

# Clean Cities Annual Metrics Report 2006

P. Bergeron and V. Putsche

*Technical Report*  
NREL/TP-540-41753  
July 2007

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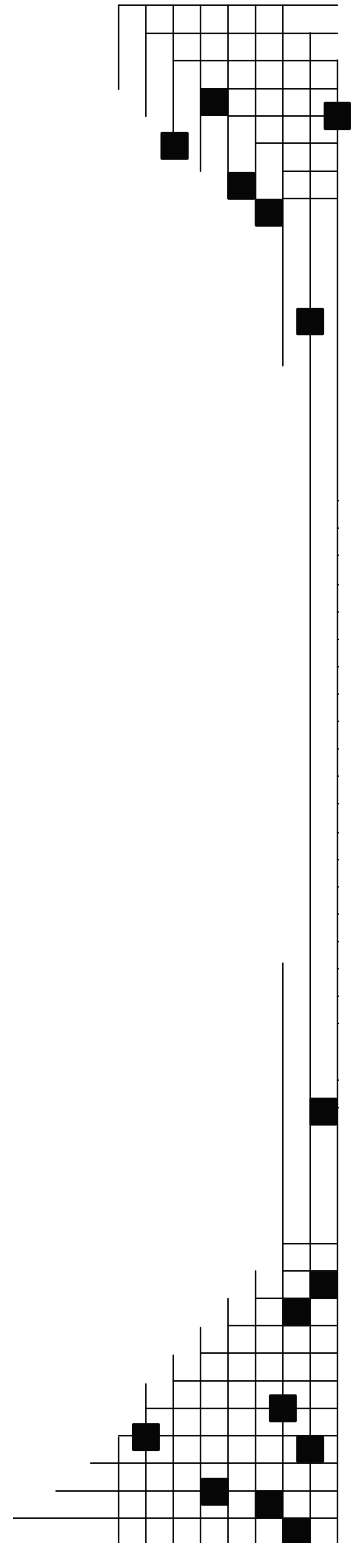


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Prepared under Task No. FC07.2200



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## Table of Contents

Introduction.....	1
Summary of Important Findings.....	1
Attribution and Fuel Use Factors.....	2
Portfolio Performance.....	2
Niche Market Vehicles.....	6
Outreach Activities.....	7
About the Coordinators.....	9
About the Stakeholders.....	10
Data Sources and Quality.....	11
Metrics on Lab Activities.....	11
Conclusion.....	12
Appendix 1.....	13

### List of Figures

Figure 1. Projected Clean Cities Displacement Based on 14.5% Annual Increase.....	3
Figure 2. AFV Split by Fuel Type.....	4
Figure 3. Percentage of AFV Displacement by Each Fuel.....	4
Figure 4. Displacement in Million Gallons Due to Idle Reduction Projects.....	5
Figure 5. Percentage of Total AFVs and HEVs by Niche Market.....	7
Figure 6. Split of Outreach Activities among Audience Types.....	8
Figure 7. Outreach Activity by Technology.....	9
Figure 8. Data Quality Responses.....	11

### List of Tables

Table 1. Gasoline Displacement of Each Portfolio Element.....	2
Table 2. Number and Type of Vehicles for Each Niche Market.....	6
Table 3. Number of Coalitions with Projects that Include Non-Road Vehicles or Equipment.....	7
Table 4. Results for the Six Types of Outreach Activities.....	8
Table 5. Breakdown of Grants by Value and Number.....	10
Table 6. Stakeholders Added in 2006.....	10
Table 7. Numbers of Private Stakeholders Affiliated with Coalitions.....	10

## Introduction

Each year the U.S. Department of Energy (DOE) asks Clean Cities coordinators to submit an annual report of their activities and accomplishments for the previous calendar year. Data and information are submitted to an online database that is maintained as part of the Alternative Fuels Data Center 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 fuel blends, deployment of alternative fuel vehicles (AFVs), hybrid electric vehicles (HEVs), idle reduction initiatives, and fuel economy activities. NREL analyzes the data and translates them into gasoline reduction impacts, which are summarized in this report.

For 2006, 80 of the 85 coalitions that were active throughout 2006 submitted their reports—a response rate of 94%. This is up from the 2005 report response rate of 70%. Appendix 1 lists the coalitions that submitted their 2006 reports by the May 15, 2007, deadline. Coalition coordinators assemble the data based on voluntary reports from their stakeholders—the private and public entities that members of the coalitions. As such, these reports represent a subset of the activities going on throughout the nation, but are an important indicator of the impact of the coalitions and of the priorities at the local level.

In addition to the coordinator reports, metrics are gathered about activities funded by the Clean Cities Program at NREL and Oak Ridge National Laboratory (ORNL). NREL provides a range of technical data, tools, and resources to support coalitions in their efforts to accelerate the use of alternative fuels and other technologies in the Clean Cities portfolio. ORNL produces the Fuel Economy Guide and provides a range of public information related to fuel economy. These metrics are also presented in this report.

## Summary of Important Findings

About 375 million gallons of gasoline were displaced<sup>1</sup> through the Clean Cities efforts in 2006—50% more than in 2005. This displacement represents the combined results of the activities reported by coalitions as analyzed by NREL, and the impacts of the Fuel Economy Guide and related activities as estimated by ORNL.

