projects is limited to 10% of any given coalition's total energy savings. This cap affected 13 coalitions; however, even with this limit in place, coalitions saved 35.3 MGGE of fuel with VMT activities. The project types, numbers, and sizes of the VMT projects are shown in Table 4.

Table 4. VMT Reduction Project Types, Number, and Energy Savings in 2019

Project Type	Number of Projects	Increase in # of Projects over 2017	GGE Saved per Project[a]	DOE-claimed GGE Saved per Project
Route Optimization	86	24	103,598	71,604
Non-motorized locomotion (e.g., bicycles)	72	10	35,472	33,655
Carpooling	68	0	48,543	37,485
Mass transit	68	1	436,503	244,393
Other	27	-1	152,799	72,540
Telecommute	26	2	8,609	7,450
Vanpooling	18	1	385,853	277,791
Car sharing (e.g., Zipcar)	14	-6	25,019	25,012
Compressed work week	10	-3	8,099	8,028
Total	**389**	**28**	**144,402[a]**	**90,827**

[a] GGE per project calculated before the 10% limit of coalition overall energy savings was implemented.

Off-Road Vehicles

Coalition impact extends beyond the road. Off-road project EUI was nearly 32 MGGE in 2019.

Vehicles used in off-road applications contributed to the overall accomplishments reported by coalitions. Many of these projects were born out of synergy with on-road projects, using several of the same alternative fuels, technologies, and strategies. Table 5 shows the number of off-road vehicles (or pieces of equipment) reported by coalitions in 2019. These categories are self-descriptive, except for three. "Construction equipment" includes cranes, earth movers, and similar equipment. The "recreation equipment" application includes jet skis, snowmobiles, and all-terrain vehicles. The "other" category includes vehicle speed limitations and changes to hydraulic pumps.

Table 5. Number of Off-Road Vehicles or Equipment and EUI in 2019

Application	Number of Vehicles	Energy Use Impact (GGE)	GGE saved per Vehicle
Forklifts	5,608	4,465,645	796
Other	5,339	2,893,843	542
Construction equipment	5,143	1,142,262	222
Landscaping and lawn equipment	1,795	398,264	222
Mining equipment	1,668	3,029,899	1,816
Recreational equipment	618	151,863	246
Planes	408	4,496	11
Street sweeper	201	96,311	479
Farm equipment	180	12,802	71
Ships	147	15,656,898	106,510
Railroads	59	4,011,122	67,985
Total	**21,166**	**31,863,404**	**1,505**

Overall EUI contributions from off-road vehicles totaled 31.9 MGGE. Ships used the most fuel, despite having second-to-least number of vehicles. This is largely due to four large LNG vessels. Vehicles using biodiesel accounted for 46% of the AFVs included in this category. Vehicles using other fuels in off-road applications included EVs (22% of the total) and propane vehicles (20%). The other fuels and technologies together accounted for 11% of the total vehicles. Biodiesel use was focused in mining equipment, ships, and construction equipment applications. EVs were primarily used in the other equipment, forklifts, and recreational equipment. Propane vehicles were primarily reported as forklifts and landscaping equipment. Applications varied widely in number of GGE saved per vehicle, as shown in Table 5.

National Clean Fleets Partnership Contributions

Nine national fleets have partnered with Clean Cities coalitions, sharing data reflecting efforts that span geographic areas larger than that of any single coalition.

In April 2011, DOE began partnering with national fleets that operate in more expansive geographic areas than any one coalition covers. The NCFP currently has 28 partners, who lead by example and are pacesetters for local stakeholder fleets. Nine of them reported their fuel use data directly to NREL. NREL then allocated NCFP data to 73 individual coalitions based on fleet garage locations, refueling locations, and partner estimates. The coordinators then verified that they did assist the NCFP fleets operating in their regions and claimed full, partial, or no credit for the partner's alternative fuel use that was attributed to them. Table 6 shows the contributions to total Clean Cities EUI that were attributed to national partners.

Table 6. Vehicles, EUI, and Emissions Reduction from National Partners

Fuel	Vehicles	Energy Use Impact (GGE)	GHG Reduced (tons)
CNG	21,977	129,178,020	109,854
LNG	1,814	32,923,090	33,022
Propane	4,295	15,219,625	5,966
PEV	3,548	9,012,121	36,133
Biodiesel	878	8,066,878	70,642
Fuel Economy	15,613	7,281,186	90,288
HEV	7,130	2,799,969	34,489
Renewable Natural Gas	60	1,409,934	13,769
Idle Reduction	1,342	70,648	876
Hydrogen	5	33,529	134
Vehicle miles traveled	50	14,937	185
Off-Road	356	6,107	23
Total	57,068	206,016,043	395,382

Estimated Contributions from Outreach Activities

This category measures impact from behavior changes such as vehicle purchases, fuel choice, driving habits, vehicle maintenance, and transportation patterns that were influenced by coalition outreach activities. Calculating these contributions involves a fair degree of uncertainty, but it is nevertheless important to quantify the impacts of educational and outreach activities as much as possible. 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 Energy Use Impact from Outreach Activities

To estimate net alternative fuel use and emission reductions from outreach events, NREL and Oak Ridge National Laboratory developed the Behavioral Impact Model (BIM) and added related functionality to the Clean Cities coalition annual reporting tool to make it compatible with the BIM.

Impacts from coalition outreach events are estimated using standard analytical methods derived from advertising and marketing industries.

Clean Cities coordinators reported the type of outreach event, the number of people reached by each event, the technologies presented, and the percent that should be attributed to the coalition. To determine the number of people reached by a given event, the total number of people attending the event was multiplied by the percent of the event that the coalition claimed credit for. 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 BIM as "persons reached by the coalition about a given technology."

The BIM multiplies this persons-reached number by the probability a person will take an action as a result of the outreach (defined as purchasing an AFV or more efficient vehicle, or as

changing driving or fueling behavior). This probability is derived by comparing the outreach event and technology to comparable marketing media and products. Ten of these media-product combinations have a "customer conversion rate" that is recorded by various marketing firms, as shown in Table 7. The customer conversion rate is the ratio of purchases made (desired action) divided by the total number of people contacted through the outreach activity. The code column in Table 7 is provided for trackability through the calculation process, as continued to Table 9.

