

The West Virginia Division of Energy (WVDOE) is required by 5B-2F-2(f) of the *West Virginia Code* to submit an annual report to the Governor and the Joint Committee on Government and Finance. It requires that the report “shall relate to the division’s implementation of the energy policy and the activities of the division during the previous year” on or before the first day of December of each year. This submission addresses activities for the period Dec. 1-Nov. 30, 2015.

The WVDOE director also serves as chairman of the West Virginia Public Energy Authority (PEA) and administers the Office of Coalfield Community Development. The activities for the reporting period are addressed by energy resource as described “West Virginia Energy Plan 2013-2017”: fossil fuels, renewable energy and energy efficiency. This report will address each energy resource and the activities of WVDOE in supporting them.

## Fossil fuels

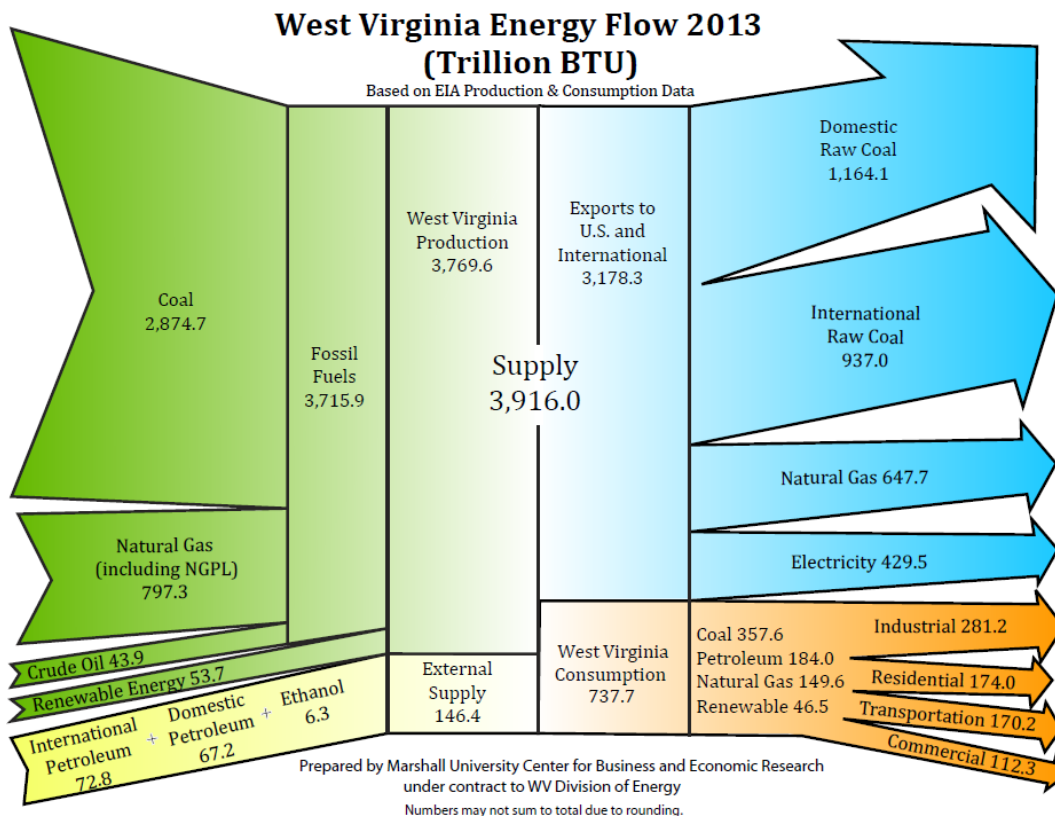
- West Virginia’s fossil fuels industry continues to face challenges from national initiatives to reduce coal-fired emissions. In 2015, Appalachian Power closed three power plants in response to the Mercury and Air Toxic Standards (MATS). Earlier, First Energy closed three of its plants that did not have low-NO<sub>x</sub> burners or SO<sub>2</sub> controls. In total, the MATS standards caused roughly 2,000 megawatts of West Virginia coal generation to close representing 18 percent of the state’s generation base. Within the PJM grid, MATS standards have caused roughly 25,000 MW within its 13-state region to close. Both utilities have engaged in transmission upgrades to accommodate these closures. West Virginia is now challenged with the carbon dioxide reduction requirements of the Clean Power Plan (CPP) promulgated by US EPA. West Virginia’s mass-based goal is a 29 percent CO<sub>2</sub> reduction from 2012 levels. This CO<sub>2</sub> reduction goal could roughly equate to the equivalent of 3,500 MW of coal-based power. WVDOE is working with the West Virginia Department of Environmental Protection (WVDEP) on assuring that any negative impacts are minimized. West Virginia has more than two years to formulate a response plan. One innovative solution to addressing CO<sub>2</sub> emissions is to claim West Virginia’s tree growth as a carbon sink. West Virginia is the third most-forested state in the nation after Maine and New Hampshire and harvests 150,000 acres of timber each year, roughly 2.5 percent of the state’s forest cover. West Virginia demonstrates sustainable forestry. West Virginia University estimates that state tree growth absorbs (sequesters) at least 10 percent of the CO<sub>2</sub> generated by West Virginia power plants. While the CPP as written by EPA does not recognize the benefits of terrestrial sequestration, given the relevance of tree growth to reducing the state’s CO<sub>2</sub> emissions, West Virginia is obligated to continue to support the relevance of this issue. EPA’s intention is to use the CPP to advance renewable energy and energy efficiency. While West Virginia will continue to support these energy resources, the state should not expect new renewable energy and efficiency programs to meet the state’s carbon reduction goals. Recently announced grid-scale solar, wind and hydro projects in West Virginia would total less