At 71%, AFVs once again accounted for the largest share of the total displacement. The use of biofuels (ethanol and biodiesel) as fuels for AFVs and in low-level blends displaced 128 million gallons, 34% of the total 376 million. Fuel economy impacts were responsible for displacing 80 million gallons (combined impacts of coalition and ORNL activity), and idle reduction and HEV technologies combined to displace 16 million gallons of gasoline.

In addition to petroleum displacement, a remarkable achievement of the coalitions is their ability to leverage the DOE investment. In 2006, the coalitions won 165 grants worth a total of \$87.3 million, plus another \$33.1 million in leveraged funds from coalition members. This represents a

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<sup>1</sup> The fuel displaced includes both gasoline and diesel. Fuel displacement in this report has been converted to gasoline gallon equivalents using the lower heating value ratio of the fuels.

15:1 leveraging of the \$8 million program budget in FY06. This level of funding enabled the coordinators to spend more than 80,000 hours pursuing Clean Cities' goals—like having a national network of 47 full-time technical sales professionals working to reduce U.S. dependence on oil.

Coordinators entered 917 outreach activities for 2006, which were estimated to reach 21 million people. AFVs were most often the subject of these activities, as has generally been the case in the past. As was the case last year, blends were the next most popular outreach subject. More than half of the outreach activities included blends as a target technology.

## Attribution and Fuel Use Factors

In an effort to improve the link between coalition activities and end results, the coalition annual report includes an attribution factor to account for the percentage of a project's outcome that might be due to coalition activities versus those of other participants in the project. This was used in the estimate of impacts for fuel economy, idle reduction, alternative fuel blend, and outreach projects. Coordinators entered the percentage of the project's outcome they thought they were responsible for, and the project's overall outcome was multiplied by that percentage to determine the coalitions' impacts. Although subjective, it does attempt to address the issue of attribution where coalitions are one of multiple partners involved in a project.

This year's coalition report introduced a new option allowing the coordinators to enter the amount of alternative fuel used by the AFVs they reported. If they knew this amount, they could enter it instead of the default values on the form to convert numbers of AFVs reported into an amount of fuel saved.

## Portfolio Performance

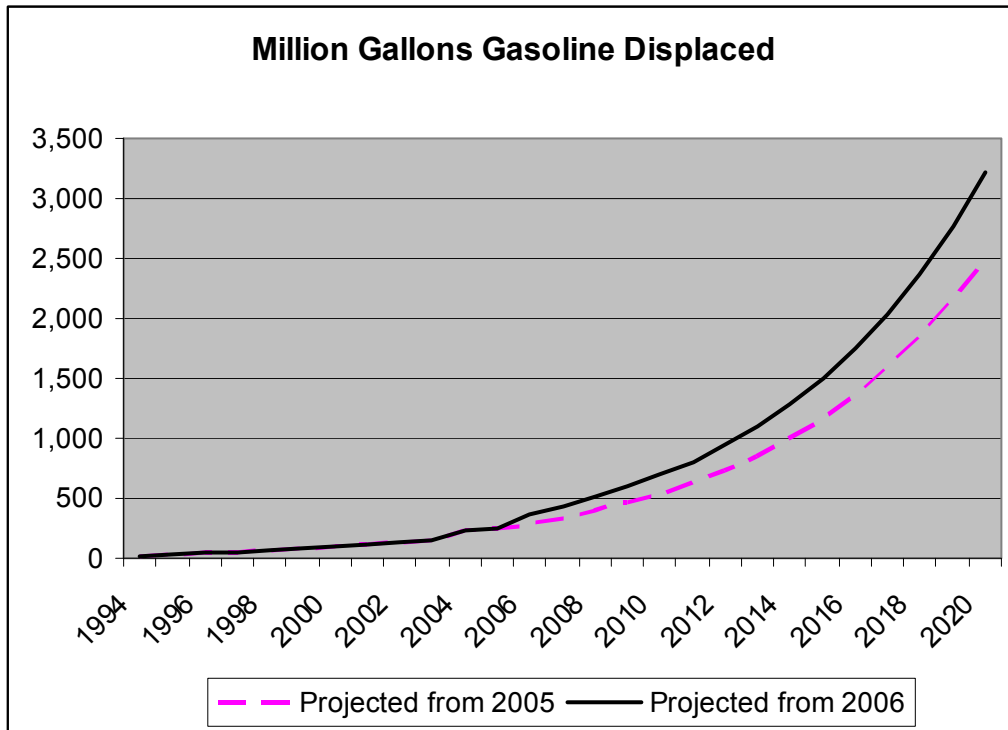
Coordinators submitted information on all five technologies in the Clean Cities portfolio. These data were analyzed and converted into an amount of gasoline displaced by each element. As shown in Table 1, about 375 million gallons of gasoline were displaced through Clean Cities efforts in 2006. The coalitions were responsible for 302 million of the total displaced, for an average of 3.8 million gallons per responding coalition. This is 50% higher than the total 2005 displacement of 250 million gallons.