Table 7. 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 and website ads	Nielsen and Facebook, 2010. *Advertising Effectiveness: Understanding the Value of a Social Media Impression*. And Fireclick.com, accessed June 16, 2011
4	2.5% for industry-specific mail	Direct Marketing Association. 2011
5	3.2% for email	Fireclick.com, accessed June 16, 2011
6	7% for affiliates and 8% for "social ads" that are endorsed by peers	Fireclick.com, accessed June 16, 2011. Nielsen and Facebook, 2010. *Advertising Effectiveness: Understanding the Value of a Social Media Impression*
7	0.6% AdMeasure product: LDVs	GfK Mediamark Research & Intelligence, LLC. 2011
8	5.5% AdMeasure product: Gasoline	GfK Mediamark Research & Intelligence, LLC. 2011
9	17% AdMeasure smoking cessation "actions taken"	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 rates based on the Ostrow Model of Effective Frequency, Krugman's Three Exposure Theory, and the authors' assumptions. Table 8 lists a set of relationships that increase or decrease the impact of advertisements.

Table 8. 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 7 by the relationships for media effectiveness shown in Table 8. The direct application of these rates and relationships is shown in Table 9, where the number relates to the code in Table 7 and the letters relate to the code in Table 8. The final customer conversion rates used are displayed in Table 10.

Table 9. 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	IR 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 10. Customer Conversion Rates Used in the BIM

Activity Type	Purchase New AFV	Use Alternative Fuel in Existing Vehicle	Use Biodiesel Blends in Diesel Vehicle	Purchase More Efficient Car	Operate Vehicle More Efficiently	Purchase HEV	Reduce Idling	HDV IR Equipment 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 number of people reached multiplied by the appropriate customer conversion rate (from Table 10) results in the number of people assumed to take the intended action. After the conversion factors have been applied, the BIM is like the Clean Cities coalition annual reporting tool, as it converts the estimated number of vehicles purchased or number of people changing their driving habits into an EUI. We make downward adjustments of 30%–40% 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.

Estimated Outreach Accomplishments

Coalitions' outreach, education, and training activities were classified into nine categories, as shown in Table 11. A total of 3,525 activity days were reported, which were estimated to have reached over 23 million people. This was heavily influenced by a media event effort by a single coalition that distributed a series of news releases that reached nearly 20 million people. Apart from this effort, outreach events reached over 3.4 million people overall and 976 people per event on average. Media events continued to be the activity that reached the most people. Conference participation reached the second most people at over 550,000. Estimated persons reached through outreach decreased by 36% in 2019.

Table 11. Outreach, Education, and Training Activities

Activity type	Number of Activity Days	Share of Total Activities	Activities Increase Since 2018	Persons Reached	Share of Total Persons Reached	Persons Increase Since 2018
Meeting - Stakeholder	784	22.2%	-17%	18,491	0.1%	-32%
Meeting - Other	774	22.0%	-13%	45,541	0.2%	-91%
Conference Participation	568	16.1%	-18%	555,142	2.4%	-39%
Workshop Held by Coalition	429	12.2%	24%	49,019	0.2%	71%
Literature Distribution	374	10.6%	45%	193,100	0.8%	-67%
Media Event	201	5.7%	-29%	21,868,076	94.9%	-34%
Social Media	157	4.5%	-22%	101,780	0.4%	-24%
One-on-One Fleet Outreach	125	3.5%	NA	2,309	0.0%	NA
Advertisement	77	2.2%	-36%	32,146	0.1%	-88%
Website	36	1.0%	-45%	187,250	0.8%	-33%
TOTAL	**3,525**	**100.0%**	**-7%**	**23,052,854**	**100.0%**	**-36%**

Figure 4 illustrates the types of audiences reached through the 3,525 outreach activity days. Each activity could be aimed at multiple audiences; in fact, each activity targeted an average of 3.7 different audiences. Government fleets were the most-cited target audience, followed by the general public and private fleets. The other audience group, mass transit, and utility trucks groups were reached by similar percentages of activities. Waste management, delivery trucks, and airports were identified as audiences in less than 30% of the outreach activities. This composition of outreach activity audiences was consistent with 2018.

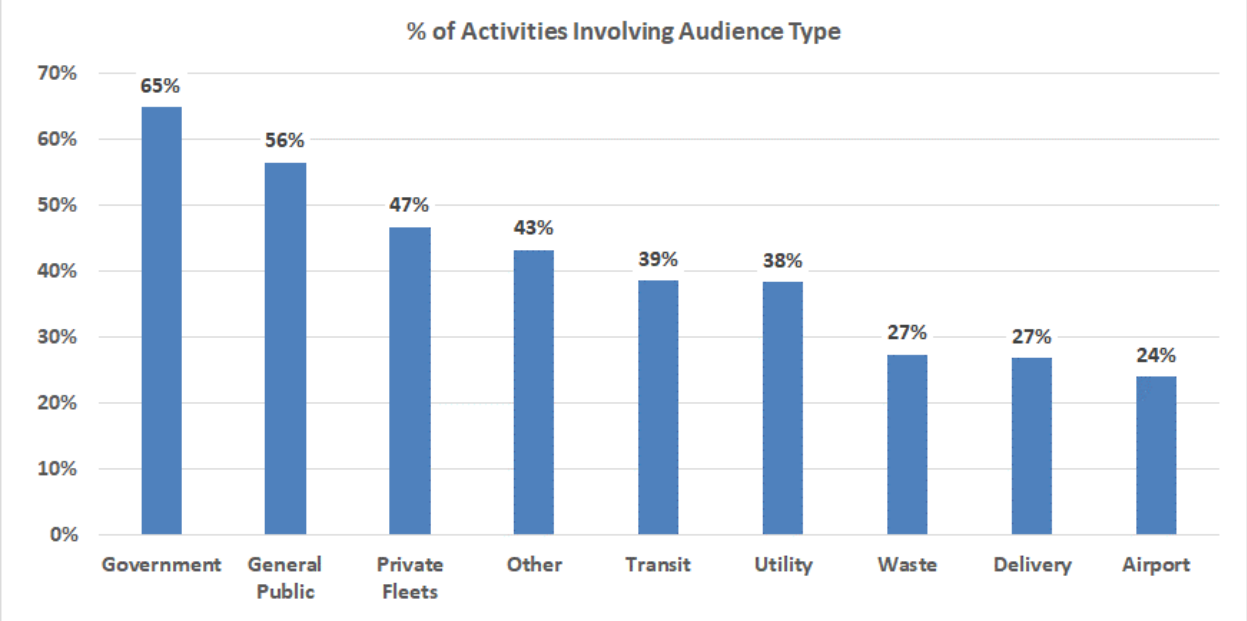

Figure 4. Percentage of outreach activities reaching each audience type

Coalitions' outreach events featured a relatively even mix of technologies, as illustrated in Figure 5, but EVs were covered more than any of the other technology type. Just as with audience types,

any one activity could address more than one technology; each activity featured an average of 4.5 different technologies.

