

Clean Cities Now

Preparing to Plug In



Clean Cities is helping communities lay the groundwork for widespread adoption of electric vehicles



U.S. Department of Energy

Georgia landfill turns trash into fuel

National Mall deploys propane lawn mowers

Workplace charging helps Utah company go green

Welcome

Thank you for taking a moment to explore the latest edition of Clean Cities Now, the official newsletter of the U.S. Department of Energy's Clean Cities program. In this biannual publication, we share the latest news on program activities, successes, and resources. We also spotlight some of the accomplishments of Clean Cities' nearly 100 coalitions as they work to cut petroleum use in transportation.

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



Dennis A. Smith

Dennis A. Smith
National Clean Cities Director



Linda Bluestein

Linda Bluestein
National Clean Cities Co-Director

Photos (top) from DOE, NREL 17030; (bottom) by Trish Cozart, NREL 17004

Program News

Clean Cities Marks 20 Years at National Gathering in Washington, D.C.

People do business with people. That's the key to Clean Cities' success in spurring the adoption of alternative fuels and technologies that cut petroleum use.

This was the takeaway message at Clean Cities' 20th anniversary event, held June 24 in Washington, D.C., where more than 300 Clean Cities coordinators, stakeholders, program staff, technical advisors, and industry partners came together to celebrate two decades of progress.

National Clean Cities Director Dennis Smith kicked off the event, remarking that the program is built upon the relationships forged within and among the nearly 100 Clean Cities coalitions, which have executed thousands of projects to deploy alternative fuels, advanced vehicles, and efficiency measures. In terms of Clean Cities' cumulative petroleum savings, Smith noted that it took 11 years for

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Cover photos from City of Auburn Hills, NREL 27652 (left), and Clean Fuels Ohio, NREL 27654 (right). Table of contents photos (clockwise from top left) from City of Auburn Hills, NREL 27653; from DeKalb County Sanitation Department, NREL 26759; by Julie Sutor, NREL 26740; and from CPS, NREL 26956

the program to reach the 1-billion-gallon mark, but now it's saving nearly 1 billion gallons every year. "We really feel like this has been snowballing," Smith said. "That's the magic of networking together."

Event attendees also heard from veteran coordinators and stakeholders in panel discussions that reflected on Clean Cities' growth over the last 20 years and its opportunities for continued success in the future. "I used to be the kook talking about alternative fuels, and now some of those same people who laughed at me are telling me about their new electric car," said panelist Steve Linnell, Maine Clean Communities coordinator. "There's really been a transformation."



Long-time Clean Cities stakeholders Jerry Rineer of Lower Merion School District, Jim Evanoff of the National Park Service, and Mike Britt of UPS (left to right) discuss ways in which coalitions have helped them cut petroleum use. "Clean Cities offers a methodical, sustainable pathway toward our goals of making sure the environment is clean for our kids," Britt said. The panel also included Mike Speer of Schwan's Home Service and Mark Simon of the New York City Department of Transportation (not pictured). *Photo from Ken Shipp, DOE, NREL 27657*

Award Winners

Several individuals and organizations received special recognition at the event for their contributions to the Clean Cities mission.

2013 Clean Cities Hall of Fame Inductees

Yvonne Anderson, Central Oklahoma Clean Cities coordinator

Rita Ebert, Greater Long Island Clean Cities Coalition coordinator

Alternative Transportation Pioneer

Melissa Howell, Kentucky Clean Cities Partnership coordinator: *Clean Cities' longest-serving coordinator*

Industry Marathon Champions

Cummins Westport: Natural gas truck and bus engines: *Longest continuously available heavy-duty dedicated alternative fuel vehicle (AFV) product line*

American Honda: Civic Natural Gas: *Longest continuously available light-duty dedicated AFV product line*

Benjamin Watson Leadership Award

Rita Ebert, Greater Long Island Clean Cities Coalition coordinator

Lifetime Mentors and Trusted Advisors

Beth Ardisana

Dave Gelman

Cliff Gladstein

David Greene

Jill Hamilton

Mike Laughlin



DOE's Vehicle Technologies Office Director Pat Davis, left, and Clean Cities Director Dennis Smith, right, induct Greater Long Island Clean Cities Coalition Coordinator Rita Ebert into the Hall of Fame. Ebert also received the Benjamin Watson Leadership Award, from her fellow Clean Cities coordinators across the country, in recognition of the inspiration and motivation she provides her peers. *Photo from Ken Shipp, DOE, NREL 27658*

