

Clean Cities Now



Making the Cut:

Alternative Fuel
Vehicles Prove
They Can Thrive in
Extreme Conditions



Inside:

**Airport Gets Greener with Electric
Ground Support Equipment**

**Coordinators Honored for Outstanding
Efforts to Cut Petroleum Use**

**Strategy Meeting Lays Groundwork
for the Next Five Years**

**How AFVs Must Measure Up to
Federal Emissions Standards**



U.S. Department of Energy

Welcome

We hope you enjoy this latest edition of *Clean Cities Now*, the official newsletter of the U.S. Department of Energy's Clean Cities program. This bi-annual publication showcases program activities, accomplishments, and resources, as well as highlights the successes of Clean Cities' nearly 100 coalitions as they work to reduce petroleum use in transportation.

The Clean Cities program staff would like to thank those who attended the national Clean Cities Coordinator Training Workshop at Argonne National Laboratory in September. As anyone who has attended before knows, the workshop presents a unique opportunity for coordinators and program staff to spend a week together discussing current challenges and opportunities, sharing expertise, and learning from one another. The event is also a time to recognize coordinators who are truly going above and beyond to advance the Clean Cities mission. Please be sure to see page 10 to read about the four coordinators who were inducted into our Hall of Fame this year. Congratulations again to all of them.

We appreciate hearing comments from readers. Let us know what you think at cleancities@nrel.gov.

Photos (left) from DOE, NREL 17030; (right) by Trish Cozart, NREL 17004



Dennis A. Smith

Dennis A. Smith
National Clean Cities
Director



Linda Bluestein

Linda Bluestein
National Clean Cities
Co-Director

Program Resources

- Visit the new **Clean Cities website** ([clean cities.energy.gov](http://cleancities.energy.gov)) to access a robust projects database, an intuitive Coordinator Toolbox, and streamlined coalition and technical assistance pages, among a variety of other site features.
- Access the expanded **AFLEET Tool** (greet.es.anl.gov/afleet) that includes changes in the GREET Model such as updated information for methane leakage emissions for natural gas pathways, Motor Vehicle Emission Simulator factors, and 2015 U.S. electricity generation mixes.
- Read the new report, **A Primer on Motor Fuel Excise Taxes and the Role of Alternative Fuels and Energy Efficient Vehicles** (afdc.energy.gov/uploads/publication/motor_fuel_tax_primer.pdf), to learn how states are approaching declining revenues from traditional motor fuel taxes.
 - For an overview of the report, see the two-page **Motor Fuel Excise Taxes** fact sheet (afdc.energy.gov/uploads/publication/motor_fuel_tax_factsheet.pdf).
- Learn about the **Roaring Fork Transit Authority's** experience evaluating and implementing CNG for their new VelociRFTA Bus Rapid Transit program in **Developing a Natural Gas-Powered Bus Rapid Transit Service: A Case Study** (afdc.energy.gov/uploads/publication/ng_powered_bus_service.pdf).

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

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Cover photos, from left, Photo from Roaring Transit Authority, NREL 34952; Photo from ThyssenKrupp Elevator; Photo from Custer Gallatin National Forest, NREL 34972

Program News

Clean Cities Strategy Meeting Signals Roadmap for the Future

American Major League Baseball Player Lawrence Peter “Yogi” Berra once said, “If you don’t know where you’re going, you will probably end up somewhere else.”

For every organization or business, good planning can often be half the battle in achieving success and measurable impact. Earlier this year, Clean Cities Co-Director Linda Bluestein led an effort to develop the program’s strategy for the next five years.

On February 25, 2015, Clean Cities held a planning meeting at the U.S. Department of Energy headquarters in Washington, D.C., to solicit input from a broad range of stakeholders in industry, the nonprofit sector, and local, state, and federal government. This effort was documented in the meeting summary (cleancities.energy.gov/events/568).

At the strategy meeting, Clean Cities staff members encouraged attendees to brainstorm a number of ways to increase the use of alternative fuels, advanced technology vehicles, and other petroleum reduction strategies. In the plenary session, experts from the national laboratories presented the status of and issues in each area in the Clean Cities portfolio. These

presentations were based on a series of white papers, which are available on the Clean Cities website. Following the plenary, participants split into six breakout groups, each of which addressed a major element of the program’s portfolio: natural gas, biofuels, consumer fuel economy, plug-in and hybrid electric vehicles, propane, and idle reduction. In these facilitated sessions, attendees discussed the major niche market opportunities in each area and how Clean Cities could contribute resources or information. Information from these breakouts is summarized in the chart below.

The meeting focused on niches because past experience shows they are an effective way to develop the market for a particular technology. Once a few major fleets or a number of smaller ones within an industry successfully adopt a certain technology, Clean Cities has observed that others are much more likely to follow. These fleets are then able to share lessons learned and increase the number of alternative fuel models available for a specific application. For example—while they were relatively rare in the past—about half of all new orders for refuse haulers are now for natural gas vehicles.

The new five-year strategy will help Clean Cities program leadership best prioritize resources moving forward. ■

Proposed Niche Market Opportunities

Alternative Fuel/Petroleum Use Reduction Strategy	Market Opportunities Proposed by Experts in Briefing Papers and Presentations	Top-Rated Market Opportunities
Natural Gas	Concrete Mixers, Paratransit Vehicles, Regional Haul, Renewable Natural Gas—Landfills and Food Waste, School Buses, Utility Service Vehicles	<ul style="list-style-type: none"> • Regional Haul* • Paratransit Vehicles
Biodiesel	Ports, Retail Stations, Regional Haul, School Buses, Work Trucks	<ul style="list-style-type: none"> • School Buses** • Ports
E85	General Consumer, Local Government, State Government	<ul style="list-style-type: none"> • Local Government (Including Police) • General Consumer
Consumer Fuel Economy	Consumer Access via Mobile Devices, Consumer Uncertainty about Official Mile Per Gallon (MPG) Estimates, Expanded Outreach, Improving the Understanding of Advanced Automotive Technologies’ Fuel Economy, Periods of Low Gasoline Prices, Used Vehicle Market	<ul style="list-style-type: none"> • Expanded Education and Outreach • Improving the Understanding of Advanced Automotive Technologies’ Fuel Economy
Plug-In Electric Vehicles and Hybrid Electric Vehicles	Cars, Trucks, and Buses in Dense Urban Areas, Cold Climate States and Regions, Major Locations of Passenger Car Hybrid Electric Vehicles Nationwide, Major Metro Non-Attainment Areas, New Metro Edge (Outer Suburban) Construction, Workplace Charging Nationwide	<ul style="list-style-type: none"> • Corridor DC Fast Charging • Workplace Charging
Propane	Delivery Vehicles, Government Fleets, Paratransit Vehicles, School Buses	<ul style="list-style-type: none"> • School Buses** • Delivery Vehicles
Idling Reduction	Ambulance: Electrified Parking Space, Bucket Truck: Workplace Hybrid, Long-Haul Truck (North): Diesel Auxiliary Power Unit (APU), Long-Haul Truck (South): Electrified Parking Spaces, Personal Vehicles: Turn the Engine Off, Police Car: Battery APU, School Buses: Heaters	<ul style="list-style-type: none"> • Long-Haul Trucks (Northern Routes) • Long-Haul Trucks (Southern Routes)

