

It's Time to Recharge

2019 Energy Issue

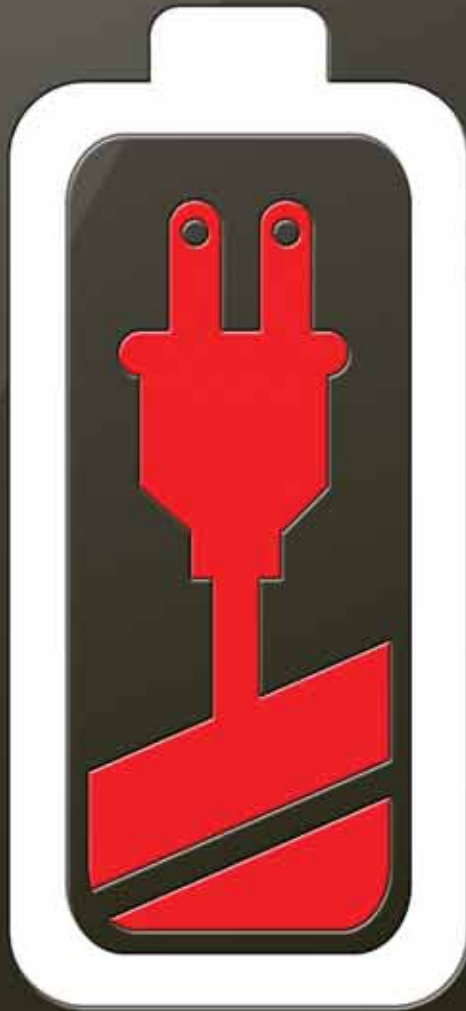
Inside:

A history of energy production in Virginia

Why storage is the green energy problem to solve

Expert information on municipal net metering

And more!



NATIONAL
SAFETY
MONTH
2019

**SAFETY
FIRST**



June is National Safety Month. Members of the Virginia Risk Sharing Association (VRSA), formerly VML Insurance Programs, have access to a variety of risk management resources and services designed to help develop and nurture a safety culture in their organizations. These include:

- **Accident Review & Assessments:** Accident review; OSHA; slips, trips and falls; machine safeguarding; physical site inspections; emergency response plans; and more.
- **Program Development:** Safety rules; employee safety handbook; safety manual; safety committee; OSHA compliance; policies & procedures; and more.
- **Safety Training:** Active shooter; OSHA 10-hour outreach training; OSHA recordkeeping; hazard awareness; OSHA at a glance; confined space; hazard communication; silica; trenching; lockout/tagout; and more.
- **Supervisor Training:** Fraud prevention; pooling 101; personal liability awareness; hazard awareness; managing safety and culture; incident investigation; safety meetings and communication; workplace violence; sexual harassment; and more.
- **Other Services:** Flood exposure assessments; property appraisals; interview panel; contract review; HR consulting; communications consulting; public safety consulting; and more.

This is in addition to online courses offered at **no additional cost** through the **VRSA Online University** and the **VRSA Public Safety Academy**. Courses are offered in the areas of public safety, public works, defensive driving, parks and recreation, human resources, school safety, law enforcement, fire/EMS, and more.



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About the cover

It's been a year since we looked at energy, so it's time for a recharge! Keeping the lights on can be complicated, expensive and, well, electrifying. Complicated, because a modern power grid is a multi-faceted network in need of constant monitoring and upkeep. Expensive, because producing and distributing energy takes advanced equipment and smart people to run it. Electrifying, because so many new, exciting things are in the works for power in Virginia. Find out more inside this issue.

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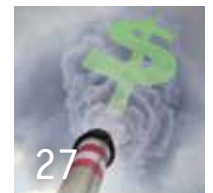
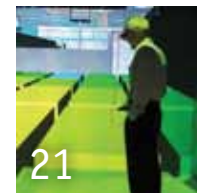
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#VBstrong

JUNE BEGAN TRAGICALLY as Virginians across the Commonwealth reeled from the mass shooting in Virginia Beach that occurred on May 31. In the days and weeks that have followed, organizations such as the United Way of Hampton Roads have done admirable work organizing fundraising efforts for those affected by this horrific event. VML and our members stand with our colleagues in Virginia Beach as they cope with the aftermath. As announced, Governor Northam's special session on gun control will begin on July 9.



In mid-May the National League of Cities was kind enough to invite Sean Polster, Council Member from the Town of Warrenton and member of the VML Executive Committee, and myself to the NLC Capstone Leaders Forum. This meeting addressed the topic of Legacy Cities and included the Cities of Lansing, MI; Waco, TX and Rochester, NY, just to name a few. Leaders from those cities attended the meeting and talked about their efforts to revitalize their cities. Here are a few of the projects being undertaken by municipalities around the country that I found particularly impressive:


I sat next to Dana Miller, the Director of Development Services from the City of Rochester and learned that his sister is a reporter on WTVR Channel 6 right here in Richmond! He told me how Rochester recently filled in an unused "ring road" to create development and greenspace areas. The city describes the project like this: "Through the Inner Loop East Transformation Project, the City of Rochester, NY is reimagining its street network by putting people and place before cars. Thanks to a federal TIGER grant and broad support from the community, Rochester is converting an outdated urban expressway into a walkable, bikeable Complete Streets boulevard. The project

reconnects the neighborhoods once divided by the expressway and works toward achieving the goals set forth in the city's Complete Streets ordinance and Master Plan."

Waco, TX is the setting for the increasingly popular TV show "Fixer Upper." As the show and its featured business owned by the Gaines family has gained notoriety, the family sought to expand its operations in Waco. It became imperative that the city support their entrepreneurship. By working with Baylor University and community economic groups, the city began to provide financial encouragement to startups in Waco. The city council also talked about creating a constant and consistent vision.

"Lansing SAVE" (Student Accounts Valuing Education) is a partnership between the City of Lansing School District and the MSU Federal Credit Union. Every student entering kindergarten in the district is provided a bank account that can be funded in various ways over the years of that student's education. The funds can then be used for post-secondary education or skilled trade training programs. Of course, kids, parents and others can add to the accounts at any time.

After the NLC event, I then attended a meeting of the Municipal Electric Power Association of Virginia (MEPAV) – a group of 16 localities that operate electric utilities. VML has worked with this group for many years and it is fascinating to learn about the issues that affect municipal electric groups. I spoke to the group about broadband and wireless in Virginia. Another discussion concerned mutual aid and the logistics of handling a power outage (i.e. making sure crews get rest in a safe place, food, clean water and understanding what type of electric system they are working on, etc.) Awards were given to localities that assisted each other during power outages last year – it is inspiring to hear how willingly our neighbors help each other during tough times. Thank you to the MEPAV members for their outstanding dedication and service in Virginia!

Finally, VML's Legislative Committee held their first meeting on June 6. I am excited for them to continue their legislative work for the 2020 session. Please keep an eye out for *eNews* so that you can find out what the potential legislative issues may be! 



VML connects you with a variety of networking and professional development events. Learn about these opportunities at vml.org/events.

- Aug. 8** **Virginia Energy Purchasing Group Association (VEPGA) – Board Meeting**
Henrico County Administration Building, Henrico, VA
- Aug. 15** **Municipal Electric Power Association of Virginia (MEPAV) – Board Meeting**
Charlottesville, VA
- Sept. 21 – 24** **Virginia Building and Code Officials Association (VBCOA) – Annual Conference and School**
Hilton Oceanfront, 3001 Atlantic Ave., Virginia Beach, VA
- Oct. 5 - 8** **Virginia Mayors Institute & Virginia Municipal League Annual Conference**
Hotel Roanoke & Conference Center, 110 Shenandoah Ave. NW, Roanoke, VA
- Oct. 23 - 24** **Municipal Electric Power Association of Virginia (MEPAV), Engineering and Operations Workshop**
The Inn at Virginia Tech and Skelton Conference Center
- Nov. 7** **Virginia Energy Purchasing Group Association (VEPGA) Board Meeting**
Henrico County Administration Building, Henrico, VA



Registration now open for attendees and exhibitors at www.vml.org.



Hogan, Sandridge join VML's staff



Brendan Hogan has been appointed the Database and Systems Administrator for VML, effective June 3. Hogan most recently was the Coordinator of Information Systems and Technology at the MathScience Innovation Center. Prior to that he worked with the Virginia Community College System. Hogan has a Bachelor of Science degree in computer information systems from Western Governors University and a Master of Arts degree in liberal studies from Hollins University.

George Sandridge has joined the VML staff as an intern for the summer. He recently graduated from Virginia Tech with a bachelor's degree in political science and a minor in History. During the summer, he will be working with the policy team on issues relating to local governments. In addition to working with the VML staff, Sandridge is a councilmember for the Town of Keysville and a member of the Charlotte County Planning Commission.



Stehle receives George Mason award



Fairfax City Council Member, **Jon Stehle**, has received George Mason University's 2019 Jack Wood Award in the government category. This award is given to members of the university and community, individuals and groups, as well as government, businesses, and not-for-profits who demonstrate leadership in fostering mutually beneficial relationships between the university and the community during the past year. Stehle also serves as chair of the City Section for VML and is a member of the league's Executive Committee.

Jack Wood, former Mayor for the then-Town of Fairfax, was the driving force for arranging a campus to be located on land adjacent to the town and deeding it to the university, thus beginning the town-gown relationship between the university and the community.

Richardson named manager in Charlottesville

Dr. Tarron J. Richardson took the helm as city manager in the City of Charlottesville on May 13. Richardson has served as the city manager of DeSoto, TX since 2011, and as assistant city manager in that city before that.



- Richardson - Richardson began

his local government career as an intern in the City of Richmond. He was the project manager of council relations for the city manager in Richmond and was later appointed as the assistant for legislation and the deputy director of the Utilities Department. Following that he was the assistant city manager in Coatesville, PA.

A standout on the basketball court, Richardson earned a bachelor's degree from Lincoln University. He also holds a master's degree in education from Temple University and a doctorate in public policy and administration from Virginia Commonwealth University.

Kensinger, Garrett tapped in Winchester



- Kensinger -

City Manager Edn Freeman has appointed Winchester Fire and Rescue Assistant Chief **Scott Kensinger** as the City's new full-time Emergency Management (EM) Coordinator. She also has appointed **William A. Garrett** as the Fire and Rescue Chief in the city.



- Garrett -

Kensinger began his career in fire and rescue as a volunteer and after two years was hired as a career firefighter by the City of Winchester in 1995. Kensinger has an associate degree in architectural design, a bachelor's degree in fire science and is currently working toward his master's degree in emergency management.

Garrett is a 30-year veteran of the Fire and Rescue Department in Fairfax County. He began his career as a volunteer in the department but later came on board as a career firefighter. He served in a variety of key positions including operations deputy chief. He has a bachelor's degree in foreign language from George Mason University and an associate degree in administration of justice from Northern Virginia Community College.

EMS management coordinator earns top honor

Allison Farole, the Charlottesville/Albemarle County/University of Virginia Emergency Management Coordinator, was named the Emergency Management Professional of the Year by the Virginia Emergency Management Association during a meeting in Newport News in March. The Warren E. Trent Individual Achievement Award is given annually to an emergency management leader who exemplifies high principles of community preparedness and personal dedication to the safety of local citizens.

Finz, Semmes come on board in Hamilton

Two experienced managers who had retired have taken part-time positions in the Town of Hamilton. **Sam Finz**, who retired from the town of Lovettsville, will serve as a project specialist in Hamilton. **Martha Semmes** is serving as the zoning administrator.



- Finz -



- Semmes -

In addition to serving as the town manager in Lovettsville, Finz was a senior planner in Fairfax County, and a city manager in Hollywood, FL and College Park, MD.

In addition to working for the town of Hamilton, Semmes is working part-time as the interim town administrator in Round Hill. She formerly served as the town administrator in Middleburg. She has worked for six of the seven towns in Loudoun County, as well as for Loudoun County.

Emporia appointments announced

Emporia City Manager William E. Johnson, III has announced the appointments of

Alton Mason, Interim Public Works Director and **Melvin Prince**, Interim Public Utilities Director. Mason has worked for the City of Emporia since April 1991 and has served in the capacity of Street Maintenance Supervisor since March 2006. Prince has worked with the City since September 1989 and has served in the capacity of Wastewater Treatment Plant Superintendent since November 2013.

Both appointments are a result of the retirement of two long-term employees: Royal Jones, Director of Public Works, and Linwood Pope, Director of Public Utilities.

Armitage retires from Fairfax



Louise Armitage, the City of Fairfax human services director who established the Human Services Office in 1989, has retired. Armitage worked on programs involving housing affordability, land use, housing displacement, emergency services, and emergency preparedness. She worked with elected officials, city staff, and various commissions — most notably, the city’s Commission for Women.

Armitage also organized cultural festivals, emergency preparedness seminars, and special programs focusing on history, human trafficking, and domestic violence. She also served as an ombudsperson for the city’s financial contracts with Fairfax County, and helmed the city’s Legislative Program.

Nelson recognized by Virginia State Bar

Lynchburg At-large Council Member **John Randolph “Randy” Nelson** has been awarded the General Practice Section’s Tradition of Excellence Award by the Virginia State Bar. The award recognizes a Virginia lawyer who “embodies the highest tradition of personal and professional excellence in Virginia, enhances the image and esteem of attorneys in the commonwealth, and has devoted significant amounts of time, efforts, and/or funds to activities that benefit their community.”



Debby Hudgins, Virginia Legal Aid Society pro bono coordinator, stated that Nelson was one of the original lawyers to

volunteer when the VLAS was founded in 1991, and that he has closed over 30 cases for them. Nelson also has donated his time to the Lynchburg Lifesaving Crew, the Lynchburg Historical Foundation, Interfaith Outreach, and the Lynchburg Community Loan Fund, in addition to his volunteer work for VLAS.

Schaeffer named town manager



Brandie Schaeffer has been appointed the town manager in Warrenton. Schaeffer had been serving as the interim town manager since January. She had been the community development director in Warrenton and had served on the planning commission. Schaeffer also had worked as a consultant in the private sector.

Schaeffer has a bachelor’s degree in public administration from Texas State University, and a master’s degree in urban planning from Virginia Tech.

Belyea appointed as Shenandoah assistant

Mandy R. Belyea will assume the position of Assistant County Administrator in Shenandoah County in July. She has been the deputy town manager for Woodstock since 2016. Her professional experience also includes serving as the director of finance in Shenandoah County from 2014 to 2016 and as Woodstock’s Director of Finance from 2006 to 2014.

Belyea has a bachelor’s degree in business administration from Bridgewater College and a master’s degree from Virginia Tech. She is a Certified Public Accountant.

Lawrence tapped as Dayton manager



Angela Lawrence has been appointed as the town manager in the Town of Dayton. She will be leaving her current position as the town manager in Chase City on July 3.

