

Clean Cities Now

Clean Cities Revs Its Engines in Indianapolis at Stakeholder Summit



AFDC Celebrates 20 Years

Idle Reduction Equipment Benefits Bottom Line

**Coordinators Inducted into Clean Cities
Hall of Fame**



U.S. Department of Energy



Dennis Smith



Linda Bluestein

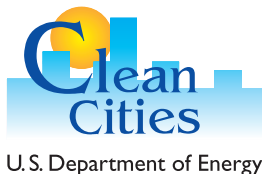
Dear Readers,

It's been an exciting summer for Clean Cities. It started out with a bang in late June when we traveled to Indianapolis for our first-ever Stakeholder Summit. At this groundbreaking event, we announced the 12 charter members of the National Clean Fleets Partnership and inducted two coordinators into the new Clean Cities Hall of Fame, which celebrates outstanding coordinators who have significantly decreased conventional fuel use in their communities. See the Coordinator Profile on p5 to read about the inaugural members of the Hall of Fame. Our feature story on p6 provides a full recap of the Stakeholder Summit, which was attended by almost 400 Clean Cities stakeholders, coordinators, and staff from across the country. It captures the spirit of this unique gathering, which gave stakeholders opportunity to learn about Clean Cities, collaborate with program staff and fellow stakeholders, and provide feedback about Clean Cities strategies and resources.

We closed the summer by celebrating the 20th anniversary of the Alternative Fuels and Advanced Vehicles Data Center (AFDC). What's now a robust website started as a single computer used to collect and analyze alternative fuel vehicle performance data from U.S. fleets. See Program News on p3 to find out how the AFDC blossomed into the comprehensive site it is today.

Also in this issue you'll find a Technology Spotlight detailing the benefits of idle reduction (p4) and an Ask the Technical Response Service (p11) explaining the various types of electric vehicle supply equipment. And no issue of Clean Cities Now is complete without Coalition News, which tells where rubber meets the road in communities across the country. See p8 for deployment success stories about propane lawn equipment, biodiesel in school buses, hydraulic hybrids, natural gas infrastructure, and more.

We hope you enjoy this issue. Let us know what you think at cleancities@nrel.gov.



Dennis A. Smith
National Clean Cities Director

Linda Bluestein
National Clean Cities Co-Director

In This Issue

Program News	3
Technology Spotlight: Idle Reduction Equipment . . .	4
Coordinator Profiles: Lisa Thurstin and Robin Erickson	5
Feature: 2011 Clean Cities Stakeholder Summit	6
Coalition News	8
Ask the Technical Response Service	11



Coordinators inducted into the Clean Cities Hall of Fame: p5



Stakeholder Summit: p6

Clean Cities Now is published biannually. View an electronic version at www.eere.energy.gov/cleancities/newsletter.html. To order print copies, go to www.eere.energy.gov/library.

Editor: Heather Proc, National Renewable Energy Laboratory (NREL)
Writer: Julie Sutor, NREL
Design: Dean Armstrong, NREL

Photos this page (top): from DOE, NREL/PIX 17030; by Trish Cozart, NREL/PIX 17004. Cover photos (clockwise from top): from iStock/4372891; by Trish Cozart, NREL/PIX 19685; NREL; from Maggie Striz Calnin, Greater Lansing Clean Cities.

Program News

The AFDC Turns 20

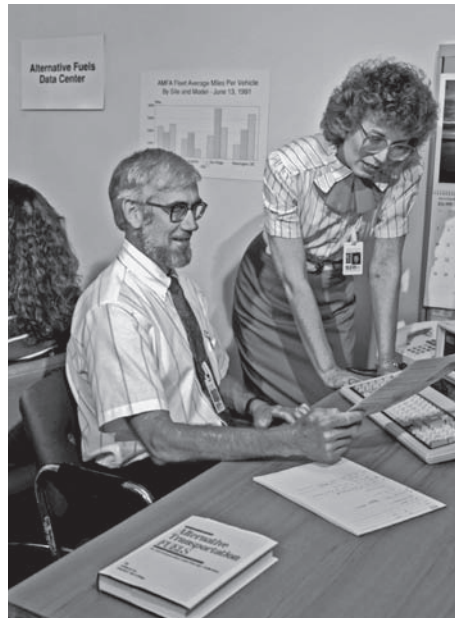
Clean Cities celebrated a major milestone in September with the 20th anniversary of the Alternative Fuels and Advanced Vehicles Data Center (AFDC) – the program’s expansive online collection of information and tools. Developed in response to the Alternative Motor Fuels Act of 1988, the AFDC was launched in 1991 as a repository for alternative fuel vehicle performance data. Since that time, the AFDC website has evolved to become a premier resource for information about alternative fuels and advanced vehicles.

“Two decades ago, the AFDC was a stack of papers on my desk,” said Wendy Dafoe of the National Renewable Energy Laboratory (NREL). “Now it’s a one-of-a-kind, publicly accessible website that provides robust, intuitive tools, data, and information.”