**Table 1. Gasoline Displacement of Each Portfolio Element**

	<b>Million Gallons</b>	<b>Percent of Total</b>	<b>Change from Last Year</b>
AFV	268	71%	64%
Fuel Economy	7	2%	470%
Fuel Economy - ORNL	73	19%	16%
Blends	10	3%	17%
Hybrid Electric Vehicles	9	2%	137%
Idle Reduction	8	2%	-15%
<b>Total</b>	<b>375</b>	<b>100%</b>	<b>50%</b>

The 50% increase in fuel displacement from 2005 is considerably higher than the 16.6% average annual increase needed to raise the annual displacement from the 2005 total to the 2020 goal of 2.5 billion gallons per year. Because of this, coalitions are on track to reach 3.2 billion gallons displaced in 2020, exceeding the goal by 700 million gallons.

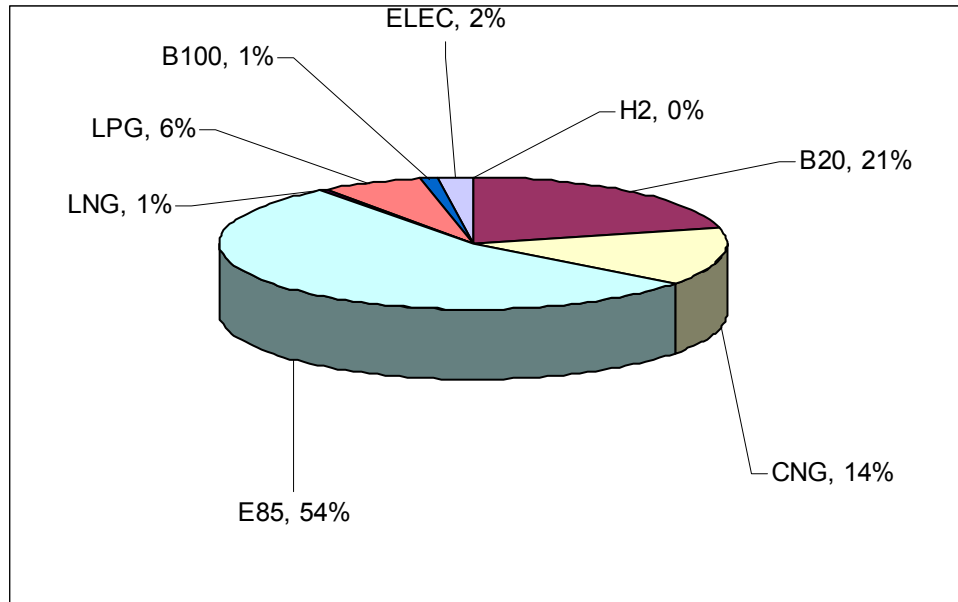
Figure 1 shows the projected annual gasoline displacement assuming a 16.6% annual increase starting from the 2006 displacement total of 375 million gallons. It compares this to the previous curve based on the 2005 survey results that projected a 2006 displacement total of 290 million gallons.



**Figure 1. Alternative Displacement Projections Based on 16.6% Growth from 2006 versus 2005**

### Alternative Fuel Vehicles

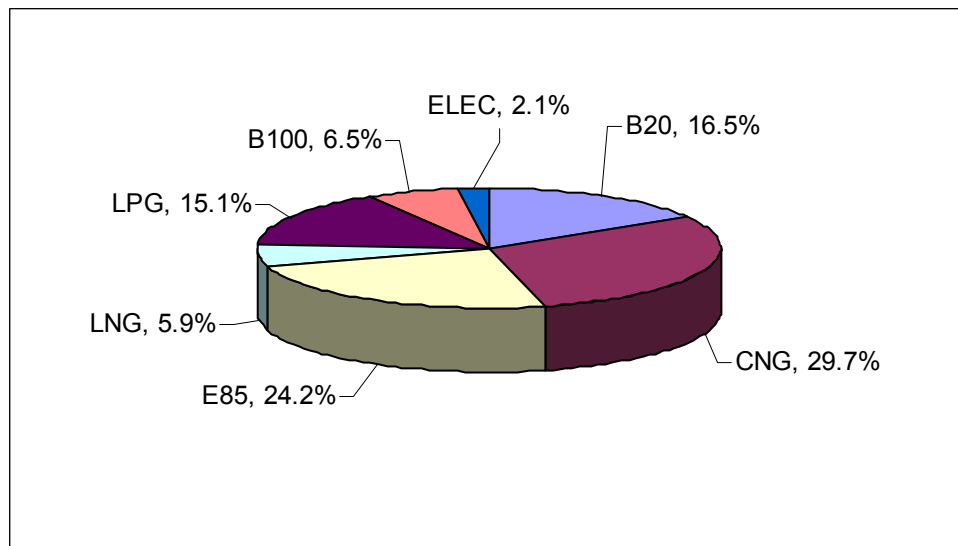
As shown in Table 1, AFVs accounted for the displacement of 268 million gallons, or 71% of the total portfolio displacement. This is an increase of 64% compared to 2005 fuel displacement by AFVs. In 2006, coalitions reported a total of 408,138 AFVs split among the vehicle types, as shown in Figure 3.



**Figure 3. AFV Split by Fuel Type**

Figure 4 shows the percentage of the total gallons displaced in AFVs by fuel type. Compressed natural gas (CNG) remains at the top of the list, having accounted for 30% of the total AFV displacement.