- Lawrence - Lawrence’s previous experience includes serving as the executive director of several non-profit organizations, including the Virginia Breast Cancer Foundation. She was a member of the town council in the Town of Ashland between 2000 and 2006, where she served as the vice mayor and mayor.

Lawrence has a master’s degree in business administration from the University of Texas and a bachelor’s degree from Kansas State University.

Povar retires from Institute of Government. Continues in a consulting role



Tedd Povar, who has worked for the Virginia Institute of Government since 1996 has retired from his full-time position effective this past March. Povar is continuing to work part-time as a consultant. He previously served as the city manager in Greencres, FL, and Emporia, VA.

Povar has a master’s degree in public administration from the University of North Carolina at Chapel Hill and a bachelor’s degree in political science from Lake Forest College in Lake Forest, IL.



In memoriam

Constance Wynn, a former member of the Town Council in Blackstone and a former schoolteacher in Lunenburg County, was one of four persons who died May 29 as a result of a vehicular accident. She and other members of a church in Blackstone were in a church van that was rear-ended by a truck. She served on the council from 1987 to 2010 and was one of the first black women to be elected in Blackstone.



ACROSS OUR GREAT VA

A three-way blind interview series conducted via email that seeks to remind our readers that wherever you go in the Commonwealth, you find connections that make us all Virginians.



Sheila Olem is the vice-mayor of the Town of Herndon. She's no fan of long approval processes but is most definitely a fan of local wrestling and football.



Joseph K. Goodman is a council member of the Town of Pulaski. He is a good guy to have around during a gas leak emergency but won't help with your speeding ticket (so don't ask).

VTC: What's something you get asked a lot as an elected official?

Sheila: Can you fix my speeding ticket?

Joseph: When do I get to meet Miss Julia? (my nearly 9-month old daughter)

VTC: Joseph, let's pretend I lived in Pulaski and asked you to "fix" my speeding ticket. What would your response be?

Joseph: I am sorry, but I can't do that nor would I. My best advice for your situation would be to consult an attorney and plead your case before the judge in court.

VTC: Sheila, what does your family think of you being vice mayor and serving on council?

Sheila: My family is very supportive. When my sons were very young, I served on county and town land use boards and commissions. After they were both out of high school, I ran and was elected.

VTC: What is the most unusual question or request you've received as an elected official?

Sheila: Can you help me find a property for my business to buy?

Joseph: My mom won't leave the house and I smell gas. You are on town council and I think she will listen to you. Can you convince her to leave? (Shortly after the tornados hit, residents smelled gas around some homes and the people left. However, one person couldn't be convinced by her family to leave. I was nearby so when they recognized me, I was asked to help. It worked.)

VTC: Joseph, what's the best public resource in Pulaski for businesses that want to purchase property?

Joseph: Start by talking with Nichole Hair, our deputy town manager, who coordinates community development. She will be able to connect you with the best resources and advise on zoning.

VTC: Sheila, as a council member do you feel that some residents give more weight to your words (even on topics not related to local government)?

Sheila: Yes, they often do. I try to be very thoughtful in conversations with citizens. Frequently, citizens feel the council has much more power than we do. When County issues arise, I try to guide them to the appropriate contacts to get assistance.

VTC: When you were new to the role, what did you find most surprising about the job?

Sheila: I was surprised at just how long it takes to get projects done.

Joseph: What amazed me was how slow, purposely slow, government functions are.

VTC: Joseph, can you give me an example of a project that took a lot longer than you thought it would?

Joseph: The West Main Development project; we did not know how complex historic tax credits were when the project started. This has caused the project to go on for over six years. The good news is we are close to completion.

VTC: Sheila, if you could speed up one aspect of how local government functions, what would it be?

Sheila: Have an Emergency Approval Process for the homes and business buildings in the Heritage Preservation District. After damage from storms, high winds, etc. occurs, the owner must file paperwork with the town to get on the agenda for a public hearing. The owner needs to secure the property until the hearing is held before work can begin. Currently the whole process can take a couple of months.

VTC: What's your favorite kind of question to be asked by members of your community?

Sheila: How can I help or get involved?

Joseph: (June through August) Am I going to see you at the Pulaski Yankees game tonight?

VTC: Joseph, what's the best way for a resident to help local government or get involved?

Joseph: Come to a Town Council meeting, meet your elected officials and ask questions. That is how I got started. If there is a board or committee that they are interested in serving on, I am happy to get more information for them and see if there is an open seat available.

VTC: Sheila, are you a fan of any local sports teams?

Sheila: Yes, the Herndon High School wrestling and football teams! My sons were involved in these sports at Herndon High and I continue to follow them. We lost my sons' dad when they were very young, so having positive male role models (the coaches and wrestling dads) was a big influence on them. Truly, it takes a village to raise children.



Women in Public Service Conference scheduled

MARK YOUR CALENDARS now for the Women in Public Service Conference, to be held Sept. 19-20, 2019 at the Hampton Roads Convention Center. The conference will be hosted by the Hampton Fire & Rescue Department. This year's conference theme is "People, Purpose & Passion: Partners in Progress." Registration for the conference opens Monday, July 15. Learn more at <https://hampton.gov/wips> or at the WIPS Facebook page at www.facebook.com/WIPSConferenceember.

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River City wins Telly Awards for social media

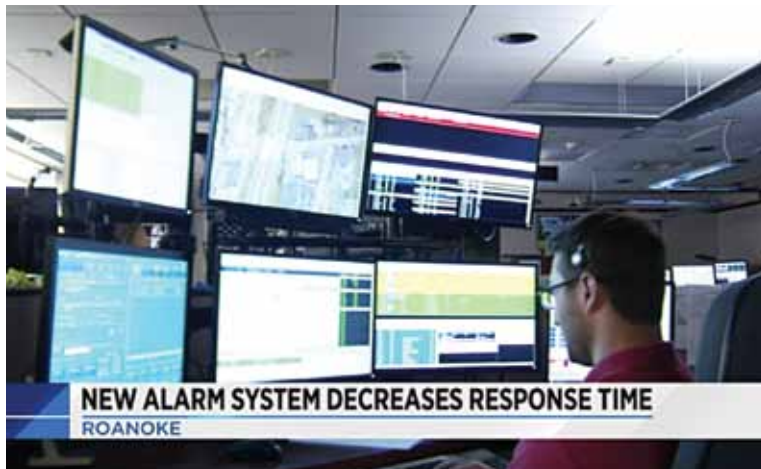
RIVER CITY TV'S LIVE video coverage of the tornado that touched down in Danville this past April has been named "Best Use of Live Video" in the Social Media category in the 40th Annual Telly Awards. The City's Government Access Channel also received an award for "Best Use of Social Video" in the general news and information category.

The Telly Awards honor excellence in video and television and is judged by leaders from video platforms, television, streaming networks, and production companies, including Vice, Vimeo, Hearst Digital Media, BuzzFeed and A&E Networks.

River City TV is the City's government and educational access channel which in recent years has expanded its operations to include a large social media presence with close to 20,000 followers on Facebook.



Roanoke E911 center launches automated secure alarm protocol



THE CITY OF ROANOKE E911 Center is now using an Automated Secure Alarm Protocol (ASAP) system that provides for the direct exchange of information from alarm companies to the 911 Center, allowing calls to be received electronically without the need for a dispatcher to take the information over the telephone. This improves accuracy and reduces the overall time it takes for the call to be dispatched for police and fire units to respond. The city currently receives automatic alarm notifications from eleven alarm monitoring facilities.

ASAP is part of the new Motorola Solutions Premier One Computer Aided Dispatch (CAD) system. The city's E911 Center is the first public safety answering point (PSAP) in southwestern Virginia with this technology.

For more information, please contact Sonya Roman, the City's E911 Manager, at 540-853-2945 or at sonya.roman@roanokeva.gov

Climate Monday workshops take place in Albemarle

ALBEMARLE COUNTY is holding a series of workshops designed to educate the public on strategies to reduce community-wide greenhouse gas emissions and to weigh-in on what strategies could work well in the county.

The "Climate Mondays" are designed to facilitate information sharing and gain input from the public as part of the county's preparation of a climate action plan. The weekly workshops, which began in early May and run through July 29, are held in the County Office Building. A full list of meeting dates, topics, and descriptions can be found at the County Climate Action webpage. You can also visit www.climateactiontogether.org to learn about climate-related activities of the City of Charlottesville and the University of Virginia.



Roanoke region, Chesapeake are getting the dogs out

THE ROANOKE REGIONAL CENTER for Animal Control and Protection recently announced its new Roanoke Adventure Dogs program, which pairs members of the community with shelter dogs for field trips. Outings can last from one hour to all day, and can include a hike, a walk on local greenways, a trip to the lake, a sleepover in a home or even a trip to pet-friendly shops.

The Roanoke Adventure Dogs program was created in order to help reduce kennel stress and provide dogs with enrichment and increased visibility. Outings give the shelter staff valuable insight on how the dogs behave outside a shelter environment. It's also a great excuse to spend a day doing something new or exploring the Roanoke Valley. RCACP is one of 100 shelters nationwide that is participating in the Arizona State University/Virginia Tech Maddie's Nationwide Fostering Study to learn about the effects of fostering for shelter dogs and the shelters themselves.

The City of Chesapeake is asking members of the community to participate in the Snout and About Field Trip Fostering Program with shelter dogs. The program will give dogs the opportunity to spend time exploring the world around them outside of the shelter. A trip to the park, a nice lunch at a dog friendly restaurant, or a relaxing drive around town are just some ideas for those wishing to take a shelter dog Snout and About!

The program is designed to make participation easy. No prior experience is necessary, and participants will be provided with everything they need for a successful field trip. This program will continue year-round during normal operating hours.



City unveils health care center for employees

THE CITY OF DANVILLE, in partnership with CareTeam, unveiled in May a concierge-style health care center to provide city employees and their spouses and dependents on the city's health plan with high-quality primary care. The CareTeam Corporate

Health Center will offer acute and episodic care, health coaching, chronic disease management, telemedicine, and laboratory services.

According to a city media release, Danville Mayor Alonzo Jones said "The center will provide City of Danville employees and their families with more convenient access to care and better help them achieve their personal health goals — all while better managing the City's overall health costs. This is a win-win situation for employees and the City, and that is why City Council supported this initiative." Further, Danville City Manager Ken Larking said that the city anticipated incremental annual cost savings by managing the health of city employees.

OneDigital, the City's benefit advising firm, partnered with the City to conduct a competitive bid process for an onsite or near-site health and wellness center provider. CareTeam was selected as the best option for the City based on experience, business model, and the variety of services it provides. The City received 11 proposals.

Same-day appointments will be available to active city employees and spouses and dependents on the health plan, with shorter wait times and 20- to- 30-minute appointments.



Danville City Manager Ken Larking discusses the health care center.

Arlington County park system earns high honors

WHEN IT COMES TO PUBLIC park systems, Arlington's ranks near the top among the nation's 100 largest cities. That's according to the Trust for Public Land's ParkScore® index, which once again ranked the County fourth on its list.

The Trust for Public Land ranks the 100 largest U.S. cities for park access and quality. Analysis is based on four important characteristics of an effective park system: acreage, investment, amenities and access. Scores for each category are presented out of 100 points, and cities can earn a maximum ParkScore® of 100.



SOVA Innovation Hub to open in South Boston

MID-ATLANTIC BROADBAND Communities Corp. (MBC) and Microsoft Corporation recently announced a partnership to build the SOVA Innovation Hub in South Boston. According to the town's website, MBC will invest over \$5 million to build the

Hub to help meet its growing need for office space. Microsoft, through its TechSpark initiative, will use the space to encourage innovation and spur economic opportunities

in the region. The facility will also bring together local nonprofit organizations from throughout Southern Virginia to offer programming for digital skills education and workforce development. The new building will be located on the site of a former tobacco warehouse built in the 1900s that was destroyed by a fire in 2002. It will include a mixture of offices, co-working spaces, collaborative work areas, event and training spaces, and technology showcase areas.

Microsoft will use the SOVA Innovation Hub as a base for its TechSpark Virginia efforts. In addition to offering access to technology, it will use the center as a convening space to leverage regional partnerships to offer programming, workshops and events that encourage entrepreneurship and expand digital skills and career pathways in the area.



Microsoft, through its TechSpark initiative, will use the space to encourage innovation and spur economic opportunities

in the region. The facility will also bring together local nonprofit organizations from throughout Southern Virginia to offer programming for digital skills education and workforce development.

Williamsburg offers Neighbors app

THE WILLIAMSBURG POLICE Department has joined the free Neighbors app by Ring to provide the community with real-time, local crime and safety information. The Neighbors network already has millions of users and has been instrumental in catching package thieves, stopping burglaries, and keeping neighborhoods safe.

City residents can text from their smartphones to download the Neighbors app and can join their neighborhood; share crime and safety-related videos, photos and text-based posts; and receive real-time safety alerts from their neighbors, local law enforcement and the Ring team.



Virginia Beach to host Cadet Challenge

THE VIRGINIA BEACH Police Department is accepting applications for the 2019 Virginia Beach Police Cadet Challenge. This week-long program is designed for 10th through 12th grade students who have an interest in law

enforcement and would benefit from training in a police recruit academy environment. The program will be conducted at the Virginia Beach Law Enforcement Training Academy and will be

structured similarly to the police academy. Physical fitness will be part of the program and cadets will participate in each day's physical training session.

Course instruction will be provided by veteran law enforcement officers, police executives, and other public safety subject matter experts in a variety of topics including how to become a police officer, situational awareness for personal safety, police discretion, CPR training, first responder skills/scenarios, physical fitness and self-discipline, team building and problem solving, and problem-based learning exercises. The course will be held from July 15 through July 19.

Arlington County recognized as fittest city in the US

ARLINGTON COUNTY HAS BEEN named the fittest city in the U.S. according to the American College of Sports Medicine's American Fitness Index®. The index celebrates healthy, active lifestyles and encourages city leaders to enact policies and make system changes to promote these behaviors.

Other cities in Virginia ranking in the top 100 include Virginia Beach, Richmond, Norfolk and Chesapeake.

The Fitness Index focuses on three strategies to support healthy active lifestyles: Demonstrate the health, social, and economic benefits of physical activity as well as the policies and infrastructure that promote healthy behaviors; inspire city leaders and residents to recognize and celebrate the factors that contribute to their city's culture of health and fitness; and expand local capacity and partnerships to implement policy and infrastructure changes to enable physically active lifestyles for all residents.

The Fitness Index is more than an annual ranking of cities. Since 2011, the Fitness Index has provided direct assistance and support to cities needing help to improve their residents' health. This tailored support helps city leaders identify opportunities for improvement and to create plans for implementing changes.



Pulaski hosts Revitalization Revival conference

THE TOWN OF PULASKI recently hosted Revitalization Revival: A Big Tent Approach to Preservation. Revitalization Revival was a two-day conference held at various historic locations throughout the Town. Nationally recognized speakers delivered remarks on a variety of topics with the overarching message of preserving Southwest Virginia's historic resources.