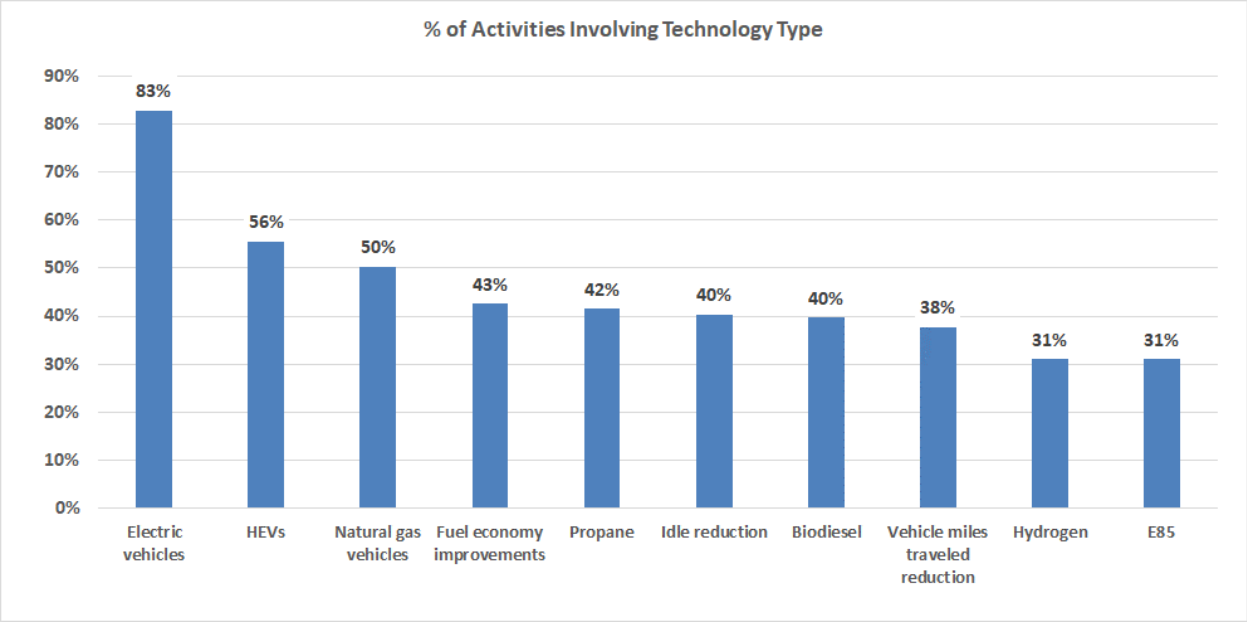

Figure 5. Percentage of outreach activities by technology type

Using the BIM, NREL estimates that Clean Cities coalition outreach events prompted and enabled actions that impacted over 42 MGGE of energy use in 2019, after accounting for a substantial overlap with reported impacts.

EVs were the most common topic of coalition outreach events.

Cumulative Energy Use Impact

Clean Cities coalitions have steadily increased their annual EUI as projects have been expanded and built upon each year. Figure 6 shows coalition annual EUI has reached new levels in recent years. During the first 10 years of tracking (1994–2003), coalitions increased the annual EUI by an average of 16 MGGE per year. In the last 10 years of tracking (2009–2019) coalitions have increased their annual EUI by an average of 58 MGGE per year. The 2019 reporting year showed the coalitions maintaining an annual EUI of over a billion GGE.

