Boards & Commissions Application

Harrisonburg VIRGINIA

I am interested in serving on the following boards/commissions. (Please indicate the order of preference).

1. Harrisonburg Electric Commission 2. ____________

As an applicant/member of a Council-appointed Board or Commission, your name, address, and phone number will be available to the press and public. Information will be kept on file for three years. Public discussion of information contained herein may occur in the meeting at which appointments are considered by the City Council.

☐Mr. ☐Mrs. ☐Ms. ☐Miss. ☒Dr. (Please type or print clearly)

Name: Papadakis (Last) Maria (First) C (M.I) **Date:** 2 January 2019

Home Address: 680 New York Ave. Own/Rent? Own

Phone Number: 540-568-1869 (home landline) **Alternate Phone:** 540-568-8142 (office)

Occupation: Professor **Employer/Organization:** JMU

E-mail: papadamc@jmu.edu **Harrisonburg resident for** 7 **years.**

Were you referred by anyone: ☒Yes ☐No Name of Referring Party: Jared Stoltfus

How did you hear about volunteering on a board or commission? ☐Cable ☐Website ☐Council Meeting ☒Other: Jared Stoltfus

Why do you wish to serve on a board or commission?

I believe in supporting the communities that I live in, and now that we have been settled in Harrisonburg for a few years, I have a good sense of how I can best contribute to the city through community service. I have expertise in energy and electric power systems and the HEC Board is a nice fit in terms of what I can give/bring to the city. I am committed to safe, affordable, and livable neighborhoods and deeply value the quality of life here in the city. We have lived in the Valley for 24 years, and moved to Harrisonburg from Mt. Solon in Augusta County.

What relevant experience or education do you have to this board or commission?

I teach at JMU in the Integrated Science and Technology program. I am a Certified Energy Manager through the Association of Energy Engineers; my expertise is energy management, and I have been teaching classes on energy economics, policy, and regulation for almost 24 years. I am well-versed in energy efficiency, conservation, demand management at the residential, commercial, and industrial scales. My expertise also includes the economics of renewable energy, grid management and regulation, and the emerging approaches to community resilience in electric power infrastructure. While at JMU I conducted a 3-year project funded by the USEPA that comprehensively evaluated the ability of the university to reduce energy consumption in its residence halls through demand management and more energy-efficient equipment; the work involved energy assessments of all of the residents halls and the characterization of their electricity load profiles. I also taught at Virginia Tech for 3 years in the Urban Planning Departmentand taught the environmental planning studio; as a consequence I am also deeply familiar with the processes and requirements of local planning and the role of citizen/community boards.

What other interests or concerns do you have regarding the community?

Professionally and as a citizen, I am deeply interested in the energy infrastructure for the city as well as waste management, and energy conservation is critical to me. I think that overall I am most interested in the ability of the city to be resilient -- to handle social, economic, and environmental challenges while continuing to provide a high quality of life to residents. The loss of the single-stream recycling has been troubling (but I understand the cause) and I would like to see an effective recycling/waste management program established. Most personally I would like to support public education in town and hope to be able to do some volunteer work with children. My work life has shifted in a way that enables me to work in the community in a way that I could not before.

Please list any past or present community involvement e.g. City Council, Board and Commissions, Citizen Academy, etc. in Harrisonburg or elsewhere:

I have not been directly involved with Harrisonburg City. However, I have done community outreach throughout the state in partnership with Old Dominion Electric Cooperative. My focus in this community work was farm energy efficiency, and I worked primarily with poultry and dairy producers as the project manager of a pilot farm energy audit and efficiency program for Virginia's Department of Mines, Minerals, and Energy. I have given a number of workshops throughout the state on ways to conserve energy on-farm as well as on the economics of wind and solar power. I have also given talks from time-to-time at the invitation of Ruritan clubs and other civic organizations. I served for several years on advisory bodies for the Commonwealth of Virginia's Department of Environmental Quality. Specifically, I was on the state advisory board for the Commonwealth's Small Renewable Energy (Wind) Permit by Rule, 9VAC15-40, and was on the advisory group that wrote the model wind ordinances for the Commonwealth as well. This brought me into contact with the major utilities in the state (Dominion Power, Appalachian Power, etc.) so I am familiar with the investor-owned utility environment as well as the rural electric cooperatives. Finally, I served as an at-large board member for several years on the Shenandoah Valley RC&D when it was sponsored by the USDA Natural Resource and Conservation Council.