In the AFDC’s early days, it functioned as a dial-up computer network that allowed users to submit data and access results. Users could also order technical reports and other documents through a telephone hotline. NREL created the AFDC website in 1995, providing easier access to those resources. The site, as well as the data behind it, has expanded over the years, establishing the AFDC as an indispensable source of information for fleets, fuel providers, policymakers, consumers, and others seeking to reduce petroleum use in transportation.

“I use the AFDC daily,” said Dallas–Fort Worth Clean Cities Coordinator Mindy Mize, who works with the North Central Texas Council of Governments. “And it’s not just me who’s using it. We have a big air-quality staff that takes advantage of AFDC resources on a regular basis.”

The AFDC’s data sets include transportation-related laws and incentives, models and specs for light- and heavy-duty alternative fuel vehicles, and



The AFDC grew from a stack of paper on a desk into a robust, informative website.

Photos by Warren Gretz, NREL/PIX 19520 (left) and Pat Corkery, NREL/PIX 19586 (below).

AFDC features an ever-expanding offering of calculators, interactive maps, and informational tools. In 2009, the AFDC launched its first mobile tool, the Mobile Alternative Fueling Station Locator. The AFDC’s next additions, the Vehicle Cost Calculator and widget, will allow users to project and compare fuel costs and emissions among thousands of models of alternative fuel vehicles, electric drive vehicles, and conventional vehicles.

alternative fueling station locations. Each data set is updated and reviewed according to a strict schedule, to ensure accuracy and timeliness. And because the data sets reach back many years, it’s possible for users to accurately map trends and histories, in addition to finding reliable information about present-day transportation options.

Drawing from its rigorously vetted data sets, the

“The assortment of tools has grown impressively over the years, continually keeping pace with technological innovations in the marketplace,” National Clean Cities Director Dennis Smith said. “The AFDC takes a lot of the guesswork out of a fleet’s efforts to implement new technologies, switch over to an alternative fuel, or employ other strategies to reduce its gasoline and diesel use.”





Technology Spotlight

Idle Reduction Equipment

An Attractive Option to Help Fleets Improve Their Bottom Lines

As fuel prices rise, so does interest in idle reduction—especially where fleets are concerned. Idle reduction offers fleets a great opportunity for fuel savings, considering over 6 billion gallons of fuel are unnecessarily burned each year in the U.S. alone, according to Argonne National Laboratory (ANL). If the mental picture of millions of barrels of oil doesn't resonate, consider that this translates to billions of dollars in fuel costs every year.

Reducing vehicle idling is a low-hanging fruit, especially in light- and medium-duty vehicles. Simple changes in driver behavior can result in decreased fuel use, reduced emissions, and money saved without any extra equipment or vehicle modifications. Idle reduction can also cut down on engine wear and maintenance costs across all vehicle categories.

Perhaps the greatest opportunity for petroleum and emissions reductions involves heavy-duty vehicles—particularly those operating long-haul routes. One of the main reasons long-haul trucks idle is for cab comfort during mandatory driver rest periods. There are several viable alternatives to idling:

- **Auxiliary power units (APUs):** APUs or generator sets are mounted on the vehicle to provide the electricity needed for climate control and other necessities. APUs generally include a small internal-combustion engine that powers a generator.
- **Diesel-fired heaters (DFHs):** DFHs supply warm air to the cab or bunk using diesel fuel from the vehicle's tank. The heat travels from a small combustion flame to a heat exchanger. DFHs can be paired with air conditioners.

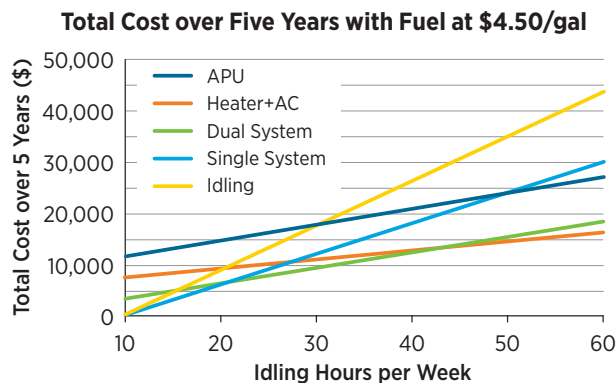


Figure 1. Total cost for five years of idle reduction operations versus weekly idling hours.

Source: ANL. Figure by Dean Armstrong, NREL

- **Thermal storage and battery electric air conditioners:** These rechargeable units pull energy from the vehicle's engine during normal operation or from an available off-board electricity supply. This increases the engine's fuel consumption by a small amount.
- **Truck stop electrification (TSE):** Also known as "electrified parking space," TSE provides power for systems on the vehicle by tapping into an electricity source off the vehicle. Single-system TSE uses only off-board equipment and dual-system TSE requires on- and off-board equipment.

There are other idle reduction technologies on the market, many of which have been evaluated by the U.S. Environmental Protection Agency for fuel savings and emissions benefits (see www.epa.gov/smartway/technology/idling.htm for more information). Strategies such as route optimization and logistics services can also help reduce unnecessary idling that occurs when vehicles are stopped in traffic or waiting to load or unload.

