The Environmental Synopsis

A Monthly Update from the Joint Legislative Air and Water Pollution Control and Conservation Committee

JANUARY 2016

The Chairman's Corner

Senator Scott E. Hutchinson, Chairman

Most people rarely give thought to where their electricity comes from as they turn on the lights or appliances in their home. Despite the deceivingly-simple flip of a switch, the process in which electricity is generated and distributed to customers is actually quite complex, requiring the transmission of electricity across massive power grids that encompass entire regions or even multiple states. This infrastructure has been in place for over a century, but the emerging trend of "microgrids" and district energy may help spur more localized power systems in the future.

Microgrids developed in response to the consolidated nature of our country's existing energy infrastructure. Most electric utility companies rely on large power plants and a network of long-range transmission and distribution lines to deliver power to customers, often over a wide geographic area. This means sacrificing a certain degree of reliability and flexibility, particularly in the event of severe weather or a cyberattack.

Shifting customer preferences have also spurred interest in microgrid technology. Many utility companies have seen an increased demand for cleaner, more localized power systems, fueled by alternative forms of energy such as natural gas, steam, solar and wind. Industry experts credit this phenomenon to the deregulation of Pennsylvania's electricity generation in the late 1990s, which opened up opportunities for renewable-based power to commercial and residential customers.

Microgrids and district energy projects are gaining momentum in the U.S., with several state and federal projects aimed at developing autonomous, local power system using alternative energy sources.

In practice, microgrids operate much like a traditional power grid, just on a much smaller scale. A small generation system supplies power to a neighborhood or cluster of buildings using its own independent, short-range transmis-

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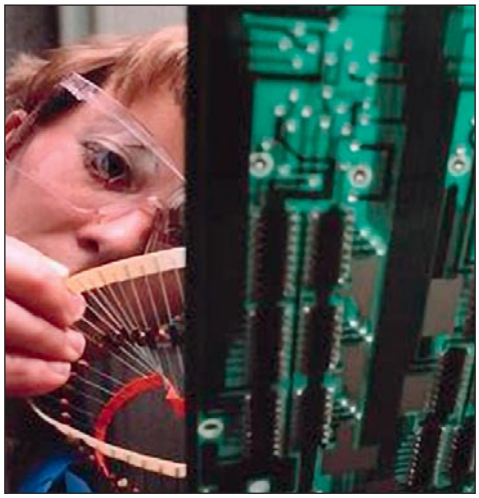

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Notes from the Director

Tony M. Guerrieri, Executive Director

Agriculture in Pennsylvania is a $67 billion economic engine that supports one in seven jobs, making it the Commonwealth's leading industry. Of Pennsylvania's 59,000 farms, over 97 percent of farm households typify what is commonly referred to as "family farmers."

So what exactly does the term family farmer mean? There are certain economic characteristics that define such an operation. For example, family farmers use mainly labor of family members to run the farm enterprise; usually own the land they cultivate; consider themselves self-employed; and have their economic enterprise entwined with "a way of life."

However, Pennsylvania farms, particularly those owned and operated by families, are slowly disappearing. Many families have faced numerous hardships to hold on to the land and pass it down to their children, grandchildren and even great-grandchildren. The decrease in number of farms has been attributed to a number of causes including urban expansion, which results in farmland being sold for non-agricultural purposes and high operating costs. The result of this trend is that older farmers are retiring, and younger generations do not want the family business, especially in rural areas that are close to urban centers.

But there are exceptions to every rule. Through changing times and generations, there were farm families across the nation that worked hard and sacrificed to keep their properties in the family, some for over a hundred years.

The idea of a so-called Century Farm Program, aimed at emphasizing the importance of economic and rural heritage and traditions, was initiated by the New York Agricultural Society in 1937. Farms which had been in the same family for more than 100 years were honored at ceremonies in Albany as members of the Order of Century Farms. In 1948, the Bradford County Historical Society of Pennsylvania began its own program, similar to the one in New York.

The Pennsylvania Department of Agriculture's Century and Bicentennial Farms program honors the rich tradition of family farms, some of which pre-date the American Revolution.

The Pennsylvania Department of Agriculture, in conjunction with the nation's bicentennial, began recognizing century farms families in 1976 as a way to showcase Pennsylvania's rich agricultural heritage and to honor Pennsylvania farmers as stewards of the land and a way of life.