Welch, Dan, and Nick Nigro. Summary Report On The Department Of Energy’s Clean Cities 5-Year Strategic Planning. 2015.

*Rated very highly compared to market opportunities for other alternative fuels and petroleum use reductions methods

**Presents a cross-cutting opportunity

Fleet Experiences

Sea-Tac and Alaska Air Group Achieve Sky-High Results with Electric Ground Support Equipment

The skies above the Seattle-Tacoma International Airport (Sea-Tac) are clearer thanks to an initiative aimed at integrating electric ground support equipment (eGSE) into the airport's operations. In fact, Sea-Tac's cutting-edge equipment is helping Alaska Air Group (Alaska Airlines and Horizon Air) cut fuel consumption by 250,000 gallons and save \$500,000 annually. Because of this success, the airport has begun working with the remaining airline tenants to acquire more eGSE.

Alaska Air Group Takes Off with eGSE

Sea-Tac, which is operated by the Port of Seattle (the Port), maintains a long history of collaboration with Western Washington Clean Cities (WWCC). When the airport started exploring an initiative to electrify ground support equipment, including baggage tugs, belt loaders, and aircraft pushback vehicles, it was only natural to share their idea with WWCC. Alaska Air Group, the airport's largest tenant, had also been eyeing eGSE for almost 10 years to reduce ground emissions and cut fuel costs. So when WWCC decided to apply for American Recovery and Reinvestment Act (Recovery Act) funding in 2009, it was an opportunity for Sea-Tac to lay the groundwork for the eGSE project, with Alaska Air Group leading the charge.

"The vision and collaboration between the airport and its largest airline was key to this project's success," said Stephanie Meyn, Sea-Tac program manager and former WWCC coordinator.

Both Alaska Air Group and Sea-Tac were recipients of funding from the \$15 million Recovery Act grant administered by WWCC. In fact, one third of the grant went to vehicles and infrastructure at Sea-Tac. After discovering that an airportwide eGSE leasing model was not feasible, Alaska Air Group purchased 204 of its own eGSE vehicles

(such as baggage tugs, belt loaders, and pushback tractors) directly from Charlotte America, using \$1.5 million of the Recovery Act project award. To support the initiative, Sea-Tac pooled \$30 million, including an additional \$3.5 million from the Recovery Act project award, \$5.5 million from a Federal Aviation Administration Voluntary Airport Low Emission Program project award, and Port budget sources to install 576 charging locations for eGSE throughout the airport. Following a competitive bid, AeroVironment provided Sea-Tac with their PosiCharge smart charging stations, which efficiently measure which eGSE needs the most charging and meters out electricity accordingly. These smart charging stations promote the efficiency of Alaska Air Group's ground operations by guaranteeing that equipment is charged and ready to handle the airport's fast-paced, round-the-clock operations.

Currently, the north half of the airport is equipped with 296 eGSE charging locations, while the remaining 280 charging installations are slated for completion in 2017. Because Sea-Tac owns all of the charging locations and is a registered utility, the airlines benefit from paying low electricity prices for their use. Alaska Air Group is already making good use of the charging infrastructure. As of 2014, the airline met its goal of 30% fleet-wide



Alaska Air Group currently operates 204 Charlotte America eGSE vehicles, including belt loaders such as this one, which saves the airlines \$500,000 annually in fuel costs. *Photo from Western Washington Clean Cities, NREL 34959*

electrification and is seeing the benefits of these vehicles first hand, including a one-year payback period on the incremental cost.

"Because airlines themselves are restricted from receiving funding from the airport, this project could not have happened without the support and Recovery Act funding from Western Washington Clean Cities," said Scott DeWees, co-coordinator of WWCC.

The coalition also provided Sea-Tac with other valuable services, such as evaluating proposals and providing expertise to help the airport compare alternative fuels. The coalition played a key role in reworking the project directly with the airline when the airport lease model did not pan out.

"When things don't go according to plan, that's when you hear great stories about the reliability of Clean Cities," Meyn said.



Sea-Tac estimates that there will be 576 charging points throughout the airport to recharge eGSE like this baggage tug when their project is complete. *Photo from Western Washington Clean Cities, NREL 34960*

No Longer Flying Solo

Alaska Air Group estimates that their eGSE project will avert nearly 2,000 metric tons of carbon dioxide (CO₂) each year. Following their success, several other airlines have expressed interest in acquiring eGSE. In fact, Southwest Airlines and United Airlines have completed eGSE pilot projects and placed orders for their own vehicles. Sea-Tac anticipates that if all of its airlines switch to eGSE, the airport will cut at least 10,000 metric tons of CO₂ annually.

Aside from the environmental benefits, Meyn says the success of the project can also be measured by the satisfaction of the ground crews.

“The ground employees have found the transition to the new electric vehicles to be effortless,” she said. “The vehicles are easy to operate and quiet, and they have no tailpipe emissions.”

Alaska Air Group plans to continue to add eGSE in locations where it is operationally feasible.

“It’s a win-win for our company, our employees and vendors, and for the local communities,” said Janet Baad, environmental affairs manager with Alaska Air Group.