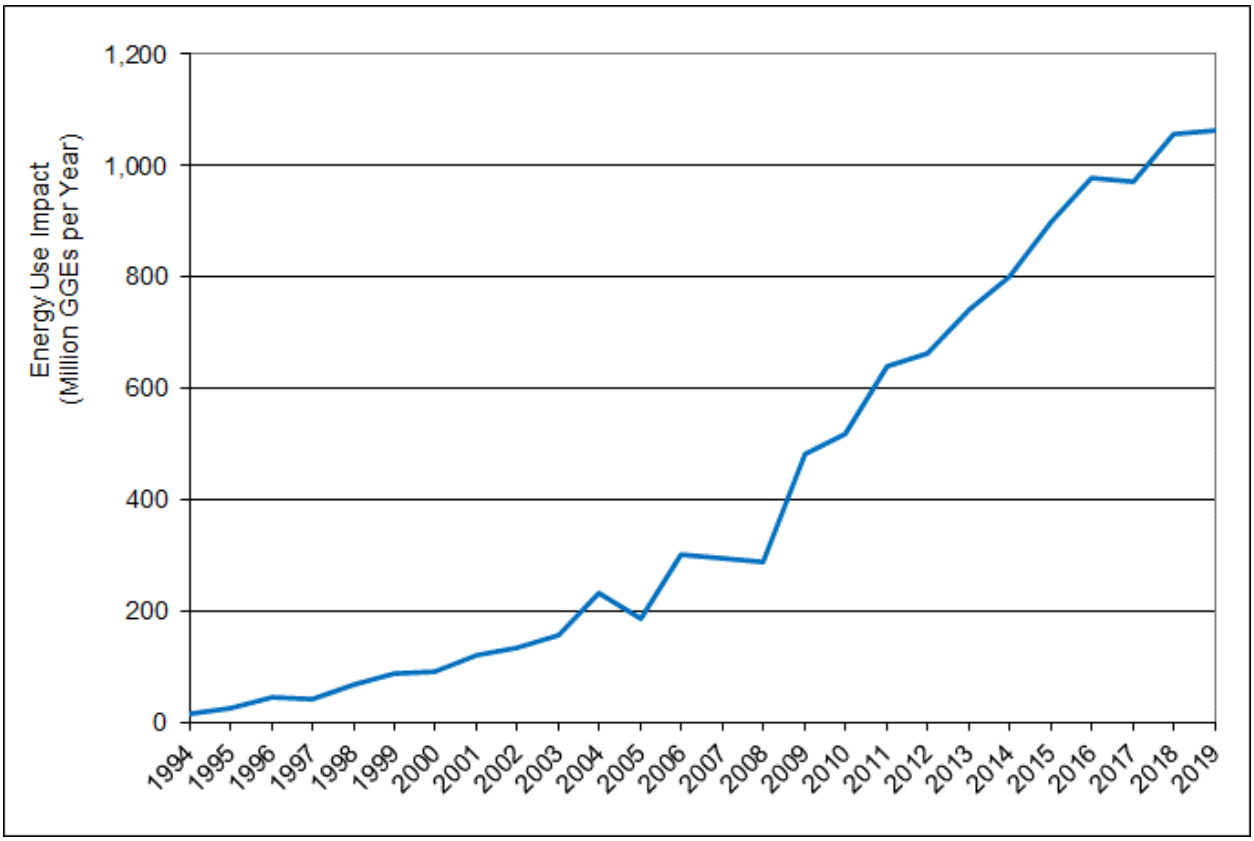

Figure 6. Increasing energy use impact (EUI) from coalitions

The impacts of Clean Cities coalition efforts have added up considerably over the years. The full extent of the program's effect can be seen when the annual EUIs shown in Figure 6 are aggregated to a cumulative EUI. This cumulative measure, shown in Figure 7, is now nearly 11 billion GGE.

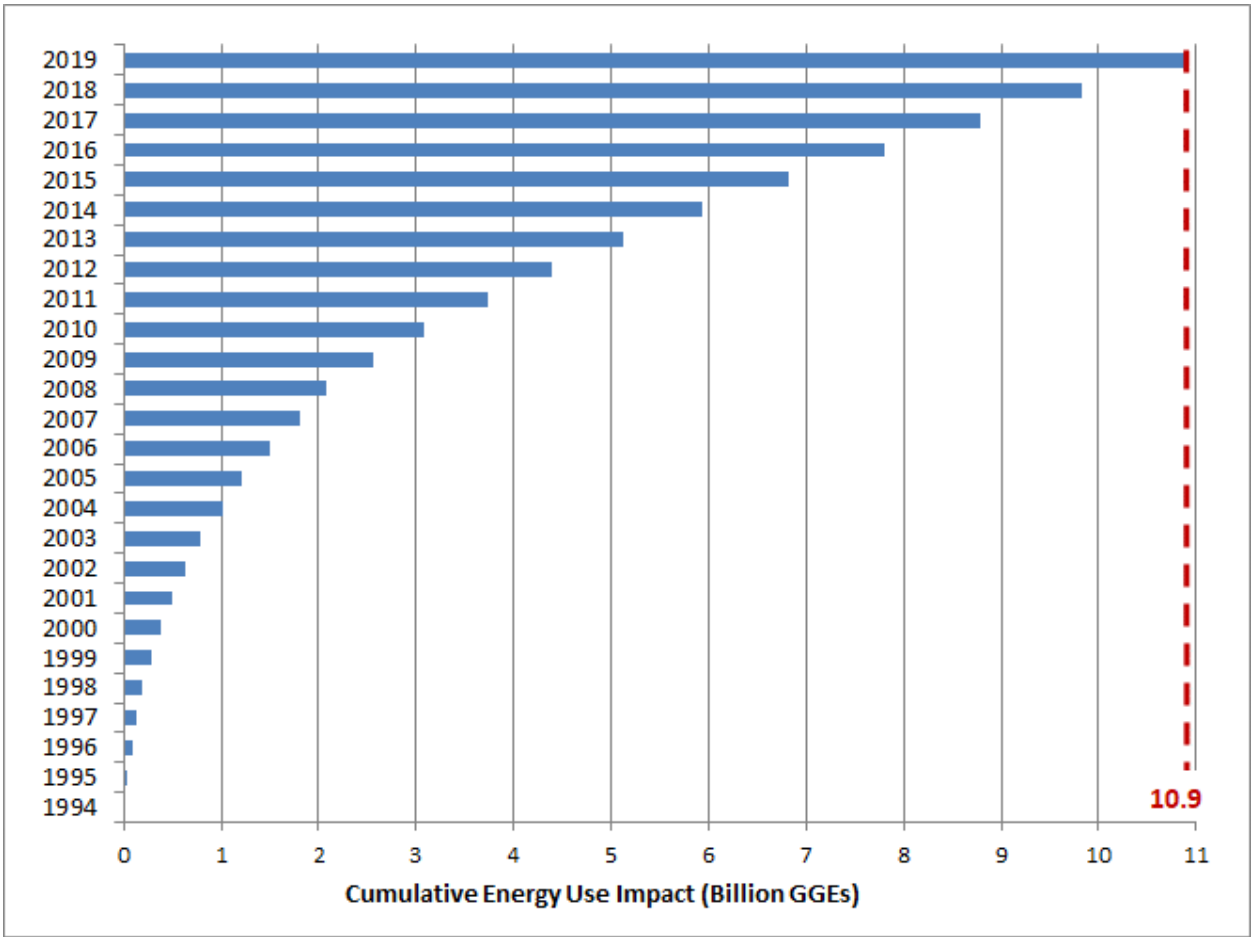

Figure 7. Cumulative accomplishments of all Clean Cities coalition activities

Notable GHG and Criteria Pollutant Emissions Trends

Clean Cities coalitions reduced 4.9 million tons of GHG emissions in 2019—just 2% less than in 2018. These efforts have led to a cumulative emissions reduction of 57 million tons over the years, as shown in Figure 8. The relationship between the two has not always been consistent, since different technologies can be more effective at increasing EUI or reducing emissions (see Figure 2), and the Technology Integration portfolio continues to stay relevant by evolving over time. Furthermore, there was a shift in the emissions calculations in 2015 as the reporting tool was updated, along with the 2015 GREET model. Therefore, Figure 7 and Figure 8 do not reflect one another exactly.