Given Pennsylvania's colonial roots, 100 years of farming is actually commonplace. Numerous farms in southeast quarter of the state predate the American Revolution by decades. Since the Century Farm programs inception in 1976 and the creation of the Bicentennial Farm program in 2004, the Pennsylvania Department of Agriculture has recognized 1,986 Century and 167 Bicentennial Farms.

Obtaining the honor of Century or Bicentennial Farm does come with rigorous accreditation process, however. To be eligible for the Century and Bicentennial Farm Program, applicants must meet the following criteria:

- The farm must be owned by the same family for at least 100 consecutive years.
- A family member must live on the farm on a permanent basis.
- Farms are eligible for recognition if they have at least 10 acres of the original farm property or if they gross at least $1,000 from farm-related sales.

The Bicentennial Farm Program follows the same guidelines but requires a full 200 consecutive years of family ownership.

One of the oldest farms on the registry is located near Chadds Ford, Chester County. According to the deed, the 200-acre farm was purchased in 1703 from William Penn's agents. Other farms recorded on the list date from 1717 and many are in Lancaster County, considered some of the richest farmland in the state.

The Pennsylvania Century and Bicentennial Farm Program is strictly a voluntary program as each family chooses to submit an application and participate in the program. The program places no usage restrictions on the farm and offers no legal protection. There is no cost to the family to submit an application and participate in the program. Successful applicants receive a special certificate identifying their historical farm.

The application asks for the name of the present owner and current information about the farm, as well as information about the first owner of the farm and the transfer of ownership from family member to family member must be traced. Information provided in the application must be certified by the seal of a notary public. The information on the applications and other information supplied by the applicants will be filed in the Archives of the State Historical and Museum Commission

Applications for the Pennsylvania Department of Agriculture's Century and Bicentennial Farm Programs are available at for download at: **www.agriculture.state.pa.us**.

Research Briefs

Each month, the committee's staff researches and prepares a number of "briefs" on several topics relevant to the committee's mission. Very often these briefs include references to reports and further research on the topics so that readers may pursue issues on their own. Please note that the information and opinions expressed in the Research Brief articles do not necessarily represent the opinions or positions of the Joint Legislative Air and Water Pollution Control and Conservation Committee, nor those of the Pennsylvania General Assembly.

Climate Change Threatens Hunting, Fishing Opportunities

Tony M. Guerrieri, Executive Director

Hunter and anglers are on the front lines of climate change, seeing the devastating effects on wildlife and recreation first-hand, according to a report by the National Wildlife Federation (NWF). The report, Game Changers: Climate Impacts to America's Hunting, Fishing, and Wildlife Heritage, explores the importance of sportsmen for conservation and the recreation economy. It also examines the challenges faced by outdoor recreationists, as well as the wildlife important to hunters and anglers, in the wake of a changing climate.

Hunters and anglers contribute over $90 billion to the national economy each year and help support more than 680,000 jobs, according to the report. The loss of recreational hunting and fishing opportunities due to climate change could have real economic impacts across the nation, particularly in rural areas.

The report lists examples of fish disappearing from some lakes and streams, big game species being pushed out of their historic ranges, and birds rapidly losing habitat. It identifies two Pennsylvania species that face serious threats from the effects of climate change, including the iconic ruffed grouse, the official state bird since 1931.

The ruffed grouse is best known for its thundering takeoffs and unique drumming displays. Known in some parts of the country as a "partridge," the ruffed grouse makes its home throughout Pennsylvania. A member of the pheasant family, the ruffed grouse is primarily a bird of the upland forests and one of our state's most popular gamebirds.

According to the report, changing climate conditions including rainfall, temperature and seasonal patterns may have catastrophic consequences for the species. While some bird species may be able to adapt to shifting climates, the ruffed grouse is far less resilient. The report claims that if no action is taken to reduce pollution, Pennsylvania may no longer be suitable to host its state bird.

A National Wildlife Foundation report highlighted the impact of climate change on some of Pennsylvania's most popular game and fish species, including the iconic ruffed grouse.

The other threatened species native to Pennsylvania identified in the report is the snowshoe hare. Like the ruffed grouse, the presence of snowshoe hares can indicate the biodiversity of a habitat and the absence of them can indicate that something is out of balance.