than 200 MW, less than 6 percent of the EPA goal. While the economic development potential of renewable energy and energy efficiency is appreciated, West Virginia's coal-based infrastructures is a national energy resource benefitting West Virginia and its markets. West Virginia's interest is in assuring that economic benefits associated with coal are maintained in the state's economy.

- Since its inception, WVDOE has coordinated annual Governor's Energy Summits. The summits are sponsored by the West Virginia Governor's Office and the West Virginia Department of Commerce and gather energy experts on a wide range of topics. In 2015, the ninth annual event, "West Virginia: A National Energy Resource," featured "Fossil Fuels: Backbone of the Energy Future," "West Virginia's Coal Future," "Electric Autos and West Virginia Energy," "Renewable Energy Resources and the Clean Power Plan," "Current State of the Natural Gas Industry in West Virginia," "Directional Drilling, Forced Pooling," "Pipeline Siting In West Virginia: An Uphill Battle – Even in an Energy Friendly State," "Governor's WV Commission on Oil and Natural Gas Industry Safety," "WVU's China Program," "Status of Coal: 2015," "Ozone Regulation and the Impact on West Virginia," "The Clean Power Plan: Determining The Path Forward for West Virginia," "Renewable Energy and Agriculture Demonstration Projects on Surface Mine Lands –2010 to Present," "Energy Service Contracting in WV," "ASHRAE 90.1-2010," "Propane Supply, Uses & Versatility in West Virginia," "Energy Efficiency," "Overview of EPA's Final Clean Power Plan Rule," "U.S. Energy Policy: A Consumer Perspective," and "Shale Hydrocarbon Resources and Developing Infrastructure in West Virginia."
- WVDOE co-sponsored the fourth annual TransTech Energy Business Development Conference hosted by the West Virginia University National Research Center for Coal and Energy (NRCCE). The conference promoted investment in new companies that can provide solutions to energy, environmental, and economic development challenges such as creating new jobs and more competitive industries. The conference featured 18 pitches, with 13 start-up companies representing five states (PA-6, WV-2, MD-2, TN-2, OH-1); and five commercializable projects representing three states (PA-2, WV-2, OH-1). Award winners include:
  - 1st Place Award to top-ranked company in finalists pitch session: Maven Machines, Inc., Pittsburgh, PA, Avishai Geller, CEO
  - Runner- Up Award for a high-ranked company in finalists pitch session: Lumishield Technologies, Inc., Pittsburgh, PA, David Luebke, CEO
  - Runner Up Award for a high-ranked company in finalists pitch session: Multi-functional Proppants, Euclid, OH, Andrew Sherman, CEO
  - TTE Alumni Fund Award: Mosaic Power, Fredrick, MD, Laurie Vaudreuil, CEO
  - Appalachian Regional Commission (ARC) Technical Assistance Award for a deserving company based in an ARC county: H Quest Vanguard, Pittsburgh, PA, George Skoptsov, CEO and president
  - WVU Research Office Technical Assistance Award for a deserving company to work jointly with a WVU research group: Hadron Technologies, Inc., Knoxville, TN, Stan Morrow, CTO
  - INNOVA Award for highest ranked WV-based start-up company: Fairmont Brine Processing, Fairmont, WV, Brian Kalt, general manager

