



SHENANDOAH VALLEY ELECTRIC COOPERATIVE

A Touchstone Energy® Cooperative 



LETTER FROM THE PRESIDENT & CEO

Finding Balance Is Important When Providing & Producing Electricity

Certain items, such as electrical energy and fuels, have become necessities in our day-to-day lives. But what can we do when the costs of these items continue to rise amid economically difficult times? It seems that things have been on “shaky ground” for a while now. The economy. Feeling secure in our own country. Relationships with other countries. Threats of terrorism. The political climate. Conflicts and wars around the world. Natural disasters.

The slightest change in external factors over which we have no control can have real consequences for Shenandoah Valley Electric Cooperative

SVEC pays 75 cents out of every dollar for wholesale power. These costs are passed to SVEC from our wholesale power supplier

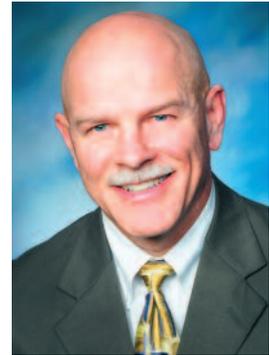
(SVEC) and its members. For example, the immediate effects of the magnitude 5.8 earthquake that rumbled through the Commonwealth on Aug. 23 were minimal in the Shenandoah Valley, causing little or no damage. However,

the temblor caused damage to the North Anna Nuclear Power Plant. How does this affect SVEC and its member/owners? Well, we get our power from Old Dominion Electric Cooperative (ODEC), and ODEC gets 12 percent of its diverse power-supply mix from North Anna. Following the earthquake, the power plant shut down. North Anna has now undergone rigorous tests and inspections for re-start, and as of Nov. 11, the facility was given the green light to resume power production.

In the meantime, an alternate source of power was needed to replace the amount of energy lost due to North Anna’s shutdown. Unfortunately, this replacement power cost was higher than the usual cost of power from the North Anna facility. Ultimately, these added costs will be passed to our member/owners in their electric bills.

Though we were unpleasantly surprised with this unforeseen natural disaster, and faced unexpected costs, we were also presented an opportunity for a renewed appreciation of the diversity, and balance, of our power-supply portfolio. Having a balance in such uncertain, and sometimes literally and figuratively shaky times, is what your Cooperative seeks.

As cited in a letter I wrote to you in June 2007: “... a gallon of gasoline



Myron D. Rummel
SVEC President & CEO

averaged \$1.40 per gallon in January 2001. Today a gallon of gas is \$2.90 ...” And today? Gas averages about \$3.40 a gallon. This bit of information is a good segue into what we at SVEC are concerned about: costs to you for your electrical energy.

In that very same letter from June 2007, I note that SVEC “... pays 70 cents out of every dollar it collects from its members for wholesale power.” Now? SVEC pays 75 cents out of every dollar for wholesale power. These are costs passed to SVEC from our wholesale power supplier. The other portion of each dollar goes to operations & maintenance, depreciation, interest on debt, and other various expenses for properly managing a business. For these expenses, rest assured we do everything we can to keep the costs as low as possible.

Finding a balance is important with many facets of energy and energy production. One of the main challenges power providers currently face are the environmental regulations being

discussed by lawmakers at the state and federal levels. Some of these environmental standards, which are still being determined, have the potential to impact future costs.

Looking into a hazy crystal ball, it is hard to say how costly the regulations may be. It is imperative that the effects of electrical energy production on the environment are considered. There is a need to attempt to preserve and protect the environment. But at the same time, a balance must be struck: if the regulations are too stringent, there's the potential to stymie economic recovery with significant increases in electrical energy costs.

America needs most all of the existing energy production facilities, and cannot afford to have many, if any, "taken off the grid." Another challenge is trying to balance the demand for electrical energy versus environmental concern. In some conversations, it has been mentioned that some of the coal-fired plants should be taken off-line, to reduce the amount of carbon emissions. Perhaps this could and should be accomplished, but I submit to our members that this action should not be taken without serious consideration. The closing of dated facilities is one thing, but the other part of the equation is then opening new plants to replace the lost production. Renewable energy projects are of course, great concepts — electrical energy created with less impact on the environment — but they also bring with them additional costs and concerns about reliability and the capacity necessary to meet demand.

