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# ENVIRONMENTAL SYNOPSIS

## The Chairman's Corner

**Rep. Scott E. Hutchinson, Chairman**

Perhaps no environmental issue is generating more "energy" in Pennsylvania these days than the future of renewable energy in all its alternative forms. One example of the interest in renewable energy is reflected in Craig Brooks' Notes from the Director (p. 2).

Development of renewable energy sources is coming from both the bottom up and the top down. Individual entrepreneurs are investing in projects both large and small and the Bush administration has signaled its desire to invest in renewable energy research, particularly in hydrogen fuel cell technology in the automotive industry.

Renewable energy technology is destined to be part of the mix of energy generation in the Commonwealth's future. As I wrote two months ago in this column, traditional energy sources such as coal, where new technologies for cleaner coal burning are also emerging, continue to play a role in Pennsylvania's energy mix, but it is evident they are to be joined by alternative, renewable sources.

**There is a "buzz" about renewable energy... in both private and public sectors**

The proof that there is a buzz about renewable energy is - as they say - in the pudding. According to a just released study done by Platts Research and Consulting (a division of the McGraw-Hill Companies), U.S. wind energy capacity is expected to increase by 650 percent between now and 2015. Platts' research also predicts increased market penetration for solar, solar photovoltaic, geothermal and landfill gas to electricity technologies. The report predicts an eight percent annual growth rate for total renewable energy capacity up to 2015. To learn more about Platts' research, visit www.renewablepower.platts.com.

Meanwhile, the Commonwealth has launched the Pennsylvania Energy Harvest Program, a $5 million grant program intended to encourage energy innovation and clean energy generation projects.

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## In This Issue...



Joint Legislative Air and Water Pollution Control and Conservation Committee

A Legislative Service Agency of the Pennsylvania General Assembly

# NOTES FROM THE DIRECTOR

**CRAIG D. BROOKS, DIRECTOR**

Remember when mobile phones were almost too bulky to bother with? Now, with high-tech advancements over the past few years, they've become nearly indispensable to everyday life. It certainly makes those early, clunky versions easy to forget.

The same can be said for fuel cells, which have seen huge advancements in recent decades. A number of manufacturers, including major automakers and various federal agencies, have supported ongoing research into the development of fuel cell technology for use in vehicles and other applications. It's been reported that fuel cell energy is now expected to replace traditional power sources in the coming years - from micro fuel cells used in cell phones to high-powered fuel cells for stock car racing. This past month, the Joint Committee invited the Siemens Westinghouse Power Corporation, a leading purveyor in fuel cell technology, to join us for our latest Environmental Issues Forum (see *Committee Chronicles* on p. 7). If you missed it, some noteworthy information bears mentioning.

First, fuel cells are environmentally friendly. They are highly efficient and low maintenance and are ideal for power generation either connected to the electric grid or installed as independent generators for on-site service in areas that are inaccessible by power lines. Because they operate silently they reduce noise pollution, as well as air pollution, and the waste heat generated from the electric generating process can be used for supplemental heating. Fuel cells operating on hydrogen emit nothing but water vapor.

**A public-private partnership is needed to develop a long-term strategy for fuel cell applications**

Second, fuel cells can reduce our dependence on foreign oil imports. If just 20 percent of the cars used fuel cells, we could cut oil imports by 1.5 million barrels every day. It has been predicted that fuel cells will reach several thousand vehicles by 2004, and by 2010, automotive fuel cells will have reached nearly four percent of the market share or more than 600,000 vehicles. The U.S. Energy Department projects that if 10 percent of automobiles were powered by fuel cells, regulated air pollutants would be cut by 1 million tons per year and 60 million tons of the greenhouse gas carbon dioxide would be eliminated.

Third, fuel cells are durable, stable and reliable, but how long is long? As fuel systems evolve, the U.S. Department of Energy has been focusing on a lifespan of 5,000 hours. For a vehicle used in day to day driving, that's a range of 10 - 20 years. In stationary applications, the fuel cell stack, which is where the electricity is produced and is the heart of the power generation, has gone from 100 hours to 10,000 hours of durability. While durability is increasing, costs are decreasing. Ten years ago, fuels cells were averaging about $4,500 per Kw. Currently fuel cells run about $3,000 per Kw and are targeted for $2,000 per Kw in order to be competitive in a residential market. Size and weight have also been reduced with fuel stack size experiencing a 50 percent reduction since 1997.