Some fleets may benefit from a combination of technologies and strategies. "The menu of technologies that can work for you is large, and there is no 'one size fits all' solution," said Terry Levinson, a researcher at ANL. "For

this reason, we have developed a calculator that fleet managers can use to make the selection process easier." The calculator, available online as a worksheet at www.transportation.anl.gov/pdfs/TA/361.pdf, helps fleet managers and drivers estimate the costs of idling and alternatives.

An important consideration for fleet managers is the payback period for investments in idle reduction technologies. When used in long-haul applications, the technologies mentioned—APU, DFH, and air conditioners—all have a return on investment of two years or less at a diesel price of \$4 per gallon. A rise in fuel costs means a shorter payback period.

Fleet managers are used to planning for the long term, and idle reduction is no exception. Figure 1 shows costs over five years based on weekly idling hours, using an average diesel price of \$4.50 per gallon. Total costs include the up-front capital cost of the equipment, plus ongoing costs like fuel, maintenance, and hourly charges (if they apply). The economics of the various technologies mainly depend on a fleet's idling patterns. Fleets with lower idling times may gravitate toward options that require little or no capital invest-

see "Spotlight" on p12 >

Coordinator Profile

Robin Erickson and Lisa Thurstin Inducted into Clean Cities Hall of Fame

In June, officials from the U.S. Department of Energy (DOE) unveiled the Clean Cities Hall of Fame to honor outstanding contributions to the Clean Cities mission of reducing petroleum use in transportation. Inductees are ambassadors for alternative fuels and champions for fuel economy. Their exemplary dedication and leadership are paving the way for a new transportation future.



The first two inductees into the Hall of Fame are Lisa Thurstin, coordinator for the Twin Cities Clean Cities Coalition (TC4), and Utah Clean Cities Executive Director Robin Erickson. DOE's Vehicle Technologies Program Manager Patrick Davis recognized them at an awards ceremony held on June 29 at the Clean Cities Stakeholder Summit.

Photos by Trish Cozart/NREL

Lisa Thurstin

For more than 10 years, Thurstin has been involved with TC4, serving as the organization's coordinator since 2007. She is also the manager of Clean Fuel and Vehicle Technologies for the American Lung Association in Minnesota (ALAMN).



Thurstin is widely known for collaborating with stakeholders on clever and innovative campaigns to advance the use of alternative fuels. TC4 worked with the Minnesota Vikings to promote E85 to thousands of football fans through radio and Web advertising, free stadium parking for flexible fuel vehicles, and an E85 road trip to Chicago's Soldier Field. It's not unusual to find Thurstin and her TC4 colleagues at Minnesota gas stations, fueling vehicles with E85 and biodiesel and discussing the benefits of alternative fuels.

In 2007, TC4 created an eye-catching exhibit at the Minnesota State Fair, where the coalition displayed a different alternative fuel vehicle on each of the fair's 12 days. Four 1-ton weights represented the emissions benefits of switching a single vehicle to run on E85 for a year. In 2010, TC4 was instrumental in the opening of 31 public E85 fueling stations, and the coalition is helping prepare Minnesota for the arrival of electric vehicles.

Under Thurstin's leadership, TC4 saved more than 11 million gallons of petroleum and averted more than 29,000 tons of carbon dioxide emissions in 2010 alone. From 2005 to 2009, TC4 efforts saved a staggering 135 million gallons of petroleum—the largest petroleum savings among the Clean Cities coalitions throughout the nation.

"It's an honor to be inducted," Thurstin said. "The award has my name on it, but TC4's success wouldn't be possible without the creativity and hard work of all our stakeholders."

For more information about TC4, visit www.cleanairchoice.org/cities/tc.cfm

Robin Erickson

Erickson has worked with Utah Clean Cities (UCC) for more than a decade. Her involvement with the coalition began in 1994, when she managed a 260-vehicle fleet for a newspaper agency based in Salt Lake City. In that role, Erickson saved her company hundreds of thousands of dollars per year in fuel and maintenance costs by incorporating compressed natural gas, propane, and biodiesel into the fleet's operations.



"We traveled 3 million miles per year, and we wanted to give back to the community by reducing the pollution from our vehicles," Erickson said. "The initial investments started paying back fairly rapidly, since we had such a high-mileage fleet."

Erickson took over as the UCC coordinator in 2007. Since then, she has more than tripled the number of participants in the coalition and expanded its reach to communities far beyond Salt Lake City. Having logged many years in the fleet yard herself, Erickson readily tackles technical challenges to help fleets transition to alternative fuels and implement fuel-saving measures like idle reduction.

"I have six little grandsons. If I can do something to help clean up the air they're breathing, that's pretty motivating for me. I don't take 'no' for an answer," Erickson said.

In 2006, Erickson established an idle-reduction program through which she has personally trained more than 3,000 Utah school bus drivers. The program's success inspired the State of Utah to incorporate the session into its mandatory driver training. Erickson has also played a vital role in expanding the state's natural gas fueling infrastructure and substantially increasing the number of natural gas vehicles on the road.

Under her direction, UCC saved more than 5 million gallons of diesel fuel and gasoline in 2010 through use of alternative fuels, advanced vehicles, and fuel-efficiency measures. Those same efforts averted more than 14,000 tons of carbon dioxide emissions.

For more information about UCC, visit www.utahcleancities.org.