Constructing and bringing new facilities on-line takes an enormous amount of time (and capital), and it's not just the physical building of the plant. Just finding a suitable location and attaining the proper permitting and permissions can take several years. Then, once the actual construction begins, another few years can be tacked

onto that. By the time the facility opens, it can take up to 10-15 years. Much planning must go into the decision to close a facility, as much time must be allowed to bring a new power producer online. Again, finding a balance between what is prudent and what is possible is vital.

What can you do? We want to help you keep your costs as low as possible. There are a couple of things you can do to potentially lower your electric bill. Participate in SVEC's Load Management program. It is free, and directly results in a reduction of wholesale power costs. Another suggestion is to replace your incandescent bulbs with CFLs or LEDs. We recently sent out coupons for LED holiday string sets in your November bill, and coupons are available at our district offices for these light sets. We also offer booklets with many energy-saving ideas, which you can view at our website, www.svec.coop, or pick up at one of our district offices.

For 75 years SVEC has brought power to the homes and businesses of the Shenandoah Valley. That's a lot of years of weathering storms, sometimes challenging economic conditions, and yes, even riding out earthquakes. But through it all, we continue to give our best, day in and day out, to bring you safe and reliable electric service at the lowest possible cost. As always and will continue to be, "We Exist to Serve Our Members."

I have touched upon many parts of our service to you in this letter. In the upcoming months, we will be publishing an article in *Cooperative Living* regarding nearly all aspects of your electric service — from the generation, to transmission, to distribution, as well as some topics in between. We look forward to presenting you with this information.



August & September SVEC Major Outages

- Aug. 11 Columbia Furnace area
1,300 consumers out for
1 hour due to power
supplier
- Aug. 15 Gainesboro area
600 consumers out for
1 hour due to lightning
- Aug. 25 Deerfield area
700 consumers out for
1.5 hours due to tree on
power line
- Aug. 27 Fort Valley area
1,030 consumers out for
2.5 hours due to tree on
power line
- Sept. 1 Gainesboro area
600 consumers out for
1 hour due to tree on
power line
- Sept. 9 Gainesboro area
600 consumers out for
2 hours due to tree on
power line
- Sept. 13 Shawneeland/Gainesboro/
Chambersville areas
4,400 consumers out for
2 hours due to substation
equipment failure
- Sept. 21 Millwood Avenue/Apple
Blossom Mall areas
1,700 consumers out for
4 hours due to substation
equipment failure
- Sept. 28 Bergton area
1,200 consumers out for
2.5 hours due to power line
equipment failure
- Sept. 28 Cub Run area
650 consumers out for
1 hour due to bird in
substation
- Sept. 30 Stuarts Draft/Fishersville/
Waynesboro areas
6,700 consumers out
for 3 hours due to
construction equipment
contact with Virginia Power
transmission line

The **FUTURE** of Nuclear Power

For decades, people in the United States have had conflicted attitudes about nuclear power. In the 1950s and 1960s, advocates of the technology believed it would usher in an age of cheap, virtually limitless energy. Later, following highly publicized nuclear accidents at Three Mile Island in 1979 and Chernobyl in 1986, concerns about safety dramatically slowed the deployment of new nuclear facilities around the country.

More recently, nuclear seemed poised to make a comeback in the U.S. The reason: It offered a “clean” way to produce power without the greenhouse gas emissions that exacerbate climate change and global warming. Then, in March of this year, the nuclear industry suffered yet another major setback. A devastating earthquake and tsunami hit northern Japan, and the resulting damage caused a meltdown and large-scale release of radiation at a nuclear plant in the city of Fukushima. The Fukushima disaster dramatically heightened political opposition to further nuclear deployment in many parts of the world. Germany, Italy and Switzerland, for instance, have all said they will abandon nuclear altogether.

What is the future of nuclear power

here in the United States? To answer that question, *Outlook* turned to expert William Tucker (WT), who has written about nuclear technology for the *New York Times*, the *Wall Street Journal* and other leading publications. Tucker believes the political obstacles to nuclear in the U.S. remain very high. Nonetheless, he argues the business case for nuclear is compelling – and that, over the long term, the technology should play a significant role in the nation's energy future.

OUTLOOK: Tell us about the state of nuclear power today: How much energy does the U.S. get from nuclear power?