Central Oklahoma Clean Cities Coordinator Yvonne Anderson shares her perspectives on coalitions' roles in transforming local markets for alternative fuels. Later during the event, Anderson was inducted into the Hall of Fame in recognition of her dedication and outstanding accomplishments. *Photo from Ken Shipp, DOE, NREL 27656*



Fleet Experiences



City of Fort Collins

Photo from City of Fort Collins, NREL 27241

A Multi-Fuel Approach to Successful Fleet Operations

City of Fort Collins Fleet Manager Tracy Ochsner is no stranger to alternative fuels. He and his fleet have been involved with Northern Colorado Clean Cities (NCCC) since the coalition began, and they have worked with almost every fuel and vehicle technology in the Clean Cities portfolio. Today, this award-winning city fleet operates nearly 700 alternative fuel vehicles (AFVs) in its fleet of 1,600, including heavy-duty compressed natural gas (CNG) and biodiesel vehicles, as well as light-duty propane, flex fuel, hybrid electric, and plug-in vehicles. This diversity is the result of a willingness to explore new technologies that make sense for the fleet and an understanding that there is no “silver bullet” that will work in every case.

Modeling Leadership in Northern Colorado

Fort Collins is located in a U.S. Environmental Protection Agency (EPA) nonattainment area for air quality standards. Motivated by the need for cleaner air, the city has been involved with AFV deployment activities since the early 1980s, beginning with propane vehicles and the early plug-in electric vehicle (PEV) models. In 1996,

the city joined with other local governments, Rocky Mountain National Park, and other key partners to form the Weld and Larimer County and Rocky Mountain National Park Clean Cities, housed within the City of Fort Collins Natural Resources Department. Since then, the coalition has been renamed and incorporated as a stand-



The City of Fort Collins uses a hybrid electric bucket truck to maintain the city's street lights. In total, the city operates nearly 700 AFVs in its fleet of 1,600 vehicles. *Photo from City of Fort Collins, NREL 27237*

alone nonprofit, but Ochsner continues to serve on the NCCC Board of Directors and various committees. The City of Fort Collins has been an integral member of NCCC, often hosting events and guided tours for stakeholders at its facilities. In return, NCCC assists the city with grant applications, provides experts to address challenges with vehicle and fuel deployment, incorporates the fleet into regional initiatives, and is in regular contact about new deployment opportunities in the area.

Finding the Right Fuel for the Job

As with any municipality, the City of Fort Collins fleet operates a variety of vehicle types with diverse duty and drive cycles, including police, utility, and transit applications. For all vehicle replacements, the city's Green Purchasing Policy requires the fleet to consider all AFV options to determine whether there is an appropriate model for the job. “As long as we can justify the benefits, we aren't afraid of trying new technologies,” Ochsner said. He and his team often use the Alternative Fuels Data Center's (AFDC) Light- and Heavy-Duty Vehicle Searches, as well as the Vehicle Cost Calculator, for their analyses.

The City of Fort Collins operates more than half its 34 transit buses on CNG, recently purchased a CNG tandem-axle dump truck, and has a few light-duty CNG vehicles. By the end of 2014, the fleet will be running 40 transit buses on CNG, an initiative that has been partially funded by a grant from the Federal Transit Administration. The city is scheduled to launch its new MAX Bus Rapid Transit line (fcgov.com/max) in May 2014 with six CNG buses.

The Fort Collins fleet also has a hybrid electric bucket truck, used to maintain the city's street lights, and operates its remaining heavy-duty diesel vehicles on a 20% biodiesel blend (B20), using nearly 300,000 gallons of the fuel annually. Approximately 400 such vehicles run year-round without issue, which Ochsner attributes to preventive maintenance practices, including tank maintenance and early fuel filter changes.

The light-duty fleet includes about 150 flex fuel vehicles currently running on ethanol blends; 53 propane vehicles, including pickup trucks and one Zamboni ice resurfer; nearly 40 hybrid electric vehicles (HEVs); and six PEVs, including Chevrolet Volt and Nissan Leaf sedans. The fleet also operates several neighborhood electric vehicles.

This diversity in vehicles is supported by a variety of fueling options and funding sources. The city operates a private fast-fill CNG station, funded in part by the Congestion Mitigation and Air Quality Improvement (CMAQ) program, and four private ethanol fueling stations, which were developed with support from the Colorado Energy Office. The city also has its own propane and biodiesel fueling infrastructure and takes advantage of a variety of publicly accessible fueling stations in the area.