Alternative fuels and AFVs were responsible for more GHG emissions reductions than any other coalition-reported activity.

The average HDV of the Clean Cities program reduced 9 times as many GHGs as the average LDV. This is largely for the same reasons that HDVs have a disproportionately

RNG is a prime example of a fuel that has extremely low life cycle emissions because it has the net effect of reducing methane (a GHG) emissions from landfills, wastewater treatment facilities, and farms.

large EUI. Other notable trends in GHG emissions that have been mentioned in other sections have been called out in boxes in this section.

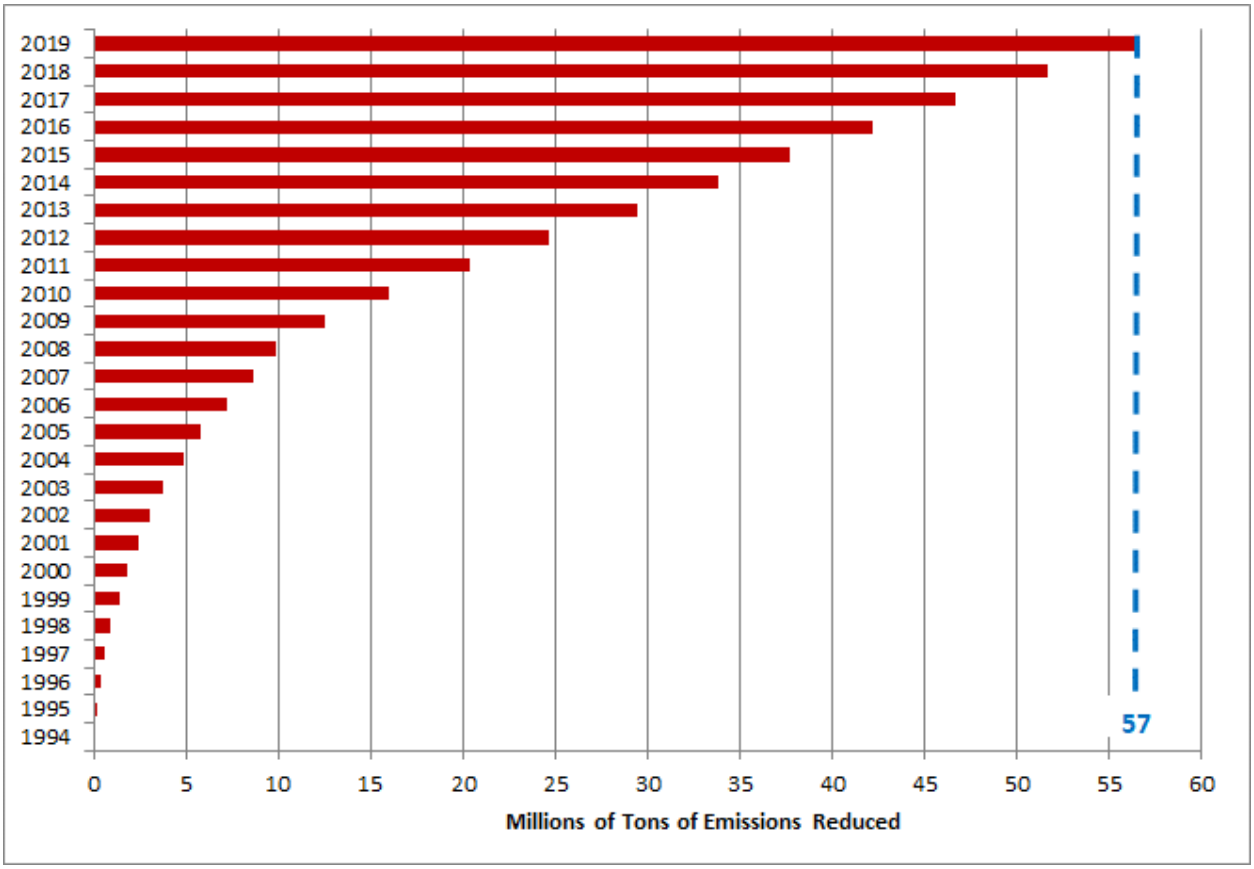

Figure 8. Cumulative emissions reductions from all Clean Cities coalition activities

In addition to reducing GHG emissions, Clean Cities improves air quality by reducing NO_x (oxides of nitrogen) and VOCs (volatile organic compounds). These are two categories of emissions that react to form tropospheric (ground-level) ozone or smog and are frequently linked to health impacts and respiratory issues. Clean Cities reduced nearly 12 tons of NO_x emissions in 2019, with CNG being the leading reduction technology. The coalitions also reduced nearly 250 tons of VOCs, with VMT reduction and electric vehicles being the leading technologies.

Conservation measures "eliminate" 100% of the emissions that would have resulted from the fuel they save.

Alternative Fuel Vehicle Types and Applications

The online reporting tool allows coordinators to categorize their AFVs into key vehicle types and fleet applications. Figure 9 shows that the largest portion (42%) of AFVs were cars. Unknown LDVs, which are usually vehicles reported in conjunction with a Clean Cities coalition-supported fueling station, were the second most reported vehicle type (26%). Light trucks/vans/sport utility vehicles represented 9% of vehicles. Unknown HDVs, typically reported in conjunction with public biodiesel fueling stations, accounted for 7% of vehicles, while heavy-duty trucks without trailers, or delivery trucks, accounted for 5%. All remaining categories individually accounted for 3% or less of the vehicle population.

PEVs in the car segment were the most frequently reported fuel/vehicle combination at over 202,571. E85 capable vehicles were the largest portion (over 275,000 vehicles) of the typical light-duty passenger vehicles segments including the unknown light-duty segment, the car segment, the light trucks/vans/sport utility vehicles segment, and the patrol car segment. Together these E85 capable vehicles represented 27% of all vehicles.