So while substantial progress has been made, there are still some challenges ahead. We need sustained commitment and leadership at the state level and continued research and development by the private sector. Ultimately, a team effort involving public and private partnerships will be necessary to address a long-term strategy for stationary, portable, and transportation fuel cell applications, including educational outreach programs to ensure public acceptance. In meeting those challenges, Pennsylvania has the opportunity to be a national leader in this technology and benefit from the promise fuel cell technology has to offer.

*Under the hood of a fuel-cell powered auto.*

# RESEARCH BRIEFS

**Each month, the committee's staff researches and prepares a number of "briefs" on several topics relevant to the Joint Conservation 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.**

## EPA Releases 2003 Fuel Economy Trends Report

**— Tony M. Guerrieri, Research Analyst**

A report by the U.S. Environmental Protection Agency (EPA) entitled *"Light Duty Automotive Technology and Fuel Economy Trends: 1975 Through 2003"*, finds that fuel economy is declining, truck market share is increasing, and fuel economy is being traded for vehicle weight and performance for light vehicles sold in the United States for model years 1975 through 2003. "Light vehicles" include those vehicles that the EPA classifies as cars or light-duty trucks (sport utility vehicles (SUVs), minivans, and pickup trucks with less than 8,500 pounds).

Fuel economy continues to be a major area of public and policy interest for several reasons, including:

- It is directly related to carbon dioxide emissions, associated with global warming. Light vehicles contribute about 20 percent of all U.S. carbon dioxide emissions.
- Light vehicles account for approximately 40 percent of all U.S. oil consumption.
- Fuel economy is of greater interest when oil and gasoline prices rise.

The average fuel economy for all model year 2003 light vehicles is 20.8 miles per gallon (mpg). Within this category, 2003 SUVs average 17.8 mpg, pickup trucks 16.8 mpg, and vans 19.6 mpg. Model year 2003 cars average 24.8 mpg. The 2003 fuel economy average is the lowest value since 1980 and is 1.3 mpg less than the peak value of 22.1 achieved in both 1987 and 1988.

All of the fleet-wide improvement in new light vehicle fuel economy occurred from the middle 1970's through the late 1980's, and has been consistently falling since. Viewed separately, the average fuel economy for new cars has been essentially flat over the last 15 years, varying only from 23.6 to 24.8 mpg. Similarly, the average fuel economy for new light trucks has been largely unchanged for the past 20 years, ranging from 17.3 to 18.4 mpg.

The most significant reason for the drop in light vehicle fuel economy is the increasing number of light-duty trucks being purchased and driven in the U.S. Sales of light-duty trucks have risen steadily for 20 years and now make up 48 percent of the U.S. market. This is more than twice their market share in 1983. Highlighted is the dramatic increase in the market share of SUVs, increasing from less than two percent in 1975 to over 23 percent in 2003.

Over the same period, the market share for vans almost doubled from 4.5 percent to 8.1 percent, and for pickup trucks grew from 13 percent to 16 percent. Between 1975 and 2003, market share for new passenger cars and wagons decreased from 81 percent to 52 percent.

### Fuel economy down...Truck sales up... More vehicle weight preferred

More efficient technologies entering the new light vehicle fleet are being used to increase light vehicle weight and performance rather than fuel economy, according to the report. Based on accepted engineering relationships, if the new 2003 light vehicle fleet had the same average weight and performance as in 1981, it would have achieved 33 percent higher fuel economy.

These more efficient technologies – such as engines with more valves and more sophisticated fuel injection systems and transmissions with lockup torque converters and extra gears – continue to penetrate the new light vehicle fleet. The trend has been to apply these new technologies to increase average new vehicle weight, power, and performance while maintaining fuel economy. This is reflected by heavier average vehicle weight (up 24 percent since 1981), rising average horsepower (up 93 percent since 1981), and lower 0 to 60 miles-per-hour acceleration time (29 percent faster since 1981). During this same time, average new light vehicle fuel economy increased by one percent.

The report is available at www.epa.gov/otaq/fetrends.htm.

# Carbon Reduction in Electricity Generation

**—Jason H. Gross, Research Analyst**

A report entitled *"Low Carbon Electricity Systems, Methodology and Results for the EU"* details strategies that may be used to reduce CO2 emissions created in the power generation process. The World Wildlife Fund (WWF) commissioned the report as a component of its "POWERSWITCH!" initiative aimed at achieving carbon-neutral electricity. The study attempts to determine a realistic implementation for CO2 emission reductions for the electricity sector in Europe and to identify the required changes to electricity production as well as to electricity demand.