E85 is the next largest contributor with 24%; biodiesel (B20 and B100) accounted for 23% of the of the AFV displacement total. Biofuels (E85, B20, and B100) use represents 47% of the displacement due to AFVs.



**Figure 4. Percentage of AFV Displacement by Each Fuel**

Sixty-one percent of the total displacement due to AFVs was from alternative fuel use in heavy-duty vehicles. Biodiesel and LNG use is confined almost exclusively to heavy-duty vehicles;



roughly two-thirds of the displacement from CNG, liquefied petroleum gas (LPG), and electricity results from heavy-duty vehicles.

### Fuel Economy

This year the 2006 questionnaire saw a large increase in displacement from coalition fuel economy projects. This category includes projects to reduce vehicle miles traveled (VMT) as well as improvements in vehicle fuel economies. Eight coalition projects that focused on reducing VMT displaced 1.9 million gallons of gasoline. Another 5.5 million gallons were displaced as a result of five coalition projects to replace lower fuel economy vehicles with higher fuel economy vehicles. On the 2005 questionnaire, coordinators reported only two fuel economy projects, which accounted for 1.5 million gallons displaced.

### Idle Reduction

Estimated fuel displacement for idle reduction technologies reached 8.4 million gallons in 2006. Idle reduction technologies included truck-stop electrification, onboard idle reduction, and idle reduction policies. As shown in Figure 5, idle reduction policies made up 70% of the displacement estimated for the three technologies; the rest were spread evenly between onboard idle reduction and truck-stop electrification. Although the number of truck-stop electrification projects increased from 10 to 11, the displacement from truck-stop electrification projects fell by about two-thirds from the 3.5 million gallons displaced in 2005.

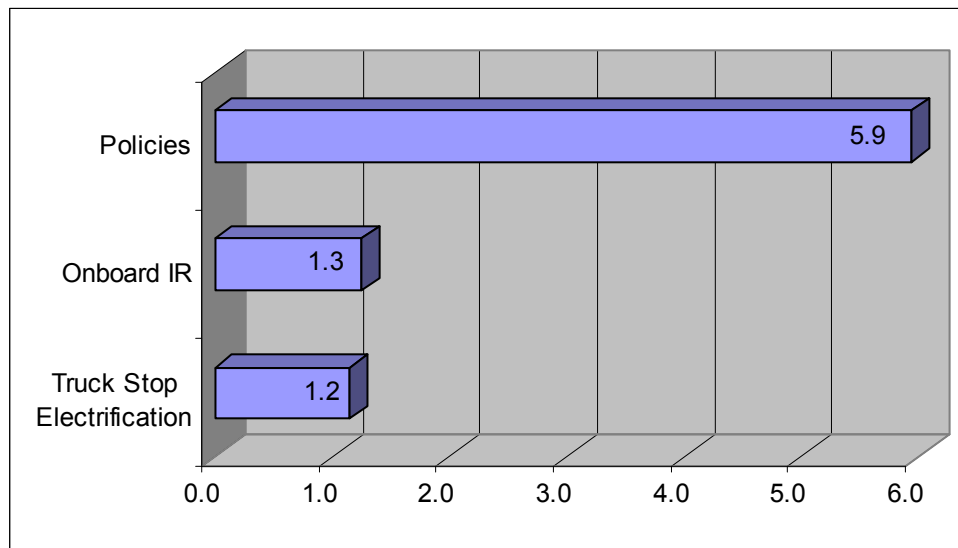


Figure 5. Displacement in Million Gallons Due to Idle Reduction Projects

### Blends

Clean Cities' efforts to promote the use of alternative fuel blends saved 10 million gallons in 2006. The use of low-level biodiesel blends saved roughly 1 million gallons; E10 saved the remaining 9 million gallons. This is a small fraction of the roughly 5 billion gallons of ethanol sold in blends in 2006, but represents what coalitions feel they were influential in getting into the marketplace.