Cooperative living

May 2007

Win a Weekend for Two at Wintergreen! See pg. 21

Partners in An Energetic Agenda

pg. 14

Are Compact Fluorescent Light Bulbs a Mercury Hazard? pg. 10

Highland County Hosts Family Friendly Motorcycle Rally pg. 32

Down Home in Lottsburg pg. 36

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STAUNTON VA 24401-8944

For changes of address, please contact your local electric cooperative.

COVER STORY

An Energetic Agenda

JMU professor and energy management and policy expert Dr. Maria Papadakis (above) spreads the gospel of energy efficiency as part of a four-pronged approach to solving future energy challenges. Having saved thousands of dollars as the result of a lighting experiment conducted by Papadakis, Shenandoah Valley poultry farmer Chuck Horn (right) is a believer.

by Bill Sherrod, Editor

Imagine a future where you could plug your fully charged electric car into a receptacle to help supply the national grid.

Imagine a future where your appliances would know when not to run to avoid building a peak demand that would overtax the available supply of electricity.

Imagine a future where wind turbines and solar technology provide a heapin' helpin' of your daily energy consumption.

Imagine a future — to borrow a recent campaign concept — bathed in the warm, glowing balm of idealistic electric-energy change.

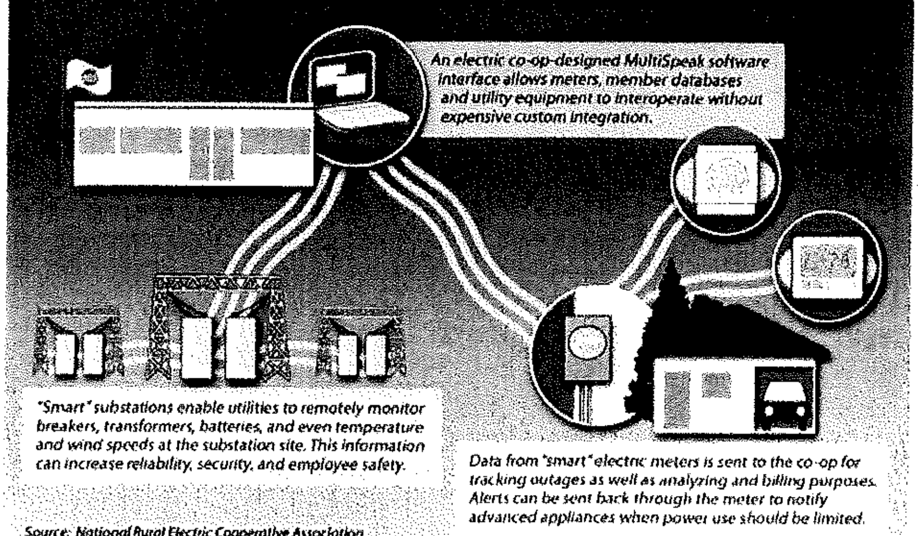
Foolish optimism? Not really. Change in the way we produce and use electrical energy is inevitable. It's as certain as the fact that demand for electric power will continue to increase.

Yes, on the way to that distant, beckoning destination of a changed world — as we perfect better ways to manufacture electricity and more efficient ways to use it — we'll continue to need increasing amounts of the crackly magic stuff. We will still get up in the morning, eat breakfast, take hot showers and go to do jobs where electricity is a necessity that we hardly think about until it's not there.

In recent months, influences ranging from the presidential campaign to looming rate increases have sharpened awareness of all things electric. Talk of energy efficiency, alternative fuels and carbon footprints has become part of the common lexicon. Virginia is blessed with a guru of sorts, an unassuming expert quietly conducting research and working toward solutions to tomorrow's energy challenges. This guru is Maria Papadakis, a James Madison University professor and specialist in energy management and policy.

The Smart Grid

By enabling both new and existing electric grid components to communicate with each other, electric cooperatives can better monitor conditions, collect information, and remotely control devices over a distribution network. Often called the *Smart Grid*, this system can use various technologies, as shown here.