Conference sessions focused on historic preservation and addressed several key sub-issues including how local cultural and economic assets influence the ability to focus on preservation and vice versa. In addition to multiple sessions, conference goers could participate in walking tours of downtown Pulaski as well as a preservation trade show.



Governor recognizes Building Safety Month

GOVERNOR RALPH NORTHAM issued a proclamation declaring May as Building Safety Month in Virginia at a ceremony held May 29 at Virginia Commonwealth University. Pete Mensinger, president of the Virginia Building and Code Officials Association and Special Projects Manager with the City of Alexandria represented VBCOA at the presentation. Other local officials included in the presentation were Tom Clarke, Prince William County Building Construction Inspection Branch Chief representing the Virginia Plumbing and Mechanical Inspectors Association; Paula Johnson, City of Fredericksburg Building Maintenance Official and Treasurer of the Virginia Elevator Safety Association; and Christina Jackson, City of Norfolk Codes Team Leader and President of the Women in Code Enforcement and Development of Virginia. Dignitaries with the state also attended.

require each code change proposal submitted to include a “resiliency statement” indicating whether the proposal will increase or decrease resiliency and how. In addition, there will be a strong focus on building technology and innovation, as well as increasing energy efficiency in buildings.

In addition to presenting the proclamation on May 29, Governor Northam also recognized high school and college students who received scholarships through the Building Safety Month Essay Contest. VBCOA, which is an affiliate organization of VML, cosponsors the essay contest, which highlights Building Code Safety Month and the importance of building and fire safety.

The essay contest is an outgrowth of the High School Technical Training Program or HSTTP. In 2014, VBCOA focused on succession planning and worked with the Virginia Department of Education to accept a Certification of Achievement Program

offered through the International Code Council (ICC). The HSTTP is now underway at 26 participating career and technical schools along with high schools and community colleges enrolled in the program. Virginia is a national leader in enrollment in the HSTTP, which prepares high school students for careers in code enforcement and the construction trades.

VBCOA is a statewide organization of building safety professionals dedicated to the protection of the health, safety, and welfare of all persons who live, work, or visit the Commonwealth of Virginia. VML staff member Sandra Harrington serves as executive director.



Building Safety Month is a public awareness campaign offered each year to help individuals, families and businesses understand what it takes to create and sustain safe and sustainable structures. Founded by the International Code Council, Building Safety Month is celebrated in May by jurisdictions worldwide. The campaign reinforces the need for adoption of modern, model building codes, a strong and efficient system of code enforcement and a well-trained, professional workforce to maintain the system.

Jurisdictions across the Commonwealth were asked to adopt proclamations about building safety month and events were held as well to inform the public about building codes and building and fire safety.

Virginia is beginning its three-year code development cycle for the 2018 Virginia codes, and the code development process will



(L-R) Tom Clarke, Paula Johnson, Pete Mensinger, Gov. Ralph Northam and Christina Jackson.

Time to recharge

Shining a light on energy in Virginia



Tesla reads by the light of his "magnifying transmitter" in his Colorado Springs laboratory, circa 1900.

DESPITE NOT BEING from Virginia, Nikola Tesla was a pretty smart guy. In fact, because of his innovations in the use and storage of energy, some say he was "the man who invented the 20th century." His relationship with electricity reputedly bordered on the mystical. According to some accounts, Nikola once nearly shook

down his own building with a small device that added wave energy to the structure by vibrating at a specific frequency. Realizing that his invention could cause large structures to crumble, he destroyed it with a hammer (because sometimes old tech is the best) and instructed his employees to claim ignorance as to the cause of the tremors.

He also invented the Tesla Coil, which produced wireless energy that could power a light bulb if grounded in proximity to the coil – for example, by being held in his hand. This was in the 1890s, so he was most certainly ahead of his time (way, way ahead).

Tesla would not be surprised to learn that we now spend much of our day consuming electrical energy. We are surrounded by it. We carry it with us in our cell phones, bask in its glow while watching shows at the end of the day and (increasingly) expect it to get us from point A to point B with zero stops at gas stations and fewer stops at charging stations. We rely upon it to keep us warm in the winter and cool in the summer. But, most of us rarely stop to consider, as Nikola Tesla did, what a wonderful, strange and immensely profound thing energy really is. Consider the following:

- In the average home, around 75 percent of energy is consumed when home electronics are powered off (remember, a modern television still consumes power when it's "off").
- A single lightning bolt unleashes the same energy as blowing up a ton of TNT.

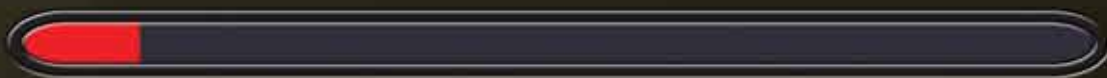
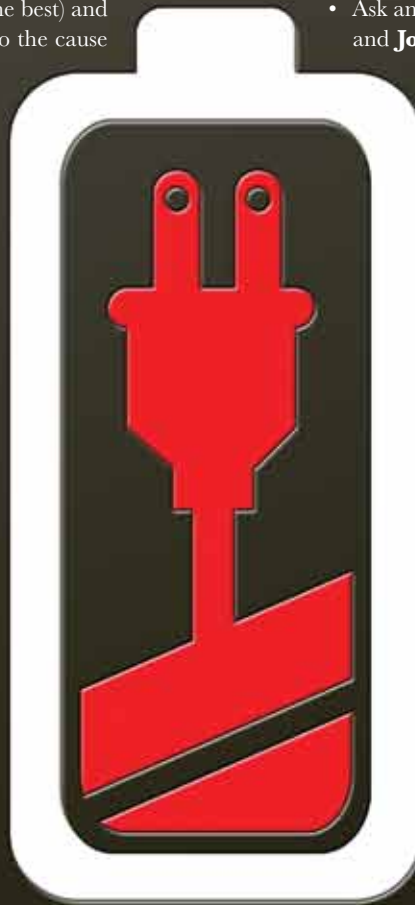
- On a hot summer afternoon, California consumes the entire output of two large nuclear reactors.
- If a person screamed for 8 years, 7 months, and 6 days, he or she would produce enough energy to heat one cup of coffee.

The contributors to this issue of Virginia Town & City have taken the time to consider energy. Specifically, energy in Virginia: where it's been, what it means and where it's headed.

- Who, what, when, where, and why? To understand why we produce energy the way we do now, we must first understand how we got here. **Preston Bryant** from McGuire Woods Consulting catalogs the history of energy production in Virginia.
- The future is now. **Harry Godfrey**, executive director of Virginia Advanced Energy Economy (AEE) explains what "advanced energy" means and where in Virginia it is being used.
- Ask an expert: Municipal net metering. **Robert Perrow** and **John Walker**, partners from the law firm Williams Mullen who specialize in issues related to energy, have the answers.

- A story of four reactors. **April Wade**, executive director of the Virginia Nuclear Energy Consortium Authority, outlines the history of nuclear energy in the Commonwealth.
- No solar power when the sun ain't shining. No wind power when the breeze ain't blowing. **Jim Regimbal** from Fiscal Analytics explains why the "green revolution" won't get started without finding an effective way to store energy.
- Why are local governments spending their time passing resolutions about federal-level energy legislation? Facility Dynamics Engineering project engineer **Emily Irvine** explains why carbon fee & dividend is causing a stir.
- Energy affiliate news and updates. **Sandra Harrington** reports recent developments with MEPAV and VEPGA.

We hope you enjoy this issue of *Virginia Town & City*. Remember, Nikola Tesla may have invented the 20th century, but it remains to be seen who will invent the 21st.



Electrifying Virginia: Over a century of progress to make our lights burn brighter

ELECTRIFIED AMERICA BEGAN in the late 1880s when small direct current power systems began lighting downtowns and factories. Early on, it was just a few city blocks that could be lit, and power was transmitted over wires for only a few miles.

Over the following few decades, however, the story changed. Significant advances were made in direct and alternating current, and more coal-fired steam plants and hydroelectric dams were built to power whole towns and cities. Major factories were powered, too, producing more goods and employing more people. Power plants also were built in some remote areas, but more for particular industries, such as mining, than for homes.

The story of American progress in the 20th century is the story of electricity – how it advanced in technology to meet the demands of a growing population and power our economy, and how all that improved the lives of Americans.

Water and coal came first

The same is obviously true for Virginia and its citizens. Electricity powered our urban areas first, notably Richmond and Norfolk, which after the Civil War had become important industrial centers and were critical hubs for railroads moving coal from West Virginia to the ports.

The earliest power was hydro. Dams powered mills and factories in towns and cities along rivers. Some mill dams were converted to hydroelectric power stations or new ones were built in their place. Virginia's rivers also became sites for coal-fired power stations, where water was turned to pressurized steam to spin turbines and create electricity.

Indeed, when we think of Virginia energy, we think of Southwestern Virginia coal, which for more than a century has fired not only Virginia power plants but many across the United States and around the world. But it wasn't Appalachian coal that was first mined in Virginia. In fact, there are three areas in Virginia with coal deposits: The Eastern Coalfields (mostly Chesterfield County), the Valley Coalfields (Roanoke, Montgomery, Pulaski, and Wythe counties), and the abun-

dant Southwest Coalfields (mostly Wise, Buchanan, and Dickenson counties).

In the early 18th century, Col. William Byrd recorded seeing coal deposits along the James River near Manakin and by mid-century coal mining began, first in the Richmond basin and soon in the Valley Coalfields. While Southwest Virginia had the largest deposits, it wasn't until the late 19th century that railroads reached the area, the mines developed, and the coal could easily be transported to the hubs in Roanoke and Richmond and from there to Hampton Roads.

Trains and electricity follow the same track

Railroads and electricity have an intertwined history. Some railroads got into the electric power business in the early 1900s when they began phasing out steam locomotives for electric ones. Railroads began building overhead electrification (catenary) systems in urban areas to run streetcars and in some mountainous regions so locomotives could have more power to traverse the difficult terrain.

In 1909 the Virginia Railway and Power Company (VRPC) was born and just two years later began operating Norfolk's streetcars. It bought a Norfolk gas company that same year. In 1925, VRPC began operating the Richmond streetcar system and changed its name to the Virginia Electric Power Company (VEPCO). That same year it acquired the Petersburg

Power Company and began expanding its electric service territory. VEPCO is, of course, today's Dominion Energy.

Electric locomotives, charged by railroad-built power stations, were at work in western Virginia as well. In 1913 Norfolk & Western electrified about 25 miles of track near Bluefield, with a small coal-fired station in West Virginia powering it. In the early 1920s, the Virginian Railway built more than 130 miles of an electrification system from the West Virginia coalfields through the rugged mountains to Roanoke. The railroad built its own coal-fired power station in the Town of Narrows.



Municipal electric takes off

As Richmond and Norfolk were growing, other towns and cities across Virginia were, too. And to bring power more efficiently to their citizens, a few localities began getting into the electricity business. In fact, several municipal electric utilities were established even before the turn of the 20th century. Danville's electric utility began operations in 1886. Franklin and Salem established their utilities in 1892. Virginia Tech set up its electric utility in 1893, Front Royal in 1894, and Bedford in 1899.

Today, there are 14 town-owned electric utilities in Virginia. Two other entities – an electric authority and a state agency – also own and operate electric utilities. Collectively they serve almost five percent of Virginia's population. They range in size from Wakefield's 500 customers to Danville's 42,000.

These utilities provide retail electric service to their customers over distribution systems – mostly poles and wires – that they own and operate. Some utilities generate electricity that provides a portion of their power. All of them buy power to fill their customers' needs, either from Dominion, Appalachian Power, the Tennessee Valley Authority, or plants operated by American Municipal Power. The federal Southeastern Power Administration sells a limited amount of power to 12 of the state's municipal electric utilities from the hydro facilities it operates in Virginia.

Power comes to the countryside

From the 1880s to the 1920s, most American towns and cities were powered, but rural America was not. Private-sector electric companies claimed they could not afford to string transmission lines across vast and sparsely populated lands. It was a money loser.

President Franklin D. Roosevelt felt otherwise. He believed that since farmers worked hard to feed the nation, they deserved the benefits of electric power. Only two years into his first term, Roosevelt made it happen.

Rural electrification is arguably the most significant engineering achievement of early 20th century America. The accomplishment is even more impressive when one considers that it happened relatively

quickly. The federal Rural Electrification Administration was established in 1935 and the following year loans began to be issued to states to build power generation facilities. Within two years, non-profit electrical co-operatives were being established across the country and within 20 years of REA's founding nearly all of rural America had power.

In Virginia, rural electrification began immediately after the REA was established when Caroline County's citizens organized the first rural electric business: Farmers Rural Utilities with an office in the Town of Bowling Green. Within a year, the first rural power line in Virginia was operational. The first home to receive electricity was near Carmel Church. FRU grew to become today's Rappahannock Electric Cooperative.

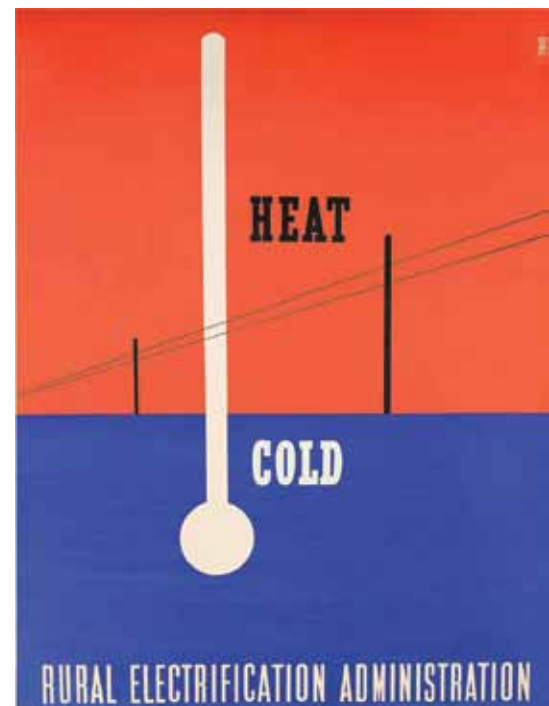
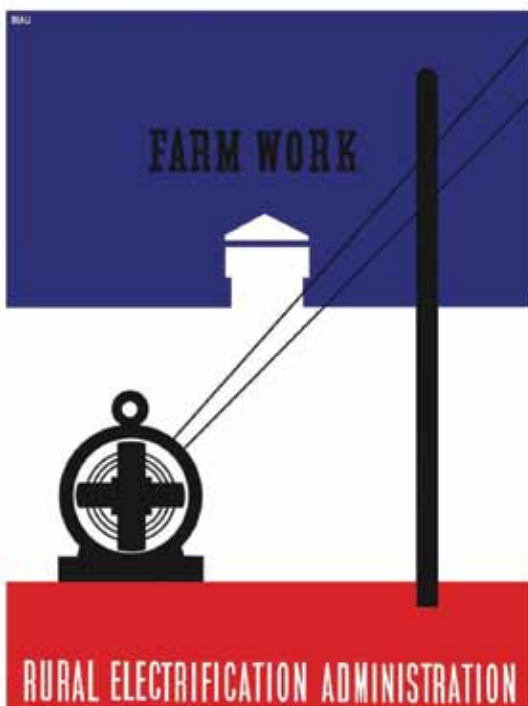
The REA funded more electric co-ops across Virginia and rural electrification continued. Co-ops, with their rich and important history, continue to thrive with 13 non-profit, consumer-owned cooperatives currently serving nearly two million people in Virginia.