WT: We have 104 reactors across the country averaging a little less than 1,000 megawatts apiece. Overall, we get about 100 gigawatts of total power. That's 20 percent of our total national consumption. Interestingly, nuclear makes up only about 10 percent of our generating capacity but it runs so efficiently it provides 20 percent of our electricity. By comparison, natural gas makes up about 40 percent of our capacity but provides only 23 percent of our electricity because gas plants are expensive to run and are often shut down for various reasons.

Nuclear has remained a pretty steady 20 percent since 1990, even though our electrical consumption has risen by more than 25 percent. The industry finally realized they were trying to run reactors like coal plants when it was a completely different technology. With coal, you run the plant for about two weeks and then shut it down to “give the boiler a rest.” With nuclear submarines, however, you may run the reactor for five years without ever turning it off. Utilities began applying those lessons in the 1990s and eventually upgraded the “capacity factor” – the amount of time the reactor is up and running – from around 60 percent (the average for coal) to over 90 percent today. Also, about half the reactors in the country have been granted “uprates,” meaning they're allowed to generate more electricity than originally licensed because they had excess capacity in their design. As a

result, we have added the equivalent of 20 new reactors to our national fleet just by making better use of what was already built. That is why nuclear has remained at 20 percent even with no new construction.

“... Interestingly, nuclear makes up only about 10 percent of our generating capacity but it runs so efficiently it provides 20 percent of our electricity.”

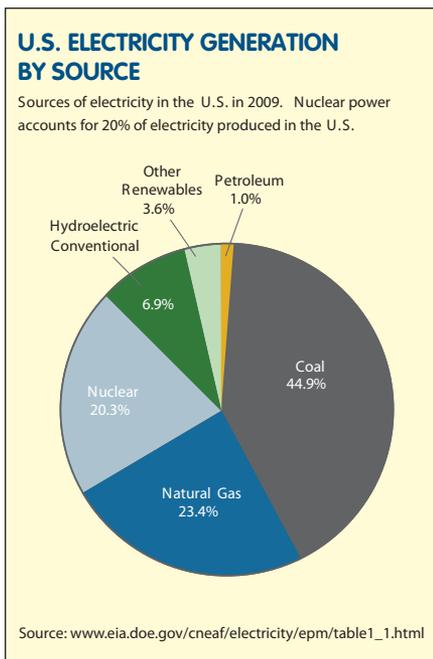
– William Tucker, author

OUTLOOK: When was the last time a nuclear plant was built in the United States?

WT: No new construction licenses have been issued since 1976, but the Tennessee Valley Authority had several existing licenses it had not used. The TVA has brought two additional reactors online since 1996 and is in the process of completing a third, which will be completed in 2012.

OUTLOOK: How about the world? What percentage of global energy comes from nuclear today?

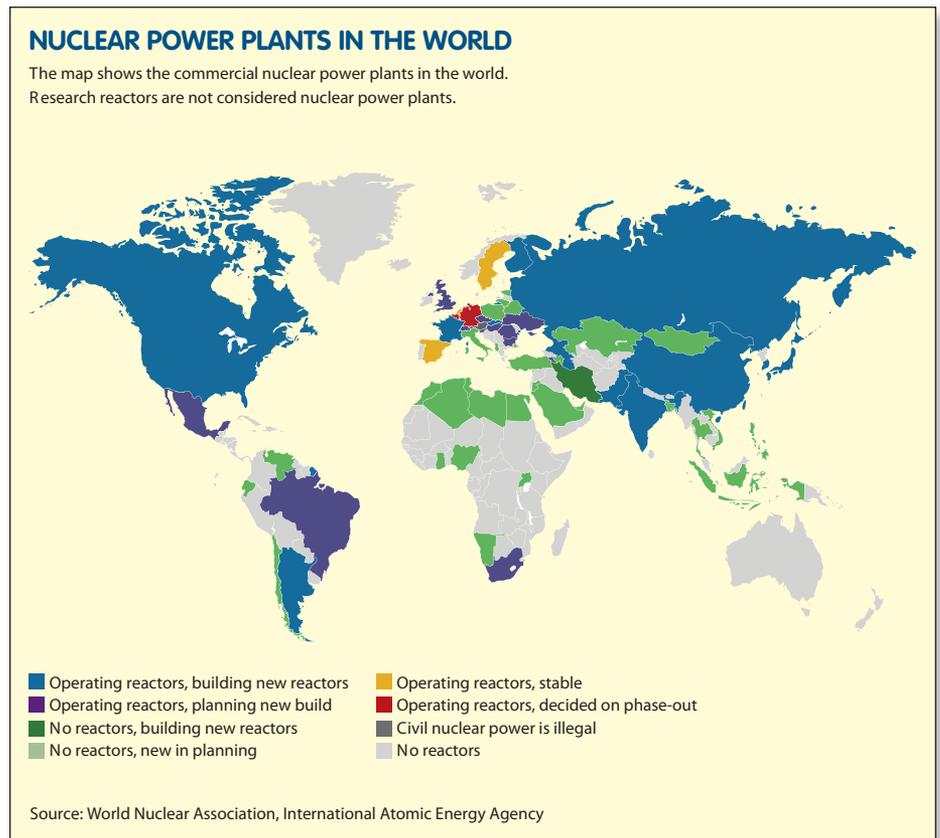
WT: There are two figures and they are often unnecessarily confused. There is energy consumption and electrical consumption. Nuclear is used almost exclusively to generate electricity, so it naturally plays a larger role here. Nuclear generates 13 percent of world electricity and about 6 percent of world energy. This is slightly lower than in the United States. Hydro provides about 16 percent of the world's electricity. This is because large hydroelectric dams are often developed very early in developing countries – i.e., the Aswan Dam in Egypt. Coal generates 41 percent of the world's electricity and natural gas 21