Source: National Rural Electric Cooperative Association

HOKIE CLASS SPARKS INTEREST IN ENERGY

Born in Virginia, Papadakis grew up in Indiana but returned to her native state to attend college at Virginia Tech. While a Hokie, she took an energy engineering course, and the die was cast. "That's where my interest began," she notes. After graduating from Tech, Papadakis earned a Ph.D. in political science at Indiana University. Her energy expertise evolved from more than 20 years of work in technology assessment. She settled in the Shenandoah Valley to teach at JMU 14 years ago.

About a year and a half ago, Papadakis began conducting agricultural-energy research on the economics of energy-efficient, dimmable compact-fluorescent lamps (CFLs) in Shenandoah Valley poultry houses.

"We did a study on possible savings comparing dimmable CFLs and traditional bulbs," notes Papadakis. "The study showed considerable savings."

Since then, she has been working with the Shenandoah Resource Conservation and Development Council and the Dept. of Mines, Minerals and Energy to develop a farm energy-audit pilot program to identify future energy needs and energy-savings opportunities for the state's agriculture sector.

Energy-savings opportunities are central to what Papadakis sees as the course to our energy future. "The reality is that we consume an extraordinary amount of electricity. And every energy-supply choice has an environmental consequence."

According to Papadakis, a good energy strategy has four points, all equally important:

- Very good energy-efficiency and conservation programs for electricity end-users;
- The cleanest base-load power that we can get;
- The addition of new renewable-energy generating sources; and
- An improved electric power grid.

"The buzz these days is on the 'smart-grid' concept," says Papadakis. "This idea is tied to the nature of the electric power that comes into the grid, and how decentralized it is."

THE SMART GRID

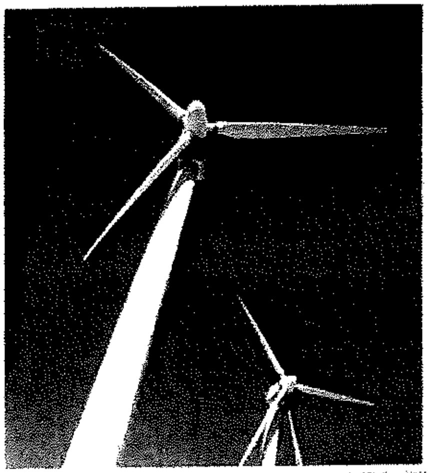
A smart grid would manage variable-power input coming from sources such as solar panels and wind-power generators. A smart grid would also accommodate demand-control for smart appliances, to reduce demand during peak power-use periods.

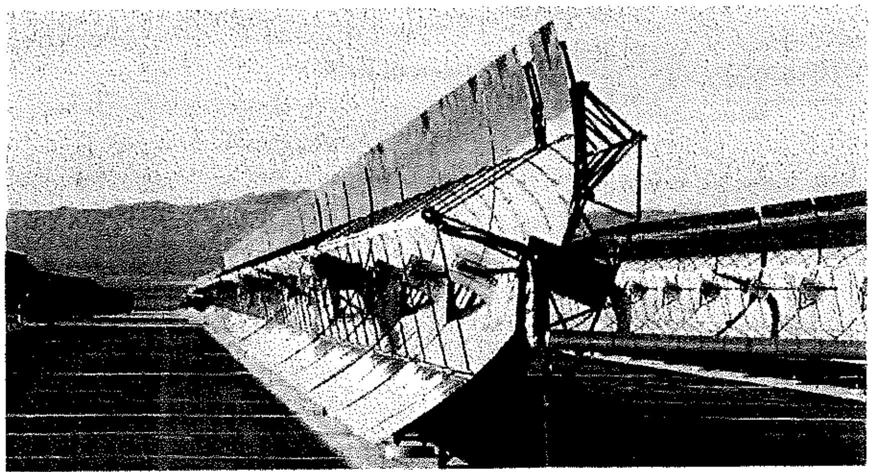
"The grid is a real-time system, meaning the amount of electricity coming onto the system is roughly the same as the amount going out," says Papadakis, "so we try to match power generation to the amount being used."