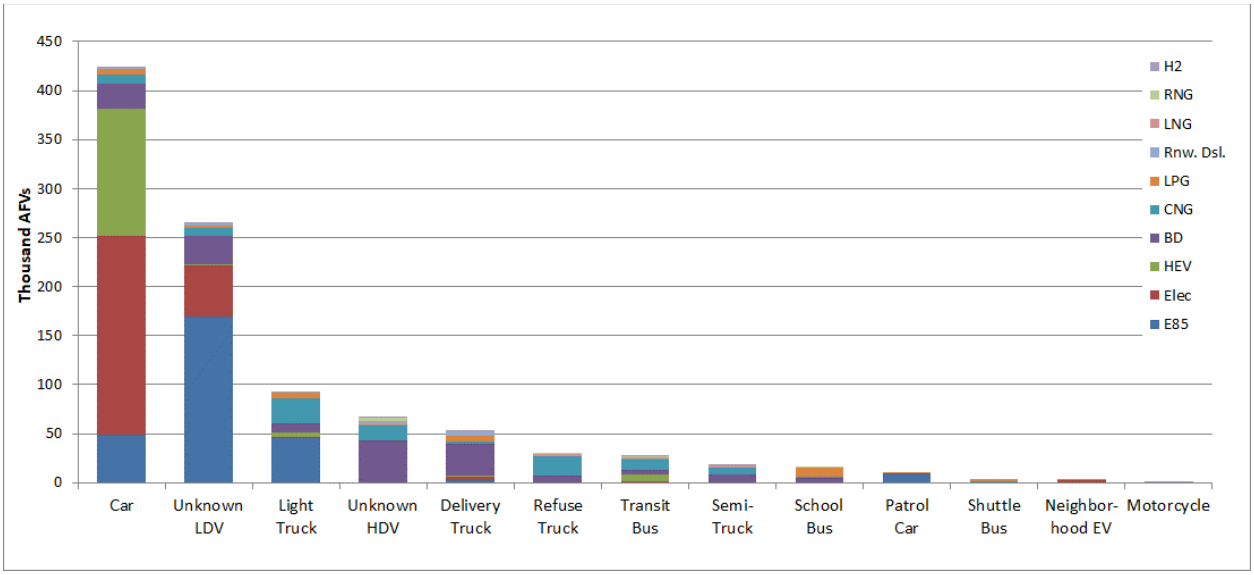

Figure 9. AFVs by vehicle and fuel type

**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 vehicle end use applications. As shown in Figure 10, more than half of the reported vehicles (55%) were owned by the general public or an unknown entity. Many of these vehicles were reported by fuel retailers to the coordinator, often back-calculated from fuel sales and an assumption for how much fuel the average car uses per year. The next largest ownership groups of AFVs were local government fleets, commuters, corporate fleets, and state government fleets at 14%, 10%, 8%, and 6% of the total vehicles, respectively. If commuters are combined with the general public category, 66% of vehicles are owned by the general public.

Of these ownership groups with greater than 5% of reported vehicles, commuters increased the most from 2018 by 143% to 103,864 vehicles while reported state government fleet vehicles shrank by 34% to 61,181 vehicles.

66% of coalition-reported vehicles are owned by the general public and now have access to alternative fuel infrastructure because of Clean Cities coalition projects.

Flex fuel vehicles or E85-capable vehicles, biodiesel vehicles, and renewable diesel vehicles were most often reported for the general public, state fleets, and local fleets. PEVs and HEVs comprised 87% of commuter vehicles (62% and 25% respectively). CNG and propane vehicles made up the largest portion of corporate vehicles at 60% combined (44% and 16% respectively).

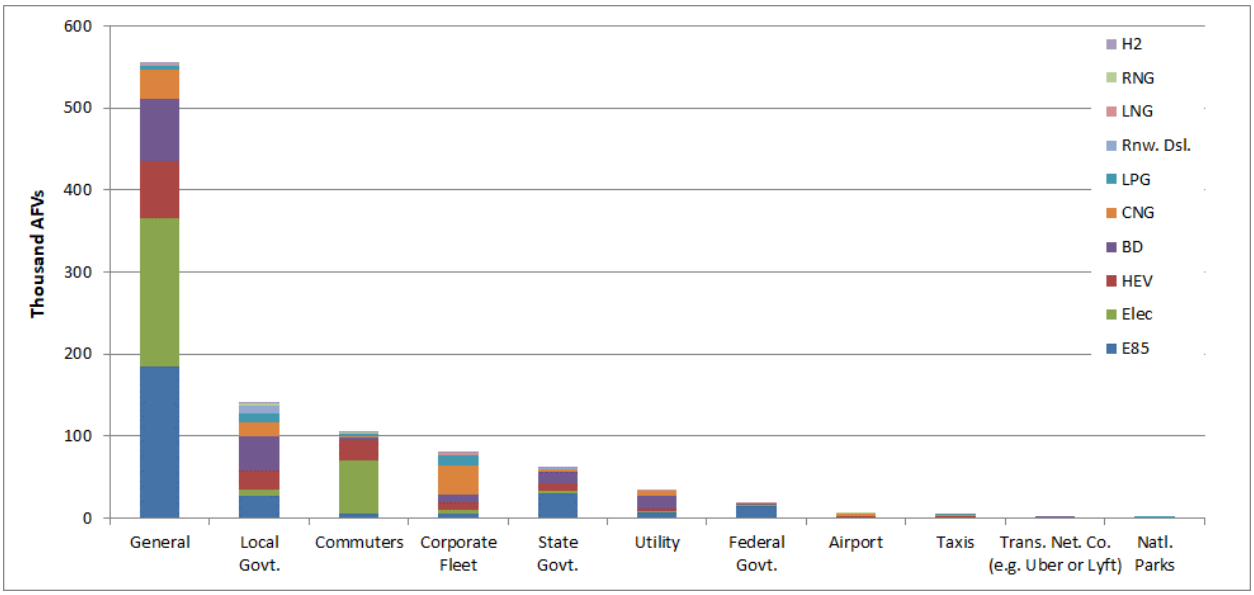

Figure 10. AFVs by application and fuel type

Emerging Technologies—Experimental, Prototype, and Demonstration Vehicle Projects

A small number of Clean Cities coalitions have worked with fleets and stakeholders that have an interest in field-testing advanced vehicle technologies (e.g., hydrogen and fuel cell vehicles). This subset of vehicles represents just 0.1% of the total number of alternative fuel or advanced 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. In 2019, 691 hydrogen vehicles were reported, and the largest portion were for general public owners as reported for fueling stations. Data reported to Clean Cities coalitions for some of these vehicles show the noteworthy potential these technologies have for both energy and environmental benefits, but no significant market trends could be drawn from this limited data set.