percent. Non-hydro renewables are still insignificant at both levels and this figure usually refers to wood burning, not wind or solar installations.

OUTLOOK: How long does it take to get a permit to build a nuclear plant in the U.S.?

WT: In theory, the permit process can take forever and nothing has happened yet to disprove the theory. The Nuclear Regulatory Commission issued its last construction license in 1976, shortly after being separated out from the old Atomic Energy Commission. Under the old system, a utility got a construction license and then after spending several billion dollars to build the reactor it came back in for an operating license. Environmentalists and nuclear opponents, however, found they could contest the operating license and keep the reactor from opening. Several major reactors were delayed for years trying to secure operating licenses, and one reactor on Long Island never opened. Utilities naturally refused to invest any more money under such a system. In 1992 the procedure was revised so that you now apply for a single construction-and-operating license – under the presumption that someday somebody might want to build another reactor. Nobody ever applied, however, until NRG Energy broke the ice in 2007 and applied for two new reactors in Texas. A bunch of other utilities jumped in and for a while there were almost 30 applications in the hopper at the NRC, although several have subsequently been withdrawn. However, the process is still somewhat open-ended. Before a utility can build, it has to get a license for the design of the reactor. Since most of the current proposals involve new designs – instead of the 30-year-old ones – that adds another layer of approval. Two plants in Georgia now seem to be closest to getting licensed for construction, but the NRC has not yet approved the design – Westinghouse’s new AP1000 – even though there are four Westinghouse AP1000s nearing completion in China. And even if the NRC does eventually issue a license, it will be subject to a long barrage of court challenges. Also the NRC has a long history of changing its mind and requiring new design changes even after a license has been issued. I’ve



actually heard environmentalists who are concerned about global warming suggest that we should turn nuclear power over to the military or some other arm of the government just so it could overcome all the roadblocks and resistance from within the government. I think what it really comes down to is a question of whether private enterprise can function any more in this country with regard to nuclear power or whether government regulations have completely suppressed it.

OUTLOOK: You argue that we need more nuclear power because of its efficiency. How does a nuclear plant compare to a coal plant?

WT: The comparison I make revolves around Einstein’s equation $E = mc^2$, which says there’s a relationship between matter and energy. Before Einstein, no one had ever conceived of the idea that matter and energy were interchangeable, that you could create energy by transforming matter. It took a long time to realize that when you combust things, such as burning coal, you’re actually transforming very, very, very minute amounts of matter into energy. Those transformations are chemical reactions