Snowshoe hares never were very common in Pennsylvania. From 1918 to 1981, more than 33,000 snowshoe hares were released by the Pennsylvania Game Commission (PGC) to augment a statewide population that was never considered large enough to support large scale hunting. In Pennsylvania, where hares are found mostly in isolated forests and shrubby wetlands on the northern tier of the state, officials have listed the snowshoe hare as a species of concern.

Resembling a cottontail rabbit, the hare – named for its disproportionately large hind feet, which with dense fur form "snowshoes" – is well adapted for motion in deep, powdery snow. It is also called "varying hare" because it has pure white fur in the winter, except for black eyelids and ear tips. They depend on consistent snow cover during the winter to provide camouflage from predators. The snowshoe hare's fur changes to black-peppered rusty brown or grayish color in summer. This allows them to blend in with the undergrowth in their forest and swamp habitats.

According to the report, Pennsylvania's snowshoe hare population is declining, and it partially links this problem to the effects of climate change. When the days get shorter, snowshoe hares molt to white fur. The problem for hares in recent years is that snow is coming later and melting

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sooner, but molting is triggered by the length of day, rather than temperature or presence of snow, leaving them mismatched with the habitat around them.

Snowshoe hares are an important ecological and cultural species in Pennsylvania. With their white coats against a dark background, they are glaringly exposed to predators such as coyotes, foxes, great horned owls and red-tailed hawks.

Culturally, they are also part of Pennsylvania's hunting heritage; however, only a relatively few hunters take advantage of the snowshoe hunting potential. In 2012, the PGC reduced their traditional hunting season to less than a week and only in restricted areas. The hare harvest has been in the 500-600 range for the last three seasons, according to the PGC's annual Game-Take Survey. In the five years prior to that, the harvest averaged 1,100 hares.

The report contains several recommendations including: using the U.S. Environmental Protection Agency's Clean Power Plan to cut climate pollution from the biggest source – power plants – and increasing investments in wildlife conservation and clean energy.

The National Wildlife Federation report, Game Changers: Climate Impacts to America's Hunting, Fishing and Wildlife Heritage, is available at: **http://www.nwf.org/News-and-Magazines/Media-Center/Reports/Archive/2015/~/media/PDFs/Media%20Center%20-%20Press%20Releases/2015/NWF_Game_Changers_Report.pdf**.

Examining Loopholes in Pollution Credit Markets

Coleen P. Engvall, Research Analyst

In an effort to combat pollution, many regulatory structures include "pollution marketplaces" and trading schemes that help individuals and companies comply with environmental laws. These marketplaces allow good actors to accumulate credits, which can be bought or traded to offset pollution. In essence, this makes companies which contribute to pollution pay for what they are releasing into the environment.

This process is supposed to reward clean operations while making it more costly to pollute. However, some argue that the marketplace can be exploited and is more difficult to regulate. This concern led Food and Water Watch to conduct a review of the implementation of these trading mechanisms with respect to waterway pollution programs in Pennsylvania and Ohio. They released their findings in a report entitled Water Quality Trading: Polluting Public Waterways for Private Gain.

In the report, the Watch outlines their concerns for how these market mechanisms could serve to undermine the Clean Water Act. In the states that make up the Chesapeake Bay watershed, markets have been put in place that allow nonpoint source polluters, such as farmland, to implement voluntary measures to reduce nutrient runoff. This allows them to sell credits to point source polluters. Point source pollution is discharged at a facility at a specified place, such as a pipeline.

These voluntary measures for nonpoint source polluters tend to be cheaper to integrate than the technologies needed to regulate point source discharge, thus creating an incentive for the measures without costly government programs. However, the Watch expresses several concerns with this method as it has been applied in the pilot programs in the watershed.

Food and Water Watch criticizes the lack of oversight and accountability in water pollution credit trading mechanisms, citing the possibility of fraud and abuse.

The Clean Water Act originally imposed blanket limits on point-source polluters. The law required facilities with direct discharges to monitor outflow and install pollution reduction technologies. Since its passage in 1972, these measures have seen great improvements in overall water quality. However, this does not cover all pollutants. Nonpoint source pollutants, such as runoff from agriculture, is more difficult to regulate.

This, the researchers argue, is where a major problem lies. They write that water pollution trading markets that allow credit transfers from non-point pollution to point-source polluters can be used to avoid regulation. As nonpoint source pollution is harder to manage, the researchers raise the concern that facilities buying pollution offsets are not being monitored closely enough. That could mean more pollutants overall reaching the waterways.