Among supply side reduction options to reduce CO2 output at power plants is to convert older coal-fired power plants to new, more efficient coal burning technologies. According to the report, new coal-fired plants can obtain efficiencies over 45 percent and when combined with new technologies up to 60 percent.

Another supply side reduction technique is to use biomass as a fuel in electricity production. Biomass is burned in a boiler to produce electricity and recycle excess heat back into energy production. Another biomass alternative is to use the gas generated by biomass dumping, as in the case of landfill gas, for energy production. Still another option for the short-term reduction of CO2 is to combine direct combustion of biomass in existing power plants. This provides higher efficiency, uses the continuous supply of available biomass, and can be done using the currently existing infrastructure. According to the report, direct co-firing of biomass in existing coal-fired power plants would be most efficient and provide the highest reduction in CO2 emissions.

**Supply side and demand side changes are among the report's recommendations**

Wind energy is a potential source for high-grade electric power that produces little or no CO2. According to the report, the worldwide available potential for wind energy is estimated at 53,000 Terra watts per year. The report goes on to state these resources are currently being underutilized, yet potentially will provide the cleanest energy for the smallest amount of CO2 output. The bottleneck for maintaining a high rate of growth in the wind generation sector, says the report, is the industry's lack of ability to increase its manufacturing capacity. Only when demand increases will the cost of manufacture decrease to a level where more turbines can be installed. This creates a catch-22, because in order for demand to increase, the price of turbines must fall. State subsidizing of wind energy is one possibility to kick-start the industry and break the cycle.

Another technique that the report recommends to reduce supply side emissions is to recover and store the CO2 produced by power plants. This differs from other approaches because it does not reduce the use of fossil fuels but instead separates out the carbon component and stores it underground to prevent it from entering the atmosphere. The storage potential for CO2 is large since probable storage sights are used oil and gas fields.

Two other techniques for reducing supply side demands on energy consumption dovetail together by increasing efficient use of electricity in equipment and cooling. Implementing current best practices of efficiency can save approximately 30 percent on the average use of appliances such as washing machines, dishwashers, and clothes dryers as well as electronics such as computers, photocopiers, and printers. The other side of increasing efficiency is making cooling in households and businesses more efficient. The report estimates that by increasing the efficiency of refrigerators and air conditioning equipment, electricity use will be reduced by 40 percent.

Demand side reductions in households and businesses are the other piece of the puzzle in overall CO2 reductions. One option is to reduce stand-by losses in households by replacing or unplugging appliances that consume power while in stand-by mode. According to the report, this would reduce overall household electricity use between five percent and 13 percent.

For more information or a copy of the Powerswitch! report, visit WWF's website at www.panda.org/powerswitch.

# Elevated Mercury Levels Found in Rainfall in 12 States

**— Tony M. Guerrieri, Research Analyst**

Concentrations of mercury in the rainwater in a dozen states along the Atlantic and Gulf coasts, including Pennsylvania, exceed the safe level established by the U.S. Environmental Protection Agency (EPA) for surface water, according to a report by the National Wildlife Federation (NWF). The report, *"Cycle of Harm: Mercury's Pathway from Rain to Fish in the Environment"*, found precipitation throughout the Southeast, Gulf, and mid-Atlantic states contains mercury in sufficient concentrations to make fish toxic to wildlife and humans that consume them.

The report analyzed mercury precipitation samples collected from 1995 to 2001 at 35 monitoring sites in Alabama, Florida, Georgia, Indiana, Louisiana, Maryland, Mississippi, New York, North Carolina, Pennsylvania, South Carolina, and Texas. The rain measured at scattered testing sites in those states contained as much as 30 times the amount regarded as safe in surface water by the EPA.

State profiles highlight mercury sources, fish advisories, sport fishing revenue, and mercury-related activities for all 12 states. An examination of the Pennsylvania profile indicates:

- The highest mercury level measured in Pennsylvania rain was over 45 times the EPA human health standard for mercury in lakes.
- Over 92 percent of the rain samples in Pennsylvania exceeded the EPA human health standard for mercury in lakes, adversely affecting over 5,500 acres of lake water.
- The average rain sample collected in Pennsylvania's seven monitoring sites was 2.8 times the EPA's human heath standard for mercury in lakes.