Looking ahead, the fleet is excited about opportunities to build PEV charging stations that will be available to the public. It secured a grant from the State of Colorado to add five such stations at municipal facilities and is looking to build additional charging stations in the future. As part of this



A CNG dump truck in the Fort Collins fleet. Photo from City of Fort Collins, NREL 27235

effort, the city will conduct community outreach activities on the benefits of PEVs. Fort Collins has also been involved in the Drive Electric Northern Colorado (driveelectricnoco.org) and Project FEVER (Fostering Electric Vehicle Expansion in the Rockies) (electricridecolorado.com) initiatives and is partnering with the Electrification Coalition (electrificationcoalition.org) to encourage PEV deployment in the area.

Ensuring Success

In 2012, the Fort Collins fleet used approximately 490,000 gasoline and diesel gallon equivalents of alternative fuels (about 55% of its total fuel purchases), averting more than 800 tons of greenhouse gas emissions. Others have taken notice. In 2012 and 2013, the city landed on the list of 100 Best Government Fleets, and in 2012, it ranked 22nd on the list of Government Green Fleets. But success has not come without a few bumps in the road. When the fleet first deployed CNG buses, drivers complained about lack of power. The fleet leadership acknowledged the issue and implemented newer technology. The drivers now prefer the CNG buses over their conventional counterparts because they offer comparable power with a quieter ride. "When it comes to fuels, we have tried them all and had

our share of successes and failures," Ochsner said.

In for the Long Haul

The City of Fort Collins fleet has enjoyed consistent support for AFVs from city leadership over the last three decades, and Ochsner expects it to continue. Plan Fort Collins, the city's long-term strategy, was built on the vision of a healthy and sustainable community. According to the most recent Fort Collins environmental health plan, the city's transportation-related priority actions include "convening an interdepartmental team to explore options for addressing new vehicle types and fuel sources," and "investing in infrastructure to support the use of alternative fuels and highly efficient vehicles." In addition to the air quality benefits of such fuels and technologies, the city also values their clear financial advantages and their contributions to U.S. energy independence.

"We don't believe there is going to be one silver bullet to help us become more energy independent and accomplish our emissions-reduction goals. It's going to take all types of fuels. By diversifying, we have the opportunities to fit the best type of vehicle with the application. We don't get locked into one fuel or technology," Ochsner said.

Feature

Clean Cities Helps Communities Prepare to Plug In

Clean Cities coalitions across the country are working with local and regional stakeholders to lay the groundwork for broad adoption of electric vehicles and charging infrastructure

Plug-in electric vehicles (PEVs) have enormous potential to reshape the energy landscape of the U.S. transportation sector. But to fully realize their environmental, economic, and energy security benefits, stakeholders in the public and private sectors must engage in thoughtful planning that facilitates PEV adoption in a market long dominated by petroleum-based fuels.

In 2011, the U.S. Department of Energy (DOE) announced \$8.5 million in project awards for 16 PEV community readiness projects across the country. The projects, all of which included or were led by Clean Cities coalitions, included 24 states and the District of Columbia. Each of the awardees had 18 months to forge local partnerships, assess local and regional markets, gather input, and create publicly available PEV readiness plans. Some of the projects involved more than 100 partners, including municipalities, counties, universities, state agencies, utilities, vehicle manufacturers, and fleets. The resulting plans, each tailored to the geographic area it serves, address issues such as permitting for charging infrastructure, building codes, charging station design, training for local officials, infrastructure planning, and public awareness of electric-drive technologies.

“These plans represent an enormous body of work,” National Clean Cities Co-Director Linda Bluestein said. “The projects were truly trailblazing in terms of identifying market barriers to PEV deployment and developing practical solutions.”

A Diversity of Barriers and Solutions

The project teams represent a diverse set of scenarios in regard to geography, urban density, PEV adoption rates, and



established PEV deployment initiatives. Like the team in Oregon, some had already been actively paving the way for PEVs and establishing statewide networks and programs. In other locations, like Kansas City, communities were just getting started. Some plans focused on individual counties or cities while others covered large multistate regions. “There is something in here for everyone. So many of the recommendations, templates, and solutions are applicable and replicable in other locations,” Bluestein said.

The New York City plan tackles the unique challenges associated with dense urban locations, such as intense competition for on-street parking and heavy reliance on parking garages.

Colorado project partners spread the word about PEVs at the Denver St. Patrick’s Day parade (above). Stakeholders in North Carolina provide input on locations for future charging infrastructure development (left). Photos from Denver Metro Clean Cities, NREL 27245; Centralina Clean Fuels Coalition, NREL 27659

PEV Readiness Policy Issues

The project led by the New York State Energy Research and Development Authority covered 10 northeastern states. The plan identified several key policy issues:

- Ensuring new construction is ready for electric vehicle supply equipment (EVSE)
- Clearing administrative pathways for residential service upgrades and EVSE retrofit
- Providing safe, consistent, and accessible EVSE installations with good site design
- Ensuring new construction can support higher electricity demand
- Enabling dedicated parking spaces for EVs in public and private settings
- Aligning EVSE deployment with policy and environmental mandates.