In the case of Pennsylvania, the report points to the fact that a private company, rather than a regulatory body monitors the credit approvals and transfers. The researchers doubt that this is the best way to hold the market and traders accountable. For example, while the Pennsylvania Department of Environmental Protection is involved in the marketplace, it is a private company that verifies if a farm is implementing best management practices, making it eligible to sell credits.

In addition to this, they argue that the market is being used in a way that

was not intended. The market was intended to help facilities comply with the Clean Water Act without having to purchase cost-prohibitive clean technologies, and to provide funding to nonpoint source polluters for cleaning up their operations. Instead, they point to certain point source polluters which have not made an effort to scale down the nutrients they release, and rely completely on buying offsets. This is a problem as the researchers do not believe the offsets are being held properly accountable.

The report states that if the Clean Water Act is to continue protecting the waterways and drinking water of the country, changes to the current program must be made. They strongly advocate for a return to an overarching limit on point source pollution. This includes eliminating the option for buying offsets. While increasing oversight of best management practices in the marketplace could reduce abuses, they write that this would make the program too expensive to be effective.

For nonpoint source pollution, instead of creating financial incentives for voluntary best management practices, they state that monitoring, accountability and limits should be imposed. While these actors are more difficult to regulate, they are a major contributor to impaired waterways such as the Chesapeake Bay.

To read the full report, go to: **https://www.foodandwaterwatch.org/sites/default/files/rpt_1510_waterqualitytrading-final2-web.pdf**

Who Pays More for Flood Insurance?

Tony M. Guerrieri, Executive Director

The National Flood Insurance Program (NFIP) began in 1968 as a way to extend government-backed insurance to homeowners in communities that are prone to flooding. Currently, 5.5 million property owners hold federal flood insurance policies. That means the public bears trillions of dollars in exposure to loss – with damage climbing as more powerful storms collide with increasing development along the U.S. coasts.

A report by the Public Policy Center at the University of Massachusetts Dartmouth examined the relationship between NFIP premiums paid and the value of the property being insured. The report, Subsidizing Risk: The Regressive and Counterproductive Nature of National Flood Insurance Rate Setting in Massachusetts, examined more than 57,000 Massachusetts properties insured by the federally-backed NFIP.

The Public Policy Center's report found that homeowners in wealthier Massachusetts communities with higher-value properties, on average, paid less for flood insurance than homeowners in more modest communities despite similar levels of storm and flood risk. The findings are counterintuitive because many public policy experts assume more expensive properties are charged higher rates for insurance.

Researchers at the University of Massachusetts Dartmouth found that wealthier communities tend to pay lower average rates for flood insurance than blue collar neighborhoods, despite similar levels of flood risk

Every property with a mortgage in a designated flood plain must have flood insurance. The NFIP covers homeowners in flood-prone areas because private insurers will not due to costs. The flood coverage is on top of traditional homeowners insurance and required by banks for mortgages on homes in floodplains, whether they sit near the ocean or along tributaries. In Massachusetts, about 60,000 properties in more than 330 cities and towns are covered by federal flood insurance.

The report does not use income to determine eligibility, and for a host of potential reasons wealthier people end up paying disproportionately less for protection.

For example, in the more blue-collar town of Fairhaven, residents pay an average premium of about $820 per $100,000 in property value, compared with $400 for residents of Edgartown on Martha's Vineyard, widely known as a summer playground for the wealthy.

There are several factors for more expensive properties paying less for flood insurance, according to the study. The history of the NFIP has a lot to do with it, particularly in older coastal communities like Massachusetts. Because many coastal communities had homes that existed before the NFIP began, many expensive older homes may have grandfathered status and be eligible for lower premiums because they were built before current flood maps were drawn in the 1970s.

Also, homeowners in wealthier communities are better able to afford the thousands of dollars associated with elevating their homes on stilts as well as other measures that can lower premiums. Additionally, wealthier municipalities might be more likely to be able to afford the modifications – such as building sea walls and setting aside open space land – that lowers risk and therefore insurance premiums.

From an economic perspective, paying less for flood insurance can help increase the value of the home because the costs of insurance are artificially lowered. As a result of the relatively low cost of insurance, wealthy homeowners are incentivized to keep building along coastal areas – and hundreds of thousands of federal dollars can be used to repair flood damage to the same expensive homes, over and over again.