Hydro power flows to the Commonwealth

The 1940s and '50s – early in the post-World War II economic boom – were Virginia's fastest-growing decades until the 1980s, when northern Virginia began its own local population boom. During this time, rural electrification was well under way and Virginia's population began spreading out from the cities to the suburbs. This migration gave rise to shopping centers and other stores to serve the new residential subdivisions.

To keep up with rising demand for electricity, major hydropower facilities were planned and constructed. The U.S. Army Corps of Engineers began building the John H. Kerr dam on the Roanoke River in 1947 and finished the project in six years. The Corps began its four-year construction of the Philpott Dam on the Smith River in 1948.

Within a decade of the Kerr hydropower project being completed, Appalachian Power Company began constructing the Smith Mountain and Leesville dams and reservoir lakes. These dams, built in half the time it took to construct the Kerr dam, were completed in 1963 and within a year were generating power. In operation, water is



released from the upstream Smith Mountain Lake to the lower Leesville Lake to turn five turbines; the water is then pumped back to the upper reservoir.

In the late 1970s, Dominion Energy built its Bath County Pumped Storage Station. Here, too, water is pumped between upper and lower reservoirs, released when electricity demand is heavy to generate extra power and pumped back to the upper reservoir when demand is low. Dominion considers the Bath County Pumped Storage Station to be the “world’s largest battery.”

Virginia enters the atomic age

The mid-20th century continued to see extraordinary advances in power generation technology, the most significant of which was the advent of nuclear power.



North Anna Power Station

The nation’s first nuclear power plant was opened outside of Pittsburgh in 1957. Soon thereafter Dominion Energy began planning its Surry nuclear power plant and construction alongside the James River began in 1968. Four years later, its two reactors were generating 1.6 gigawatts of energy. Today it powers 420,000 homes; it has been relicensed to operate until 2053.

In 1971, Dominion began construction of its North Anna nuclear power station. Its two reactors, sitting on Lake Anna, opened nine years later, producing 1.8 gigawatts. Today it powers 450,000 homes; it has been relicensed to operate until 2038. Old Dominion Electric Cooperative partly owns the facility. Dominion is currently considering construction of a third reactor (to generate 1.7 gigawatts) at the North Anna site.

Power sources of the past, present and future


Virginia coal has had a storied history, but in recent decades it has faced challenges. Coal production in southwestern counties peaked in 1990 and has dramatically declined in recent decades as natural gas has become more abundant. Increased clean-air regulations also have hurt coal’s viability. Many of Virginia’s coal-fired power plants have been converted to gas. Appalachian Power, for example, closed its 96-year-old coal-fired Glen Lyn plant in Giles County in 2014. The company’s Clinch River plant, which opened in Russell County in 1958, was converted from coal to gas-steam in 2015.

The present belongs to natural gas. Over the last 15 years, advances in hydraulic fracturing, or “fracking,” technolo-

gies have made it possible to produce usable natural gas from shale. Virginia is in proximity to the abundant Marcellus shale gas fields in West Virginia. This has led to the Atlantic Coast Pipeline being developed by Dominion Energy and Duke Energy to tap the shale gas in West Virginia and transport it some 600 miles through Virginia to the very southern regions of North Carolina. Similarly, the 300-mile Mountain Valley Pipeline, being developed by EQM Midstream Partners, Con Edison Transmission, WGL Midstream, and others, will carry gas from northwestern West Virginia to Pittsylvania County, Virginia.

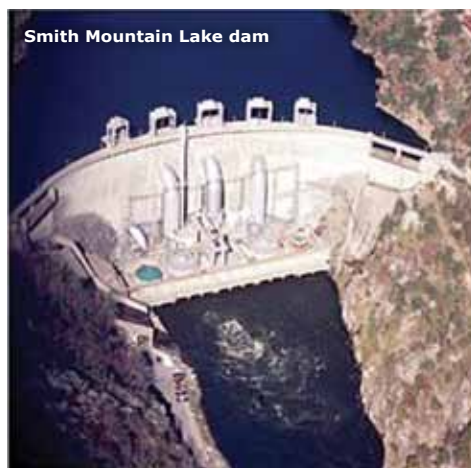
The future, however, is perhaps brightest for solar and wind power. Virginia’s largest utilities, Dominion Energy and American Electric Power (Appalachian Power), are investing heavily in renewable energy. Dominion is among the nation’s largest solar developers. AEP’s nationwide power generation portfolio is diversifying and has dropped from 70% coal-fueled to less than 50% today.

In Virginia, solar power is booming. There are more than 730 megawatts of solar power installed today, enough to power more than 82,000 homes. Private solar developers are leading the way. Dozens more utility-scale solar projects are on the drawing board. Solar capacity in Virginia is expected to triple in the next five years. Virginia’s first-ever utility-scale wind project – approximately 80 megawatts, enough to power about 20,000 homes – is poised for construction in Botetourt County. Additional terrestrial and offshore wind projects are possible too, with Dominion Energy preparing to build two pilot-program wind turbines some 25 miles off Virginia’s coast.

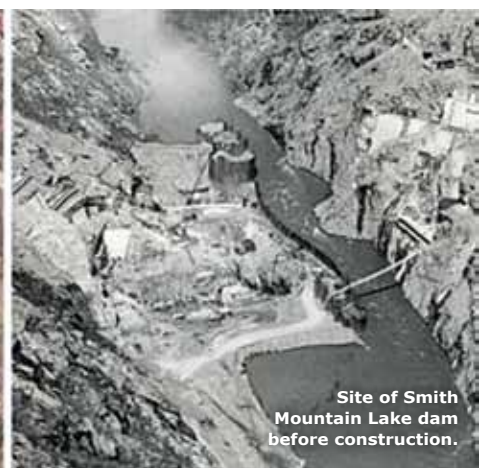
Solar and wind power are today’s new thing but if history is any teacher, we know that the energy sources of tomorrow are yet to be discovered. How will Virginian’s get power in 2119? 

About the author: *L. Preston Bryant, Jr., is senior vice president at McGuireWoods Consulting, where he works in the firm’s infrastructure and economic development group. He served on Lynchburg City Council and represented the city of Lynchburg and Amherst County in the Virginia House of Delegates for 10 years. He also served as Virginia Secretary of Natural Resources from 2006 to 2010, during which time he helped write Virginia’s first-ever statewide energy plan. Mr. Bryant is a VML consultant on environmental and energy issues.*

The sources relied upon were many: the Virginia Department of Mines, Minerals and Energy, histories of energy companies and electric cooperatives, the Weldon Cooper Center, the Municipal Electric Power Association of Virginia, the U.S. Army Corps of Engineers, and others.



Smith Mountain Lake dam



Site of Smith Mountain Lake dam before construction.

Advanced energy gains momentum in Virginia

ADVANCED ENERGY. For some, the term conjures visions of a futuristic source of electricity like cold fusion. In fact, advanced energy refers to a host of technologies (such as wind and solar energy) and services (energy efficiency programs, electric charging stations, etc.) that are already at work to keep the lights on, reduce harmful emissions, and lower electric bills for families and businesses.

But, before you start thinking that advanced energy is a niche industry, sooner found in Silicon Valley than the Shenandoah Valley, think again. Advanced energy is taking hold across the Commonwealth, from rooftop solar in Richmond to electric buses in Hampton Roads; from electric vehicle (EV) chargers popping up on I-81 to efficiency upgrades to public buildings across the state.

The advanced energy industry is helping to grow and sustain Virginia's economy. Today, the industry employs almost 100,000 people in the Commonwealth. That is more jobs than you will find in all the supermarkets and grocery stores across the state, twice as many as exist in our hospitality industry, and seven times the number in Virginia's fossil fuel industry!

Advanced energy employs people in every corner of Virginia: 1,990 in Roanoke; 4,600 in Virginia Beach; 3,580 in Chesterfield; 19,900 in Fairfax, the list goes on and on. In the ranks of the industry you will find electrical engineers and software designers, HVAC repair people, sales professionals, construction workers, and financial analysts. Moreover, advanced energy professions, such as solar installer and wind turbine technician, are among the fastest growing jobs in the United States.

Advanced energy generates not only jobs, it also creates in-state investment. The construction and operation of new wind and solar facilities, for example, provides wages, spending, and tax revenues for the state and localities. This array of renewable energy projects also helps attract data centers and Fortune 500 companies that need affordable, reliable electricity that helps them meet corporate sustainability goals.

Where is advanced energy headed in Virginia?

The advanced energy industry has already put down roots in Virginia, but over the next decade it is poised to truly blossom. In part this is due to simple market economics. Thanks to technological advances, the price of a megawatt-hour from large-scale wind and solar facilities today can readily compete with conventional forms of generation. Cost declines in battery storage make it increasingly affordable to store and dispatch energy when it is needed [**Editor's note:** For more on the topic of energy storage, see the article on page 23]. Meanwhile energy savings from efficiency measures and demand-response (i.e. time-specific energy conservation) have only become more accessible and affordable with technological progress.

Recent actions by Virginia lawmakers and regulators complement these market developments. The Grid Transformation and Security Act, passed by the General Assembly last year, will spur the development of (at least) 5,000 megawatts (MW) of new wind and solar capacity in Virginia over the next decade, as well as over \$1 billion

in new energy efficiency investment by customers through our major utilities. This legislation has already begun to bear fruit. In May, regulators at the State Corporation Commission approved 11 new energy efficiency and demand response programs proposed by Dominion for Virginia homes and businesses. Over the next five years, the utility will spend almost \$226 million on these measures to help customers save money.

Advanced energy is on the grow

Here are five snapshots of recent and ongoing advanced energy projects in Virginia:

Wind in Botetourt County

Wind power has spread across the United States, from the Texas prairie to the Iowa plains. North Carolina, West Virginia, and Maryland all have turbines generating clean energy in their state. To date, though, Virginia has missed out on this advanced energy technology. Working in close collaboration with Virginia leaders, Apex Clean Energy is hoping to change that. Apex, which is headquartered in Charlottesville, has one of the nation's largest portfolios of renewable energy projects – including \$1 billion in wind and solar projects under development in Virginia alone.



Among those projects is Rocky Forge Wind, a 76 MW wind farm that the company plans to build in Botetourt County. With local and state approvals secured, and supported by state and local officials, the project will bring a construction boom, long-term maintenance jobs, and millions in tax revenue to the rural county. What's more, the project sends a clear signal to other industries considering Botetourt County: "We are open for business."

This project, moreover, will send a signal far beyond Virginia's borders. Development of large-scale renewable projects tells major employers that Virginia is a place where they can meet their sustainability goals. "The market, driven by customer demand, is heading toward clean energy," says Tyson Utt, Apex Clean Energy's Vice President of Development for Eastern Regions. "Access to renewable energy is often a key factor for corporations when deciding where to locate their facilities for future growth."

Solar schools in Arlington County

Rooftop solar has become an increasingly common sight on homes and business throughout Virginia. This is most evident on the roofs of Virginia's schools, thanks in large part to several Virginia-based solar companies, including Sun Tribe Solar. Founded by three Virginia Tech alums, Sun Tribe claims the title of Virginia's largest distributed solar energy provider, working with a range of Fortune 200 companies, government agencies, and rural communities to meet their energy needs.

A focus of the company has been public school divisions. To date, Sun Tribe has partnered with divisions to install solar on or around public schools in places such as Henrico, King William, Louisa, Middlesex, Powhatan, and Westmoreland counties. In Arlington County, Sun Tribe is building the largest school-based solar installation in Northern Virginia. To make this possible Sun Tribe worked



closely with Arlington Superintendent of Schools Dr. Patrick Murphy, School Board Chair Reid Goldstein, and Cathy Lin, the Energy Manager and Storm Water Program Administrator for the school system. When complete, Arlington schools will host 6,980 solar panels, saving the division more than \$4 million in energy costs over the lifetime of the project.

The benefits of this project don't stop with the financial savings, however. Sun Tribe has partnered with STEM educators to integrate solar technology into educational activities. Energy dashboards in classrooms, for instance, help students monitor energy production from their solar arrays, giving them a better understanding of energy systems and (with a bit of luck) helping to develop the next generation of advanced energy leaders.



Offshore wind in coastal Virginia

Offshore wind (OSW) is a well-established industry on the other side of the Atlantic, supplying gigawatts of energy to power homes, businesses and factories in Europe. Here at home, however, the industry is just beginning to be considered. That is what makes the Coastal Virginia Offshore Wind project (CVOW) especially notable, not only for Virginia but for the U.S. as a whole.

CVOW, which is being developed by Orsted in conjunction with Dominion, will be the first offshore wind in federal waters, as well as one of the first in the Mid-Atlantic. Located 27 miles off the coast of Virginia Beach, this pilot project will consist of two, 6 MW turbines when completed in 2020. Power from these turbines will come ashore at Camp Pendleton. The project developers have worked closely with state and local officials, including the Department of Mines, Minerals & Energy (DMME), elected leaders in Virginia Beach, and base command at the Camp, to ensure the project is properly permitted and interconnected to Virginia's grid.

CVOW is notable not only for the power and insights it will provide in the short-term but for the energy resources and economic investments it may unlock over the long-term.

Advanced energy

OSW is a valuable renewable resource, providing electricity during hours of peak demand, complimenting solar generation, and reducing the need for costly “peaker” plants that we pay to have on standby for those times of greatest electricity need.

Energy efficiency in Fluvanna County

The lowest cost kilowatt-hour is the one you don't use. That truism is central to the enduring economic appeal of energy efficiency and demand response technologies and services like Energy Performance Contracting (EPC). Through EPC, businesses, industrial facilities, and public institutions upgrade their energy-intensive systems – such as lighting, heating, and cooling – and use the resulting energy savings to pay off upfront costs.

EPC has been used successfully throughout Virginia for over \$900 million in projects, according to DMME. In Fluvanna County, local leaders hired TRANE, an energy service with deep roots in the Commonwealth, to upgrade their lighting, HVAC and building controls. Although the investments cost over \$7 million, the county was able to implement them immediately through performance contracting. As a result they are now saving almost \$500,000 a year in energy, and over \$100,000 in operations and maintenance, money that can be reinvested in local schools and returned to taxpayers over the long run.




for many Virginians it is already more affordable to own an EV than a gasoline-powered car. As battery prices continue to fall, the purchase price of EVs will reach parity with conventional vehicles – and sales will increase dramatically.