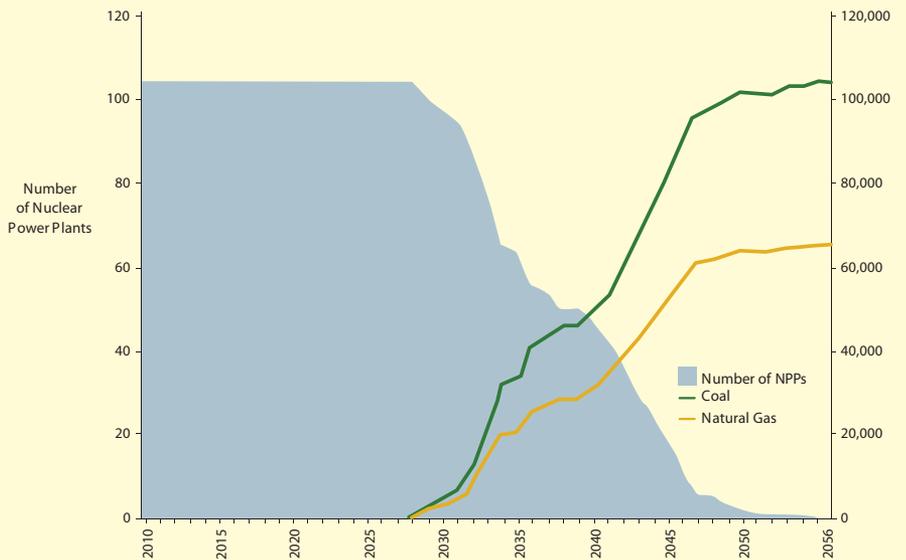
that take place in the electron shells. The key is there is about 2,000 times as much mass in the nucleus as in the electrons. So the nucleus is an incredibly larger reservoir of potential energy. When you set off a chain nuclear reaction in a pound of uranium, you get about 2,000 times as much energy as you do when you combust an equal weight or volume of coal. What that means is that you’re going to need much less mass, much less matter, to get the same amount of energy. The average coal plant produces about 1,000 megawatts. In order to feed that plant, you need a 100-car coal train to arrive at the plant every 30 hours.

A nuclear reactor producing the same amount of power will be refueled by a fleet of six trucks carrying a set of fuel rods and arriving at the plant about once every 18 months. A fistful of uranium has more potential energy than one of those 100-car coal trains. In fact, they say if you extract the trace amounts of uranium in coal, you’d get more energy from that than from the coal itself. So when it comes to environmental impact, the less material you have to deal with, the less impact you have on the

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IMPACT OF NPP RETIREMENT ON CARBON EMISSIONS

This graph illustrates the potential rise in CO₂ emissions if base-load electricity currently produced in the U.S. by nuclear power were replaced by coal or natural gas as current reactors go offline after their 60 year licenses expire. Note: graph assumes all 104 American nuclear power plants receive license extensions out to 60 years.



Source: Brett R. Stone

do with our spent fuel but keep it in on-site pools or dry casks. Eventually, we'll probably send it to Russia, which is now volunteering to reprocess fuel for the whole world.

The French went ahead with reprocessing and have created an international industry. They recycle spent fuel for Japan and several European countries, making money in the process. Since all the nuclear waste ever produced in this country would fit inside of one Target store, the volumes that the French end up handling are remarkably small. All their unrecyclable high-level waste is stored beneath the floor of one room at Le Hague.

OUTLOOK: You suggest people don't pay nearly as much attention to the human cost of other types of energy. Why does nuclear energy scare people so much?

WT: It's new, it's different, it's unknown. They've done studies on how people evaluate risk and what they've found is that people are much more afraid of new phenomena than risks that are familiar. They're more concerned about highly infrequent events that have very large consequences versus more common events that are not catastrophic. People feel more nervous about airplane

travel than getting in your car, even though far more people die in cars and it's much more dangerous per mile traveled. Four coal miners a week die in China, but that's 'dog bites man.' You never see anything in the press. But if somebody drops a wrench at the Indian Point reactor, it makes the *New York Times* because it has to do with nuclear. There's also that unfortunate association with nuclear weapons that we've never quite overcome. You could see that with Fukushima. People were expecting it to blow up like a nuclear bomb. In that sense there was some educational value to the accident in that the news commentators finally got it straight that those hydrogen blasts were not "nuclear explosions."

OUTLOOK: You've written that the only reason we don't object to the environmental effects of renewables like hydro, wind and solar is "because we haven't yet encountered them." But none of them can possibly be as dangerous as a nuclear accident, can they?

WT: It's the same point about day-to-day risks versus far-off possibilities. The consequences of a full-scale nuclear accident are obviously much greater than anything that can happen with a wind farm or solar assemblage –

although you can't lump hydroelectric dams in here. There was a series of dam bursts in China in the 1970s that killed 76,000 people. But in terms of day-to-day environmental impact, wind and solar will have a huge impact. They're going to occupy dozens and dozens of square miles. On the other hand, we're now developing small-scale nuclear reactors that will have virtually no impact. You could put an 80-megawatt reactor in a single basement and power a town of 20,000 people. No one would ever notice. If there were an accident, the reactor would be three or four stories down and nothing would escape. So the potential for low-impact nuclear is much greater than for any other technology.