Coordinators and Coalition Types

The average Clean Cities coordinator has eight years of experience.

Collectively, coordinators reported spending a total of 2,723 hours per week on Clean Cities coalition tasks, which is equivalent to more than 136,000 total hours during the year.[3] This translates into 68 full-time, experienced technical professionals working to increase the use of domestic alternative fuels and reduce wasted energy. For an individual coalition, the average amount of time spent coordinating Clean Cities coalition business per week was 34 hours. The average increased from 30 hours in 2018, while the median remained at 30 hours. The reporting tool also gathered information on coordinator experience. Coordinators have been on the job for an average of eight years. Forty-eight percent of

[3] Assuming 50 work weeks per year.

coordinators have held their position for five years or less. Thirty-six percent, or 29 coordinators, have 10 years or more of experience.

Coalition types were tracked, and the relationships between coalition type and general metrics were analyzed. The coalition types correspond to their host organizations (which generally pay the coordinator's salary) and are listed in the first column in Table 12 and defined in Appendix B. Standalone nonprofits 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 12, followed by metrics such as the average number of stakeholders, average funds (including grants and dues) received in 2019, the average GGE of energy impacted, 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 based in standalone nonprofits were the most common, had the highest average number of stakeholders, and created the second highest average EUI.

The most common coalition type was standalone nonprofit, which also reported the highest average number of stakeholders. Coalitions reporting the fewest stakeholders were hosted by city and county governments. However, these coalitions raised the most funds on average and reported the largest average EUI. University-based coalitions were the least common coalition type, brought in the least amount of funding on average, and had the lowest average EUI. Coalitions that reached the most people in outreach events were hosted nonprofits, which was heavily influenced by a single coalition that reached over 19 million people in press releases. Without this outlier, state government coalitions would have reached the most people on average.

Table 12. Coalition Metrics by Coalition Type

Coalition Type [a]	Total # of Coalitions	Average # of Stakeholders	Average Funds Raised	Average Program Impact (GGE)	Average Persons Reached
Nonprofit - Standalone	37	309	$2,587,549	13,712,778	34,301
Regional Governing Coalition	15	177	$2,752,535	11,555,803	61,873
Nonprofit - Hosted	12	118	$4,085,661	7,655,916	1,676,949
Government - State	10	198	$8,514,047	7,943,845	68,897
Government - City or County	4	34	$53,979,455	14,199,904	10,237
University	2	141	$25,900	5,914,671	1,163
Total/Overall Weighted Average	80	224	$6,089,567	11,508,103	288,161

[a] Coalition types are defined in Appendix B.

Funding

In 2019, 32 coalitions reported receiving 82 new project awards (project-specific grants) worth a total of nearly $179 million. These coalitions also reported garnering over $55 million in leveraged or matching funds for a combined total of over $234 million in new grant and matching contributions. The value of 20 of the 82 awards met or exceeded $1 million each. Table 13 presents a breakdown of the number and value of awards reported by the coalitions without the matching funds.

Table 13. Breakdown of 2019 Project Awards by Number and Value

Grant Range	Number of Grants	Share of Total Number	Total Value	Share of Grand Total Value
<$50,000	27	35%	$653,719	0.4%
$50,000 - $99,999	6	7%	$357,826	0.2%
$100,000 - $499,999	16	19%	$5,014,400	3%
$500,000 - $999,999	13	15%	$9,619,315	5%
$1,000,000+	20	24%	$163,132,553	91%
Total	**82**	**100%**	**$178,777,813**	**100%**

Of the nearly $179 million in primary grant dollars received, $9.5 million (5%) was reported as from DOE. State governments were involved in the largest portion of the funding at (32%). Other federal contributors included the Department of Transportation's Congestion Mitigation and Air Quality Improvement Program, the U.S. Environmental Protection Agency, and a grouping of other federal agencies. The largest nongovernment contributor was from the Volkswagen settlement with $20 million (11%). The Regional Greenhouse Gas Initiative, a multi-state market initiative, provided $31 million or 17% of the total grant dollars.

Coalitions leveraged $6 of project funding for every $1 directed to coalitions by DOE.

In addition to new 2019 awards, coordinators reported the portions of previous multiyear awards spent during the calendar year. If a coordinator failed to report the amount spent during 2019, the total amount of the award divided by the number of years of award duration was assumed. Coalitions reported spending 33% of the funds they were awarded in 2019, suggesting that projects start quickly after being awarded. In 2019, coalitions used a total of $95 million in project funds that were awarded and matched between 2013 and 2019.

In addition to project-related funds, coalitions reported collecting $1.2 million in stakeholder dues and receiving $1.6 million in operational funds, primarily from their host organizations. Combining these funds with non-DOE grant and matching funds totaled $228 million in supplemental non-DOE funds. This total represents 6:1 leveraging of the $38 million that was included in the VTO Technology Integration budget for 2019.

About the Stakeholders

Coalitions included nearly 18,000 stakeholders in 2019, with 39% of them from the private sector.

In 2019, 80 coalitions reported a total of 17,915 stakeholders, for an average of 224 stakeholders per coalition, which is more than the average of 198 stakeholders in 2018. Coalitions drew local stakeholders from the public, private, and nonprofit sectors. Stakeholders included local, state, and federal government agencies, large and small businesses, auto manufacturers, car dealers, fuel suppliers, public utilities, nonprofits, and professional associations. Coalitions reported that 39% of stakeholders were from the private sector. This composition is less than the 43% reported in 2018 but shows a balance between public and private stakeholders.

Data Sources and Quality

Gathering data is often 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 80 coordinators who answered the question. Thirty-one percent of the respondents classified their data as excellent, 65% as good, and 5% as fair. No respondents reported their data as poor.

The reporting tool 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 and written questions were the most used method of data gathering, accounting for 25% each. The third most used method was coalition records (19%), then estimates (19%), and finally online questionnaires (11%). Figure 11 shows that all collection methods resulted in similar levels of reliability, with no coalitions rating their data as poor.