Feature

2011 Clean Cities Stakeholder Summit

Clean Cities Descends on Indianapolis to Share Strategies and Expertise

For more than a century, Indianapolis has been a proving ground for the automotive world—a place where courageous pioneers embrace risk to push the boundaries of vehicle technologies and human ingenuity. In keeping with that spirit, more than 400 Clean Cities stakeholders, coordinators, and program staff rallied at the city's famed Indianapolis Motor Speedway in June to steer markets away from petroleum and imagine a transportation future that bolsters our nation's energy security.

The 2011 Clean Cities Stakeholder Summit took place June 27-30 in Indiana's capital city and was the first such event in Clean Cities' history. In the past, coordinators from the nearly 100 Clean Cities coalitions have participated in national gatherings to exchange strategies, learn from one another's successes, and hear about the latest technological developments in alternative fuels, advanced vehicles, and idle reduction. With the rapidly growing interest in reducing petroleum use, however, Clean Cities coalitions and the U.S. Department of Energy (DOE) recognized a need to fortify the program's potential for nationwide networking by bringing stakeholders into the mix at these events.

"The stars of this meeting are our Clean Cities coordinators and their local partners," National Clean Cities Co-Director Linda Bluestein said.

At the first-ever Stakeholder Summit, Clean Cities convened coordinators, industry, national laboratory analysts,



Clean Cities coordinators Wendy Lucht (left) and Jason Wager (right) discuss the challenges and opportunities around biodiesel and other alternative fuels with Bruce Thompson of the North Carolina Department of Transportation. *Photo from Maggie Striz Calnin, Greater Lansing Clean Cities*

nonprofits, fleets, and local and state government officials to discuss future directions and opportunities to be seized in the transportation sector. The event capitalized on the collective knowledge of Clean Cities' most valuable asset: its 8,400 stakeholders, who are on the front lines of alternative fuels and advanced vehicle deployment.

"At the local level, coalitions are nimble enough to be creative and mold projects to meet the needs of their individual communities," said Wendy Dafoe of the National Renewable Energy Laboratory (NREL). "Stakeholders and coordinators can then come to an event like this and push their imaginative solutions out to peers in other regions."

Two-Way Street

The Stakeholder Summit featured more than a dozen workshops and breakout sessions, many of which focused on a particular technology or fuel in the Clean Cities portfolio. Attendees heard presentations not only from technical experts and DOE program staff, but also from stakeholders who have successfully deployed alternative fuels and advanced technologies in their own fleets.

In the biodiesel workshop, Mayor Tony Petelos of Hoover, Alabama, discussed his city's residential cooking-oil recycling project, which provides the city fleet with about 1,000 gallons of biodiesel per month. Hoover residents drop off their used vegetable oil

"This was as much about pushing out information and expertise as it was about gathering it."

— Marcy Rood Werpy,
Argonne National Laboratory

at fire stations, libraries, and other city buildings, and the city converts it to biodiesel at a cost of less than \$1 per gallon. The recycled oil is used as B100 to fuel 40 fleet vehicles.

Mayor Petelos spent as much time learning at the Summit as he did teaching. "I was very intrigued with what San Francisco is doing," Petelos said. "They're extracting grease from restaurant trap waste and turning it into biodiesel. I'm going to check in with them some more, because there's no one doing anything close to that in Alabama."

Clean Cities Announces Six New National Partners

The following companies joined AT&T, FedEx, Frito-Lay, PepsiCo, UPS, and Verizon as charter members of the National Clean Fleets Partnership:

Coca-Cola has the largest hybrid delivery fleet in North America and has trained more than 10,000 drivers in eco-driving techniques.

Enterprise Holdings, which includes Enterprise Rent-A-Car, Alamo Rent A Car, and National Car Rental, currently offers Chevy Volts and Nissan Leafs to its customers.

General Electric has committed to convert half its global fleet to electric vehicles by 2015. Working with fleet partners, the company will deploy 25,000 plug-in vehicles.

Staples has increased the fuel economy of its fleet by more than 20% since 2007. The company is testing all-electric delivery trucks in Ohio and California.



Photo by Trish Cozart, NREL/PIX19684

Ryder recently celebrated the opening of its first natural gas vehicle maintenance facility, which will deploy hundreds of heavy-duty vehicles powered by liquefied natural gas. The project is expected to save 1.5 million gallons of diesel fuel per year.

Osram Sylvania is aiming to replace 10%–12% of its fleet with more energy efficient vehicles each year. This year, the company will replace more than 20% of its delivery trucks with more efficient models that reduce idling time.

Roger Kelly, transportation director for Gloucester County Public Schools, had a similar experience. Kelly has championed the use of biodiesel and propane in Virginia school buses and has extensive knowledge in alternative-fuel deployment. “The big thing I’m bringing back is some good information about propane lawn mowers and weed eaters,” Kelly said. “I’d love to see our local grounds people get involved with that.”