—Creating EV-Ready Towns and Cities: A Guide to Planning and Policy Tools



Cincinnati Mayor Mark Mallory (left) discusses PEV deployment opportunities with Jason Phillips of Clean Fuels Ohio at a ride-and-drive event. *Photo from Clean Fuels Ohio, NREL 27655*

PEV Readiness Project Locations



“In Manhattan, drivers aren’t necessarily the ones parking their vehicles,” Empire Clean Cities Coordinator Christina Ficicchia said. “They pass their keys to a parking attendant.” One of the elements of the New York City plan is a training manual for garage attendants, which includes information on signage and the basics of charging. The plan also takes into account the city’s goal of reducing the total number of vehicles on the road, so key priorities for electrification include car-share services, taxis, and commercial delivery truck fleets. “A lot of the recommendations we’ve been laying out for New York City could certainly be used in other dense cities, particularly in regions where we’re seeing increased urbanization,” Ficicchia said.

Policy Guidance for PEV Readiness

Proactive PEV policy development—including for long-range infrastructure development plans, municipal codes, statewide regulations, and local permitting and inspection processes—is a major area of focus in the PEV readiness plans. “The plans contain some excellent information on the best ways to site stations,” Clean Cities’ Bluestein said. “They offer guidance on creating user-friendly configurations in a variety of different locations, like curbside spaces, parking lots, garages, and workplaces, so that equipment isn’t clumsily located.”



Project partners in Michigan developed standardized signage designs that are awaiting final approval from the Federal Highway Administration to become the national standard. *Photo from City of Auburn Hills, NREL 27653*

Michigan’s Clean Energy Coalition worked closely with a substantial number of municipalities and the Michigan Municipal League in the creation of its statewide plan. It contains one section on codes and standards, and another on master planning and zoning, both with a complete set of templates, guidelines, and sample ordinances that municipalities can use in their own policymaking processes. The Michigan plan offers three tiers of sample master-plan language related to PEV readiness, based on whether a community aims to be “Accepting,” “Encouraging,” or “Assertive” in its approach. “We didn’t want to create a plan that was just going to sit on the shelf,” said the Clean Energy Coalition’s Mark Rabinsky. “We wanted it to be very easily usable.

The tools in this plan eliminate the need for cities to invest time in coming up with their own language.”

The City of Auburn Hills was a leading partner in the development of the Michigan plan, and its own ordinances serve as the basis for many of the samples and templates. In collaboration with the Clean Energy Coalition, the city dedicated significant resources to the creation of standardized signage for charging stations. The resulting designs have since been adopted by the Michigan Department of Transportation and are awaiting final approval by the Federal Highway Administration. “Auburn Hills and the Clean Energy Coalition are helping set an example in hopes that others will follow,” said Steve Cohen, the city’s community development director. “We see this as an economic development opportunity for Michigan.”

Public Outreach

Many of the PEV readiness projects included public outreach components aimed at generating interest in and familiarity with electric-drive technologies. “Our No. 1 goal was to elevate Colorado to be a Tier 1 market for the manufacturers that offer PEVs,” said Denver Metro Clean Cities Coordinator Natalia Swalnick. “Between the policy foundations we’ve laid and our

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Coordinator Profile

DOE Honors Clean Cities' Longest-Serving Coordinator

In 1994, Melissa Howell sat in her office at the newly formed Central Kentucky Clean Cities coalition, picked up the phone, and began dialing fleet managers to discuss the benefits of alternative fuels. At the time, fuels like biodiesel and natural gas were something of a novelty, and fleets needed a fair amount of convincing that a shift away from petroleum fuels could be a viable option. Nearly two decades and thousands of phone calls later, Howell has built the organization into a widely recognized institution in the Bluegrass State, where hundreds of stakeholders have displaced millions of gallons of petroleum. Today, Howell says, she answers the phone far more often than she dials it.

“When you look back at where we started, we were working on local projects with small fleets that were willing to give it a shot,” Howell said. “Now, because of all that homework, major decision makers and national partners are reaching out to us and asking us to be at the table.”