Mercury is a potent neurotoxin that has made its way into the food supply, contaminating fish and posing a risk to people and wildlife that consume fish. Expectant or nursing mothers and children up to age seven, whose nervous systems are developing, are most at risk. According to the Centers for Disease Control and Prevention (CDC), one in 12 women of childbearing age has blood mercury levels exceeding the EPA safe level for protection of the fetus. That translates into approximately 320,000 babies born annually in the United States at-risk for neuro-developmental delays, producing such problems as attention deficiency disorder, impaired visual spatial skills, and poor coordination.

In wildlife, mercury is a reproductive hazard with harmful effects on species such as rainbow trout, zebra fish, mallard and American black ducks, loons and terns, otters and mink. Mercury is bio-accumulative meaning that its potency increases in concentration as wildlife, fish, and people consume contaminated food. Concentrations in fish tissue can be more than a million times higher than in surrounding water.

Much of the blame is directed at outdated coal-fired generating plants. In Pennsylvania, the top 10 mercury sources are electric generation plants. Together they report emitting over 7,000 pounds annually. Nationally, more than one-third of mercury emissions come from coal-fired power plants, with much of the remainder coming from municipal and medical waste incinerators and other sources.

**Read the report online at http://www.nwf.org/nwfwebadmin/binaryVault/CycleOfHarm111.pdf**

It takes about one gram of mercury to contaminate a 25-acre lake to the point that the fish are unsafe to eat. Pennsylvania, along with 43 states nationwide (including all of the states discussed in the report), has issued advisories warning people to limit consumption of certain species of fish caught from thousands of inland lakes and streams. Mercury pollution triggers advisories that affect more than 1,266,000 resident and non-resident anglers who spend more than $580 million annually in Pennsylvania, according to the report.

In addition to calling for nationwide controls on mercury emissions from coal-fired power plants and the elimination of mercury in products and manufacturing, the report recommends specific actions each state can take to safeguard the health of people and wildlife. In Pennsylvania, the report recommends:

- Improved monitoring of mercury deposition by placing monitoring sites downwind of significant sources of airborne mercury.
- Adopting a more stringent standard for issuing fish consumption advisories, such as those employed in the neighboring states of Ohio and New Jersey.
- Developing a comprehensive mercury reduction program to phase out use and disposal of mercury-containing products, and reduce coal combustion emissions.
- Adopting protective wildlife and human health water quality standards for all non-Great Lakes basin waters.

# Water Utility Security

**—Jason H. Gross, Research Analyst**

Since the events of September 11th, 2001, the water utility industry has undertaken measures to ensure that drinking water in the United States will remain among the safest in the world. A report, *"Protecting our Water"* produced by the American Water Works Association (AWWA) details the efforts made to make our drinking water secure from terrorist attack.

Since September 11th, the water utility industry has come under the Bioterrorism Act, under which the EPA mandated five new security requirements for all community water systems serving more than 3,300 people (which would cover approximately 90 percent of the nation's population served by community water systems). The Bioterrorism Act requires that community water systems conduct a vulnerability assessment and submit it to EPA. Water utilities must also prepare or revise their emergency response plan to focus on terrorist attacks or other intentional acts intended to disrupt the ability to deliver a safe and reliable supply of drinking water or which otherwise present a significant health concern.

**Vulnerability assessments and emergency response plans are post 9-11 realities for water utilities**

In conducting the vulnerability assessment, utilities must examine and consider risks associated with a possible terrorist attack such as assessing and examining pipes, physical barriers, water collection, pretreatment, and treatment processes, storage facilities, electronic and other automated systems, the handling of hazardous materials, and the operation and maintenance of the system.

After the completion of the vulnerability assessment, water utilities are required to prepare or revise emergency response plans based on the assessment results. Utilities must certify to the EPA that they have completed their plan within six months after they have submitted their assessments. The new or revised plan must be designed to prevent, mitigate and respond to immediately apparent malevolent attacks such as deliberate chemical release, explosives, or other damage to the water distribution system. The plan must include methods of determining if an attack has occurred by non-violent and non-immediately apparent means that may only be able to be determined by constant monitoring, or changes in taste or odor.

According to the report, utilities are working to instill a strong culture of security alertness within every aspect of their operations. Everybody from the guards at the gate to the receptionist must be aware of the security issues within their job and their immediate surroundings. New employees must be screened in the hiring process, and once hired must be trained in security along with other aspects of their jobs. The general public can also be included in the culture of security by way of a network of neighborhood watch programs for reservoirs, storage tanks, pumping stations and other remote areas away from the central utility plants. In the case of a terrorist attack the message that is communicated to the public will be quite different than the message that is communicated after a natural disaster has interrupted supply. The typical "boil water" order may well be replaced with a "do not use" order, which must be distributed to the public quickly and widely.