Will Virginia be ready? Early signs point to “yes,” but we still have a long way to go. In 2017, Virginia was awarded \$96 million as part of a federal settlement with Volkswagen over their falsification of emissions reports. Fifteen percent of those funds were set-aside for EV charging infrastructure. The remainder will be used to help reduce emissions from medium and heavy-duty vehicles. For example, a portion of the money will be used to convert municipal buses and drayage trucks at Virginia ports from diesel to electricity.

Following a competitive bid process, Virginia's Department of Environmental Quality awarded the contract to build the statewide charger network to EVgo. The company, which has been working in the Commonwealth since 2013, operates the largest public direct current fast charger network in the United States. This May, EVgo, in conjunction with state and local officials, property owners, and small businesses, kicked off construction of the statewide network. Over the next three years, EVgo will build a set of fast, superfast, and destination chargers at dining and retail locations, state parks, and other attractions across Virginia.

Advanced energy: Here to help, here to stay

Whether it is wind, solar, battery storage, energy efficiency, electric vehicles, or a host of other technologies, advanced energy is here to stay. Rather than being isolated to limited regions of the state or specific sectors of the economy, it has spread – from urban centers to rural communities. Whether you're concerned with creating good jobs, attracting new investment, reducing emissions, or cutting costs, that's good news for Virginia. 

About the author: *Harrison Godfrey is executive director of Virginia Advanced Energy Economy, a coalition of businesses that seeks to make the Commonwealth's energy more secure, clean, and affordable.*



EPC allows public leaders to be good stewards of public funds, cutting electricity bills – and their emissions footprint – through cost-effective investments. It is just one example of the array of cost-effective energy conservation measures that should spread across Virginia as state and local governments, alongside utilities, increasingly invest in efficiency.

Electric Vehicle (EV) chargers across Virginia

Virginia is poised to witness a transportation revolution. Since 2011, the sale of light-duty EVs in the US has grown, with buses and heavy-duty EVs following closely. When you consider lifecycle costs,

Ask an expert

Municipal net metering pilot program

EFFECTIVE JULY 1, 2019, most municipalities and counties will have the opportunity to participate in a six-year pilot program for renewable energy net metering on a “first-come, first-served basis” under a new provision of state law adopted in the 2019 session of the Virginia General Assembly (Va. Code § 56-585.1:8; 2019 Acts c. 746). As used in the statute, “net metering” refers to measuring the difference in a billing period between the electricity supplied by the public electric utility flowing through the municipality’s electric meter and the electricity generated by the municipality and delivered through the municipality’s meter to the public utility. The difference is “netted” to determine the credit the municipality will receive for generating electricity. Thus, the statute provides eligible local governments a new opportunity to use self-generated electricity from renewable energy sources and reduce the cost of electricity received from their public utility.

Since this issue of *Virginia Town & City* is all about energy, we thought it would a good time to ask a couple experts how it will all work.

Note: For the sake of brevity, we have designated our experts, Robert D. Perrow and John L. Walker, III as “RJ.” “Municipalities” refers to cities, towns and counties.

VTC: Who is eligible to participate in the pilot program?

RJ: Any Virginia county, city, or town, other than a municipality that owns and operates its own utility, may participate in the net

metering pilot program established by the public utility that serves the municipality.

VTC: Got it. So, as long as a municipality doesn’t own or operate its own utility, it can participate. But, is there a limit on how many municipalities can participate in the pilot program?

RJ: Yes. The total generating capacity of participating municipalities in the Appalachian Power territory cannot exceed 5 megawatts unless the company allows more, within reason of course, up to a maximum of 10 megawatts. In the Dominion territory, the limit is 25 megawatts. Participation is on a first come, first served basis until the capacity limit is met.

VTC: I see, so the limit is determined by the total megawatts being produced by the participants. What I’m still trying to understand is how does the statute define net metering for the pilot program?

RJ: Participating municipalities will receive a credit from the public utility for the difference between electricity supplied to a municipality from the electric grid and the electricity generated by the municipality and fed into the electric grid.

VTC: OK. That makes sense. So, how does the municipality receive the benefit of the excess energy supplied to the public utility?

RJ: We’re glad you asked! At the end of the 12-month period, after the municipality and public utility interconnect and every 12 months thereafter, the public utility will credit the account(s) of the municipality with the energy generated that exceeds the amount used by the municipality during the 12-month period. To the extent pos-



Metering pilot program

sible, the credit for excess energy must be directed first to accounts of the buildings and facilities of public schools before the credit is directed to other accounts of the municipality.

VTC: So, schools are the first to benefit from the credit. I like that. But now I'm wondering who pays the administrative costs of establishing and operating the pilot program?

RJ: The participating municipalities – and it is important to note that it is only the participating municipalities – will pay the administrative costs.

VTC: Interesting. Will a municipality that contracts with a public utility but does not participate in the pilot program still be held responsible for any costs associated with municipalities who participate in the pilot program?

RJ: Great question with a simple answer: No, they will not be held accountable. The statute protects non-participating municipalities from bearing such costs.

VTC: I understand that only participating municipalities will be held accountable for costs but what are the requirements for participation in the pilot program?

RJ: In order to participate in the pilot program, the municipality must (1) generate electricity from a 100% renewable energy source located on the premises that it owns, operates or leases and (2) interconnect to the public utility's transmission and distribution system from a single municipality-metered account.

VTC: In that case, how much electric energy is a municipality allowed to generate?

RJ: The generating capacity of a municipality cannot exceed one megawatt. However, if the generating facility is located on an airport, landfill, parking lot, park, post-mine land, or a reservoir that it owns, operates or leases, then the generating capacity can be up to two megawatts.

VTC: I see, so with these qualifications and a series of 12-month how long will the pilot program last?

RJ: The pilot program will last six years; however, those still participating at the end of six years will be able to continue in the program.

VTC: That's a good benefit! Does the State Corporation Commission have a role in the program?

RJ: The Commission has three duties: (1) requiring the public utilities to submit a proposal to the Commission to conduct a pilot program that meets the requirements of the statute; (2) enacting either rules or guidelines for the administration of the program; and (3) reviewing the pilot programs beginning in 2021 and for every two years thereafter.

VTC: If those are the three duties the Commission plays then will the General Assembly monitor the pilot programs as well?

RJ: The General Assembly will have a part in monitoring the program. Any public utilities participating in the pilot program must report to the General Assembly by December 1 of each year the program is in effect.

VTC: One final question for you. If a municipality participates in the pilot program, may it participate in other net metering programs?

RJ: The statute provides that the pilot program shall not limit participation by any municipality in any other current net metering programs.



About the Experts: *Robert Perrow* bperrow@williamsmullen.com and *John Walker* jwalker@williamsmullen.com are partners with the law firm of Williams Mullen and regularly represent the VML/VACo APCo Steering Committee before the State Corporation Commission and in contract negotiations with Appalachian Power Company on behalf of municipalities in the Appalachian territory.

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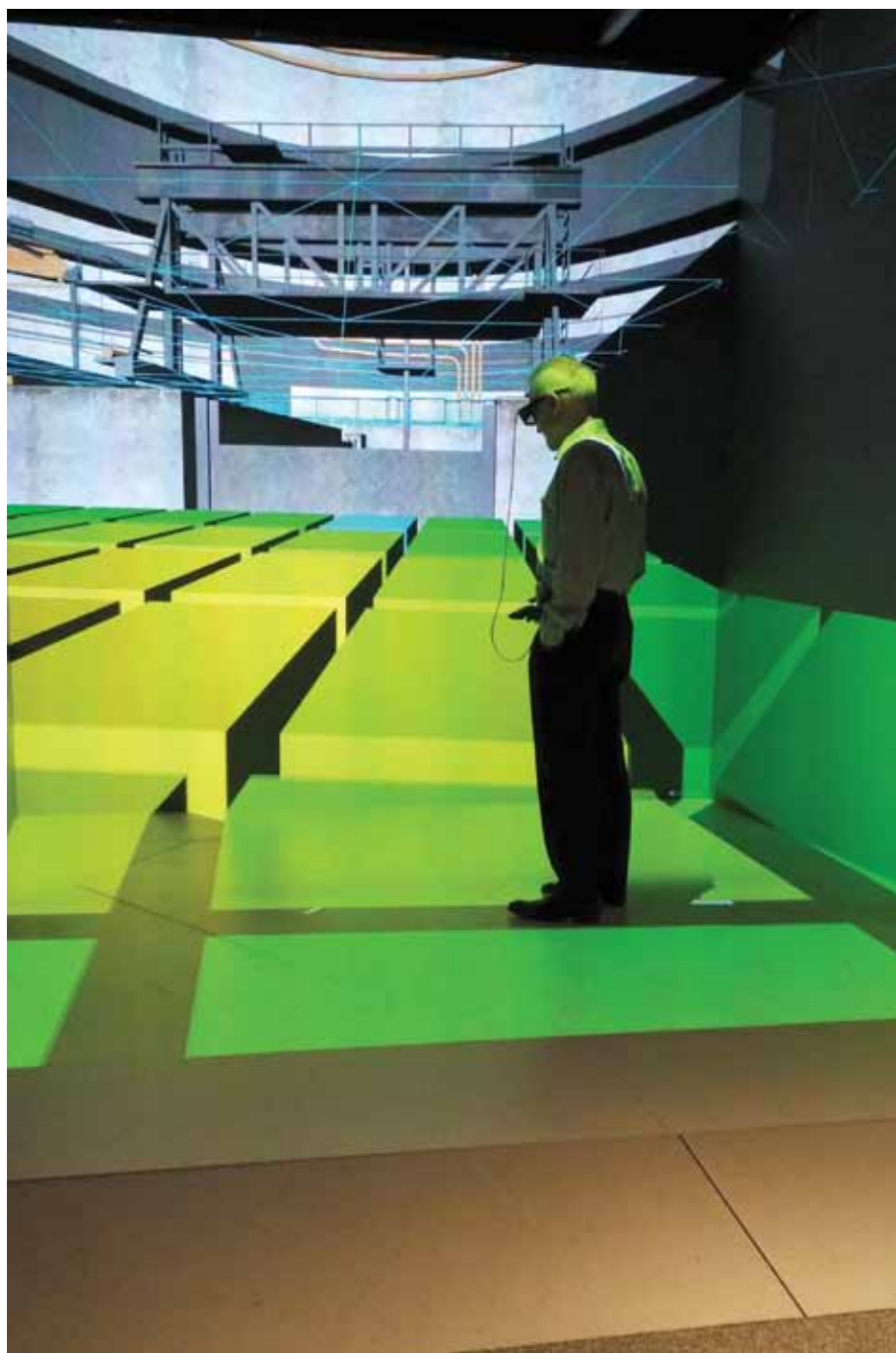
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Nuclear energy in Virginia

ON DECEMBER 2, 1942, Manhattan Project scientists at the University of Chicago created the first controlled, self-sustaining nuclear reaction and proved the power of the atom could be harnessed by man. Almost seventy-seven years after those initial steps ushered in the atomic age, an array of subsequent advancements and innovations have changed the world. From commercial power to nuclear medicine to defense applications, that first

atomic reaction reverberates around the world today and will continue to be felt into the future.

Closer to home, many people don't realize that the Virginia nuclear industry (commercial and defense) plays a significant role in the United States' overall nuclear picture. How did nuclear come to play such a vital role in Virginia's economy?



A history of firsts

During the 1950s and 1960s, the United States looked to nuclear energy to power the Navy. Ships powered by nuclear could stay at sea longer than ships which had to carry and use conventional fuel. Newport News Shipbuilding began construction of nuclear-powered aircraft carriers and submarines at its shipyard. The USS Enterprise, the world's first nuclear powered aircraft carrier, entered service in 1960 along with the USS Shark, the world's first nuclear submarine.

One of the earliest reactors commissioned by the U.S. Atomic Energy Commission was constructed at Ft. Belvoir, VA. Originally conceived as a demonstration of a small reactor that could be deployed by airplane to supply both energy and heating in remote locations; this 2-megawatt reactor was hooked into the local electrical grid and became the world's first supplier of nuclear energy to the public. It was envisioned that similar reactors would be used in arctic radar stations as part of early warning systems but technological advances in the ensuing years rendered it obsolete. The Fort Belvoir reactor operated until 1973.

Commercial industry – power to the Commonwealth

As nuclear was growing in popularity for defense applications, commercial nuclear power gained traction as well. In June 1968, construction began on the Surry Nuclear Power Station. In February 1971, construction began on the North Anna Nuclear Generation Station. The four reactors at the two stations came online in 1972, 1973, 1978, and 1980.

Today, these two commercial power plants employ over 1,800 employees and generate 32.7 percent of the state's electricity while emitting no greenhouse gases. They have operated safely for more than 40 years.

Defense industry – economic advantages abound

Newport News shipbuilding employs more than 20,000 employees, making it the largest industrial employer in Virginia. The Newport News shipyards build every U.S. aircraft carrier and submarine. In addition, the shipyards refuel America’s fleet of nuclear carriers and subs.

Companies like BWX Technologies, Inc., Framatome, Bechtel, Lightbridge Corporation, Enfission, and others who operate in Virginia supply fuel, technical expertise, manufacturing, engineering, security, and supplies to the industry. These companies are global leaders - they are developing new fuel technologies, next-generation nuclear projects, and even working on the innovations that will take us to Mars. Many more small businesses support these major employers – extending the reach of nuclear energy’s economic benefit.