With 19 years under her belt, Howell is Clean Cities' longest-tenured coordinator. She has assisted with alternative fuels deployment projects undertaken by many high-profile fleets, including those of Fort Knox military base, UPS, the Universities of Kentucky and Louisville, and Murray State University. Howell has worked closely with Mammoth Cave National Park for many years, helping it become the first national park in the country to operate all its vehicles on alternative fuels. These efforts are helping the park reduce its transportation-related emissions and showcasing fuels like propane, ethanol, and electricity to the park's hundreds of thousands of visitors every year. The partnership has helped pave the way for alternative fuels projects at other national parks from Alaska to Washington, D.C.

Thanks to Howell's leadership, thousands of Kentucky students ride to school each day on hybrid electric buses. School districts across the state now operate a combined 156 hybrid buses, and project partners analyze vehicle performance data on an ongoing basis. On the right routes, and with proper driver training, some of the hybrids are achieving double the fuel economy of their diesel counterparts. “We have these buses operating in all different types of topography. We can look at the data as it comes in, and when we see that one county is knocking it out of the park in terms of fuel savings, we can share the keys to its success with other districts,” Howell said.

Her depth of experience is a boon not only to Kentucky fleets, but also to Howell's fellow Clean Cities coordinators across the country. She actively mentors new coordinators and is always eager to help her peers navigate past



Melissa Howell manages logistics at the 1999 national Clean Cities conference in Louisville. Howell has been a key leader within the Clean Cities network since 1994. *Photo from John Nation, NREL 07869*

technical barriers, reinvigorate stalled projects, or identify critical resources. In recognition of Howell's dedication and outstanding accomplishments, National Clean Cities Director Dennis Smith presented her with the Alternative Transportation Pioneer Award on June 24 in Washington, D.C., where coalitions, industry partners, and program staff gathered for Clean Cities' 20th anniversary ceremony.

“Melissa Howell has left an indelible mark on Kentucky's transportation sector,” Smith said. “Her many successes serve as models that other Clean Cities coordinators emulate to make similar progress in their own communities.”

> Plug In, from p. 7

strong public outreach campaign, we've achieved that goal. The manufacturers see that Colorado is primed, and they're reaching out to our drivers.”

The Colorado plan included the creation of a stand-alone website, “The Electric Ride,” at electricridecolorado.com. The site features information on PEVs and charging equipment, necessary planning and preparation for homes and businesses, and a list of available vehicles and local dealers. Project partners drove audiences to the website through public events and media outreach. In March 2011, they participated in the Denver St. Patrick's Day parade, showcasing PEVs to the event's 250,000 attendees.

Looking Ahead

With the 16 PEV plans complete and implementation already under way, the momentum is building for local and regional PEV markets, according to Bluestein. “One of the things that makes me really optimistic is how successful the projects were in getting the right people together to talk about these issues in concrete ways,” she said. “They're very well positioned to make a real impact.”

Access the PEV readiness plans online through the Clean Cities website at cleancities.energy.gov/pev-readiness.

Coalition News



GEORGIA

Don Francis
Clean Cities-
Georgia

DeKalb County sanitation vehicles fill up at a fueling station that dispenses renewable natural gas made from landfill gas.
Photo from DeKalb County Sanitation Department, NREL 26760



DeKalb County Turns Trash to Gas

A forward-thinking community in Georgia is turning its trash into treasure and cutting greenhouse gas emissions in the process. The county sanitation trucks that unload solid waste at the Seminole Road Municipal Landfill in DeKalb County fuel up on renewable natural gas (RNG) produced from landfill gas (LFG) and dispensed on-site. A state-of-the-art energy facility converts the LFG to RNG.

“In a very real sense, our trucks are powered by the trash they are hauling,” said Robert Gordon, superintendent of the DeKalb County Fleet Management Department. The new facility, which currently produces up to 2.1 million diesel-gallon-equivalents of fuel a year, was designed to accommodate future growth—or to double its fuel output over time.

“Even if our 300-plus over-the-road vehicles and the entire sanitation fleet

filled up on RNG—which is our plan for the future—we’d still only use about 1.5 million gallons a year,” Gordon added. The county plans to sell any surplus gas, which would be distributed via the pipeline.

Through a partnership with Clean Cities–Georgia, DeKalb County received a \$7.1 million American Recovery and Reinvestment Act award to help fund

See “Georgia” on p. 12 >



MICHIGAN

Kristin Jobin
Greater Lansing
Area Clean Cities

helped Charlotte officials get support through EPA’s National Clean Diesel Funding Assistance Program. The district, as a subrecipient on the grant, received \$108,125 and committed roughly \$338,500 in matching funds for the new buses. CPS funded its own on-site propane fueling station.