Lessons Learned

As with any pilot project, Alaska Air Group encountered a few hurdles during the switch to eGSE. One was establishing the placement for the Posi-Charge equipment. As airlines merge or grow, the gates assigned to each airline change, so placement created a challenge. To manage this, Sea-Tac developed a more flexible installation system that allows equipment to be moved a few feet in either direction at a particular gate. Another difficulty was ensuring that the charging equipment was installed and ready for use by the time the eGSE were delivered to the airline. Because of this, both Alaska Air Group and Sea-Tac had to be fully invested to guarantee success of this project.

“Many airlines can learn from the experiences of Alaska Air Group,” Meyn

said. “In addition to careful coordination and planning, positive relationships between airlines and the airport are critical to the project’s success.”

Piloting Other Alternative Fuels

Sea-Tac’s commitment to alternative fuels doesn’t stop at eGSE. The airport also has 40 shuttle buses, 2 sweepers, and 60 light-duty vehicles running on compressed natural gas (CNG). To grow the market for CNG vehicles in the area, Sea-Tac required that the airport’s CNG station be publicly accessible. As a result, drivers of CNG taxis and personal vehicles can fuel up at the airport’s public CNG station or at four other public stations within 35 miles of the airport.

In addition to their eGSE charging locations, Sea-Tac has 48 electric vehicle charging spaces in the customer parking garage and a few charging spaces for airport employees. Due to high demand, Sea-Tac plans to add more public and employee charging spaces in the coming years.

To further reduce airport emissions, Sea-Tac also requires taxis servicing the airport to use alternative fuels or have a fuel economy rating of at least 45 miles per gallon. As of 2015, there are now 93 hybrid electric taxis and 17 CNG taxis serving the airport. In 2014, the airport’s numerous emission reduction projects led Sea-Tac to become the first airport in North America to receive the Airport Carbon Accreditation award.

“Sea-Tac’s sustainable achievements are a result of its firm commitment to reducing emissions and reducing the airport’s carbon footprint,” stated Meyn. “The airport is helping to lead the industry in greenhouse gas reductions and is a model of sustainable growth for airports across the country.”

Sea-Tac and its tenants are continuing to explore ways to expand their current initiatives and implement new projects, but their leadership in airport sustainability is off to a flying start! ■

Feature



Photo from Roaring Fork Transit Authority, NREL 34950

Alternative Fuel Vehicles Beat the Heat, Fight the Freeze, and Conquer the Mountains

When thinking about buying an alternative fuel vehicle (AFV), it's natural to be concerned about how it might fare in the harshest landscapes and most brutal climates. Many AFVs are proving they can handle almost any extreme—from freezing conditions in the dead of winter, to substantial heat waves in the height of summer—with ease.

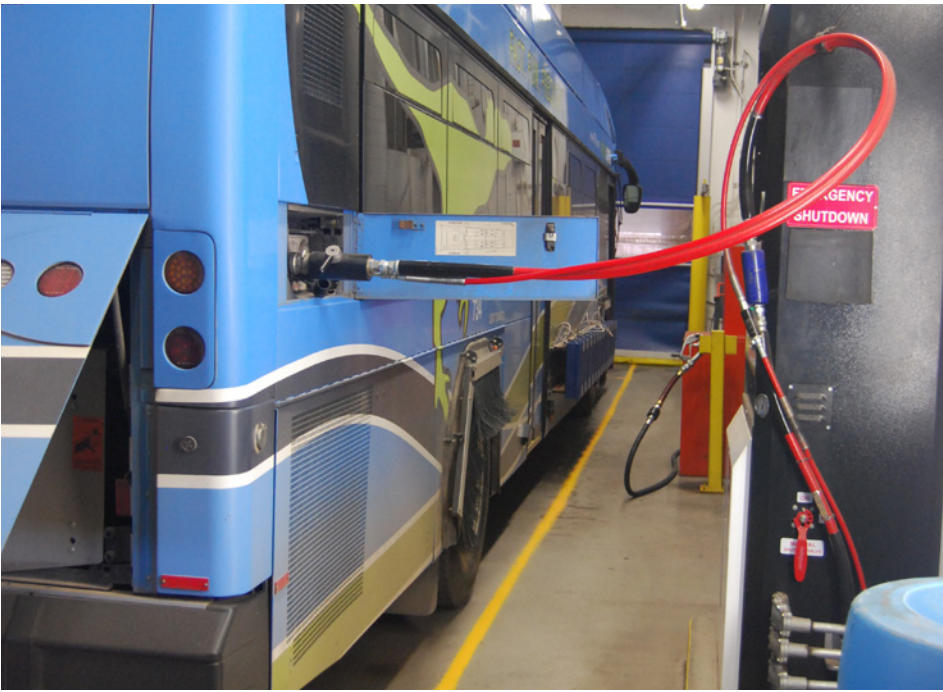
Succeeding with Natural Gas Vehicles in Subzero Temps

Up in the high terrain of the Colorado mountains, the Roaring Fork Transit Authority (RFTA) fleet navigates through snow, slick roads, and freezing temperatures four months of the year. Its buses also have to deal with frequent steep ascents. When RFTA made the decision to implement the nation's first rural bus rapid transit system in 2013, it welcomed the opportunity to put compressed natural gas (CNG) to the test.

This wasn't the first time RFTA had expressed an interest in natural gas. An early pioneer in the market, RFTA had purchased its first CNG bus in 1989—which struggled with numerous maintenance issues and did not prove successful. The agency didn't let that deter them, however. In the late 1990s, RFTA worked with engine manufacturer Cummins to determine if their new CNG engines could work in its service territory. At the time, Cummins and RFTA decided conventional diesel was the best fuel for the job, citing

hesitation about whether early CNG technology could perform in cold conditions because of the properties of pipeline natural gas in Colorado.

Almost 20 years later, RFTA decided it was ready to try again—this time, with new Cummins Westport engines designed for high altitude and low temperatures that were also more tolerant of the local natural gas composition. In just 18 months, the agency went from a blank drawing board to full-blown implementation of CNG. RFTA built a



new CNG fueling station, made extensive facility modifications, developed necessary training for technicians and drivers, and pushed 22 new CNG buses into service before the end of 2013.

“Based on what we heard from fleets who tried CNG in the past, we expected a fuel economy penalty, but instead we saw a significant improvement in fuel economy over the [older] conventional buses,” said Kenny Osier, RFTA’s director of fleet maintenance. “In fact, the CNG buses run as well as their diesel predecessors and provide the same torque and horsepower.”