- Scott Rotruck Award for a company or project best exemplifying a “0 to 1” innovation: General Graphene, LLC, Oak Ridge, TN, James Vig Sherrill, CEO
  - In-Kind Arnett Carbis Toothman Technical Assistance Award to set up Quick Books Accounting/Information Systems for a designated awardee: One Oak Systems, Pittsburgh, PA, Jacob Kring, Project Lead
  - In-kind Robert C. Byrd Institute Technical Assistance Award for engineering/ design/prototyping/fabrication assistance and services: Carbon Free Innovations, Athens, OH, Randall Gabriel, project CTO
  - Crowd Choice Awards for audience favorites: Pitch Session 1: PixController, Inc., Export, PA, Bill Powers, founder & CEO; Pitch Session 2: Sustainable Dental Products, Morgantown, WV, Madelyn Harwell, CEO; Pitch Session 3: Mosaic Power (Fredrick, MD) Laurie Vaudreuil, CEO, and Lithium-Sulfur Batteries, Morgantown, WV, Trina Waffle, Project CMO; Pitch Session 4: Maven Machines, Inc., Pittsburgh, PA, Avishai Geller, CEO
- WVDOE is the energy emergency liaison between the state of West Virginia and DOE. In this capacity, it attends DOE conferences and participates in state and federal training sessions. WVDOE serves in an advisory role to the West Virginia Division of Homeland Security and Emergency Management (WVDHSEM) on energy supply/energy shortage issues. WVDOE maintains a contact list of wholesale petroleum marketers in West Virginia. This has proven valuable in identifying available suppliers in emergencies and obtaining region-specific price and supply data. To remain current, WVDOE staff attended a USDOE/NASEO Energy Emergency Risk Assessment Workshop in Denver, CO, in April 2015.
  - WVDOE continues to work with development prospects advancing coal-to-liquids and coal-to-gas projects. Innovative natural gas technologies are also surfacing. As reported last year Trans Gas has refocused its proposed coal-to-liquids project. The business plan is now to evaluate the markets and costs associated with producing ammonia-based fertilizer from West Virginia natural gas. Product markets and financing remain issues. The project intends to retain southern West Virginia as the plant location. Assistance to Trans Gas is provided on an as-needed basis. Development assistance continues to be provided to coal-to-liquids projects; however, developers have not made these projects public. Coal has the potential to produce liquid fuels of higher environmental quality than petroleum. Coal-derived diesel fuel has lower particulate content than petroleum-produced diesel. Coal-derived diesel burns at a lower temperature than petroleum-derived diesel, reducing NOx emissions. Developers of coal-derived diesel reference the health benefits of producing liquids from coal. Low oil and natural gas prices and generally unstable markets have prevented advanced fossil fuel technologies from entering the marketplace.
  - The Center for Business and Economic Research (CBER) at Marshall University continues to support WVDOE goals to advance West Virginia’s energy resources. In early comments on the CPP, CBER assisted WVDOE in quantifying the realistic opportunities from West Virginia’s existing renewable energy and energy efficiency resources. An early estimate on the job impacts of the CPP predicted employment losses approaching 4,000 by 2030. Given the substantial drop in natural gas prices, it

would be impossible to completely isolate the two impacts, although it is clear today that federal efforts to restrain coal use are hurting West Virginia's economy. The Energy Blueprint at [www.energywv.org](http://www.energywv.org), first prepared by CBER in 2013 to document West Virginia's contribution to meeting national energy needs, continues to quantify and illustrate natural gas and electric transmission assets. CBER is updating this document. CBER created energy flow charts for the state of West Virginia for 2005 to 2013 detailing energy production by resource, exports by resource and consumption by sector. As embodied in the 2013 chart below, "West Virginia Energy Flow 2013 (Trillion BTU)", West Virginia remains one of the cornerstones of domestic energy production. Energy-consuming states should be more supportive of energy-producing states such as West Virginia, a national energy supplier. West Virginia has major energy customers at its borders. Virginia, Maryland and Ohio, three of West Virginia's border states, are some of the most energy-dependent states in the country. West Virginia is No. 3 in the amount of net electricity put into the electric grid. Only Pennsylvania, Alabama and Illinois put more electricity into the grid than West Virginia. Augmenting the nation's baseload coal power with natural gas and renewables will require extensive new infrastructure but unprecedented low energy prices impart increased relevance of existing energy infrastructure. West Virginia urges due diligence by the federal government on the CPP's impacts on grid reliability. It remains to be seen whether permit approvals will be timely in an era of overt hostility to energy developments. WVDOE joins West Virginians who remain committed to ensuring that West Virginia energy resources fuel the nation.