OUTLOOK: The resistance to nuclear power has been a U.S. phenomenon since Three Mile Island. After Fukushima, is there greater concern in other nations that had been advocates of nuclear?

WT: Yes, definitely. Germany says it's going to close down all its reactors, although I think they're going to find it much harder than they imagine. At best, they'll end up completely dependent on Russia for natural gas. Japan has cancelled new construction. But other countries are shrugging it off, saying, "We're not worried about tsunamis here." Or, "We can do better than that." South Korea is now the world's technological leader and you haven't heard a word out of them. Britain is going ahead and Russia is, too.

But it is definitely going to slow down. There were countries that had some pie-in-the-sky kind of plans – Vietnam was going to build two reactors; Nigeria was going to build a reactor; Egypt was, too. A lot of that wasn't realistic. But the difference is this: The countries that are going to go ahead are industrializing and providing for people who don't now have access to electricity. They're building fresh and not replacing anything. For us, it's a matter of replacing coal and trying to deal with global warming. But if we don't build anything new, our people will still have access to electricity. That's why China, Russia and Korea may move ahead while we stay behind.

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OUTLOOK: So can we supplement or even replace the existing stock of U.S. nuclear plants with new plants that have significantly higher safety standards?

WT: This is a long, long process, but I think if we were developing small reactors now, it would be a much safer technology. They don't reach the same temperature, and most are air-cooled, not water-cooled, so you don't have to be next to a body of water and you lose the tsunami risk. You can put them out in the middle of the desert. You've always been able to cool a reactor with either air or water, but with these giant reactors, 1,000-megawatt or 1,500-megawatt, the air can't carry away the heat. You need something more dense, such as water. If we were evolving this technology, moving ahead the way we do with other technologies, we would be gradually dispersing large-scale generation and moving toward this much safer technology of smaller reactors.

“This is the first technology since the American Revolution where America has not led the world.”

– William Tucker, author

OUTLOOK: Is the political environment in the U.S. such that a privately owned company would not undertake a nuclear project? What type of government subsidies, guarantees, regulatory waivers – even public ownership – would we need to make that happen?

WT: Milton Friedman always said that when government gets big enough, the only thing that can oppose it is another brand of government. I think we're at that point now with nuclear. The American nuclear industry is really just one giant corporation run out of the 11-story headquarters of the Nuclear

Regulatory Commission in Beltsville, Md. None of our reactors operate independently. They have to ask permission for everything. It may take months and years before a decision ever comes down. I was in the Cooper reactor in Nebraska, wandering around with my guide, and I saw a tricycle.

I asked, “What's that doing there?” He explained, “This is a big place and cars aren't allowed in here, so there's a lot of walking to be done. Some of the employees asked if they could ride bicycles between the buildings. We sent up a request to the Nuclear Regulatory Commission and eight months later the word came back “Bicycles are too dangerous but you can have a tricycle.” That's the kind of decision-making that goes on. Westinghouse applied for a design certification for its AP 1000 reactor in 2004, and they're still waiting. It's taken seven years for the NRC to decide whether it can be built. Meanwhile, China is building four of them. Very few private companies are interested in this kind of investment. The time horizon is just too long. You can't go to investors and say, “Well, if you want to put some money into this reactor we may start to make money in 15 years.” Nobody's going to invest under those circumstances. That's why they have to ask for loan guarantees. I think we're at a real critical point in our history. This is the first technology since the American Revolution where America has not led the world. Trains, automobiles, electricity, radio, television, computers – we were always ahead of everyone else. But even before Fukushima, we were falling embarrassingly behind the rest of the world. In 20 to 40 years, it's entirely possible there will be advanced industrial economies that will blow right past us. We think we're having a bad time now competing against China's cheap labor. Wait until they have cheap electricity as well.

OUTLOOK: It sounds like the largest obstacles to nuclear development are all political, and Fukushima will only heighten those. Over the long term, however, do you think the case for nuclear is compelling enough that we will see a significant increase in nuclear plant deployment here in the U.S.?