To address operational challenges in the winter, RFTA also installed an indoor fast-fill CNG station and added engine block heaters to each bus. Though RFTA invested more money than anticipated to build and ensure code compliance and safety for its indoor fueling facility, the agency has found the modifications to be

worthwhile. With the indoor facility, the buses are able to warm to operating temperatures before encountering the winter weather. In less than two and half years, RFTA’s CNG buses have driven more than 3 million miles—a testament to the dependability of CNG in the transit industry and harsh conditions.

Initial performance results indicated a substantial 25-cent savings per mile when compared to diesel. In its first 12 months of operation, the RFTA fleet reported that it had saved more than \$362,100 in fuel costs and displaced more than 52,800 gallons of petroleum.

Natural gas vehicles (NGVs) can also thrive in cold weather freight applications. Convenience store chain

The Roaring Fork Transit Authority in Aspen, Colorado, installed an indoor fast-fill CNG station and added engine block heaters to each bus in order to warm engines to operating temperatures before encountering the winter weather. *Photo from Roaring Fork Transit Authority, NREL 34949*

Kwik Trip, a National Clean Fleets Partner (NCFP), operates in some of the coldest areas in the country, and has driven more than 20 million miles on natural gas.

“We were looking for an alternative to diesel that would allow our vehicles to operate in the same climates, at an equal or lower price, without any major interruptions to service,” said Carl Suhr, superintendent of fleet operations.

Kwik Trip’s advice for other fleets looking into operating NGVs in cold conditions? Take extra care when refueling the vehicles from an empty tank. To reduce the risk of O-ring leakage, introduce natural gas to the tank gradually. Additionally, train technicians early and often. “Operating NGVs in severe temperatures is no more problematic than operating diesel vehicles in the same conditions,” Suhr said. “There are different problems that come with each fuel, but similar solutions.”

For more natural gas maintenance and safety information, contact your local Clean Cities coordinator or visit the Natural Gas section on the AFDC (afdc.energy.gov/vehicles/natural_gas_maintenance_safety.html).

Convenience store chain Kwik Trip operates CNG fueling stations in Minnesota, Wisconsin, and Iowa. The company is a member of Clean Cities’ National Clean Fleets Partnership. *Photo from Saturn Lounge Photography, NREL 28496*





The City of Phoenix, Arizona, has operated CNG refuse trucks since 2010. Today the fleet includes 55 refuse trucks and is committed to an ongoing replacement schedule that promises to grow its CNG fleet. *Photo from The City of Phoenix, NREL 34948*

NGVs in Scorching Temps? Phoenix, Arizona, Says “No Problem”

Looking for a way to improve air quality and ensure reliability in its day-to-day operations, the City of Phoenix, Arizona, decided to give CNG a try in 2010. Today, the city has 55 CNG refuse trucks and is committed to an ongoing replacement schedule that promises to grow its CNG fleet.

To avoid issues with hot weather, Phoenix chose to install time-fill CNG stations. Time-fill made sense for the fleet, because as the rate of fueling increases, the temperature of CNG increases. When fuel warms up, it expands and becomes less energy dense. “With temperature swings from 60 to 115 degrees in summer, time-fill dispensers ensure that we are able to get more fuel per fill and extend vehicle range,” said Gregg Duckett, Phoenix’s public works operations manager.

ThyssenKrupp Elevator fuels more than 85 of its vehicles with propane nationwide, and in 2014, minimized its petroleum use by using 158,000 gallons of propane instead. The company has plans to operate 10% of its fleet on propane in the near future—about 300 vehicles—in Dallas, Sacramento, and San Francisco.

Photo from ThyssenKrupp Elevator

Another key to Phoenix’s success was the networking assistance they got from the local Clean Cities coalition.

“Valley of the Sun Clean Cities brought us together with other fleets and industry experts and proved highly instrumental in our success,” Duckett noted.

Propane Makes the Cut in Extreme Weather

As an industry leader in sustainability and a member of the NCFP, ThyssenKrupp Elevator makes alternative fuels one of its main priorities. As of April 2015, ThyssenKrupp operated 85 propane vehicles nationwide, and in

2014, minimized its petroleum use with 158,000 gallons of propane.

Tom Armstrong, ThyssenKrupp’s fleet director, encourages the widespread use of propane in his vehicles across the country. ThyssenKrupp has dedicated propane vehicles operating north to Vancouver, Washington, and propane vehicles operating as far south as Phoenix, Arizona. Armstrong says the vehicles run just as well as the company’s conventional vehicles with no issues. For hotter climates, Armstrong recommends that fleets work with suppliers to install fuel tanks inside the vehicles to reduce tank exposure to extreme heat on the ground.

“Propane is completely feasible in all climates,” he said. “With today’s updated sequential fuel injection technology, we don’t have any significant issues in extremely cold or hot weather. The on-board computer controls fuel injection and the new systems run seamlessly.”

Forest Service Champions Cold Weather Plug-In Hybrid Electric Vehicles

Custer Gallatin National Forest is doing its part to dispel the misconceptions about operating plug-in electric vehicles in freezing temperatures. Located on more than 3.1 million acres of forest in Montana and South Dakota, this national forest has successfully operated plug-in hybrid electric vehicles (PHEVs) since 2012.





Above: Custer Gallatin National Forest, located on more than 3.1 million acres of forest in Montana and South Dakota, has successfully operated PHEVs in its colder climate since 2012. *Photo from Custer Gallatin National Forest, NREL 34943*

Right: Cold-weather fleets across the United States have seen success running biofuels throughout the year, thanks to working with their fuel provider to ensure the right biofuel blend for their climate. *Photo from Southwest Research Institute, NREL 34968*



Perhaps one of the most outspoken proponents of the vehicles is Michael Donch, fleet and safety manager at the Custer Gallatin National Forest.

“Despite warnings that the PHEVs would become ‘garage queens’ in the winter, we’ve proven the opposite,” Donch explained. “Our vehicles are out every day, often in slick terrain and unruly weather, and we haven’t noticed any difference in drivability between the PHEVs and our old conventional vehicles. On top of that, we’re seeing about the same battery range in the winter as we are in the summer.”

Other fleets have reported a slight decrease in PHEV battery range in colder months, though the extent of this impact depends on outside air temperature and drive cycle.

When the Forest’s five PHEVs are not in use, they are housed in a parking garage where they recharge overnight using Level 1 outlets powered by rooftop solar panels.