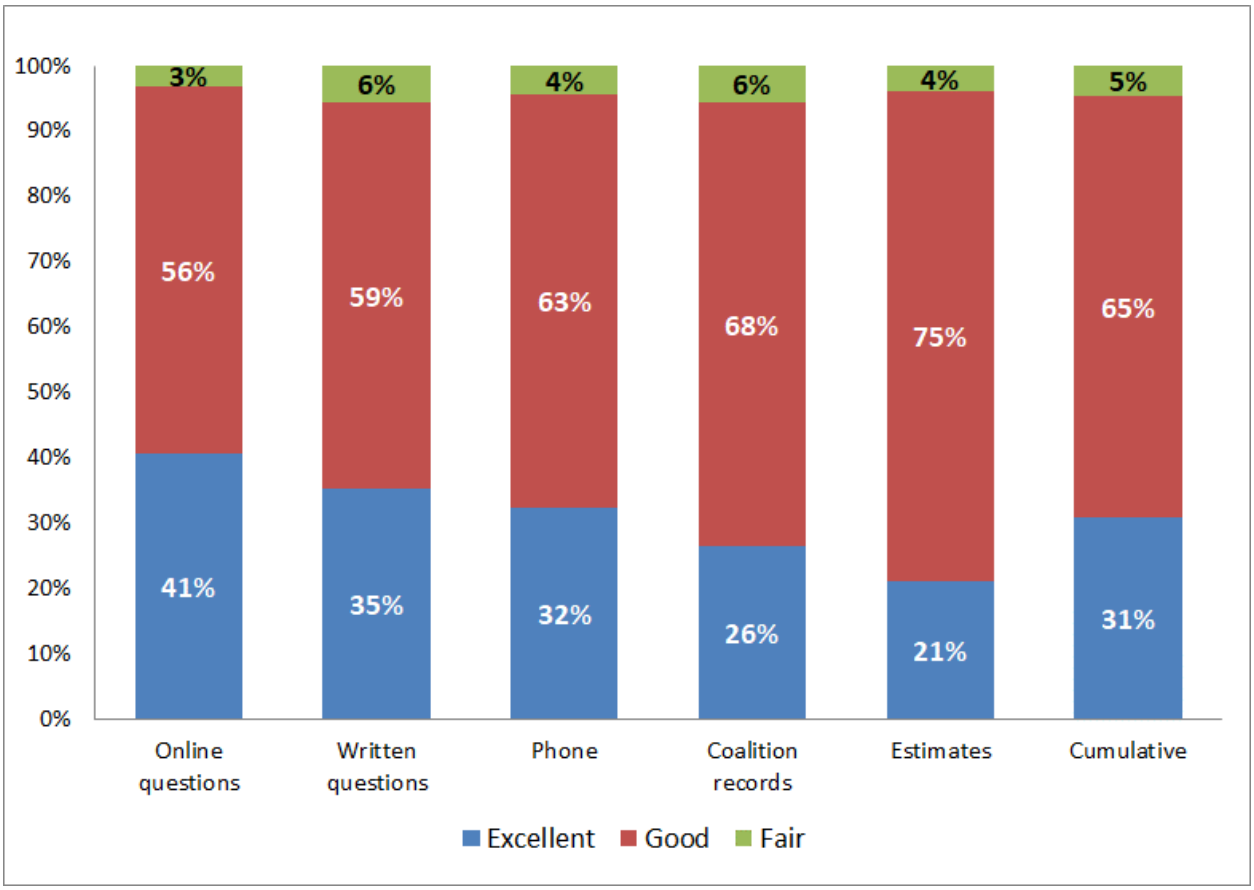

Figure 11. Data quality responses by data source

Conclusion

The 2019 *Clean Cities Coalitions Activity Report* helps quantify accomplishments and the impact of the coalitions. The report shows that Clean Cities coalitions had a year of many successful projects. The data indicate that the EUI is over 1 billion GGE for activities reported by coalitions in 2019.

Overall, Clean Cities coalition accomplishments maintained a high level, and improved over last year. Coalition efforts continued to increase the number and diversity of AFVs and advanced vehicles on U.S. roads in 2019. The combined efforts of local Clean Cities coalitions, DOE, and its National Laboratories bring together otherwise disparate groups to leverage people, funding, and resources, to accelerate the nation's progress in increasing domestic fuel use, improving energy security, and reducing emissions.

Appendix A: Clean Cities Coalitions that Completed 2019 Annual Reports

State	Coalition
AL	Alabama Clean Fuels Coalition
AR	Arkansas 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
DC	Greater Washington Region Clean Cities Coalition
DE	State of Delaware Clean Cities
FL	Central Florida Clean Cities Coalition
FL	North Florida Clean Fuels Coalition
FL	Southeast Florida Clean Cities Coalition
FL	Tampa Bay Clean Cities Coalition
GA	Clean Cities-Georgia
HI	Sustainable Transportation Coalition of Hawaii
IA	Iowa Clean Cities Coalition
ID	Treasure Valley Clean Cities
ID MT WY	Yellowstone-Teton Clean Cities Coalition

State	Coalition
IL	Chicago Area Clean Cities
IN	Greater Indiana Clean Cities Coalition
IN	South Shore Clean Cities
KS	Central Kansas Clean Cities
KS MO	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	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	Greater Long Island Clean Cities
NY	Greater Rochester Clean Cities
OH	Clean Fuels Ohio
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

State	Coalition
RI	Ocean State Clean Cities
SC	Palmetto Clean Fuels Coalition
TN	East Tennessee Clean Fuels Coalition
TN	Middle-West Tennessee Clean Fuels Coalition
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

Appendix B: Definition of Clean Cities Coalition Types

Coalitions have categorized themselves into six different types, depending on their organizational structures and relationship to hosts.[4] 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. "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.
4. "Standalone Nonprofit" coalitions are nonprofits typically with 501c3 status and operate with no or minimal oversight and management of a host organization.
5. "Regional Governing Coalition" coalitions are hosted in a multigovernmental body such as a council of governments, municipal planning organization, or regional planning commission.
6. "Hosted in a University" coalitions are hosted by a university (public or private).

[4] 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.