## Hybrid Electric Vehicles

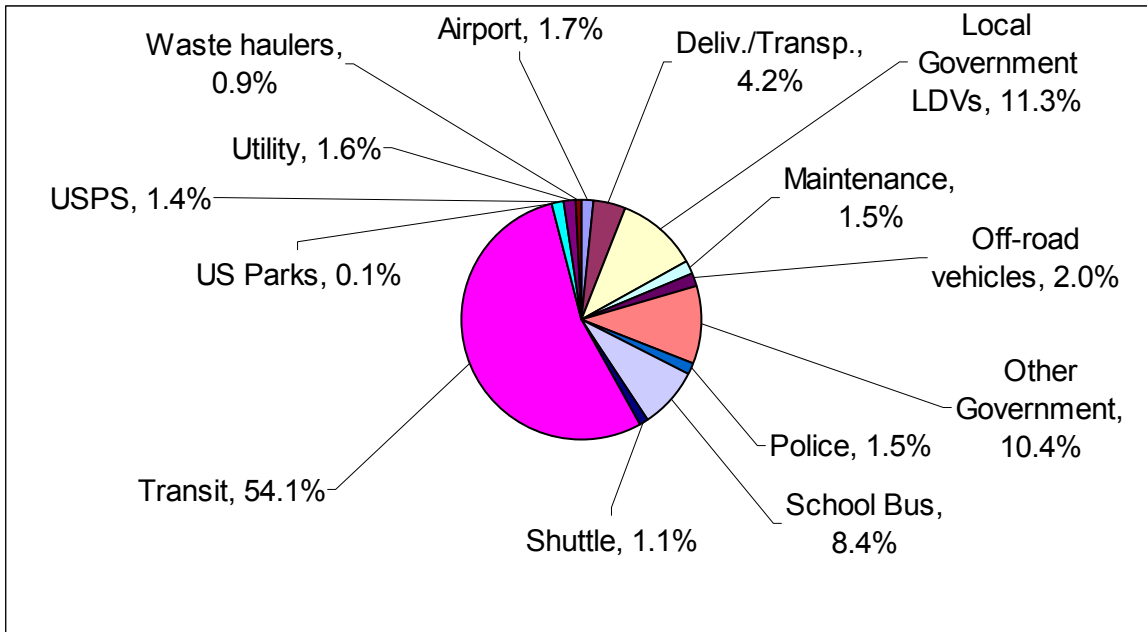
The number of HEVs resulting from Clean Cities efforts reached 43,886 in 2006, about 10% of the total vehicles (AFVs plus HEVs) reported in the 2006 questionnaire. Using these vehicles rather than conventional vehicles saved 9 million gallons in 2006, a 137% increase compared to savings estimated from the 2005 questionnaire. Like fuel economy measures, higher gasoline prices seem to have been a major factor in the increased displacement by HEVs compared to 2005.

## Niche Market Vehicles

The questionnaire also asked coordinators to inventory their AFVs and HEVs in key niche market fleets in their areas. As shown in Table 2 and Figure 6, the transit niche market has the largest number of vehicles and accounts for nearly 54% of the total niche market vehicle population. Over 90% of these transit buses run on B20. Overall, B20-capable vehicles account for 63% of the AFVs in the total niche market vehicle population.

**Table 2. Number and Type of Vehicles for Each Niche Market**

Niche Market	B20	B100	CNG	ELEC	E85	H2	HYB	LNG	LPG	M85	NEV	PHYB	TOTAL
Airport	124	0	1,629	212	0	0	7	122	44	0	76	0	2,214
Deliv./Transport	708	127	1,556	106	23	4	1,001	47	1,970	0	0	0	5,542
Local Government LDVs	1,384	0	4,851	227	3,251	11	3,343	0	1,909	0	2	0	14,978
Maintenance	71	24	327	0	1,314	0	39	0	52	2	190	0	2,019
Off-road vehicles	1,607	425	0	399	0	0	0	0	116	0	115	0	2,662
Other Government	3,775	68	1,492	100	7,123	5	115	60	486	0	563	0	13,787
Police	1	0	1,901	13	2	0	18	0	21	0	5	0	1,961
School Bus	9,620	0	631	0	0	0	0	0	909	1	0	0	11,161
Shuttle	87	13	487	14	0	0	17	0	812	0	0	0	1,430
Transit	66,640	339	2,532	11	0	0	462	1,361	705	0	0	1	72,051
US Parks	7	120	15	10	2	0	10	0	1	0	31	0	196
USPS	0	0	428	22	1,350	0	0	0	0	0	0	0	1,800
Utility	223	0	1,107	17	636	0	13	0	121	0	2	0	2,119
Waste haulers	56	6	200	0	0	0	0	887	28	0	0	0	1,177
<b>Total</b>	<b>84,303</b>	<b>1,122</b>	<b>17,156</b>	<b>1,131</b>	<b>13,701</b>	<b>20</b>	<b>5,025</b>	<b>2,477</b>	<b>7,174</b>	<b>3</b>	<b>984</b>	<b>1</b>	<b>133,097</b>



**Figure 6. Percentage of Total AFVs and HEVs by Niche Market**

Coalitions were asked what type of non-road equipment or vehicles they had used in their projects. They were provided six categories of vehicles/equipment from which to choose: planes, railroads, ships, forklifts, construction, recreation, and other. Responses broke down as shown in Table 3.

**Table 3. Number of Coalitions with Projects that Include Non-Road Vehicles or Equipment**

Category	Number of Coalitions
Planes	2
Railroads	6
Ships	4
Forklifts	8
Construction	16
Other	24