Making Biofuels Fit for Winter Weather

When it comes to using ethanol or biodiesel in low temperatures, misconceptions are a dime a dozen. Yet the truth is that many fleets in colder areas of the country report very few issues running biofuels throughout the year. These successes can be attributed to fleets carefully considering the right biofuel blend for their climate and ensuring they use the industry standard for biodiesel, American Society for Testing Materials (ASTM) D675 fuel.

“E85 is widely available in Minnesota, and represents roughly 15% of the total fuel used in our light-duty vehicles,” said Paul Hanson, fleet director at the Minnesota Department of Administration. “While extreme temperatures are tough on any vehicle, we have not had issues using E85 in our fleet of about 1,625 flexible-fuel vehicles.”

Biodiesel can also be used in cold temperatures, but like ethanol, small measures should be taken to prevent engine issues. Specifically, to prevent fuel from

gelling when temperatures drop, fuel providers will often incorporate diesel with a cold weather additive. This keeps the cloud point of biodiesel low.

Stephen Russell, former fleet manager for the City of Keene, New Hampshire, and the current coordinator for Massachusetts Clean Cities, recalled: “In Keene, we ran diesel vehicles on B20 year-round and never experienced issues. Yes, biodiesel blends do sometimes need to be reduced in winter months to prevent fuel gelling, but all fuel types require some blend adjustments in the winter months, including diesel.”

As with the adoption of any new vehicle, fleets should carefully consider the best fuel for their application and climate. However, regardless of fuel choice, fleet managers around the country can be confident that alternative fuels are up to the job in even the most extreme temperatures and terrain. Further, as concerns about global climate change increase, fleets and the communities they serve can feel good about minimizing their greenhouse gas emissions, reducing their dependence on petroleum, and contributing to cleaner air in the process. ■

Coordinator Profile

Four Coordinators Help Save 63.6 Million GGE of Petroleum

Samantha Bingham, Carl Lisek, Lorrie Lisek, and Jonathan Overly became the latest inductees into the U.S. Department of Energy's (DOE's) Clean Cities Hall of Fame in September for their outstanding contributions to cutting petroleum use in U.S. transportation. National Director Dennis Smith and Co-Director Linda Bluestein announced the awardees during the annual Clean Cities Coordinator Training Workshop.

Connections, partnerships, and collaboration defined this year's Hall of Fame inductees. The four coordinators lead the Chicago Area Clean Cities, South Shore Clean Cities, Wisconsin Clean Cities, and East Tennessee Clean Fuels coalitions, respectively. Among their achievements, the groups have pioneered connections along new fuel corridors, forged strategic partnerships with alternative fuel stakeholders, and collaborated with each other to create regional training centers.

Through their combined efforts, their coalitions saved more than 63.6 million gasoline gallon equivalents of petroleum in 2014 alone. Their efforts in 2014 also averted more than 396,844 tons of carbon dioxide emissions, which is equal to removing 88,187 passenger cars from the road.

Working Together on Lake Michigan

Bingham, along with Carl and Lorrie Lisek, lead the Lake Michigan Consortium—a collaboration between the Chicago Area Clean Cities, South Shore Clean Cities, and Wisconsin Clean Cities coalitions. Created in 2007, the Consortium is made up of more than 500 member organizations. It serves a geographic population of more than 9.8 million people within 11 counties that hold non-attainment status for the U.S. Environmental Protection Agency 2008 Ground-Level Ozone standard.



(Front left to right) Coordinators Lorrie Lisek, Samantha Bingham, and Carl Lisek, receive their Clean Cities Hall of Fame awards in September from (back left to right) National Director Dennis Smith and National Co-Director Linda Bluestein. *Photo from Argonne National Laboratory, NREL 34720*

With more than 40 years of combined experience in the Clean Cities program, the Consortium works closely to provide support and technical expertise for stakeholders using or considering alternative fuel vehicles. The trio of coalitions also holds numerous outreach events and trainings aimed at educating the public, fleets, and automotive technicians in an effort to reduce petroleum use.

Together, the Consortium has established alternative fuel corridors along I-90 and I-94, as well as created alternative fuel hot spots in Chicago, Illinois; Milwaukee, Wisconsin; and Gary and South Bend, Indiana. The Consortium has also been highly successful at replicating each other's alternative fuel vehicle programs and creating training centers across all three regions.

Samantha Bingham—Chicago Area Clean Cities

Bingham's mark on the Windy City dates back more than a decade. Thanks to her strategic approach and perseverance, Bingham has carefully honed the coalition's reputation as the go-to resource for fleets, fuel providers,

community leaders, and other stakeholders seeking to secure and manage grants for projects to reduce their petroleum use.

"While Carl, Lorrie, and I collaborate through the Consortium to broaden our impact, I'm also extremely grateful for the work of our coalition's members," Bingham said. "We are making terrific progress in the six-county Chicago region to protect the environment. Our commercial fleet and municipality stakeholders in the coalition deserve the real praise for our successes."

Carl Lisek—South Shore Clean Cities

Since Carl Lisek signed on to lead the South Shore Clean Cities Coalition, his passion, undeniable charisma, and ability to forge relationships have helped propel the coalition into the program's top ranks. Among his various accomplishments, Lisek hosts *The Green Commuter*, a radio program highlighting local clean transportation activities. He also started the Northwest Indiana Green Fleet program, which aims to significantly improve the environmental performance of the region's business and government vehicle fleets through diesel retrofits and other strategies.

“Carl is a proven master at communication and connecting people. As a native of the Chicago area, I truly appreciate what he and the consortium are doing to keep our community clean and energy secure,” said DOE’s Clean Cities Co-Director Linda Bluestein.

Lorrie Lisek—Wisconsin Clean Cities

Lorrie Lisek has proven herself a crusader for embracing alternatives to gasoline and diesel. Her grit and sheer resolve have earned her the respect of colleagues, state and local officials, and fleets.

“Lorrie grew her coalition from just a few members to more than 80 members in 2015. She has a well-earned reputation for being able to organize events and obtain funding for coalition projects. The Consortium has made tremendous advances in alternative fueling infrastructure by growing the number of stations from 26 in 2013 to 308 in 2014,” Bluestein said.