DOE’s Mark Smith, left, talks with Alabama Clean Fuels Coalition Executive Director Mark Bentley (center) and Mayor Tony Petelos (right) about new opportunities for alternative fuels in Hoover, Alabama. Photo by Trish Cozart, NREL

Workshop facilitators solicited information and opinions from stakeholders and coordinators about the most important opportunities and challenges associated with each fuel and technology. They also sought feedback on DOE strategies and resources. “This was as much about pushing out information and expertise as it was about gathering it,” said Marcy Rood Wery of Argonne National Laboratory. “We heard from participants about where the gaps are, what we’re doing right,

where we need to make course corrections, and what additional resources people need.”

For many attendees, networking opportunities throughout the conference were just as valuable as the formal presentations and discussions. “The highest benefit was the direct conversations I had with several Clean Cities coordinators,” said Martin Tull, executive director of the nonprofit Green Sports Alliance.

Tull’s group works with professional sports organizations like the Seattle Mariners and Boston Red Sox to help teams, venues, and fans reduce their environmental impacts. “I think there is a strong likelihood that the Green Sports Alliance will work with Clean Cities coordinators to engage citizens throughout the country around clean transportation.”

Expanding the National Clean Fleets Partnership

As part of the event, DOE announced the addition of six industry leaders to the National Clean Fleets Partnership. The new partners include Coca-Cola, Enterprise Holdings, General Electric, Ryder, Staples, and Osram Sylvania.

The National Clean Fleets Partnership, announced by President Barack Obama in April, is a Clean Cities initiative that helps large companies reduce diesel and gasoline use. The new partners join AT&T, FedEx, Frito-Lay, PepsiCo, UPS, and Verizon as the initiative’s “charter partners.”

“These 12 charter partners have already made strong commitments

see “Summit” on p12 >

Coalition News



NORTHWEST REGION

Stephanie Meyn, Western Washington Clean Cities

Seattle's Waste Haulers are Going Green

Refuse haulers are competing to out-green one another in the Seattle area, where some of the region's largest municipalities are using contract levers to reduce petroleum use and vehicle emissions.



Waste Management is using CNG to power its fleet in the Seattle area. *Photo from Western Washington Clean Cities, NREL/PIX19681*

In the Puget Sound region, most municipalities contract out waste-hauling services to private companies. This is the case in the cities of Seattle and Issaquah, both active members of the Western Washington Clean Cities Coalition (WWCCC). In 2008, Seattle required bidders for its waste-hauling contracts to demonstrate "cleaner than diesel" fuel use, in keeping with the city's sustainability plan. Similarly, the City of Issaquah decided to incentivize bidders for its solid-waste collection to become certified Evergreen Fleets.

Evergreen Fleets is a voluntary fleet-certification program created by WWCCC and the Puget Sound Clean Air Agency. The program assesses a fleet's "greenness," evaluating its performance in a suite of best practices that reduce petroleum consumption, lower emissions, and increase efficiency.

Together, Seattle and Issaquah are spurring a green revolution in Washington's waste-hauling industry. Eager to win the Seattle contract, two leading waste-hauling companies in the Puget Sound region, Waste Management and CleanScapes, integrated compressed natural gas (CNG) vehicles into their fleets. They also began using biodiesel in their remaining diesel vehicles. The changes resulted in more than 2,000 metric tons per year of greenhouse gas emissions reductions.

Waste Management continues to rise to the challenge. As a company with a solid commitment to sustainability, Waste Management has already invested \$40 million regionally in CNG vehicles, CNG fueling infrastructure, and idle reduction practices. These measures helped the company garner recognition through Evergreen Fleets: Waste Management became the first private company and the first waste-hauling company to become certified. It also won the Issaquah contract. When CleanScapes got wind of the news, it quickly became the next private fleet to achieve certification.

The leadership of Seattle and Issaquah is creating a ripple effect as more municipalities recognize the benefits of using contract levers to reach sustainability goals. And the entire region is benefitting. Alternative fuel infrastructure is becoming more available, accessible, and affordable. As one example, Waste Management located its public CNG fueling facility half-way between downtown Seattle and Sea-Tac International Airport, allowing taxis and airport shuttles to take advantage of its fast-fill system.



SOUTHEAST REGION

Alleyn Harned

Virginia
Clean Cities

School Buses Go Green in Virginia

Thousands of students in Virginia are breathing cleaner air, thanks to the hard work of several school districts and a small army of Virginia Clean Cities (VCC) stakeholders. Through the Clean School Bus USA Middle Peninsula Project, VCC helped four

counties in the state's Middle Peninsula and Piedmont regions deploy biodiesel, idle reduction, propane, and other emissions-reduction strategies in their school bus fleets from March 2008 through December 2010.

"We've taken some important first steps toward lower emissions and reduced dependence on foreign oil," said Roger Kelly, transportation director for Gloucester County Public Schools. "Everybody needs to be doing everything they can to set solutions in motion for the next generation".

VCC laid the foundation for the project through early outreach to school dis-

tricts, inspiring school boards to pass resolutions to reduce petroleum use in bus fleets. As a result, local champions were ready and willing to take action when funding opportunities became available from the U.S. Environmental Protection Agency's (EPA) Clean School Bus USA program, the Virginia Department of Environmental Quality (VDEQ), the Mid-Atlantic Regional Air Management Association, and other sources.