## Outreach Activities

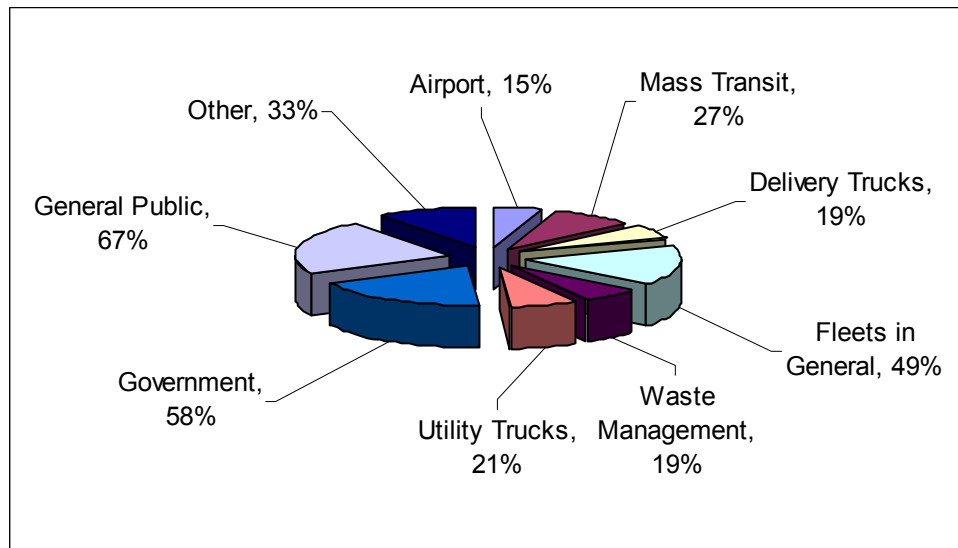
Outreach activities were classified into seven categories (see Table 4). A total of 917 activities were reported and were estimated to reach 21 million people. Media events accounted for 72% of the total people reached; advertising and Advancing the Choice events accounted for the next highest totals. These numbers do not necessarily reflect the actual impact each event had on the audience. For example, extended personal contact at an Advancing the Choice event may have a much greater impact than an advertisement heard on the radio.

**Table 4. Results for the Six Types of Outreach Activities**

Activity Type	Persons Reached	# of Entries	% of People Reached	% of Total Entries
Advertisement	2,896,569	25	13.85%	3%
Advancing the Choice	1,578,565	131	7.55%	14%
Legislation	5,572	29	0.03%	3%
Literature Distribution	937,551	144	4.48%	16%
Media Event	15,089,130	158	72.16%	17%
Meeting	83,035	408	0.40%	44%
Web site	320,999	22	1.54%	2%
Total - All Types	20,911,421	917	100%	100%

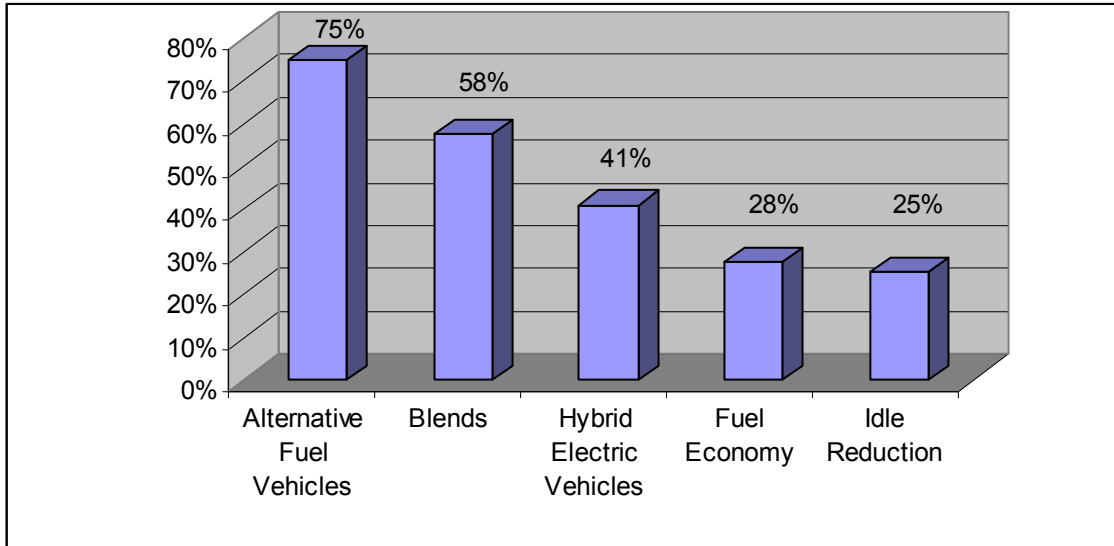
Coordinators were asked to judge how much they thought they were responsible for each event’s number of persons reached versus the contributions of other event sponsors and participants. Analysis of the responses shows that coordinators felt they were responsible for 80% of the 21 million persons reached.

Figure 7 illustrates the types of audiences the 917 outreach activities attempted to reach. Any one activity could be aimed at more than one audience, and in fact about half of the activities featured multiple technologies. The general public was most often cited as a target audience, followed by government officials and fleets in general. Specialized applications—airports, waste management, delivery trucks, utility trucks, and public transport—were identified as audiences in 15% to 27% of the outreach activities. Other audiences were cited as audience types in 33% of the activities reported.



**Figure 7. Split of Outreach Activities among Audience Types**

Figure 8 shows that AFVs were most often the technology targeted during outreach activities. This has generally been the case in the past. In general, the split among the technologies listed as targets are very similar this year to the results from the 2005 questionnaire.