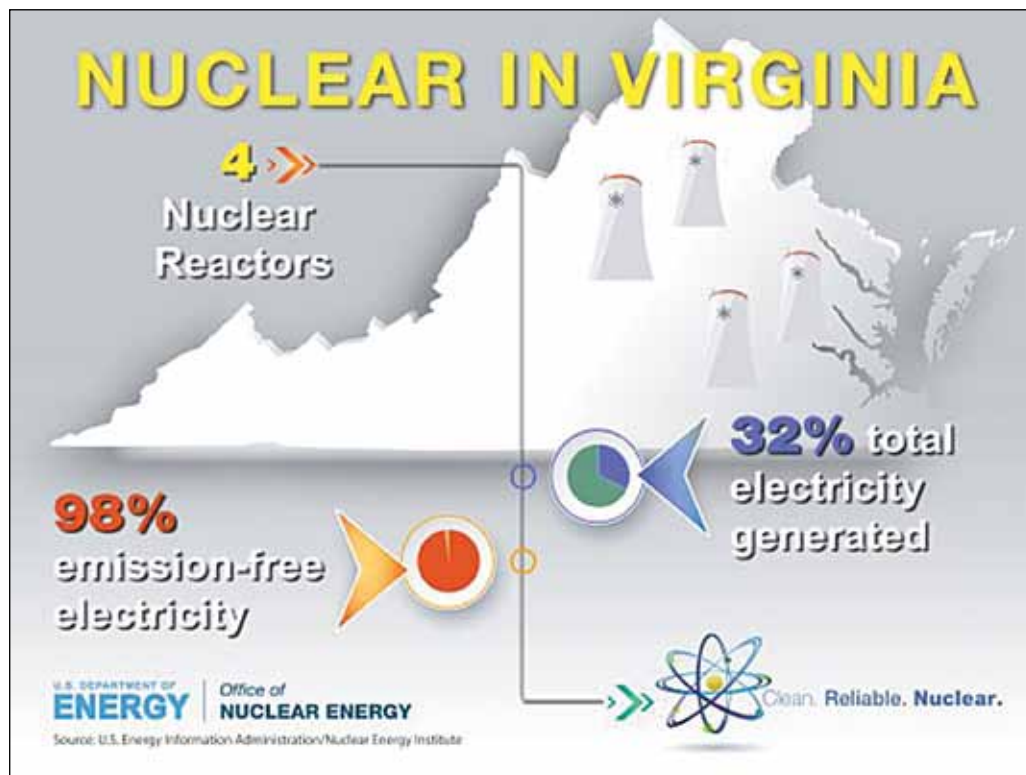
Academic initiatives shine in Virginia

Innovation in nuclear will lead to the next generation of nuclear jobs, innovation, and economic growth. Virginia is well-positioned to reap the benefits:

- Virginia is home to two of the approximately 30 nuclear engineering programs in the United States. These programs are at Virginia Commonwealth University and Virginia Tech.
- Renowned research programs bring students to Virginia’s institutions of higher learning. These research programs cover nuclear power and security, plant cybersecurity, nonproliferation and safeguards, radiation therapy and diagnostics, and nuclear policy matters.
- The Virginia Community College system has programs supporting the nuclear industry workforce.
- In 2019, the Virginia General Assembly passed a law to create a 17th Career Cluster for Energy to further develop the training and education opportunities available to students in Virginia. This effort will help ensure the state’s education system is aligned with energy industry jobs of tomorrow.

Enter VNECA

In 2013 the Governor and the General Assembly created the Virginia Nuclear Energy Consortium Authority (VNECA) with the intent of making Virginia a national and global leader in nuclear energy, science, and technology. An interdisciplinary study, research and information resource for the nuclear industry in Virginia, VNECA established the Virginia Nuclear Energy Consortium (VNEC), a non-profit corporation. VNEC was incorporated in 2015 with a straightforward mission: To ensure that the Commonwealth of Vir-



ginia remains a leader in nuclear energy and to promote the industry’s vital role in the state.

Virginia’s position as a leader in commercial and defense applications for energy, research and development, and nuclear medicine makes the state an excellent location for advanced nuclear projects. VNEC is currently working to bring research and development opportunities related to advanced nuclear technologies to the Commonwealth.

Looking ahead

Like most industries, nuclear is undergoing tremendous technological developments. Some of the more promising include:

- A new generation of reactor technology called Small or Advanced Modular Reactors (SMRs or AMRs) is changing the way we think about producing nuclear energy. Smaller and easier to build, AMRs also have coolant options – liquid metals, salt, and helium – which may make using nuclear fuel safer and more economical. Additionally, the SMRs/AMRs can scale up, so power generation can vary between a couple of megawatts to hundreds of megawatts.
- Advances in reactor designs and technologies promise to make nuclear even more efficient and accessible.
- Next generation fuels allow for higher burnup rates and longer fuel cycles, requiring less fuel to produce more power over a longer lifecycle.
- Advanced nuclear reactor technologies can bring scalable and versatile solutions to our energy portfolio.

As the US moves to the next generation of nuclear, Virginia shall continue to lead as it has done since the earliest days of atomic power.



About the author: *April Wade is the executive director of the Virginia Nuclear Energy Consortium Authority.*

Energy Storage is key to the “Green Revolution”

MANY “GREEN REVOLUTION” proponents believe renewable energy generated by wind and solar (coupled with additional conservation efforts) is the best way to reduce CO2 emissions and combat global warming. However, generating energy to meet residential, commercial and industrial power needs (and an anticipated massive scale-up in electric vehicles) can’t be contingent upon the sun shining or the wind blowing. A critical element is needed for this massive transformation to succeed – the ability to reliably store large amounts of energy for long periods, at low cost.

This idea, however, is not revolutionary. In fact, it’s becoming a standard consideration in government planning. For example, according to Virginia’s 2018 Energy Plan: “The demand for renewable energy is stronger than ever, but an inherent limitation is the intermittency of the resource.” The Plan asserts that a variety of existing energy storage solutions will be necessary for a renewable energy future – including off-peak electric power pumped storage facilities, underground compressed air containment areas, flywheel energy storage systems, thermal storage systems that store excess energy produced as heat in the form of molten salt or other materials, and large-scale lithium-ion or other types battery technology.

It remains to be seen which combination of these solutions, or new technological innovations, will prove most effective for the Commonwealth, but one thing is certain: Virginians will continue to demand a low cost, reliable energy system. In order to meet that demand using renewable energy, the cost of storing that energy must come down.

U.S. energy consumption

Since 2010, utility-scale solar energy has risen 942 percent, while wind energy has grown 174 percent.

Before we consider our future energy storage needs and options, it is necessary to understand the degree of change that will be needed to achieve carbon free energy consumption in the U.S. According to

the U.S. Energy Information Agency (see chart below), primary energy consumption in the United States reached a record high in 2018, up 4 percent from 2017. U.S. consumption of fossil fuels – petroleum,

natural gas, and coal – also grew by 4 percent in 2018 and accounted for 80 percent of U.S. total energy consumption. Natural gas consumption reached a record high, rising by 10 percent from 2017. The increase in natural gas consumption more than offset a 4 percent decline in coal consumption. In 2018, renewable energy consumption (11.5 percent of total energy) increased 3 percent from 2017. While utility-scale wind (2.5 percent) and solar (1 percent) growth rates are impressive, these energy sources still make up a relatively small percentage of primary energy consumption. Biomass (such as fuel ethanol and biodiesel) and hydroelectric production still account for 68 percent of all renewable energy consumption.

The United States has also made progress on energy conservation. Driven by economics, advances in technology, consumer awareness, and public policy initiatives, U.S. per capita energy use is down 7% below 2010 levels. Virginia has also continued progress on energy conservation and uses energy more efficiently than the nation, consuming 277 million Btu per capita (down from nearly 350 million Btu in 2007), while the U.S. consumes an average of 345 million Btu per capita.

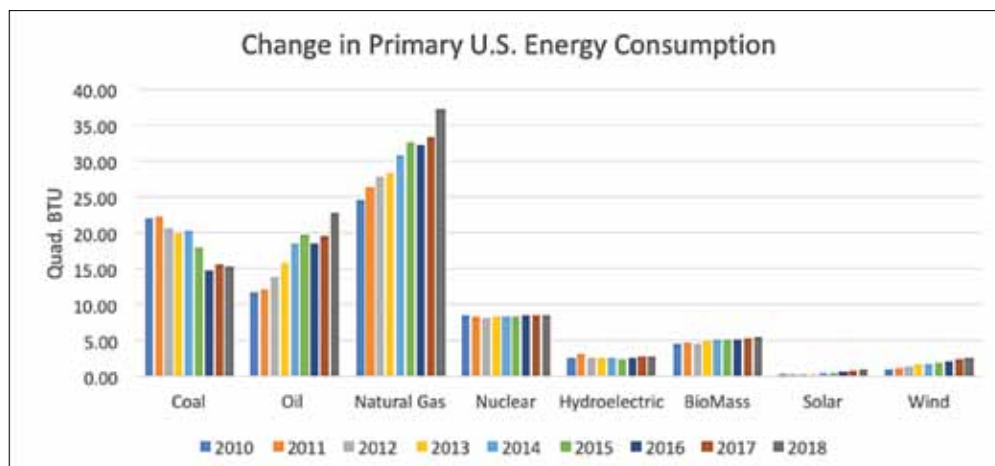
Rooftop solar

ALTHOUGH UTILITY SCALE SOLAR gets the most attention, rooftop photovoltaic (PV) solar installation offers another opportunity to increase solar energy consumption. Although current U.S. installed solar PV capacity is 50 gigawatts (currently producing well under 1 percent of total electricity consumption), the Department of Energy’s Office of Energy Efficiency and Renewable Energy finds that installed PV capacity could increase 20 times the current production by 2050. However, as discussed later in this article, the increased use of rooftop solar presents its own challenges.

Energy usage: Nation vs. Virginia

Now that we’ve established how we produce the energy we use, it’s necessary to understand what we use that energy to do. Nationally, the shares of total primary energy consumption in 2017 were allocated as follows:

- 32% - Industrial (manufacturing, agriculture, construction, mining)
- 29% - Transportation (cars, trucks, buses, trains, aircraft, ships)
- 20% - Residential (homes and apartments)
- 18% - Commercial (offices, stores, schools, hospitals, restaurants, warehouses, churches, etc.)
- 1% - Other



Source: U.S. Energy Information Agency <https://www.eia.gov/totalenergy/data/monthly/>

Energy storage

In Virginia, **transportation** is the largest sector for total energy use. Petroleum motor fuels (primarily gasoline, diesel, and jet fuel) deliver 99 percent of the transportation energy. Only about 1 percent of energy used for the transportation sector comes from electricity.

The **industrial** sector consumes 19 percent of the electricity used statewide and is the second-largest natural gas-consuming sector in Virginia.

In the **residential** sector, electricity delivers 58 percent of energy for space conditioning, hot water, lighting, and electronic devices. Approximately one in three households in Virginia use natural gas for home heating.

In the **commercial** sector, electricity delivered 61 percent of all energy with most of the remainder served by natural gas. Commercial building energy use overall peaked in 2010 and has declined slightly in subsequent years.

Virginia's renewable energy picture

Electricity generated in Virginia in 2016 came from a variety of sources generating over 25,000 megawatts (MW) of capacity, including:

- 52% from natural gas
- 28% from nuclear
- 11% from coal
- 6% from renewables
- 2% from hydroelectric
- 1 % petroleum

Virginia's 2018 Energy Plan seeks to increase our use of renewable resources to about 20 percent of its electric generating capacity in a relatively short period of time. Specifically, the goal is to have 5,000 MW of utility-owned and utility-operated wind and solar resources and 500 MW of rooftop solar resources installed by 2022. In addition, the plan calls for a \$1.1 billion investment in energy efficiency programs by investor-owned utilities, and cost recovery structures for projects that modernize the grid and support the integration of distributed energy resources.

A case study: Germany's move to renewable energy

Beginning in 2010, Germany began phasing-out nuclear energy, and expanding renewable energy sources with the aim to make its economy climate-neutral by mid-century. Germany's energy revolution or *Energiewende* grew from a grassroots anti-nuclear and environmental movement into a vast national project, which is having profound effects throughout its society and economy. Despite its ambitions, Germany struggles to meet its short-term climate targets. Emissions from trucks and passenger cars remain stubbornly high, and the country continues to burn coal to generate electricity. The results of Germany's aggressive renewable energy program include an unstable electric grid and an in-

creased need for reliable back-up power (mostly coal). Germany also has the highest electricity costs in Europe at 33 cents US per kWh – 2.5 times higher than the United States' 13 cents per kWh average.

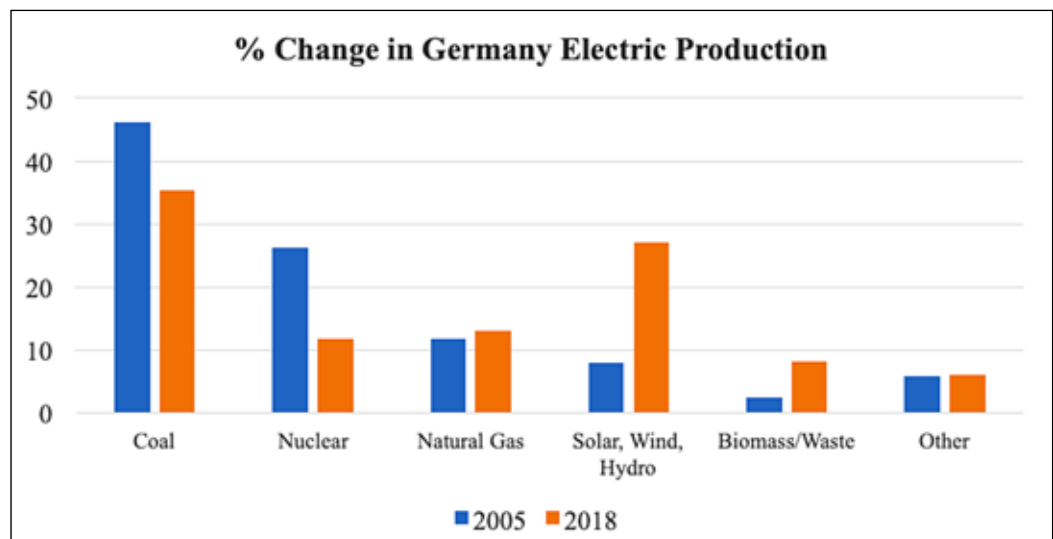
Despite the tremendous pressure on Germany's industrial economy, the country is determined to expand its renewable power ambitions and eliminate its need to burn coal. To accomplish this, Germany envisions a transformation from a strongly centralized energy system to a decentralized, flexible, and renewable system. To this end (and despite the current high cost), around half of all new residential rooftop solar systems in Germany are now installed in conjunction with a battery. However, the current excitement about batteries sometimes overshadows the fact that batteries simply cannot store energy for long periods and cannot store enough of it to be an effective means of decarbonizing a world that uses as much power as we do now.

What's needed are new, cheap, renewable energy storage systems.

Current state of U.S. energy storage

Energy can be stored in a variety of ways. Examples include:

- **Pumped hydroelectric.** Electricity is used at off-peak hours to pump water up to a reservoir. When water is released from the reservoir, it flows down through a turbine to generate electricity during peak hour usage.
- **Compressed air.** Electricity is used to compress air at up to 1,000 pounds per square inch and stored, often in underground caverns. During high demand, the pressurized air is released to generate electricity through an expansion turbine generator.
- **Flywheels.** Electricity is used to accelerate a flywheel (a type of rotor) through which the energy is conserved as kinetic rotational energy. When the energy is needed, the spinning force of the flywheel is used to turn a generator. Some flywheels use magnetic bearings, operate in a vacuum to reduce drag, and can attain rotational speeds up to 60,000 revolutions per minute.
- **Batteries.** Large batteries can store electricity until it is needed. Similar to common rechargeable batteries, these systems use lithium ion, lead acid, lithium iron or other battery technologies.
- **Thermal energy.** Electricity can be used to produce thermal energy, which is stored until is needed. For example, electricity can be used to produce chilled water or ice during times of low demand and later used for cooling during periods of peak electricity consumption.



Source: <https://www.cleanenergywire.org/factsheets/germanys-energy-consumption-and-power-mix-charts>

In addition to the methods outlined above, new technologies are currently under development, such as flow batteries, supercapacitors, and superconducting magnetic energy storage.