**The Office of Coalfield Community Development's (OCCD) activities for the period are as follows:**

- The OCCD reviewed 25 permits, consisting of nine original notification letters requiring community impact statements (CIS) to be filed. The office approved 16 new and updated CIS plans during the period. This number includes amended CIS submissions for changes made to the original.
- The OCCD continued a contract with Rahall Transportation Institute (RTI) to develop Land Use Master Plans for Preston, Kanawha, Barbour, Braxton, Randolph, Mineral, Taylor, Ohio, Harrison, Mason, and Lewis counties. All have been developed and approved by each of the 10 counties. The OCCD worked with directors of each of the 10 economic development authorities to review and personalize the plans to meet their individual county's needs.
- The OCCD works with the Hatfield McCoy Trails system to identify property located on reclaimed mine sites for future development opportunities as well as other tourist-based industries.
- The OCCD works with RTI to develop site marketing plans for Wayne, Lincoln, Boone, Mingo, Logan, Wyoming, Raleigh, McDowell, and Mercer counties. The group identifies reclaimed mine sites in various coalfield counties to help market to potential site selectors and/or developers.
- The OCCD works with the Land and Mineral Owners Association to review and suggest recommendations regarding potential development opportunities on surface-mined lands.
- The OCCD met with local economic development authorities in the designated coalfield counties. A review of projects included residential, industrial, commercial, and business development use of surface-mined properties.
- The OCCD is actively working with the W.Va. Agriculture Commission to utilize post-mine lands throughout the state for agricultural and business opportunities.
- The OCCD worked in conjunction with Marshall University to implement WVDOE's grant from the Appalachian Regional Commission to promote agricultural and renewable energy development on surface-mined lands. In one of these projects, OCCD worked with the Clay County Economic Development Authority and the WV National Guard to develop an economic development program to revitalize the "Golden Delicious Apple" brand in Clay County.
- The OCCD attended and participated in two annual meetings (legislative and fall conference) of the W.Va. Economic Development Council.
- The OCCD participated (as an ex-officio member) in quarterly meetings of the National Coal Heritage Area Board of Directors.
- The OCCD attended monthly Corridor G Development Authority board of directors meetings.
- The OCCD attended and participated in the planning of the annual 2015 Miners' Celebration.
- The OCCD attended the 2015 Bluefield Coal Show.
- The OCCD participated in the 2015 CEDAR Program, a weeklong event to promote coal education and scholarship opportunity.

- The OCCD participated in the WV State Brownfields' Partnering Planning meeting.
- The OCCD attended the annual 2015 West Virginia Coal Association Conference.
- The OCCD worked with Commerce Communications to manage notifications utilizing the office's website and local newspapers where mining activity is indicated within the Community Impact Statements (CIS). This adheres to the legislative requirements of public notice.
- The OCCD participated in the 2015 Leadership Southern Academy. This included sessions in Boone, Lincoln, Logan, Mingo, McDowell, and Wyoming counties.

#### **2016 action report goals:**

- Work with local economic development authorities in the designated coalfield counties that have the opportunity to engage coal companies to develop land or leave infrastructure. Those projects include residential, industrial, commercial and business development use of surface-mined properties.
- Facilitate meetings with Boone County Economic Development Authority and Patriot Coal Company regarding the Hill Fork site in Boone County for future land development use.
- Work with other county development authorities or land owners that have current mining operations with large infrastructure and building investments within the county to ensure those resources remain in place after mine closure.
- Work with 10 coalfield counties to develop/update Land Use Master Plans by providing pertinent information. Counties include Brooke, Clay, Grant, Greenbrier, Marion, McDowell, Raleigh, Upshur, Wayne, and Wyoming.
- Work with the Corridor G Regional Development Authority as well as other county development authorities in Boone, Lincoln, Logan and Mingo counties to recruit, expand and develop economic development projects along the 119 Corridor to create opportunities for that region of the state.
- Work with RTI to develop marketing plans in Mason, Kanawha, Clay, Fayette, Nicholas, Greenbrier, Webster, Braxton, Upshur, and Lewis counties.
- Coordinate site visits for interested developers on bond-released sites where potential projects can occur, such as Bull Push, Indian Ridge Industrial Park, Mingo Industrial Park and sites identified along Corridor G, the Kanawha River and the Monongahela River.
- Work with the W.Va. Department of Transportation, local representatives, coal operators and/or land owners to further promote development of the Coalfield Expressway and King Coal Highway along the proposed routes.
- Explore and promote tax incentives for development on post-mined lands.
- Work with the W.Va. Department of Agriculture to explore agriculture development opportunities on post-mined lands.
- Work with the W.Va. National Guard to explore opportunities to utilize post-mined lands for training exercises.
- Work with Clay County Economic Development Authority to develop the "Golden Delicious Apple" brand in Clay County.
- Continue participation with the National Coal Heritage Area Board to promote coal history.