The amount being used is the big variable, one that utility forecasters can predict. What can't always be predicted are the unexpected peaks because of, for example, unseasonably hot days. The grid has to be able to meet these demand peaks.

Demand-control programs, such as the water-heater switches used by many electric cooperatives, are used to reduce peak demands. "A smart grid can enhance the utility's ability to do these types of demand control," Papadakis says.

One interesting smart-grid possibility would involve use of plug-in hybrid vehicles. "The mathematical modeling is being done now," notes Papadakis. In principal, the





Use of variable energy sources like wind and solar power as base load will require new technologies.

hybrids would be plugged into the grid for recharging at night, during the off-peak period. Potential vehicle-to-grid technology would allow such vehicles plugged in during the day to give some of their stored power back to the grid. Basically, the hybrid cars would act as a huge aggregate battery-storage system for the grid.

BASE-LOAD GENERATION: THE POWER BEHIND THE POWER

"Base load is power generation that is constant — it's running all the time, at full capacity, to ensure that the grid always has enough electricity to keep things going," says Papadakis. "The only time it's not at full capacity is when it's shut down for maintenance or repair." Because of its nature, base-load power must be the cheapest available. Historically, coal, nuclear and, where available, hydroelectric power have been the primary sources of base-load energy.

Base-load energy generators are not responsive to small changes in demand: "You typically can't turn a base-load generator on and off — it's not efficient," says Papadakis. "To supplement base-load, utilities have generators that can respond more quickly. These tend to be powered by natural gas, and when you turn them on, you get electricity in a hurry." These intermediate or peaking-power generators are typically up to 160-megawatt sources, while base-load generators are typically 800- to 1,500-megawatt sources of electricity.

"These sources of power — base load and intermediate — have very predictable and stable output," says Papadakis.

"The renewable sources are where things start to get complicated. Wind and solar power are intermittent and variable — not continuous sources of energy. The electric grid doesn't 'like' a variable energy supply. It likes stable current," she adds. This is where development of a "smart grid" would help. We're headed in that direction, but patience is required.

"To most effectively use large amounts of variable energy, we need technology to help stabilize it. Right now, we don't have the technology to use wind and solar power as 'base load' or intermediate load. Large-scale battery storage is the focus of much research, as is renewable 'firming power,' such as solar and hydropower. A basic amount of electric power needs to be on all the time as a predictable and continuous supply — our grid cannot function without base load."

The Department of Energy estimates that in 20 years, 14 percent of our energy will come from renewable sources, meaning that 86 percent will still be from traditional types of generators.

"We'll still add gigawatts of base load from mostly coal and nuclear sources," she says. "Building base load takes a long time, five to 10 years for design, permitting and construction. So you have to plan today for what's projected as need 15 years from now. And the planning has to use technology that is available today. For those concerned with the environment, we need to think about slowing down the need for base load. This requires effective economic incentives and public policies that will promote that outcome."

It's critical for utilities to assess the cost-effectiveness of efficiency and conservation programs versus construction of new facilities, according to Papadakis.

Building smaller plants as opposed to one large base-load facility is another possibility for future power supply, she adds. "Small-plant advantages are that you can get the plant closer to the load center, so you don't lose power shipping it long distances over transmission lines. And small plants can potentially produce electricity with less pollution; so there are economic gains as well as environmental advantages."

New coal-fired base-load plants use the latest environmental-protection technology and are more efficient and cleaner compared to those of 20 or 30 years ago, Papadakis adds. "And there's a lot of renewed interest in nuclear power as a source for base-load energy," she notes.

Other fuels available for base-load generation on a limited basis range from biomass to landfill methane.

"A utility has to consider its customers' needs a decade or more into the future," says Papadakis. "And construction costs are a very sensitive component of these models."

In the final analysis, a sound plan for ensuring an adequate supply of electric power will involve a variety of approaches which, when condensed, define the essence of Papadakis' four-point strategy.

"There's simply no 'magic bullet' to solve our energy challenges for the future," she concludes.

For more information, see the following online resources:

Energy Resource Guide for Virginia
www.energyguide.ext.vt.edu

U.S. Department of Energy, Energy Efficiency and Renewable Energy
www.eere.energy.gov

The ENERGY STAR Program
www.energystar.gov