School districts in four counties used \$39,000 to install diesel oxidation catalysts on 70 buses to reduce diesel

continued on p9 >

emissions. VCC estimates the devices averted at least 39 tons of emissions during the 32-month project period, and they continue to contribute to improved air quality today. The project also paid up to \$0.06 per gallon toward the use of B5 (5% biodiesel, 95% petroleum diesel) by two school districts. Together, they used 347,080 gallons of B5 during the project, reducing emissions of both carbon dioxide and particulate matter by about 3%. Districts in two counties installed 24 engine block heaters and conducted driver training to reduce idling time by 23%, resulting in total estimated emissions reductions of more than 5 tons per school year.

A pilot project in Gloucester County Public Schools put five Blue Bird propane school buses on the road. Funds from EPA and VDEQ subsidized the incremental cost of purchasing the buses, and now the district is benefiting from lower emissions, reduced petroleum use, lower fuel costs, quieter operation, and higher driver satisfaction. From October 2009 to November 2010, the five buses saved almost \$7,000 in fuel and maintenance costs and averted 8.4 tons of greenhouse gas emissions.

“The only complaint I’ve had was from one parent whose daughter is missing the bus because she can’t hear it rumbling down the street like she used to,” Kelly said.

Kelly’s strong support for diesel alternatives was critical to the project’s success. Also essential was a concerted outreach effort that provided administrators and school board members with the background they needed to make informed decisions. VCC provided Kelly a scholarship to attend a propane vehicle workshop in Michigan and organized a propane bus demonstration for school board members, so they could see, touch, and ride propane buses. And now, Gloucester’s success is helping to make the case for dozens of other fleets in Virginia who are considering a transition to propane.



SOUTH CENTRAL REGION

Stacy Neef, Central Texas Clean Cities

Texas Puts a New Spin on Mowing

Central Texas Clean Cities is confronting air pollution one lawn at a time by introducing the Lone Star State to propane-powered mowers.

On hot, sunny, summer days, many large metropolitan areas in Texas suffer unhealthy levels of ground-level ozone pollution, prompting the state to declare Ozone Action Days. On these days, residents and businesses are encouraged to limit driving, wait until evening to fill gas tanks, avoid the use of gasoline-powered lawn equipment, and take other steps to reduce air pollution.

Such measures help ease the squeeze on air quality, but they pose significant logistical problems for landscaping companies and organizations with large swaths of grass to maintain. Central Texas Clean Cities (CTCC) and its fellow Clean Cities coalitions in Texas offered a creative solution in the form of propane lawn mowers. These mowers produce much lower emissions than gasoline mowers do, and they can be used on Ozone Action Days. CTCC applied for funding from the Propane Education and Research Council and received \$127,000 to conduct an outreach campaign and to offer financial incentives to offset the cost of propane mowers.

Through a rebate program developed with input from CTCC stakeholders, purchasers of new propane mowers received 20% of the purchase price or up to \$2,500 back. Those who paid to convert conventional mowers to run on propane received 50% of the conversion cost. Clean Cities coalitions spread the word through media outreach, email blasts, and mower demonstration days. Propane mower distributors enlisted the help of lawn equipment retailers. In less than a year’s time, CTCC distributed \$100,000 in rebates toward the purchase or conversion of 52 mowers.

Purchasers of the new and converted propane mowers have been pleased. The engines are cleaner, no fuel is lost to spillage, all-too-common gasoline theft is averted, customer satisfaction is higher, and operators are saving on fuel costs. Most importantly, business doesn’t grind to a halt on Ozone Action Days, and petroleum use is reduced by about 100,000 gallons per year.

CTCC distributed the last propane mower rebate in October 2010, but the project’s momentum is still evident in the Texas landscaping world and beyond. Program participants included some of the state’s largest landscaping companies, and they have since added more propane mowers to their fleets. Some operators are so impressed by propane that they’d like to have their trucks converted to run on this affordable, clean fuel. Today, more than 14 manufacturers are selling propane mowers in Texas. CTCC is proud to have played a part in making the state’s lawns a little greener and to have laid the groundwork for similar programs in other states.



Clean Cities coalitions in Texas have helped plant the seed for propane lawn mowers in the Lone Star State. *Photo from Central Texas Clean Cities, NREL/PIX 19682*



NORTHEAST REGION

Lee Grannis, New Haven Clean Cities Coalition

Clean Cities Coalitions Bring LNG to the East Coast

Clean Cities coalitions in Connecticut are celebrating a breakthrough in alternative fuel deployment with the Enviro Express compressed natural gas (CNG) and liquefied natural gas (LNG) fueling station in Bridgeport. Opened in December 2010, the station is the first LNG transportation fueling center east of the Mississippi.

“We could not be happier with the results,” Enviro Express President Bill Malone said. “This station has invigorated the alternative fuels debate, proven a concept on a large scale for private enterprise, and made the air cleaner.”

Enviro Express, which provides solid waste collection services in southwestern Connecticut, is using the LNG facility to fuel 18 Kenworth Class 8 trucks that make daily trips along Interstate 95 from Bridgeport to a landfill in Putnam, 70 miles away. In the station’s first five months of operation, the trucks traveled more than 600,000 miles and used 110,000 diesel gallon equivalents of LNG. Malone expects the project will reduce his company’s diesel fuel use by 250,000 gallons per year.