- Continue participation with the planning efforts of the annual Miners' Celebration group, which provides a yearly recognition to individuals or groups in the mining industry.
- Continue participation with the W.Va. State Partnering group, which meets annually to understand the upcoming goals/activities of the U.S. Army Corps of Engineers.
- Continue working with the WV Manufacturing Extension Partnership (WVMEP) and Southern W.Va. Community and Technical College to fund an extension agent to identify/assist manufacturers in Logan, Mingo, Boone, Lincoln, McDowell, and Wyoming counties.

## Renewable energy

- WVDOE works with the WVU Division of Forestry (DOF) and the hardwoods industry on utilizing West Virginia hardwoods as an energy resource. Wood pellets, co-firing of wood and coal, combined heat and power systems for kiln applications, bio oil from wood and residue-fired power plants have been promoted at wood focused conferences. Energy from wood remains relevant, especially in residential and small commercial applications. WVDOE has supported an annual survey of primary and secondary wood producers from West Virginia and adjacent counties in neighboring states to maintain a listing of wood residues available for resale. WVU DOF makes this information available to the industry. West Virginia's three wood pellet manufacturers add to the diversity of the state's energy production and produce pellets for regional markets. Wood pellet use has been on the agenda of the Governor's Energy Summit and was a focus of a Morgantown conference. Wood pellet use in the European Union has provided a strong regional market. Through a collaboration with West Virginia's timber industry and WVU, WVDOE has supported planting hardwood trees on surface-mined lands. Funded through the Appalachian Regional Commission (and referenced earlier in this report), these projects add to the diversity of West Virginia's forest resources. Typical plantings are 20 acres or less.
- For the past several years West Virginia has had two wind projects with exempt wholesale generator (EWG) permits from the West Virginia Public Service Commission (PSC) but had not begun construction. One project, New Creek in Grant County, was recently sold by AES, the owners of the existing Laurel Mountain project in Randolph/Barbour counties, to Everpower, a wind developer. The 98 MW project will include up to 49 wind turbines on an approximate 5,000-acre area. The project will be located along a ridgeline used as recreational land with a point of interconnection located onsite. Current plans will utilize a turbine at 78-meter (256 feet) hub height and will include a single project access road and underground collection located on top of the ridgeline.
- West Virginia's first grid scale solar project has been submitted for EWG approval to the PSC. This project is a 5.9 MW system at Sam Black Church in Greenbrier County. The developer, Solar Thin Films (STF) led by Jim Solano, plans two additional projects in West Virginia as well. Solano's West Virginia partner is from Summersville.
- Advanced Hydro Solutions is advancing two new hydro projects in West Virginia, one at Jennings Randolph Lake and the other at the Tygart Dam. Both of these sites are Army Corps of Engineers' installations. The project at Jennings Randolph Dam is on the North Branch of the Potomac River. The license for 14 MW project was issued at the end of March 2012. The second project is on the Tygart Dam, which is in the FERC licensing process. The final license for this 30 MW project is expected in early 2016.