For more information and a copy of the full report call AWWA at 202-628-8303.

## News to Use in the Environmental Synopsis... share it with a friend

The *Environmental Synopsis* is issued monthly. The newsletter examines timely issues concerning environmental protection and natural resources.

If someone you know would like to receive a copy of the *Synopsis* each month, please contact the committee office at 717-787-7570.

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# On the Horizon . . .

**A LOOK AT UPCOMING EVENTS**

✔ **August 14, Valley Forge National Historical Park – Trail Maintenance Workshop.** Sponsored by the Pennsylvania Recreation and Park Society (PRPS), with support from the PA Department of Conservation and Natural Resources (DCNR) and the National Park Service, the seminar will focus on high cost items involved in trail maintenance and help students select and efficiently use structures and techniques to provide high quality enjoyable trails. For more information, contact PRPS at 814-234-4272 or e-mail llitz@prps.org.

✔ **September 22-23, Holiday Inn, Grantville – Innovative Trail Design Workshop.** Also **s**ponsored by PRPS, with support from DCNR, this 12-hour course will concentrate on how natural surface trails are shaped and includes both indoor instruction and outdoor design and evaluation. For more information, contact PRPS at 814-234-4272, e-mail prpslisa@vicon.net or visit www.prps.org.

**Watch this space for fall's Environmental Issues Forum schedule, which will be developed when fall legislative session dates are selected. Or visit the Joint Committee's website at http://jcc.legis.state.pa.us.**

# Committee Chronicles . . .

**REVIEW OF SOME MEMORABLE COMMITTEE EVENTS**

In photo at left, Joseph Pierre, manager of Tactical Marketing for the Siemens Westinghouse Power Corporation of Pittsburgh, explains Siemens' tubular solid oxide fuel cell program to the audience at the Joint Committee's June Environmental Issues Forum.

At right, Pierre discusses the process with committee member Rep. Thomas Petrone of Allegheny County.

In photo at lower left, committee Executive Director Craig Brooks (left) chats about fuel cells and other environmental issues with newly appointed Department of Environmental Protection (DEP) Deputy Secretary of Pollution Prevention and Compliance Assistance Dan Desmond.

The program is open to local governments, conservation districts, non-profit organizations, school districts, colleges and universities, and for some funding streams to farms and businesses. The application deadline is September 19, 2003. To learn more about Pennsylvania Energy Harvest, visit the PA PowerPort at www.state.pa.us and use the PA Keyword "DEP 2003 Energy Harvest Grant" or call DEP's Grants Center at 717-705-5400.

Other anecdotal evidence of renewable energy growth abounds. FirstEnergy Solutions recently signed a power purchase agreement for the Meyersdale Wind Project in Somerset County. PPL and Community Energy, Inc. announced their entrance into the wind market with the Bear Creek facility in Luzerne County. Air Products and Chemicals is to construct a hydrogen fuel pump in Ann Arbor, Michigan to fuel a pair of United Parcel Service (UPS) fuel cell vehicles built by Daimler Chrysler, the first time a commercial fleet will use hydrogen to power its daily rounds. State government announced it is increasing its purchase of renewable electricity to 10 percent of Commonwealth usage, and the Rendell administration has said it is going for 20 percent.

**For more on PA Energy Harvest, go to www.state.pa.us and use PA keyword "DEP 2003 Energy Harvest Grant". Or call 717-705-5400 for DEP's Grant Center.**

Another facet of renewable energy is the role it may play in reversing the exodus of Pennsylvania's young people to other states through its potential to create jobs, particularly advanced technology and research jobs. It stands to reason that as new energy sources are studied and brought on line, they will require bright minds to not only research and develop technology, but find ways to make it economically viable and market it. Consider if you will the recent announcement that Advan Tek International LLC, a wind energy engineering facility employing 13 engineers and technical staff, is relocating to Pennsylvania from Delaware. Advan Tek's technology will make wind power generation more efficient, while creating jobs.

Pennsylvania's universities are among the leaders in seeking out and utilizing renewable energy sources and will hopefully market the potential of that field to students and future job seekers. Since those in the agricultural field may be among those most able to make use of renewable energy, its development should aid farmers and agri-businessmen and women as well.

Pennsylvania's energy needs are growing, not diminishing, and we need to find the right recipe for cleaner, more efficient energy sources, both renewable and traditional, that will meet these needs.

Joint Legislative Air and Water Pollution Control and Conservation Committee

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