WT: I doubt it will happen in the near future. But in the long run, I think the case for nuclear will become overwhelming.

OUTLOOK: In order to stop using nuclear power, the world will have to rely on fossil fuels and emerging energy sources like wind and solar. The executive director of the Sierra Club told Fortune magazine they support elimination of fossil fuels first, then nuclear. Do you see that as feasible?

WT: That must be after they've finished tearing down all the large hydroelectric dams, which is another of the Sierra Club's declared missions. I think this is very unrealistic. I don't think the so-called renewable energy sources will ever be able to contribute anything more than marginal amounts of electricity. The Sierra Club and other environmentalists will probably be able to block nuclear and may even succeed in shutting down some coal. But what they're going to end up with is lots of natural gas. They don't seem to like fracking for that, either. The only other alternative is that we will have no electricity and start experiencing shortages, which is exactly what happened in California in 2000 for exactly the same reasons. They stopped building power plants and ended up with a huge shortfall of electricity.

OUTLOOK: What public policy changes should be made today to reach an optimal outcome here in the U.S. regarding nuclear power?

WT: The main change has to be in public opinion. If people truly recognized that serious accidents are extremely unlikely and that nuclear has huge environmental advantages, the NRC and the bureaucracy would quickly follow suit. It could happen in the near future. Americans are going to get tired of seeing their landscapes littered with windmills and solar collectors that only produce electricity about one-third of the time. At that point, their concern about global warming will probably lead them back to nuclear power.

SVEC Offers Scholarship Opportunities

Since 1992, Shenandoah Valley Electric Cooperative (SVEC) has awarded scholarships to deserving high school seniors in the region that it serves. These students have earned the scholarships with excellence in the classroom, extracurricular activities, and contributions to the community. In the years since the scholarship has been awarded, the Cooperative has given back more than \$60,000 to the community. During the spring of 2012 SVEC will award ten \$1,000 scholarships to students whose parents or guardians are member/owners of SVEC.

Furthering one's education is the best investment for success in the future. The obstacles facing most students today are the rising costs associated with a college education.

The goal of SVEC's scholarship program is to make a student's dream of higher education become a reality. The only requirements for a student to apply for the scholarship are that their parents, or guardians, must be member/owners of Shenandoah Valley Electric Cooperative and the student must attend a high school located in the areas served by the Cooperative.

Students will be judged for the scholarship based on a number of



criteria. The three most important criteria will be the quality of the essay provided by the student, participation in school/community activities, and the quality of their high school course load. Other information used to judge the applicants will be letters of reference and grade-point average. It is important to note that the first step in the judging process is a blind review of the essays. The judges have no information (including name, high school, or gender) regarding who wrote the essays at this point. Based on the essays, the judges will narrow the applicant pool before reviewing all other information submitted with the application.

The eligibility requirements and judging criteria are outlined in the application form that is available at any SVEC office or the students' school guidance department. All applications and essays must be delivered personally to SVEC's Mt. Crawford office by 4:30 p.m. on Feb. 24, 2012, or postmarked no later than Feb. 24, 2012.

If you have any questions concerning this scholarship opportunity, please check our website at www.svec.coop or call Cammie Tutwiler at Shenandoah Valley Electric Cooperative.

PREVIOUS SCHOLARSHIP RECIPIENTS IN PAST FOUR YEARS:

2011

Jessica Barr	Central High School
Kristen Baber	Fort Defiance High School
Savanah Cary	Harrisonburg High School
Margaret Freed	Riverheads High School
Maggie Getaz	John Handley High School
Mark Gordon	Spotswood High School
Kelsey Grimm	Riverheads High School
Emily Knupp	Harrisonburg High School
Michael Strickler	Buffalo Gap High School
Sarah Ward	Turner Ashby High School

2010

Audrey Bierly	Spotswood High School
Whitney Kite	Spotswood High School
Ranee Sager	Broadway High School
Matthew Wertman	Wilson Memorial High School

2009

Benjamin Jones	Turner Ashby High School
Audrey Poe	Fort Defiance High School
Kelsey Sager	Broadway High School
Layton Schaeffer	Spotswood High School

2008

Jessica Conley	Stonewall Jackson High School
Bethany Sirk	Moorefield High School
Ashley Sonifrank	Turner Ashby High School
Colton Wenger	Broadway High School

SHENANDOAH VALLEY ELECTRIC COOPERATIVE

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