**Figure 8. Percentage of Outreach Activities that Included Each Technology**

## About the Coordinators

Coordinators reported spending a total of 1,636 hours per week on Clean Cities tasks. The average weekly time spent on Clean Cities business was 22 hours, and the median amount of time was 20 hours per week. Information on coordinator experience was also gathered in the questionnaire. On average, coordinators have been on the job for 4.9 years. Half have had more than 4 years and half had 4 or fewer years of experience. The longest serving coordinator has accumulated 14 years experience. If all 85 coalition coordinators worked 22 hours per week on Clean Cities business, almost 98,000 hours were spent promoting the Clean Cities petroleum reduction portfolio. This is equivalent to having a national network of 47 full-time experienced technical sales professionals working to reduce U.S. dependence on oil.

### Coalition Grants

In 2006, 60 of the 80 reporting coalitions received 165 grants worth \$87.3 million. These coalitions also reported garnering another \$33.1 million in leveraged funds. Of the 165 grants, the value of 14 grants exceeded \$1 million. The highest-value grant was obtained by the Granite State coalition for \$13.7 million; the project was awarded another \$2.4 million in leveraged funding. The funds will be used for AFV and fueling infrastructure projects. The Greater New Haven coalition was awarded a grant for \$13.1 million, with another \$7.4 million in leveraged funds. This grant was for a fuel cell bus demonstration project.

Table 5 presents the breakdown of the value and number of grants reported by the coalitions.

**Table 5. Breakdown of Grants by Value and Number**

	<b>Number</b>	<b>% of Total</b>	<b>Total Value</b>	<b>% of Grand Total</b>
< \$50,000	85	52%	\$1,322,346	2%
\$50,000–\$99,999	20	12%	\$1,226,594	1%
\$100,000–\$499,999	33	20%	\$7,120,689	8%
\$500,000–\$999,999	13	8%	\$7,283,498	8%
\$1,000,000 +	14	8%	\$70,395,261	81%
Grand Total	165		\$87,348,388	

## About the Stakeholders

Clean Cities is voluntary, and coalitions draw local stakeholders from the public and private sectors. Stakeholders include local, state, and federal agencies; public health and transportation departments; transit agencies and other government offices; as well as auto manufacturers, car dealers, fuel suppliers, public utilities, and professional associations. A total of 5,452 stakeholders were reported by the 80 coalitions that submitted reports. Of these, 590 were added during 2006.

Table 6 illustrates the number of stakeholders added by coalitions in 2006. Seventy-seven percent of the reporting coalitions added at least one new stakeholder and 43% added more than five new stakeholders.

**Table 6. Stakeholders Added in 2006**

<b>Number Added</b>	<b>Number of Coalitions</b>	<b>Percentage of Total</b>
None added or not reported	18	23%
1–5 added	28	35%
6–10 added	19	24%
More than 10 added	15	19%
Total:	80	

Coalitions reported 2,716 private stakeholders in 2006—50% of the total stakeholders. Table 7 shows how this total was apportioned among the coalitions. Two-thirds of the reporting coalitions had more than 10 private stakeholders as of the end of 2006.

**Table 7. Numbers of Private Stakeholders Affiliated with Coalitions**

<b>Private Stakeholders</b>	<b>Number of Coalitions</b>	<b>Percentage of Total</b>
0–10 stakeholders	26	33%
11–25 stakeholders	26	33%
26–50 stakeholders	17	21%
More than 50 Stakeholders	11	14%
Total	80	n/a

## Data Sources and Quality

A couple of questions relating to coordinator sources and data quality were added to the questionnaire last year. Gathering the data is always challenging for the coordinators, as they rely on the voluntary reporting of their stakeholders and members. In these questions, coordinators were asked to rate the quality of their data as excellent, good, fair, or poor. Figure 9 presents the response breakdown for the 80 coordinators who answered the question. Forty-nine percent of the respondents classified their data as good, 31% as fair, 19% as excellent, and 1% as poor.

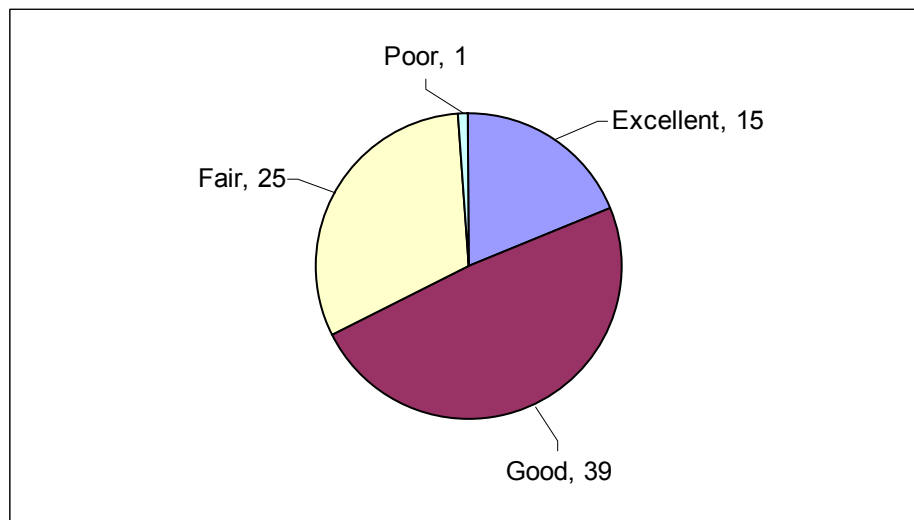


Figure 9. Data Quality Responses

Coordinators were also asked where they obtained their data. They could choose one or more of the following: paper or electronic questionnaires to stakeholders, phone questionnaires of stakeholders, coalition records, or estimates. Cross-correlation of these data with the data quality data showed that the least effective data collection method was using estimates; the quality of the other three methods was similar to each other.