Moving to a “greener” electrical generation system that relies on large amounts of intermittent generation capability (i.e. wind and solar), would require a massive expansion of the storage system we currently have in place. According to the U.S. Department of Energy, as of March 2018, the United States had more than 25 gigawatts of electrical energy storage capacity. Of that total, 94 percent was in the form of pumped hydroelectric storage, and most of that pumped hydroelectric capacity was installed in the 1970s. The six percent of other storage capacity is comprised of battery, thermal, compressed air, and flywheel.

Issues with energy storage and distributed power

Germany, California and other places that want to move to a renewable energy future are banking on much cheaper energy storage options than exist today. For example, lithium-ion technology, with limited battery life, is too expensive and not well suited to fill gaps during the days, weeks, and even months when large-scale wind and solar generation flags. This problem is acute in California, where both wind and solar fall off precipitously during the fall and winter months.

Today’s battery storage technology works best in a limited role as a substitute for natural gas “peaking” power plants which can afford to operate infrequently by firing up quickly when prices and demand are high. In fact, lithium-ion batteries may soon compete economically with these natural-gas “peakers.” In late 2018, the California Public Utilities Commission approved four contracts for battery storage that total 567 megawatts to replace a gas-fired power plant. However, batteries run into real problems once you go much beyond the role of filling short demand fluctuations.

Crunching the numbers

To illustrate the problems associated with storing energy in batteries, consider the economics of energy storage in roof-top distributed power systems (such as those Germany is banking on). A home uses an average of 1.5 kW of power, with a peak rate of 20 kW (stove, oven, dryer, and A/C all running, plus some lights, on a summer afternoon).

Nearly all residential solar/wind users install only a modest amount of renewable capacity to supplement the power that comes from the existing grid. Many of these people also modify their usage patterns to minimize the amount of power they purchase from the grid.

It would be possible to install a 20 kW solar array that would be able to meet the peak demand, so long as the sun was shining at the same time. When a home goes 100% off-grid, it is not easy to come up with a system

that captures and stores enough energy to make it through weeks of cloudy winter days, or no wind in the summer doldrums. To further illustrate the unfeasibility of energy storage in batteries with existing technology, let’s consider what it would take for the home outlined above to go off-grid. The Tesla PowerWall (cited by SolarReviews.com as the best solar battery available in 2019) had a recent price tag of \$10,000 per installed 13.5 kWh of usable electricity, or about \$740 per kWh of installed usable storage capacity. In our example home, the total system must be able to supply a peak of 20 kW (discharge rate) for a 24-hour period. The solar system must also have enough capacity to replenish the system daily. The batteries also can only be charged and discharged at a certain rate of speed,

otherwise they will overheat. This is typically around a total capacity over 5 hours (C/5). The 20 kW discharge rate means we need a bank of 100 kWh in total capacity (C/5), so multiple PowerWall units will be needed at \$740 per kWh to go off-grid.

The bottom line: up to \$74,000 just for the batteries only to meet the 1-day minimum. Even if conservation tactics reduced this cost, what about multiple days of limited solar energy and the solar panel requirement to recharge the battery bank? This example illustrates why the energy storage problem is so important and, with current technology, hard to solve.

The path forward

The Virginia Energy Plan sets ambitious, but attainable goals for additional deployment of renewable energy supply and conservation, while inherently recognizing that energy from the sun and wind need leaps in energy storage technology innovations for further carbon-free deployment. Renewable energy generation will increase as improvements and cost reductions in energy storage technology occur. In the meantime, Virginia, like Germany will continue to rely on natural gas as a bridge fuel to the future.

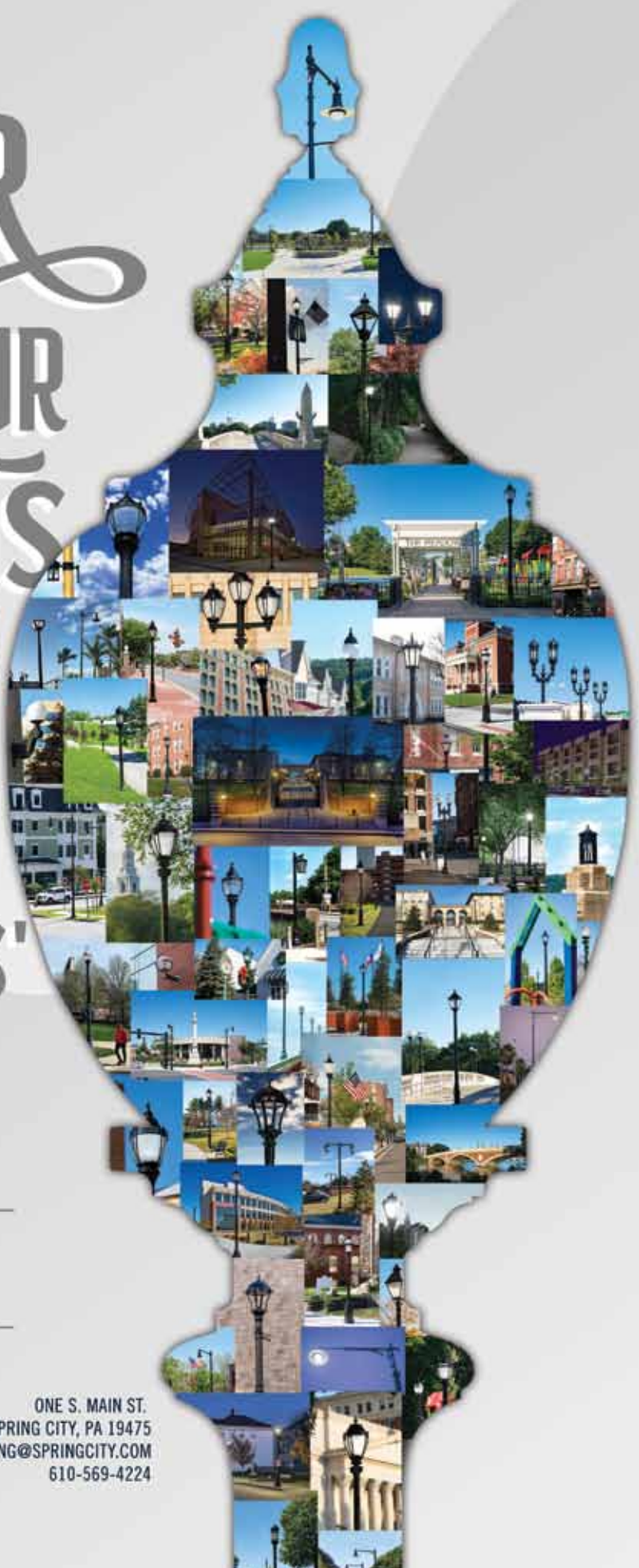
A note about nuclear

IT IS STILL POSSIBLE that a complete carbon-free future may need to involve nuclear energy. While nuclear energy development in this country is currently cost prohibitive, none other than Bill Gates has recently been quoted in his latest year-end public letter saying “Nuclear is ideal for dealing with climate change, because it is the only carbon-free, scalable source that’s available 24 hours a day. The problems with today’s reactor, such as the risk of accidents, can be solved through innovation.” For example, Gates’ TerraPower Company has a Travelling Wave Reactor design that gradually converts the fuel through a nuclear reaction without removing it from the reactor’s core, eliminating the need for reprocessing, generating heat and producing electricity over a much longer period of continuous operation. Eliminating reprocessing reduces proliferation concerns, lowers the overall cost of the nuclear energy process, and helps to protect the environment by making use of a waste byproduct. Advancing Gates’ vision, Congress approved \$221 million through the Department of Energy to help companies develop advanced reactors and smaller modular reactors in fiscal year 2019.



About the author: *Jim Regimbal is the principal in Fiscal Analytics, Ltd, which provides research on state and local budget and tax policy issues to local governments, business groups, trade associations, and nonprofit organizations.*

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Hot topic: Carbon fee & dividend

IN MAY, THE CITY OF CHARLOTTESVILLE City Council voted 5 – 0 to pass a resolution supporting federal-level carbon fee & dividend legislation. In doing so, Charlottesville is in concert with fellow Virginians in Blacksburg as well as with more than 130 other municipalities across the United States, from North Carolina to Oregon. Why are local governments spending their time passing resolutions about federal-level legislation? The answer lies in the bipartisan appeal of the carbon fee & dividend approach to curbing pollution.



What is carbon fee & dividend?

Many economists agree that pricing pollution at the source is the most efficient and effective way to reduce greenhouse gas emissions. This idea is at the heart of the cap & trade model which places a limit on the amount of carbon a company can produce but allows them to purchase extra carbon when they exceed those limits. Carbon fee & dividend also prices pollution at the source but establishes a market-based, revenue-neutral system wherein companies are charged a fee for carbon emissions that is then given back to American taxpayers as a dividend. The fee would start low and increase over time with the goal of sending a market signal to businesses and consumers while generating revenue for taxpayers. As the price of pollution gets higher, so do the dividend payments until polluters reduce their emissions, therefore avoiding the fees.

Of course, companies would likely increase the cost of their services to offset the fees. However, the Treasury Department estimates the bottom 70% of income earners would receive more back in their

dividend than the initial increase in energy costs. This amounts to increased disposable income for families. So, in the short term, a properly administered carbon fee & dividend program could strengthen the economy and help to boost the economic prospects of low-income Americans. In the long term, it could create a market incentive for companies to aggressively cut their carbon output which benefits everyone by improving air and water quality.

Pricing pollution can also increase innovation and job growth. As traditional pollution-intensive sources of energy become more expensive, people may be more inclined to look towards low-carbon alternatives. This is already happening here in the Commonwealth where each year, renewable energy sources make up an increasing portion of Virginia's energy portfolio. For example, in the past 10 years, Virginia has added over 50 megawatts of solar production across the State. According to Virginia's 2018 State Energy Plan, that number is expected to increase to over 10 gigawatts in the next few years (even without the added market incentive that could come from carbon pricing). The rapid growth of renewable energy does face the challenge of creating infrastructure and the obstacle of energy storage [**Editor's note** – see article on page 23 for more on this topic]. However, these challenges could be met more quickly with a carbon fee in place, as a rising carbon cost creates a financial incentive to attract both public and private investment to speed the transition.

To be sure, carbon fee & dividend has its skeptics. Those on the progressive left of the climate debate don't like that the money from the fees won't be used to directly fund green initiatives. Far better, they argue, to use the dividends to support projects for clean energy than turn them over to consumers. Those on the fiscally conservative right worry that the dividends represent a permanent expansion of the welfare state. Once you start giving citizens money, it's hard to stop giving it.

However, the Energy Innovation and Carbon Dividend Act (H.R. 763) currently before Congress has garnered support from a wide range of individuals and organizations including former U.S. State and Treasury Secretary George P. Schultz, Exxon Mobil, former U.S. Secretary of Energy Steven Chu and the Better World Club in Portland, OR. The long list of supporters also includes dozens of local governments.

So, to return to the original question: Why are local governments spending their time passing resolutions about federal-level legislation? The answer: With citizens increasingly looking to their state and local officials to re-examine their emissions plans and explore ways to quickly switch to renewable and low-carbon sources of energy, some local officials believe it will be much easier to reach these goals with federal-level incentives in place to reduce greenhouse gas pollution.



About the author: *Emily Irvine is a project engineer at Facility Dynamics Engineering, Inc. and a member of the Charlottesville chapter of the Citizens' Climate Lobby.*

Public power is hometown power



Turning on a light ... turning on the oven ... turning on a computer. They all require electricity. Thanks to the members of the Municipal Electric Power Association of Virginia, more than a quarter million residents across the Commonwealth don't have to worry if there will be power to turn on, because it's always there. MEPAV members are your not-for-profit, community-owned

utilities that provide reliable and safe electricity at a reasonable price. Our commitment to the communities that we serve goes beyond keeping the lights on and appliances running. Our success is intertwined with that of each family and local business. MEPAV is part of a vital American tradition that makes communities better places to live and work. It's a tradition that works.

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MEPAV sponsors scholar working to ensure power grid stability

AS ELECTRICITY BECOMES essential to more of what we do each day, it is increasingly critical to restore power rapidly when it goes out. There are many threats to a power grid

DEED is a research and development program of the American Public Power Association (APPA), which supports innovations that improve efficiency, reduce customer and operational costs, support adoption of new technologies, develop the workforce, and launch new products and services for public power communities.

that can lead to electricity outages: severe weather events, cyber-attacks, animal intervention, and vegetation (to name just a few). At present, the leading cause of outages are severe weather events which can cause blackouts affecting millions of people, last for weeks, and result in millions of dollars in economic losses. Additionally, long-term power outages have serious effects on the health and safety of communities, resulting in deaths due to the inability to access

medical supplies and treatment, food and water, and exposure to extreme temperatures, contamination and disease.

As part of a larger national effort to ensure that the United States' power grid is prepared for future events, the Municipal Electric Power Association of Virginia (MEPAV) is sponsoring a Demonstration of Energy and Efficiency Development (DEED) research student whose work is on the cutting edge of the field. Shiyuan Wang, who goes by the nickname Steven, was born in China and came to

In 2017, Hurricane Maria hit Puerto Rico and caused the largest and longest blackout in United States History. 1.5 million customers were without power; it took 11 months to restore power to some parts of the island.

the United States in 2013. He completed his undergraduate studies at the University of Science and Technology Beijing and is currently a PhD candidate at George Washington University. Working with advisor Dr. Payman Dehghanian and others at the GWU SmartGrid Laboratory, Steven is conducting research on event detection and classification in power grids using machine learning and synchrophasor technology.



- Steven Wang -

What is "synchrophasor technology?"

Modern power grids use Phasor Measurement Units (PMUs) to assess the performance of the grid at various points. These measurements are then aligned (typically using a global positioning system as the common time source) across the grid to establish a measurement known as the "synchrophasor." The wide deployment of PMUs in power systems has revolutionized the traditional method of measuring power grids. However, existing

marketplace PMUs are typically furnished with only one Synchrophasor Estimation Algorithm, or set of rules for the measurements. This is limiting because power grids continuously experience transitions caused by internal and external uncertainties, such as equipment failures and weather-driven faults/outages which the single algorithm cannot handle.

GWU SmartGrid Laboratory points the way

The research being done by Steven Wang and the team at the GWU SmartGrid Laboratory seeks to offer a framework to achieve online surveillance and monitoring of power grids that does not rely on synchrophasor estimates. They propose a single PMU, equipped with a suite of algorithms deemed effective to various prevailing conditions in the grid.

This framework can operate within various electronic devices and further allows PMUs to adapt to changing conditions and events by selecting the best-fit algorithm, which in turn minimizes the measurement error under all operating conditions.

An additional advantage to their line of work is that the framework can safely tolerate the delay or loss of communication channels (due to failures or attacks), thereby making the framework less susceptible to communication failures and vulnerabilities.