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The NFIP said it has received a copy of the report and is reviewing the findings. The Public Policy Center's report, Subsidizing Risk: The Regressive and Counterproductive Nature of National Flood Insurance Rate Setting in Massachusetts, is available at: **http://publicpolicycenter.org/wp/wp-content/uploads/ 2015/06/PPC_ENV_2015_01_FInal.pdf**.

Trends Driving Down Global Coal Use

Coleen P. Engvall, Research Analyst

For decades now, societies have been making a push for cleaner energy sources. Whether it be for air quality, public health or, more recently, for reducing greenhouse gas emissions. Many local and international regulatory bodies have been calling for a green energy revolution. However, some argue that the market may have already done this, keeping in line with the theory that the free market is more nimble than the governments they operate in.

Demonstrating one trend in the energy sector, the Institute for Energy Economics and Financial Analysis (IEEFA) compiled data on coal consumption in developing countries, with a particular focus on China. This November, they outlined their findings in a report entitled Past Peak Coal in China.

Over the past decade, China has industrialized and modernized at a pace that

defied many economic analysts. Obviously, this required a great deal of power. According the IEEFA, China consumed over half of the world's produced coal from 2012-2014. This fact, along with the constant reports of health-damaging smog in China's largest cities, may not sound like a clean energy revolution to many. However, the researchers point to three main signs which they argue signal that China has reached peak coal.

Before addressing these factors, they point to the quantitative evidence that China's consumption of coal during the year 2015 went down in relation to years past, despite the fact that the demand for electricity increased. And this is not the first year of decline. Peak coal, they write, was reached in 2013 then began to decline, showing both in consumption of coal as well as in imports. This trend seems to be meaningful as coal prices have simultaneously been very low. Under a business-as-normal scenario, these low prices would expect to see China purchasing more.

Using China as a case study, researchers at the Institute for Energy Economics and Financial Analysis outline why they believe that coal use has peaked globally.

The first indicator that China will be shifting away from coal is the makeup of their economy. They have been trending towards more energy efficient industries, such as financial and consumer services. This will likely continue as more of China falls into the urban middle class. Coupled with less construction and heavy industrial activity, the Chinese Communist Party has begun implementing incentives and programs for energy efficiency in many sectors of the economy. Not only is this becoming the more economically viable route, but the popular demand for healthier air and water are driving these important changes.

The next sign of coal's decline is China's actual energy portfolio. In the past, China's energy sector was dominated by coal-fired power plants. In recent years, growth in renewables and investments in alternative energy has far exceeded the government's projections. The report mentions that China increased its target for solar generation for 2020 by 50 percent. Along with solar, the Chinese are increasingly investing in wind, hydro and nuclear facilities. This trend, along with the increasing efficiencies in their economy are expected to drive the use and imports of coal down even further.

Finally, the report highlights the change in China's coal sourcing. They have been increasingly using domestic sources of coal. Due to their massive role in consumption of global supplies of coal, this reduction is expected to impact the market as a whole.

While China is still the world leader in coal consumption, the report also examines trends in other major countries. The United States has been in rapid decline for years now, with many coal plants retiring in recent years, some of them here in Pennsylvania. This phenomenon, coupled with the natural gas boom and unprecedented levels of renewable energy investment, means coal will likely not continue to be economically viable and the current decline will, according to projections, accelerate.

All of these trends point to a movement away from coal and onto newer, cleaner sources of electricity for the modern world. Regardless of the reason, whether it be economic viability, public health or greenhouse gas reduction, coal appears to be diminishing on the global stage.

To read Past Peak Coal in China, go to: **http://ieefa.org/past-peak-coal-in-china/**

This Month in Conservation History

Exploring the evolution of environmental stewardship

50 Years Ago

State Representative John F. Laudadio of Westmoreland County was named National Conservation Legislator of the Year by the National Wildlife Federation and the Sears-Roebuck Foundation, according to an article in the Altoona Mirror dated January 6, 1966. Among other accomplishments, Laudadio played a significant role in the passage of Pennsylvania's comprehensive Clean Streams Act of 1965.

Representative Laudadio was one of the founding members of the Joint Legislative Air and Water Pollution Control and Conservation Committee, appointed in 1968 and serving for nearly a decade, including a stint as chairman from 1971 to 1976. Today, his conservation legacy lives on in the form of the John F. Laudadio Conservation Leadership Award, presented annually by the Pennsylvania Federation of Sportsman's Clubs to a young adult who has demonstrated a commitment to conservation.