The \$6.2 million Enviro Express station was developed with funding assistance from the American Recovery and Reinvestment Act (ARRA) and is part of the \$29 million Connecticut Future Fuels Project, administered by New Haven Clean Cities Coalition. ARRA funds covered half the fueling infrastructure cost, as well as the incremental cost of the LNG vehicles. The project also included a substantial educational component, through which more than 500 fire fighters, law enforcement officers, and paramedics received training on how to handle an accident involving LNG.

Enviro Express isn’t the only company benefitting from the new station. Other commercial fleets, including 50 vehicles from AT&T, use the facility for CNG fueling. And the station is attracting attention from public- and private-sector organizations throughout the Northeast who are concerned about the rising cost of diesel fuel and are looking for alternatives.



Clean Cities coalitions in Connecticut helped bring LNG to the East Coast. The new Enviro Express station in Bridgeport fuels long-haul trucks with LNG, and it dispenses CNG to other customers. *Photo from New Haven Clean Cities Coalition, NREL/PIX19683*



WESTERN REGION

Richard Battersby
East Bay
Clean Cities

California Ramps Up Biofuels Infrastructure

New biodiesel and E85 fueling pumps are cropping up across California as Clean Cities stakeholders work to expand the availability of biofuels.

Five years ago, the Golden State had only one E85 station. Today, it boasts more than 60, due in large part to a station-development project known as the Low Carbon Fuel Infrastructure Investment Initiative (LCF13). The

project is on pace to meet its goal of installing 75 new retail renewable fuel stations in California by 2012, with the potential to displace 39 million gallons of petroleum and 187,500 tons of carbon dioxide emissions per year. In addition, the project will create more than 450 green jobs in a state particularly hard-hit by unemployment. LCF13 is funded through an ARRA award and by the California Energy Commission and Propel Fuels.

California has more than 1 million diesel and flexible fuel vehicles on the road, and LCF13 is now matching the fuels to the vehicles. East Bay Clean Cities and other California coalitions are working with project partners like Propel Fuels and the California Department of General Services to target ZIP codes with high densities of alternative fuel vehicles and to find

locations where the coalitions’ fleet partners operate. Clean Cities coalitions are also coordinating with station owners to publicize the new facilities through station-opening events and ethanol buy-down days.

Biofuels providers and Clean Cities coalitions began laying the foundation for the new fueling infrastructure back in 2007 by contacting elected officials, educating local regulatory agencies, and helping to streamline permitting processes. Today, fuel providers are able to offer station owners turn-key packages, complete with tanks and dispensers, with a minimum of paperwork. And with more stations coming on line every month, California is poised to be a global leader in the deployment of low-carbon, alternative fuels.



MID-ATLANTIC AND GREAT LAKES REGION

Lisa Warshaw
Ann Arbor
Clean Cities

Hydraulic Hybrids a Success in Ann Arbor

One year after the City of Ann Arbor, Michigan, began using hydraulic hybrid technology in four of its recycling trucks, the investment is paying off with fuel savings, lower maintenance costs, and increased productivity. ARRA funding was provided through the Ann Arbor-based nonprofit Clean Energy Coalition, which manages both the Ann Arbor and Detroit Area Clean Cities coalitions. The funding helped defray the incremental costs when the city purchased the hydraulic hybrid recycling trucks to launch its single-stream recycling program in July 2010.

The innovative trucks are built using a technology pioneered by the U.S. Environmental Protection Agency's National Vehicle and Fuel Emissions Laboratory, also based in Ann Arbor. The City of Ann Arbor was one of the first municipalities in the country to deploy this advanced vehicle technology, which uses hydraulic tanks to store energy that would otherwise be lost to braking. The stored energy is then used to power the vehicle when it moves again. This regeneration of braking energy improves fuel economy by 15%, saving the city almost 1,800 gallons of fuel each year.

The hydraulic regenerative braking system also means huge savings in brake maintenance. Normally, a truck that stops and starts frequently—like a refuse truck does—requires replacement brakes several times a year. The new technology significantly increases the life span of brakes: In the year that Ann Arbor has been using the trucks, the brakes have never had to be replaced. That's an annual savings of almost \$12,000.

Ask the Technical Response Service



Do you have questions about alternative fuels, fuel economy measures, or advanced vehicles? The Clean Cities Technical Response Service (TRS) will help you find answers. For more information about the topics in this column or anything in the Clean Cities portfolio, email technicalresponse@icfi.com, or call 800-254-6735.

Q: What types of plug-in electric vehicle charging are available today and how do they differ from one another?

A: The equipment used to deliver electricity to a plug-in electric vehicle is called electric vehicle supply equipment (EVSE). Not all EVSE is the same, as there are differences in how much power is provided to the vehicle's battery and how the power reaches the battery.

The first point of distinction is the type of electric current—alternating current (AC) and direct current (DC). Some EVSE provides AC electricity to the vehicle, which is converted to DC using equipment onboard the vehicle, then delivered to the battery. Other EVSE provides DC electricity without any conversion. Within these two current types, the industry has defined (or is in the process of defining)



This EVSE, equipped with a SAE J1772 connector, can be used to charge PEVs. Photo by Angela Costanzo, NREL/PIX 18723

levels of charging based on variables including circuit rating amperage and voltage. A summary of EVSE being deployed today is listed in Table 1.