The final goal of the team's effort is to develop a stand-alone software prototype which fulfills a new class of "Smart Measurement Units" with the intelligent grid surveillance and measurement technology embedded. This critically important research will improve a power grid's ability to precisely and quickly address warning signals to drastically reduce the instances in which an outage could occur and significantly improve the speed at which power can be restored.

About the author: Sandra Harrington is the MEPAV executive secretary/treasurer and a member of the VML Staff.



Shiyuan Wang (fourth from the right) with the MEPAV Executive Board Members.

MEPAV celebrates 65 years!

A report on the annual meeting and conference in Virginia Beach

IN MAY, OVER 100 attendees were part of the Municipal Electric Power Association of Virginia (MEPAV) annual conference and meeting including member utilities, associate members, and guests. About 50 of the attendees participated in the Annual Reggie Oliver Golf Tournament.

The meeting featured contributions from several notable speakers.

Delia Patterson, Senior Vice President for Advocacy and Communications and General Counsel at the American Public Power Association (APPA), discussed APPA cybersecurity services and the new APPA Cybersecurity Scorecard, a self-assessment tool for small to mid-sized public power utilities to evaluate their current cybersecurity

risks and threats. Using the Scorecard output, public power utilities are guided to improve their cybersecurity programs, invest in cyber-

To learn more about APPA's cyber and physical security services, visit: <https://www.publicpower.org/topic/cybersecurity-and-physical-security>.

security technologies, and connect with cybersecurity technological solutions.

VML Executive Director Michelle Gowdy delivered a summary of current broadband/wireless legislation and legal updates about a ruling by the FCC regarding municipal pole attachments and proposed FCC franchise fee caps related to cable.

In his address, MEPAV Legal Counsel Jim Horwood identified three key impacts of the FCC small cell order: it applies to municipal pole attachments, local government fees for Small Cell Wireless Facilities (SWF) must not exceed a reasonable approximation cost, and there are new time requirements that apply to applications to install SWF's in the right of way and on municipal poles. Additionally, Horwood discussed the status of possible MEPAV filings in support of the APPA's pending court appeal on the order. Horwood is partner in Spiegel & McDiarmid LLP, a law firm with headquarters in Washington, D.C.

Craig Batchelor and Kenny Roberts, Safety and Training Specialists from ElectriCities of North Carolina, provided training related to safety during mutual aid events. They discussed the importance of managing expectations of deployed line-workers to better ensure their safety. Stressing that a mutual aid event is a "marathon, not a sprint," Batchelor and Roberts reminded the audience that it is the responsibility of employers to ensure that crews get food, rest, and sleep. Furthermore, they counseled on the elimination of distractions such as electronic devices and social media. Of utmost

importance, they stressed maintaining positive morale throughout the duration of the mutual aid event.

The meeting concluded with the election of Mike Stover, director of light and power in the Town of Culpeper, as the new MEPAV president and Durwin Joyce, director of utilities for the City of Martinsville, as the new vice president. Additionally, David Jenkins, director of energy services in Front Royal; Tim Logwood, director of electric utilities for the City of Radford; and Brian O'Dell, general manager of the Harrisonburg Electric Commission were elected to the association's executive committee.

MEPAV will hold its Fall Engineering and Operations Workshop at the Inn at Virginia Tech and Skelton Conference Center, Oct. 23-24, 2019.

About MEPAV

MEPAV has been an affiliate of the Virginia Municipal League (VML) since it was first created, holding their first annual meeting April 22, 1954, in the Town Hall in the City of Franklin. MEPAV has remained focused on its mission to meet the needs of its members by advocating for issues that affect member utilities; providing information, engineering and operations technical training; providing mutual aid assistance; participating in fundraising activities to support the Fallen Linemen Foundation (www.fallenlinemenfoundation.com); and providing scholarship funds for those attending Power Line Worker Training programs in Virginia's community colleges.

More information about MEPAV may be found at www.mepav.org.

About the author: Sandra Harrington serves as the MEPAV executive secretary / treasurer and is a member of the VML staff.



Reception break took place on the beach front patio.

VEPGA holds annual conference

THE VIRGINIA ENERGY Purchasing Group Association (VEPGA) held its 2019 annual member meeting and conference in Newport News on May 2nd. VEPGA is composed of representatives from local governments and political subdivisions in the Commonwealth of Virginia who have, for several decades, jointly negotiated the purchasing of energy services from Dominion Energy Virginia on behalf of VEPGA members. In addition, VEPGA keeps members informed of energy developments in Virginia, collectively promotes issues of mutual interest and provides opportunities for sharing expertise.

Speakers included Angela Navarro, Virginia's deputy secretary of commerce and trade, who provided an update on the Commonwealth's Energy Plan and other statewide energy initiatives. Cathy Lin, energy manager and stormwater program administrator at Arlington County Schools, discussed power purchasing agreements as a vehicle to bring solar powered energy to schools and government buildings. VEPGA's legal counsel Cliona Robb, a partner in the Richmond law firm of Christian and Barton, LLP, addressed key energy legislative developments from the 2019 General Assembly session. Additionally, a peer panel composed of representatives from localities shared ideas, tools, and lessons learned on issues ranging from utility rate modeling, theoretical downsizing and totalizing electrical metering for savings, and educating and engaging building occupants.

Elected at the annual meeting to the VEPGA Board of Directors for three-year terms (expiring in 2022) were Susan Hafeli, chief of the public utilities branch in Fairfax County; Rick Raike, chief of electrical and energy management for the Hampton Roads Sanitation District; Wayne Lassiter, utilities deputy director for the City of Richmond; Cathy Lin, energy manager for Arlington County Schools; and John Morrill, energy manager in Arlington County. Susan Hafeli will continue to serve as the VEPGA chair, Rick Raike as the vice chair, and Wayne Lassiter as the budget and finance committee chair.

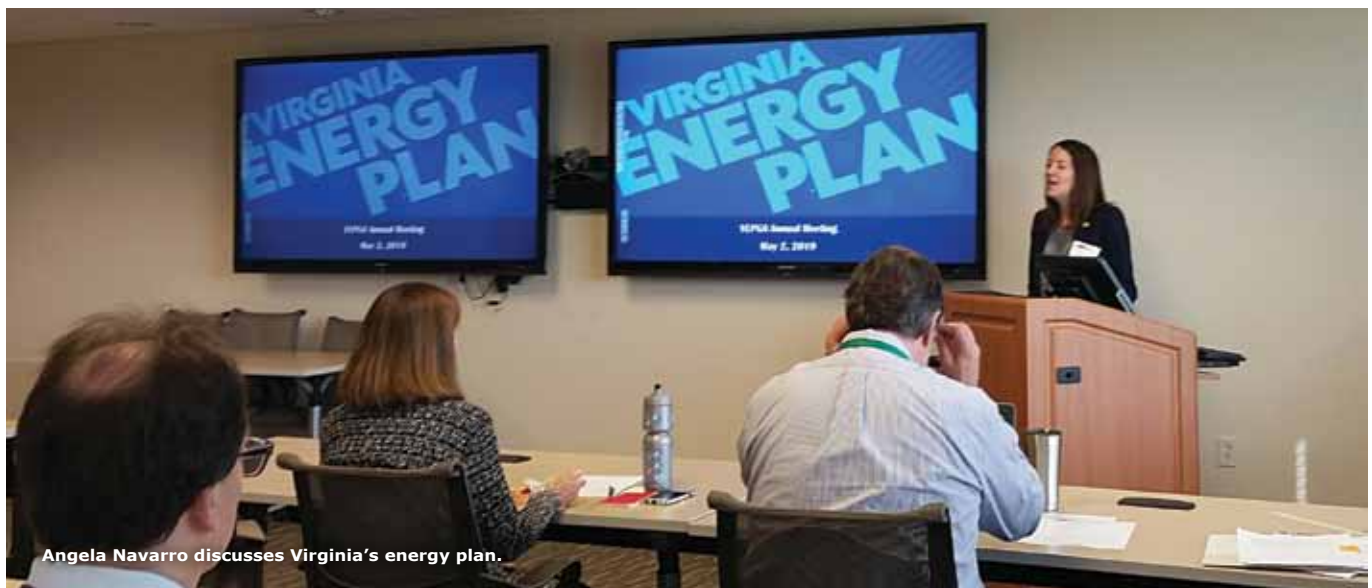
VEPGA includes over 170 Virginia local governments, public school systems, authorities, and other governmental entities. In the 1970's, local governments in the Virginia Electric and Power Compa-

ny service area (VEPCO, now known as Dominion Energy Virginia) formed a steering committee to collectively negotiate electric power rates and terms and conditions of service. This Steering Committee was jointly sponsored by the Virginia Municipal League (VML) and the Virginia Association of Counties (VACO). In 2002, the Steering Committee formally organized as the Virginia Energy Purchasing Group Association (VEPGA). In order to participate and be a VEPGA member, an entity must have a signed Joint Powers Association (JPA) agreement and an ordinance or resolution from its governing body, in addition to paying annual dues.

While VEPGA retains an expert technical and legal team, maximizing VEPGA's ability to negotiate favorable rates and terms and conditions, much of VEPGA's activity is completed by the work of committees made up of local representatives. Carrie Webster, energy manager in Henrico County, serves as the chair of the Energy Efficiency and Conservation Committee (EECC), which presents educational opportunities to members on topics such as best practices, ways to control energy use, and emerging technologies. She coordinates the EECC webinars, manages the VEPGA webpage, and assists with the development of the quarterly newsletter. Bill Eger, energy manager for the City of Alexandria, serves as the chair of the Innovative Supply Side Initiatives (ISSI) Committee which explores alternative energy options that may be available to VEPGA members. Lori Herrick-Borden, Energy Management Administrator for the City of Virginia Beach, serves as the chair for the Joint Action Committee (JAC). This committee meets quarterly with Dominion Energy Virginia representatives and serves to identify and resolve operational issues, including those involving construction, streetlight maintenance and repair, and billing issues.

For more information about VEPGA please visit the VEPGA website at www.vepga.org or contact Sandra Harrington at sharrington@vml.org

About the Author: Sandra Harrington serves as the VEPGA secretary/treasurer and is a member of the VML staff.



Angela Navarro discusses Virginia's energy plan.

FOCUS ON OUR MEMBERS

Local officials are a fascinating bunch of people who have careers all over the board and a range of backgrounds and interests. Over the next several months VML will include a brief focus on various members so that we can all gain an appreciation of what a diverse group occupies the seats in council and board chambers. Do you know someone who could be featured? Email Rob Bullington at rbullington@vml.org.

By Mary Jo Fields

Gary Johnson, Mayor, Big Stone Gap

GARY JOHNSON WAS APPOINTED by the council to serve as mayor of the Town of Big Stone Gap in 2018. He had served on council for 10 years before that.

Gary and his family are deeply connected to the coal mining industry. Gary was a coal miner for years, retiring from that job about a decade ago. He still works today teaching electrical and installation maintenance and safety courses at the community college.

It's not just that Gary himself has a connection to the coal industry, but so does his entire family, and his wife's family as well. Gary's grandfather died in a mining accident and his wife works for the United Mine Workers of America Health and Retirement Funds. Gary said that working in the mines was an accepted way of life. If you came from a coal mining family, you could get a job. A myriad of factors changed that equation.

Any elected official in Southwest Virginia can tell you the challenges the region faces. As coal was the primary industry, the area had a difficult time seeing another prosperous industry coming to this community. Gary and others are working hard to diversify the local economy. It's not just in Big Stone, but in other towns throughout that region. And they work together and support each other.

Big Stone Gap is proud to host the longest running outdoor drama, *The Trail of the Lonesome Pine*. People in town and the whole area work hard to build the tourism industry. These efforts were given a big boost by the publication of *Big Stone Gap*, the book by Adriana Trigiani, and then the production of the movie by the same name. But town officials knew that could not be the town's sole claim to fame and have worked to bring events to town such as the Celtic Festival, which provides entertainment including sheep dog competitions, great food and other Celtic events; a soap box derby; and Gathering in the Gap each Memorial Day weekend. Gary is a board member of the group that promotes Big Stone Celtic; a local newspaper article noted that Gary, while in high school, won the caber toss event at an event in North Carolina. Now he does not have to travel as far to see the event!

Gary is very proud of the Green Belt that surrounds the town. The walking trail winds around a beautiful serene town with plans to tie in with other trails. The town's many tourist attractions include the Harry Meador Coal Museum, John Fox Jr. House, June Tolliver House, Heritage Center and Southwest Virginia Museum, all of which are worth a visit to Big Stone Gap. Gary recommends a stop at the Visitors Center to begin your adventure.

Gary says to be sure to come by Town Hall to see if he is there. He'd like to meet you!



Maphis Oswald, Council Member, Onancock

MAPHIS WAS APPOINTED this year to serve the remainder of a vacated term in the Town of Onancock, but she is not new to council, having served a term from 2008-2012. She and her husband Ed operated a B&B in Onancock for seven years, and here is what she had to say about that: "When I arrived in Onancock all those years ago, I could almost *smell* potential! The first year here I was so busy turning a tourist home into a first-class B&B that I barely had time to think about anything else. I was so lucky to have another B&B owner a block away, Nancy Hartz, who said we need to get the businesses here united and focused on tourism. We formed the Onancock Business and Civic Association (OBCA). It was clear from the beginning that the private sector and commercial establishments working together could get this town rolling again. This year will be the 20th anniversary of the Onancock Christmas Homes tour, an OBCA event that grew from seeds planted by that union."

Maphis is quick to credit not only Ms. Hartz but others in the community. She said "Sprucing up the town was really started by one restaurateur, Armando, who almost single-handedly put this town on boating and yachting clubs trip agendas for years. He put huge flowering pots on the sidewalk in front of his business. Out of that inspiration came the Beautification Committee. Four of us planted and maintained pots in front of every business and now there are benches beside an ever-growing display of potted plants and garden spots, mostly maintained by volunteers.

Speaking of boaters and yacht clubs, our Town, along with former Council Member T. Lee Byrd at the helm, has just finished upgrading our beautiful Marina and its services. I cannot sing the praises enough of the people who over the years have put in countless hours to make Onancock the warm and welcoming town that it is."

She has a great perspective on council service: "My first time elected, ten years ago, I served on council during a very turbulent time in our growth. We had to make some very difficult decisions, on some of which I stood alone. I ran for reelection and was not elected. I was okay with that because I knew I took an unpopular stance--but it was correct.

I ran for council again in 2018 because I care about the well-being of all of our citizens. I understand the struggles and financial hardships that some of our citizens face where any increase in the cost of living in this small town has an impact. I can't print money, but I can try to influence the spending of tax dollars responsibly. I filled a vacancy, so this term is just two years. I hope that I can make a difference in that time and achieve the goals I've set for myself. If not, I'll have to run for a full term and keep trying."



About the author: Mary Jo Fields is an adjunct VML staff member and a contributing editor to *Virginia Town & City*.



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