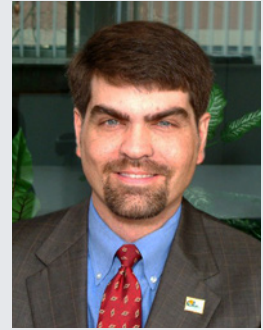
Putting Tennessee on the Map

When it comes to Clean Cities coordinators, Overly is a rare triple threat—possessing the right combination of determination, profound enthusiasm, and a dogged ability to identify how something can be done better and acting on it.

Overly was recognized as a transportation champion who has helped put Tennessee on the map by promoting alternative fuel adoption through strategic partnerships. Some of these efforts include facilitating statewide fuel discussions via natural gas and propane task forces and developing an educational biofuels webinar series. Additionally, he helped lead a sizeable truck stop electrification project to install 50 electrified heating, ventilation, and air conditioning-supplied truck spaces at a major travel plaza.

“Jonathan is a social guru who maximizes social media as part of his collaborative leadership,” said DOE’s Clean Cities Director Dennis Smith. “His list of accomplishments is long, and he’s especially skilled at identifying new partners and then strategically pairing those partners together to achieve petroleum reduction.”

Overly’s East Tennessee Clean Fuels coalition was also involved in creating the country’s longest biofuels corridor, which made it possible to travel from Sault Ste. Marie, Michigan, south to Miami, Florida, by refueling with either E85 or B20 the entire way. ■



Jonathan Overly, East Tennessee Clean Fuels

Coordinator/Staff Awards

Ohio Coordinator Honored for Inspiring Others

Fellow coordinators recently recognized Coordinator Sam Spofforth with the Benjamin Watson Inspirational Award for being a thorough, thoughtful, and compassionate mentor with a proactive approach to helping fellow coalitions meet their financial goals.

The award is presented annually at the Clean Cities Coordinator Training Workshop to the coordinator who provides inspiration and motivation to other coordinators and who strives to create a fun, engaging, and unified team spirit within the program. Spofforth, who helms the Clean Fuels Ohio Coalition, was chosen as this year’s award recipient for his mentorship in helping fellow coalitions establish effective dues systems and his leadership in organizing the Energy Independence Summit.

“Sam is a wonderful mentor,” said Kimberly Cline of Western Washington Clean Cities. “His guidance has helped make a seemingly daunting task more manageable and I’m grateful to have had the opportunity to learn from him.”

Former Triangle Clean Cities Coordinator Lacey Jane Wolfe added that Spofforth has provided unparalleled financial leadership through the Clean Cities mentoring program, where his dues guidance has become the go-to resource for coalitions who want to become self-sustaining. “Sam is helping the entire Clean Cities program by helping us all to reach our financial goals,” said Wolfe.



Sam Spofforth, coordinator of the Clean Fuels Ohio Coalition. *Photo from Rick Bennett, www.nearbennett.com*

The award is named after Benjamin Watson, a long-time coordinator of Kansas City Regional Clean Cities. Watson’s engaging personality and spirit left an indelible stamp on the Clean Cities program.

Coalition News



ARKANSAS

Patti Springs
Arkansas Clean Cities Coalition
arkansasenergy.org/arkansas-clean-cities

Arkansas Launches Natural Gas-Powered Buses and Refueling Station

When the central Arkansas transit authority, Rock Region METRO (RRM), began to consider switching its fleet to compressed natural gas (CNG), one of its first sources for advice was the Arkansas Clean Cities Coalition (ACCC).

Before RRM’s board of directors would approve the CNG transition project, they checked with a variety of sources, including ACCC, to ensure that the initial increased costs would be worth the investment. The coalition, backed by the Arkansas Energy Office, helped educate the board about transitioning to CNG and promised its support through the process. The Arkansas Energy Office also provided a \$100,000 grant for station infrastructure and equipment, which encouraged funding from RRM’s board. This led to the board’s approval of the transit authority’s alternative fuel vision and the initial purchase of 15 CNG-powered buses.

To prepare for the new buses, ACCC worked with the transit authority to identify contractors who could design, construct, and provide operation and maintenance of a CNG fueling station.

“This is a great opportunity for [Rock Region METRO] to continue to meet the needs of our customers with the fleet they deserve,” said Jarod Varner, RRM executive director and a strong champion of the alternative fuel project. “The transition to CNG reflects our commitment to remain environmentally conscious as we enhance our fleet.”



Rock Region METRO, the central Arkansas transit authority, operates 15 CNG-powered buses that provide public transportation services to the Little Rock metro area. *Photo from Arkansas Clean Cities Coalition, NREL 34689*

RRM opened its new CNG refueling station for full-time use in August in tandem with the transit authority’s first 15 CNG buses officially hitting the streets. The transit authority estimates that the initial transition to 15 CNG buses will save about \$341,838 in fuel costs per year. A plan is also under way to move the entire fleet to CNG within the next 10 years. That transition is likely to save RRM up to \$1,264,801 per year. Because the station has the capacity to fuel up to 55 buses in an 8-hour period, service employees can fuel buses overnight instead of during daytime service hours. RRM has also been able to save money due to the lower cost of controlling its own fuel supply.

“We strive to provide active support for partners interested in alternative fuels, and we help to connect them with financial resources—whether through a direct grant or innovative financing options,” said ACCC Coordinator Patti Springs. “We know this will greatly improve the likelihood that these types of projects will come to fruition.” ■



Rock Region METRO’S board of directors (left) celebrate the opening of the transit authority’s new CNG refueling station (below) in February 2014. *Photos from Arkansas Clean Cities Coalition, NREL 34682 and 34683*





MASSACHUSETTS

Stephen Russell
Massachusetts Clean Cities Coalition

mass.gov/eea/energy-utilities-clean-tech/alternative-transportation/clean-cities-coalition.html

Massachusetts Sees Significant Growth in Electric Vehicles and Infrastructure

In 2009, Massachusetts had seven electric vehicle (EV) charging stations located at a couple of hotels. Today, 134 charging stations span 25 towns and cities, bringing the state's number of individual charging units up to 800—with more on the way.

Stephen Russell, co-coordinator of the Massachusetts Clean Cities Coalition (MCCC) and alternative transportation program coordinator for the Massachusetts Department of Energy Resources (DOER), witnessed the state's EV evolution first-hand.