One common point of confusion is the use of the term "Level 3." There is currently no Level 3 EVSE United States for either current type. The industry is working to define Level 3, as well as finalize Level 1 DC and Level 2 DC definitions.

The time it takes to charge a battery or add range to a vehicle depends on the amount of power available from the EVSE, battery type and size, and how depleted the battery is prior to charging. The total charging time for Level 1 EVSE, for example, may be anywhere from 3 to 20 hours. Typical charging rates, expressed as number of miles of range added, are as follows:

- **Level 1:** 2 to 5 miles per hour of charging
- **Level 2:** 10 to 20 miles per hour of charging
- **DC fast charge:** 60 to 80 miles per 20 minutes of charging

For more information about alternative energy or energy efficiency, you can also contact the EERE Info Center at 1-877-337-3463 or www.eere.energy.gov/informationcenter.

Table 1. EVSE Types				
	Current Type	Amperage*	Voltage	Kilowatts
Level 1	AC	12-16 amps	120 V	1.3-1.9 kW
Level 2	AC	≤ 80 amps	208-240 V	3.3-20 kW
Fast Charge	DC	≤ 200 amps	200-450 V	≤ 80 kW

* Amperage is based on the circuit ratings and is often expressed as the maximum amperage. For example, Level 1 AC maxes out at 16 amps on a circuit rated at 20 amps.



> Spotlight from p4

ment, whereas higher idling time favors options with low hourly costs.

While idle reduction equipment pays for itself over time, the up-front costs can be a bit intimidating. Thankfully, financial incentives are available to help reduce these costs. There are also other incentives meant to increase the use of idle reduction technologies. Many states, for example, allow vehicles equipped with qualified technology to exceed gross vehicle weight limits so that the added weight of the idle reduction device does not reduce the amount of freight in the vehicle or revenue for the company. See the

Alternative Fuels and Advanced Vehicles Data Center's (AFDC) State and Federal Incentives and Laws website for more information about incentives and regulations (www.afdc.energy.gov/afdc/laws).

Fleets and drivers alike have the opportunity to improve bottom lines by taking a hard look at their idling behavior to decide if there is a solution right for them. "Unnecessary idling will happen less often once fleet managers and vehicle owners see the financial advantage of driver education, quick payback on equipment, and reduced maintenance costs," Levinson said.

For More Information

See Argonne National Laboratory's *Idling: Cruising the Fuel Inefficiency Expressway* (http://www.afdc.energy.gov/afdc/pdfs/idling_reduction_primer.pdf), a comprehensive report updated in June 2011.

Also refer to the Idle Reduction section of the AFDC at www.afdc.energy.gov/afdc/vehicles/idle_reduction.html.



Each Technology Spotlight details an alternative fuel or technology and sometimes includes companies that offer or use it. Clean Cities does not endorse the technologies or companies featured.

> "Summit" from p7

and taken significant steps to reduce their petroleum use," said Mark Smith, Clean Cities' Vehicle Technologies Deployment Manager. "By joining the National Clean Fleets Partnership, they're gaining access to key resources and relationships that will help accelerate their adoption of clean, advanced, energy-efficient vehicles for widespread use in communities across the nation."

Verizon's Ken McKenney says he is looking forward to working with Clean Cities to strengthen the company's existing commitment to fleet sustainability. Within a fleet of 32,000 domestic telecom vehicles, Verizon operates 500 natural gas vans and nearly 1,000 hybrid pickup trucks, among other technologies.

Since joining the Clean Fleets Partnership in April, McKenney said he has already benefitted from new networking opportunities with other large fleets. "As a neutral third party, Clean Cities readily brings people to the table and introduces us to folks we wouldn't otherwise meet," McKenney said. "At the Stakeholder Summit, I heard some very good success stories on propane, and it solidified our feeling that this is a fuel we'd like to explore."

A Day at the Track

Most activities at the 2011 Clean Cities Stakeholder Summit took place in hotel conference rooms, but on June 29, stakeholders and coordinators were treated to a day at the Indianapolis Motor Speedway—hallowed

ground in automotive history. The day kicked off as a caravan of conference participants took a lap around the famed 2.5-mile "Brickyard" in 20 alternative fuel and advanced vehicles.

"That's a pretty sweet experience," said Greater Indiana Clean Cities Coordinator Kellie Walsh, the day's chief organizer. "There aren't too many people who get the opportunity to drive on that oval."



Photo by Trish Cozart, NREL



Photo by Trish Cozart, NREL/PIX 19544



Photo by Trish Cozart, NREL/PIX 19686

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy

EERE Information Center
1-877-EERE-INFO (1-877-337-3463)
www.eere.energy.gov/informationcenter

Printed with a renewable-source ink on paper containing at least 50% wastepaper, including 10% post consumer waste.

Prepared by the National Renewable Energy Laboratory (NREL), a national laboratory of the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy; NREL is operated by the Alliance for Sustainable Energy, LLC.

DOE/GO-102011-3336 • Revised November 2011