GLACC assisted the district by evaluating which alternative fuels would work best for its fleet, providing guidance on how to approach the bidding process, and informing it of options to dispose of old buses.

CPS says it’s saving money with propane, given that fuel costs for the new buses are less than half those of their diesel counterparts. “It is a cleaner-burning fuel, and there are significant cost savings. That’s why it’s appealing,” said Belinda Hoyle, CPS transportation director. Pleased with the savings and the emissions benefits, CPS plans to acquire additional propane buses as its diesel buses come due for replacement; officials hope to someday run the entire fleet on propane.



Photo from CPS, NREL 26956

Michigan School Buses Get Rolling on Propane

School districts across the country have been under budgetary pressure for years, so it takes ingenuity to keep up with operational demands when resources are scarce. Charlotte Public Schools (CPS) in Charlotte, Michigan, is no different. In 2010, leaders of the semi-rural district were grappling with financial constraints, and there seemed to be no way to replace aging vehicles in their 20-bus fleet.

However, with the assistance of Greater Lansing Area Clean Cities (GLACC), the district was able to acquire five propane-powered Blue Bird buses, delivered in May 2012. GLACC

Beyond the expected monetary benefits, the project is yielding other dividends. The bus drivers say they love the propane vehicles, and CPS is proud to serve as an example for other districts in the region, as word of the project’s success spreads. The GLACC team created educational materials for Charlotte to distribute to parents and other community members, and CPS transportation staff is available to consult with other fleets.



UTAH

Robin Erickson,
Utah Clean Cities

Utah Paper Box Adds Workplace Charging to Boost Sustainability

Utah Paper Box (UPB) in Salt Lake City has a strong commitment to energy

efficiency and renewable energy technologies. In addition to adhering to efficient manufacturing processes and sourcing sustainable paperboard materials, the company's new, soon-to-be LEED Gold-certified building has a rooftop photovoltaic system with an output of 130,000 kWh a year. But UPB's sustainability efforts don't stop there. Late last year, the company installed five electric vehicle charging stations and added three plug-in electric vehicles (PEVs) to its fleet. Employees are encouraged to charge their personal PEVs at the stations as well.

"I purchased a Chevy Volt a year-and-a-half ago. Since then, I've driven it more than 18,000 miles and only purchased about 58 gallons of gas, the same amount I used to purchase each month," said Teri Jensen, vice president of finance for UPB. "And I am not the only one at the company who drives an electric vehicle—UPB President Steve Keyser drives a company-owned

Volt on sales calls to help spread the word about the alternative transportation options available today that can improve our region's air quality."

Through a partnership with Utah Clean Cities, UPB received American Recovery and Reinvestment Act funding to support the station installation and defray the incremental cost of one of the PEVs. "We've learned a lot about clean transportation options and strategies for reducing emissions from the Utah Clean Cities coalition," Jensen said. "As a result, we've implemented a company-wide idle-reduction policy that prohibits employees from idling for more than two minutes. Some of our employees have taken this policy on the road and posted idle-reduction signs at area schools."

According to Robin Erickson, executive director of Utah Clean Cities, UPB serves as an excellent example of a privately owned company that adheres to green business practices for all the right reasons—reducing its carbon footprint and showcasing clean energy technologies that save energy, reduce emissions, and improve air quality.

"Our progressive actions show how production and sustainability work together in the quest for clean air," said Keyser. "UPB hopes to serve as a model for responsibility for other Utah businesses."



WASHINGTON, DC

Ron Flowers
Greater Washington
Region Clean Cities
Coalition

A National Park Service employee operates a new propane-powered mower at the National Mall in Washington, D.C. *Photo by Julie Sutor, NREL 26748*

The millions of visitors who stroll the National Mall and Memorial Parks in Washington, D.C., each year may soon notice some new attractions alongside the park's iconic monuments. With help from the Clean Cities National Parks Initiative and Greater Washington Region Clean Cities Coalition (GWRCCC), the National Park Service (NPS) is showcasing alternative fuels and advanced vehicles in and around the historic space between the U.S. Capitol and the Lincoln Memorial.

The National Mall recently added the first two plug-in electric vehicles (PEVs) to its 150-vehicle fleet. The park will install four PEV charging stations, two of which will serve fleet vehicles at the park's headquarters near the Jefferson

Memorial; two more will be for public use, soon to be placed in locations that maximize accessibility by PEV drivers. In addition, idle-reduction technologies will be installed in 20 of the park's vehicles most often prone to idling, such as larger trucks involved in maintenance operations. Visitors can learn about these green transportation efforts through interpretive signage and educational talks by NPS staff.