“Nissan approached us in late 2009 when it deemed Massachusetts an EV-friendly state due to the large number of hybrid electric vehicle registrations per capita,” Russell said. “Six months later, we sponsored a stakeholder meeting, including representatives from Nissan and a few charging station companies, and opened the meeting to anyone interested in learning about electric vehicles. Attendance was staggering—more than 300 people participated, many of whom took advantage of the opportunity to test drive an electric vehicle for the first time.”

Soon after, representatives from the state, along with a group of MCCC stakeholders, formed a task force to spur the region's budding EV market. The task force set out to secure funding for consumer rebates and to increase public acceptance via EV ride-and-drive events at workplaces across the state. The effort didn't stop there, however. The forward-thinking team went on to develop a plan designed to put 300,000 zero-emission vehicles (ZEVs) on Massachusetts roadways by 2025. This mandate is part of a broader effort also happening in California, Connecticut, Maine, Maryland, New Jersey, New York, Oregon, Rhode Island, and Vermont, which will require 15% of new vehicles sold within their borders by 2025 be ZEVs—about 4 million vehicles in about 11 years.

“Fast forward from 2009 to today and you'll see a very different EV landscape,” Russell added. “As of July 2015, more than 1,000 Massachusetts residents have secured rebates through DOER's Massachusetts Offers Rebates for Electric



This “free juice bar” at the Charles Hotel in Cambridge, Massachusetts, was one of the first electric vehicle charging stations in the state. *Photo from Massachusetts Clean Cities Coalition, NREL 34787*

Vehicles Program, dubbed MOR-EV, which offers up to \$2,500 to state residents who buy or lease EVs.”

Russell noted that a total of \$3.72 million is available to MOR-EV to increase the number of EVs on the road.

In addition to these rebates—which cover all-electric vehicles, plug-in hybrid electric vehicles, fuel cell electric vehicles, and zero-emission motorcycles—up to \$25,000 is available for workplace-based EV charging equipment through the Massachusetts EV Incentive Program.

MCCC has also partnered with the U.S. Department of Energy's Workplace Charging Challenge initiative to promote charging in the workplace and increase the convenience and affordability of driving electric. While many EV owners primarily charge their vehicles at home, Russell said that having access to chargers at work can nearly double a driver's all-electric daily commuting range. ■



Manufactured by NRG EVgo, this “charge while you shop” electric vehicle charging station is located at the South Shore Plaza in Braintree, Massachusetts. *Photo from Massachusetts Clean Cities Coalition, NREL 34663*



OHIO

Sam Spofforth
Clean Fuels Ohio

cleanfuelsohio.org

City of Cincinnati Turns Sustainable Fleet Plan into On-Road Reality

Clean Fuels Ohio (CFO), headquartered in Columbus, Ohio, has served as the go-to resource for assistance with implementing alternative transportation technologies in the region for 15 years. Dedicated to promoting the use of cleaner, domestic fuels and efficient vehicles, CFO has been working with the City of Cincinnati—one of its top stakeholders—on various projects since 2009.

CFO offers consulting services designed to help assess and recommend strategies for deploying alternative fuel technologies. By considering operational requirements, fuel costs, and return on investment, CFO works with fleets like the City of Cincinnati's to find the alternative fuel that best meets fleet needs while minimizing fuel costs.

“When we wanted to better understand all of the opportunities, we hired Clean Fuels Ohio to analyze our fleet—what we had, how we used it, how we fueled it—and to evaluate what options could lead us to a more sustainable fleet configuration,” said Larry Falkin, director of Cincinnati's Office of Environment and Sustainability. “Clean Fuels Ohio is not only a source of expertise in alternative fuel vehicles, but has also been a conduit for grant funding, which has really helped the transition to alternative fuel vehicles make economic sense for us.”

As part of their consultation, CFO performed a high-level fleet options assessment and feasibility study for all city vehicles. The coalition also created a detailed fleet replacement plan for the city, highlighting the cost savings and environmental benefits achievable through alternative fuel vehicles, efficiency technologies, and fleet management best practices.

To turn the plan into an on-road reality, CFO assisted the city in applying for

This propane-powered pickup truck is one of the alternative fuel vehicles in the City of Cincinnati's Parks Department fleet. *Photo from Clean Fuels Ohio, NREL 34660*



Cincinnati's Parks Department was able to add nearly 50 alternative fuel and advanced vehicles to its fleet, including this hybrid electric sedan, after partnering with Clean Fuels Ohio.

Photo from Clean Fuels Ohio, NREL 34661

several grants, which resulted in \$1,134,465 to support the deployment of alternative fuel vehicles and fueling stations. Thanks in part to its partnership with CFO, the City of Cincinnati was able to deploy 32 propane vehicles and 12 hybrid electric vehicles, in addition to building 2 propane fueling stations.

“We're thrilled we could support the City of Cincinnati and we look forward to continuing this partnership to further the fleet's goals for years to come,” said Sam Spofforth, CFO executive director. “With meaningful partnerships and strategic planning, we believe nearly every fleet can identify opportunities to improve overall cost-effectiveness and environmental performance.” ■



Intern Profile

Intern Holds Seat in Wisconsin's Smart Fleet Program, Oversees Cutting Petroleum Statewide

As a self-described guy “who’s always been into cars,” Tim Verbeke said it was a natural fit when he was asked to manage the Wisconsin Smart Fleet program. The program is a Wisconsin State Energy Office and Wisconsin Clean Cities (WCC) initiative that connects organizations to alternative fuel sources. In the Smart Fleet program, the name of the game is networking—bringing WCC members, participating fleets, and alternative fuel providers together. The smart fleet program is supported by a \$510,000 U.S. Department of Energy (DOE) project award—Forwarding Wisconsin’s Fuel Choice—and is designed to expand the alternative fuels market.

When Verbeke joined the coalition as an intern about a year ago, he said he didn’t know much about alternative fuel sources, let alone have their respective acronyms memorized. Now more than a year into the internship, he’s running laps around his former self. He frequently meets with coalition members and fleet representatives, coordinates outreach events, plans fundraising opportunities, and is half way through earning his master’s degree in urban planning from the University of Wisconsin–Milwaukee.

Verbeke says he’s not sure if he’ll stay in the transportation sector for the long term, but his experience working with Wisconsin Clean Cities has been hands down “the best internship” he’s had yet.