## Metrics on Lab Activities

Both NREL and ORNL track the use of their information and resources. On behalf of Clean Cities, ORNL produces the Fuel Economy Guide based on fuel economy data developed by the Environmental Protection Agency. In addition, ORNL produces the [www.fueleconomy.gov](http://www.fueleconomy.gov) Web site, along with other print and educational activities related to fuel economy. Based on the distribution and use of these products and assumptions about their impact on consumer behavior, ORNL estimated the impact of the materials on new car buyers, used car buyers, and car drivers exposed to Clean Cities products and projects resulted in a savings of 73 million gallons. The 73 million gallons is just the impact estimated for 2006. As evidence of increasing concern over higher fuel prices, the annual 2006 savings are 16% higher than those estimated for 2005.

Use of online resources at NREL also increased dramatically in 2006, and this trend has continued. During 2006, 9.5 million pages of information were accessed by users on the Clean

Cities and Alternative Fuel Data Center Web sites—a 58% increase over last year’s figure of 6 million. The sites at [www.eere.energy.gov/cleancities](http://www.eere.energy.gov/cleancities) and [www.eere.energy/afdc](http://www.eere.energy/afdc) provide a range of resources to support coordinators, fleets, businesses, and local decision-makers in their efforts to implement the technologies of the Clean Cities portfolio. Site content includes technical data, success stories, publications, and industry contacts, along with databases of federal and state incentives and laws, fuel station locations, available vehicles, and other information.

## **Conclusion**

The metrics produced by Clean Cities help quantify the impact of the program as a whole, and of the activities of individual coordinators. Clean Cities believes the calculated impacts are a conservative measure of the program impact, because the ability of coordinators to gather specific data about the impact of their activities is, by its nature, limited. The ripple effect of their efforts in their local communities is difficult to measure. Clearly, the support of DOE and the laboratories enables coordinators to serve as local leaders to help leverage the efforts of otherwise disparate groups and funding sources to make more rapid progress in displacing petroleum than would otherwise be possible.



# Appendix 1

## Coalitions that Reported for 2006 (as of May 15, 2007)

Alamo Area  
Ann Arbor Area Clean Cities Coalition  
Antelope Valley  
Baton Rouge  
Capital Clean Cities of Connecticut, Inc.  
Capital District (Albany)  
Central Arkansas  
Central Coast Clean Cities Coalition  
Central Indiana Clean Cities Alliance, Inc.  
Central New York  
Central Oklahoma Clean Cities  
Centralina Clean Fuels Coalition  
Chicago Area Clean Cities  
Clean Cities - Atlanta  
Clean Cities of Middle Tennessee  
Clean Fuels Ohio  
Colorado Springs Clean Cities Coalition  
Columbia-Willamette, Inc.  
Commonwealth Clean Cities Partnership  
Dallas/Ft Worth  
Denver  
Detroit Area Clean Cities  
East Bay  
East Tennessee Clean Fuels Coalition  
East Texas Coalition  
Florida Space Coast Coalition  
Genesee Region  
Gold Coast  
Granite State Clean Cities Coalition  
Greater Lansing Area Clean Cities  
Greater Long Island, Inc.  
Greater New Haven Clean Cities, Inc.  
Greater Philadelphia Clean Cities Program  
Hampton Roads Clean Cities Coalition  
Honolulu Clean Cities  
Houston  
Iowa Clean Cities Coalition  
Kansas City Regional Clean Cities Coalition  
Land of Enchantment Clean Cities Corridor  
Las Vegas, Inc.  
Long Beach  
Los Angeles (City) Clean Cities Coalition

Maine Clean Communities  
Maryland Clean Cities  
Massachusetts  
Metropolitan Washington Council of Governments  
Middle Georgia Clean Cities Coalition  
New York City  
Northeast Ohio Clean Fuels Coalition  
Northern Colorado Clean Cities  
Norwich Clean Cities Coalition  
Ocean State Clean Cities Coalition  
Palmetto State Clean Fuels Coalition  
Pittsburgh  
Puget Sound Clean Cities Coalition  
Red River Valley - Canada  
Red River Valley/Winnipeg Manitoba  
Rogue Valley  
San Diego Clean Fuels Coalition  
San Francisco  
San Joaquin Valley  
South East Texas Clean Cities Coalition  
South Shore Clean Cities, Inc.  
Southern California Association of Governments  
Southwestern Connecticut Clean Cities  
St. Louis Regional Clean Cities  
State of Delaware  
State of Vermont  
Treasure Valley  
Triangle Clean Cities Coalition  
Truckee Meadows, Inc. (Reno)  
Tucson  
Twin Cities  
Utah Clean Cities  
Valley of the Sun Clean Cities Coalition  
West Virginia Clean State Program  
Western New York, Inc.  
Western Riverside County Clean Cities Coalition  
Wisconsin Clean Cities - Southeast Area, Inc.  
Yellowstone-Teton Clean Energy Coalition

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