Check Us Out on Social Media!

You can now receive updates on committee events, new research and more by following the Joint Legislative Conservation Committee on social media. You can find us on Facebook at **www.facebook.com/jointconservationcommittee**, or on Twitter at **www.twitter.com/PA_JLCC**. Take a moment and follow us today for the latest on issues related to Pennsylvania's diverse natural resources!

Committee Chronicles *A review of memorable committee events*

Following the September public hearing on natural gas vehicles in Finleyville, Washington County, members of the Joint Legislative Conservation Committee toured Calgon Carbon's equipment and assembly plant on Neville Island, outside of Pittsburgh. Calgon is one of the world's largest manufacturers of activated carbon used in industrial and municipal air and water filtration systems. Representatives from the plant discussed the environmental benefits of their products, along with challenges and opportunities currently facing the industry.

Representatives of Calgon (pictured at left) provide a brief overview of their plant operations to committee members Representative Rick Saccone and Representative Eli Evankovich before the beginning a tour of the Neville Island facility. Senator Pat Stefano also attended.

The tour showcased Calgon's carbon-based pollution filtration systems (pictured above), which are used by businesses, utility companies and municipalities throughout Pennsylvania and the eastern United States.

Joint Legislative Conservation Committee

CONTACT INFORMATION

LOCATION
Room 408
Finance Building
Harrisburg, PA 17120

PHONE
717-787-7570

WEBSITE
jcc.legis.state.pa.us

MAILING ADDRESS
Joint Legislative
Conservation Committee
PA House of Representatives
P.O. Box 202254
Harrisburg, PA 17120-2254

Printed on Recycled Paper

The Chairman's Corner

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sion and distribution network. Most microgrids are still connected to the larger grid, but can run autonomously in the event of a storm or power outage, mainly through the use of battery storage technology.

Microgrids certainly represent a major departure from our existing electric infrastructure, but they have attracted the attention of traditional electric utilities looking to make their networks more resilient. In November, Duquesne Light, a public utility company serving over 620,000 customers in the Pittsburgh area, announced a partnership with the University of Pittsburgh to study the feasibility of implementing microgrids within their service territory.

The experiment will set out to do something truly unique: design and operate a fully-functional microgrid in the Woods Run community of Pittsburgh. Engineering students from Pitt are assisting with the design and the goal is to have the system fully operational within a year. Duquesne hopes that if microgrids become a reality, they can be used to strengthen their traditional power grid and keep the lights on longer in the event of repairs or an outage.

What I found particularly interesting is that the Woods Run experiment is actually part of a larger, national movement to research the feasibility of district energy – a term that encompasses various forms of local power systems, including microgrids. Duquesne Light developed their plan in response to a recent partnership between the U.S. Department of Energy and the City of Pittsburgh to study district energy initiatives. Over the next several years, more district energy projects will be constructed in city neighborhoods to determine if these self-sustaining grids are worthy of future investment.

Other states have already started microgrid and district energy projects. New Jersey, whose coastline and electric infrastructure was ravaged by Hurricane Sandy in 2012, entered into a series of high-profile partnerships with the DOE to study the energy assurance of microgrid technology. Projects are currently underway in the City of Hoboken and with NJ Transit to assist them in becoming adaptive to power outages in the future.

Overall, benefits of microgrids certainly appear promising. Like most new technologies, however, these cutting-edge systems are not without some drawbacks. One problem with microgrids involves calculating the return on investment. Financing your own self-sustaining power system comes at a high cost. Utility companies and businesses considering such projects must carefully examine their future energy goals to ensure they can recapture the investment. One way to potentially speed up that process is by selling back excess electricity to the utility company, which some microgrid operators have found profitable.

It remains to be seen if microgrids and district energy projects truly represent the future of our nation's electric infrastructure. The first step in making that determination, however, is through experimentation, and the initiatives in Pittsburgh and other communities are a great start. Whether through microgrids or another form of technology, our nation will greatly benefit from making our electric infrastructure more reliable and resilient.

If you are interested in learning more about microgrid technology, visit the U.S. Department of Energy's microgrid activities page at **http://energy.gov/oe/services/technology-development/smart-grid/role-microgrids-helping-advance-nation-s-energy-syst-0**.