One of the advantages to interning with WCC was that he immediately began to fill the shoes of a former full-time employee. As part of his internship with WCC, Verbeke attended training on the Smart Fleets’ 27 fleets, dozens of alternative fuel sources, best practices, policies, and what kind of data he’d be working with. After two weeks of training from the coalition, he committed to becoming an expert himself.

“I do a lot of data gathering,” Verbeke said, describing his day-to-day responsibilities for the job. “I produce quarterly update reports based on an organization’s alternative fuel or regular fuel usage. I make updates to their fleet profiles in the system—any best practices that they use, any policies or initiatives that they implement, or any changes to onboard retrofits they might have.”

The Smart Fleet program is essentially a large network of local companies and organizations. They gain the advantage of using cleaner fuel sources and are able to market themselves as being more sustainable, in exchange for using the WCC logo on their Smart Fleet vehicles. Verbeke serves as a consultant to participating fleets—providing recommendations on different types of fuels, suggesting improvements, and getting fleet managers in touch with the right fuel providers.

“We’d like to have more engagement and involvement from our Smart Fleet program participants moving forward, so we’re always open to recommendations and suggestions,” Verbeke said. “We’re also using the data to identify anything that can further reduce participating fleets’ vehicle emissions or improve their fuel economy.”

In addition to running the show for the Wisconsin Smart Fleet program, Verbeke does many other tasks for the coalition. He spends time updating the WCC website (wicleancities.org/), attends outreach events like auto shows or the Milwaukee Sustainability Summit, promotes the sale of E85 for 85 cents per gallon at local gas stations, and even posts signs about ethanol around cornfields throughout the state of Wisconsin. If he’s not meeting with



Wisconsin Clean Cities Intern Tim Verbeke. *Photo from Tim Verbeke, NREL 34970*

WCC members or Smart Fleet representatives in person, he’s out and about somewhere, doing as much as possible to bring parties together and educate the public on alternative fuels.

“A big part of the program is networking, and we can provide the connections between fuel retailers and fuel end-users,” Verbeke said. “For example, if you’re looking to implement a certain fuel, we can provide expertise, as well as connect you with the resources and people to advise you on best practices for your fleet.”

Verbeke does all of this work for WCC while pursuing his Masters and coaching high school golf and basketball.

“This internship has taught me much more than a project or homework assignment could, because I’m getting out there and talking to people, bringing first-hand experiences back to class,” he said. “I think the program is important because there’s nothing else like it in the state of Wisconsin. We really pride ourselves on our ability to reduce petroleum, through both private and public entities, by helping them network with each other.” ■

Ask the Technical Response Service

Federal Emissions Standards: How Alternative Fuel Vehicles (AFVs) Must Measure Up

Q: What federal emissions regulations apply to on-road vehicles?

A: The U.S. Environmental Protection Agency (EPA) sets emissions standards by vehicle weight (see box). These standards cover air pollutants (carbon monoxide, formaldehyde, oxides of nitrogen, non-methane organic gases, and particulate matter) as well as greenhouse gases (GHGs) [such as carbon dioxide, methane, nitrous oxide, and fluorinated gases]. All vehicles are tested under controlled laboratory conditions using uniform test procedures.

EPA currently regulates the air pollutant emissions of light-duty vehicles (LDV) and medium-duty passenger vehicles (MDPV) through Tier II standards, which were phased in between model year (MY) 2004 and MY 2009. Tier II standards regulate not only the tailpipe emissions produced by the combustion of fuel, but also evaporative emissions, which result from fuel escaping during the fueling process.

EPA also regulates heavy-duty vehicle (HDV) air pollutant tailpipe and evaporative emissions. The most recent HDV regulations were phased in between MY 2007 and MY 2010.

To address GHG emissions (which are not addressed under Tier II), EPA's standards are coupled with the Corporate Average Fuel Economy (CAFE) standards enforced by the National Highway Traffic Safety Administration (NHTSA).

Phase 1 of this program affects LDVs and MDPVs of MY 2012–2016. These regulations are based on each original equipment manufacturer's (OEM) fleetwide average emission and fuel consumption requirement.

On the medium- and heavy-duty side, MY 2014–2018 vehicles must comply with the companion Phase 1 program for GHG and fuel economy standards. The HDV standards differ by vehicle type (combination tractor, heavy-duty pickup and van, or vocational vehicle). The heavy-duty pickup and van category works the same as the LDV and MDPV regulations, where each manufacturer has a fleetwide standard, while the other vehicle categories follow vehicle-specific standards.

Q: What's next for emissions regulations?

A: In March 2014, EPA finalized LDV and MDPV Tier III air pollutant standards for tailpipe and evaporative emissions, which will apply to vehicles between MY 2017 and MY 2025.

Phase 2 of the LDV and MDPV GHG reduction program and CAFE standards also begins to apply with MY 2017 vehicles. These regulations will be fully implemented by 2025. With its stricter regulations, Phase 2 will result in a 50% decrease in GHG emissions (as compared to MY 2010 vehicles).

EPA Weight Classifications

Light-duty vehicle: Any passenger vehicle, including light-duty trucks, up to 8,500 pounds (lbs.) gross vehicle weight rating (GVWR).

Medium-duty passenger vehicle: Vehicles between 8,501 and 10,000 lbs. GVWR that are only used for personal transportation (e.g., SUVs and passenger vans).

Heavy-duty vehicle: Vehicles weighing more than 8,500 lbs. GVWR or 6,000 lbs. curb weight, or more than 45 square-foot frontal area. This includes trucks, buses, and the engines that power them.

EPA and NHTSA are currently developing more stringent HDV Phase 2 GHG and fuel consumption standards. The agencies are expected to publish the final rule by January 2017. Those regulations will be relevant for vehicles between MY 2018 and MY 2027.

Q: What role do alternative fuels play in reducing emissions?

A: While the OEMs manufacturing AFVs continue to receive credits toward nationally mandated GHG standards, emissions regulations are fuel neutral. This means that all vehicles and engines must meet the same standards, whether they are conventional or alternative-fuel.

As emissions regulations grow stricter and conventional vehicle engine technology improves, emissions improvements associated with new AFVs, compared with new conventional vehicles, may not be as significant as they were previously. However, replacing older vehicles (which were not subject to current standards) with new conventional vehicles or AFVs can provide significant improvements. ■

Do you have any 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.

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DOE/GO-102015-4842 • December 2015

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.