A third strategy—deployment of six propane lawn mowers donated by the Propane Education & Research Council (PERC)—is expected to cut greenhouse gas emissions in half, relative to the diesel mowers they replaced in the park's 16-mower fleet. GWRCCC assisted in establishing the partnership between PERC and the park administration. "We are always looking for



ways to integrate sustainable practices into every part of our operation," said National Mall and Memorial Parks Superintendent Bob Vogel. "This generous donation helps us do just that."

Leaders from NPS, Clean Cities, PERC, and GWRCCC held a ribbon-cutting event in June to unveil the new vehicles and charging infrastructure. "The mission of Clean Cities is really to work with local communities who want to implement these alternative fuels," National Clean Cities Director Dennis

See "Washington, D.C." on p. 12 >

Ask the Technical Response Service

Drive Cycles and Duty Cycles: Implications for Fleets' Efforts to Cut Petroleum Use

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 is the difference between drive cycle and duty cycle?

A: The terms “drive cycle” and “duty cycle” are related, but they have very different meanings. In general terms, drive cycle characterizes how a vehicle is used, while duty cycle characterizes how much a vehicle is used. A good understanding of these concepts can be helpful for fleets exploring ways to incorporate alternative fuels, advanced vehicles, and efficiency measures into their operations.

A vehicle drive cycle can be charted using data on vehicle speed over time, as shown in the graph in Figure 1. These data can provide operational statistics such as maximum and average speeds, number and frequency of vehicle starts and stops, idle and engine-off time, as well as total engine hours per vehicle use cycle.

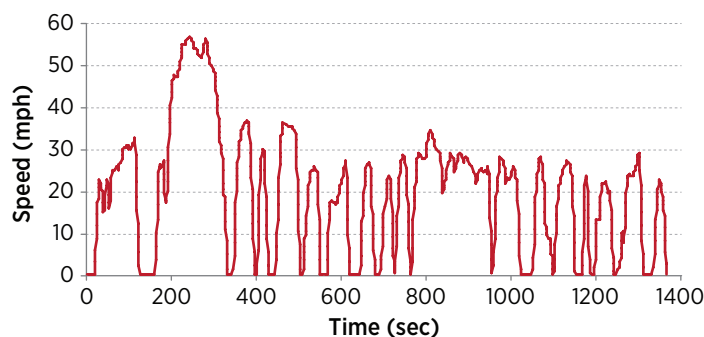
Duty cycle, on the other hand, can provide a fleet manager with information relating to vehicle use. This includes data on the hours or shifts per day, days operated per week, total miles operated per week, and average and peak load profiles. Figure 2 summarizes the characteristics included in drive and duty cycles.

Q: What do drive cycle and duty cycle say about a fleet, and how can they affect alternative fuel and advanced vehicle deployment decisions?

A: Fleet managers should consider both drive cycle and duty cycle when making acquisition decisions. It is important to keep in mind that drive and duty cycles can vary by vehicle and over time, which can affect a fleet's evaluation of the effectiveness and viability of different vehicles, fuels, and technologies. Drive and duty cycles are also important when designing efficient and effective maintenance programs and projecting overall vehicle life, replacement cycles, returns on investment, and annual maintenance costs. Analyzing drive and duty cycles may also identify opportunities for other petroleum-saving strategies, including vehicle downsizing, fleet rightsizing, idle reduction programs, and driver training.

Many alternative fuels and advanced vehicle technologies will yield greater performance and efficiency benefits in certain drive cycles. By examining how a vehicle is used, such as miles per cycle, average speed, and frequency of stops, it is possible to identify the technologies that would be best suited. For example, hybrid and electric vehicles may be good options for a vehicle with a drive cycle that includes many stops and starts, relatively low miles per week, and long idling times.

Figure 1: Urban Dynamometer Driving Schedule



Source: U.S. Environmental Protection Agency

Figure 2: Characteristics of Drive and Duty Cycles

Drive Cycle <i>How a vehicle is used:</i>	Duty Cycle <i>How much a vehicle is used:</i>
<ul style="list-style-type: none"> • Maximum and average speed • Number and frequency of vehicle starts and stops • Idle and engine-off time • Total engine hours per cycle 	<ul style="list-style-type: none"> • Hours or shifts per day • Days per week • Total miles per week • Average load profile • Peak load profile

A vehicle's duty cycle can help to determine which alternative fuel and technology options are likely to provide the greatest return on investment. For example, if a switch to an alternative fuel will involve infrastructure costs and vehicle incremental costs, but yields fuel cost savings, duty-cycle metrics such as miles per week will be helpful in determining the payback period of the initial investments. In addition, the vehicle duty cycle can play into decisions about fueling infrastructure, specifically whether the vehicles can be centrally fueled or will rely on public fueling stations along their routes. The Petroleum Reduction Planning Tool and the Vehicle Cost Calculator, both available on the Alternative Fuels Data Center, are easy-to-use online tools that help fleets use duty cycle information to explore the cost considerations associated with many alternative fuel and advanced vehicle options (afdc.energy.gov/tools).