## Energy efficiency

- In collaboration with Marshall University's Center for Business and Economic Research (MU/CBER), WVDOE sponsored "Expanding Energy Efficiency in West Virginia" May 21 in Charleston with 75 in attendance. Presentations included "Energy Efficiency Efforts at the State of West Virginia," "Energy Efficiency at Koppers," "Energy Efficiency Projects at The Homer Laughlin China Company," "Take Charge Appalachian Power," "Renewable Energy Systems & Energy Efficiency Improvements Program," "Building Residential Energy Efficiency in West Virginia," "Expanding Energy Efficiency in Buildings," "The Problem of Plugs," "Combined Heat and Power," "Expanding Energy Efficiency in WV: Appalachian Power," and "Expanding Energy Efficiency in WV: Energy Efficiency West Virginia." Presentations may be found at <http://www.wvcommerce.org/info/publications/energy/reports/default.aspx>.
- WVDOE assisted the WV Home Builders Association in providing 13 2009 IECC training workshops to 132 building professionals throughout West Virginia. WVDOE also worked with the WV Fire Commission codes committee this year, as it considers adopting 2015 I-codes.
- Through the W.Va. Manufacturing Extension Partnership (MEP) 70 professionals, including engineers, have provided hands-on technical assistance to 13 manufacturers, retailers, and other commercial entities this year, conducting energy audits and carbon footprint studies. Estimated potential savings through these projects are more than 3,426,051 kWh and \$171,300, encompassing more than 4,378,600 ft<sup>2</sup> of building area.
- WVDOE is also working with MEP and Southern W.Va. Community and Technical College (SWVCTC) to form a partnership to support an MEP industrial extension service agent to be placed at SWVCTC. This agent will identify/assist manufacturers in Logan, Mingo, Boone, Lincoln, McDowell, and Wyoming counties.
- Through the Industrial Assessment Center and the WVU College of Industrial and Management Systems Engineering, WVDOE supports energy assessments for West Virginia businesses meeting certain energy use criteria. This year, assessments were performed at SIMEX, Simonton Inc., Wilson Lumber, Braskem, Skana Aluminum, Terramite Inc., Gilco Lumber, Continental Brick Co., Columbia Flooring, and Automated Packaging Systems, with recommended energy savings totaling 5,595,380 kWh and potential in energy cost savings of \$842,596. These energy assessments also provided learning opportunities for WVU students. In the past, the program has performed energy assessments at Homer Laughlin China and Steel of West Virginia, two of West Virginia's largest employers.
- Through a partnership with the College of Mechanical and Aerospace Engineering (MAE) at West Virginia University (WVU), graduate engineering students provide technical assistance to businesses and organizations while getting real world training and experience in the Projects With Industry program. During the SEP program year ending Oct. 31, 2015, 20 students participated in seven energy audits, an urban renewal project and an alternative refrigerant study for manufacturers, commercial establishments, school districts and municipalities. Estimated potential savings through these projects is more than 2,000,000 kWh and \$400,000, encompassing more than 600,000 ft<sup>2</sup> of building area.

## Transportation

- A U.S. Department of Agriculture Biofuel Infrastructure Partnership Grant to West Virginia in the amount of \$2.5 million will expand the use of ethanol blends through the installation of 107 dispensers at 22 fueling stations throughout the state.
- In November, the U.S. Department of Energy re-designated WVDOE's West Virginia Clean State program (WVCS) as one of nearly 100 Clean Cities coalitions nationwide. The program is assessed for re-designation every three years.
- WVCS program partnered with the WV Department of Education (WVDE) in a propane school bus demonstration. Over the three-week demonstration, drivers for Kanawha County Schools got hands-on experience with school buses powered by propane. The demonstration showed that a propane bus is \$702 cheaper to operate annually than a diesel bus with a payback on the incremental cost of 11 years. If the expected life of a bus is 13.5 years, counties could realize \$1,755 savings per bus by switching to propane. Two county school systems, Monongalia and Wood, purchased propane-powered school buses this year.
- WVDOE partnered with WVU's National Alternative Fuels Training Consortium (NAFTC) to host natural gas and propane workshops in the state. The first, July 15, 2015, as part of the WV Association for Pupil Transportation Conference, provided approximately 100 school transportation directors with an overview of propane for use in school buses. A second workshop, July 30, 2015, in partnership with Ryder, offered presentations on preparing for gaseous fuels, and applicable codes, standards, laws and incentives. The workshop ended with a tour of a newly completed Ryder facility.
- Motorweek came to West Virginia to film a segment on the state's CNG fueling corridor along Interstate 79 that aired Jan. 17 on PBS and Jan. 27 on Velocity.
- WVCS presented at a W.Va. state agency fleet coordinators' workshop on benefits of choosing alternative fuel vehicles. The state of West Virginia's vehicle fleet currently includes 21 compressed natural gas (CNG) vehicles, 2,843 flex fuel vehicles that can use E85, and 14 hybrids.