It is important to remember that not every vehicle in a given fleet or application will necessarily have the same operating profile. For example, a school bus that operates in a dense urban area will likely have significantly different duty and drive cycles compared to a bus that serves suburban and rural routes. Therefore, a particular alternative fuel or technology may not be a good fit for every vehicle in the fleet. For more information on drive and duty cycles, see “Drive Cycles vs. Duty Cycles” (www.ntea.com/content.aspx?id=27297) and “Using Drive and Duty Cycle Data to Successfully Green your Fleet” (www.ntea.com/content.aspx?id=27660), two articles recently published by NTEA, the Association for the Work Truck Industry.

Program Resources



Clean Cities offers a large collection of information resources available for use in education and outreach activities. Publications can be accessed online at afdc.energy.gov/publications.

- The **Plug-In Electric Vehicle Handbook for Workplace Charging Hosts** helps employers assess whether they should offer workplace charging stations and outlines important steps for implementation.
- The **Handbook for Handling, Storing, and Dispensing E85 and Other Ethanol-Gasoline Blends** serves as a guide for blenders, distributors, sellers, and users of E85 and other ethanol blends above E10.
- The National Renewable Energy Laboratory, in collaboration with Argonne National Laboratory and DOE, recently published the final report in the **Transportation Energy Futures (TEF)** series. The reports examine multiple strategies to reduce GHG

The **Clean Cities Guide to Alternative Fuel and Advanced Medium- and Heavy-Duty Vehicles** helps fleet managers explore the wide range of fuel and technology options currently available in the market. The guide includes an extensive list of vehicles, engines, motors, and other propulsion systems. Applications covered in the guide include buses, refuse trucks, tractors, vans, and vocational trucks.



emissions and petroleum use, including opportunities related to light-duty vehicles, heavy-duty vehicles, fuels, and transportation demand. These publications and related resources can be found online at nrel.gov/analysis/transportation_futures.

- The **Alternative Fueling Station Locator iPhone app** is now available for free download from the App Store. The new application optimizes this popular tool for iPhone users, who can now find alternative fueling stations while they're on the go. Users can locate stations that offer electricity, propane, hydrogen, natural gas, E85, and biodiesel.

> Georgia, from p. 9

the new energy facility, a public-access natural gas fueling station, and 40 natural gas vehicles. "Sanitation Director Billy Malone was the driving force behind this project, which serves as a template for success for other landfills across the nation," said Don Francis, coordinator of Clean Cities–Georgia.

In addition to serving as sanitation director for DeKalb County's Public Works, Malone is the Solid Waste Association of North America's international board representative for landfills. According to Malone, 525 landfills in North America currently have the capacity to produce a combined 1 billion gallons of RNG per year, and they can do so under a five-year payback period for the construction of a processing plant. Methane gas collection is practical for

landfills that are at least 40 feet deep with a minimum 1 million tons of waste in place.

"Processing natural gas from LFG helps displace imported oil, makes good economic sense, and is good for the environment," Malone said. "Ordinarily, LFG is burned off into the atmosphere, but why waste that energy when it can be used as transportation fuel?"

Landfills are the third-largest source of human-related methane emissions in the United States. Methane, which is 21 times more potent than carbon dioxide as a greenhouse gas, is a product of decomposing organic matter. Converting LFG to RNG reduces emissions by preventing methane release in the atmosphere and by displacing fuel from fossil sources that vehicles would otherwise use.

"My advice to other solid-waste fleets is to follow this example," Malone said. "Instead of flaring off landfill gas, process it for use as a renewable vehicle fuel—saving money, reducing emissions, and generating a long-term revenue stream that will continue for 30 years after the landfill is closed."

> Washington, D.C., from p. 10

Smith said. "If we can get the millions of parks visitors to go home and understand that they can do the same thing, then it's really a home run."

GWCC Executive Director Ronald Flowers said, "To me, it's about energy independence." Noting the impact of this leadership at the high-visibility National Mall, Flowers said, "It's a perfect place for alternative technologies to really come to the fore."

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