New York State Energy Research and Development Authority • 17 Columbia Circle • Albany, NY 12203

NEWSLETTER

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ENVIRONMENTAL MONITORING, EVALUATION, AND PROTECTION PROGRAM

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SAVE THE DATE!

Sixth Biennial EMEP Conference

October 14th - 15th, 2009

The Marriott, Albany, New York

More information will be posted later this year at the EMEP website:

http://www.nyserda.org/programs/Environment/EMEP/conferences.asp

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EMEP's New Projects Help Direct Climate Change Strategies for New York State

EMEP recently began two projects that will help to define the direction of our EMEP climate change research and provide important information for policymakers. These projects were selected to assess the current impacts of climate change on New York State resources, identify strategies for managing the associated risk and costs, and provide the technical and scientific foundation for key decisions related to reducing greenhouse gas emissions in the State.

Research partners at Columbia University, Cornell University, and Hunter College, in collaboration with New York and Rutgers Universities and the Cary Institute of Ecosystem Studies, are examining the vulnerability of specific sectors of the state to climate change as one objective of the Integrated Assessment for Effective Climate Change Adaption Strategies in New York State. Climate variability and change is anticipated to impact our infrastructure, agricultural and water resources, coastal zones, ecosystems, public health, and energy generation and delivery. The researchers, working extensively with stakeholders, will build on the vulnerability assessment to determine climate risks and adaptation strategies, and link these findings to science-based options. The economic costs or benefits of impacts and adaptation strategies are being assessed, and a generalized set of guidelines for a prioritized response to climate change will be developed.

The "Development of New York State Greenhouse Gas Abatement Cost Curves" study is being conducted by the Center for Climate Strategies/Enterprising Environmental Solutions in collaboration with the City University of New York Building Performance Lab, Jack Faucett Associates, the University of Southern California Energy Institute, Claremont Graduate University, Stockholm Environment Institute, and E.H. Pechan Associates. Several similar studies have been conducted in other states and on a national level, but this one is specific to New York. The project goal is to identify a set of options with greenhouse gas reduction potentials, construct a detailed database of existing sources for emissions reductions, determine cost and performance of mitigation technologies, develop a baseline emissions forecast, analyze the cost of saved carbon for each technology or best management practice, and quantify the co-benefits of each option. To determine the most effective greenhouse gas reduction opportunities, the sectors targeted for study include: residential, commercial, and industrial; power supply; agriculture, forestry, and waste; and transportation and land use.

Source: NASA.

EMEP has also added a section to its website that describes the science and policy of climate change, how New York State is addressing this important issue, and what you can do to help.

http://www.nyserda.org/programs/environment/emep/home.asp.

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Policy Update

Regional Greenhouse Gas Initiative (RGGI)

RGGI is the first mandatory, market-based CO_2 reduction program in the nation, and New York is one of 10 participating states. Beginning in 2009, power plants in the RGGI region must surrender one allowance for every ton of CO_2 emitted annually. Allowances can be purchased in quarterly auctions. The first auction of more than 12.5 million allowances was held in September 2008 for a clearing price of $3.07. New York participated in the auction for the first time in December 2008. More than 31.5 million allowances were offered, with a final clearing price of $3.38. Auction proceeds will be used by participating states for various public benefit programs. NYSERDA recently held a meeting to propose an operating plan and receive input from stakeholders for the use of New York's share of the auction proceeds. According to New York regulations, auction proceeds may be used for development, demonstration, and/or implementation of energy efficiency measures, including electricity, natural gas, oil, and other on-site fuel use; transportation fuel use; renewable resource technologies; and carbon emissions abatement technologies with significant carbon reduction potential. NYSERDA also may dedicate funds to research, modeling, monitoring, and analyses that contribute to achieving and evaluating the objectives of the CO_2 emissions reduction program. Additional public input will be solicited before the final determination of auction proceeds use is made.

More information is available at: www.nyserda.org/RGGI

New EMEP Staff

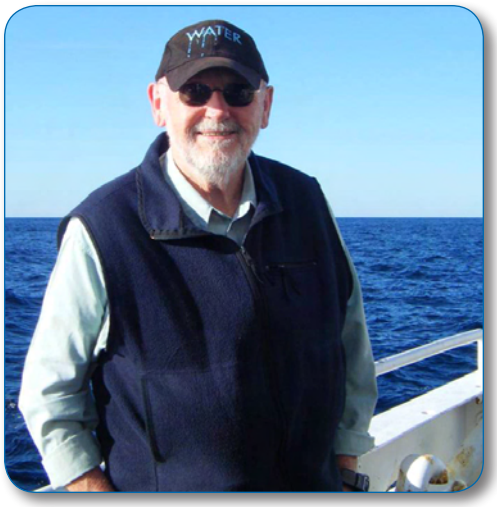
Sandra Meier has joined the EMEP program after 19 years working on environmental issues for the electric utility industry, most recently as Director of the Environmental Energy Alliance of New York. While with the Alliance, Sandra focused on environmental policy and regulatory issues in air and water quality, land use, and waste management for electric generation and transmission/distribution companies located throughout New York State. Prior to deregulation of the electric utility industry in New York, Sandra was with the environmental staff of the New York Power Pool and the Empire State Electric Energy Research Corporation. She has a BS in forest biology from the SUNY College of Environmental Science and Forestry, and an MS and PhD in forest pathology from North Carolina State University. Sandra will be responsible for coordination within the EMEP program and will primarily focus on global climate change issues and environmental policy.

Final Reports Funded through the EMEP Program

Final Report Title *(EMEP Reports Published in 2008)*	Report Number
Results From the 2003-2005 Western Adirondack Stream Survey	08-22
Ambient Gaseous Ammonia: Evaluation of Continuous Measurement Methods Suitable for Routine Deployment	08-15
Strategic Monitoring of Mercury in New York State Fish	08-11
Local versus Upwind Contributions to PM 2.5 Mass and Elemental Concentrations in New York City	08-04
Assessment of Carbonaceous PM 2.5 for New York and the Region: Executive Summary, Synthesis (Vol. I), and Full Report (Vol. II)	08-01

PROFILE: William Fitzgerald, EMEP Science Adviser

A pioneer of mercury research



On a National Science Foundation-sponsored oceanographic research cruise, William Fitzgerald studied the biogeochemical cycling of mercury on the continental shelf and slope off New England last August.
Source: William Fitzgerald.

William Fitzgerald was inspired to study mercury when, as a graduate student in the Massachusetts Institute of Technology and Woods Hole Oceanographic Institution Joint Program in Oceanography, he attended a lecture by Edward Goldberg, the noted geochemist who pioneered the use of mussels to monitor ocean pollution levels and founded the EPA-funded Mussel Watch program. Fitzgerald was stunned by Goldberg's description of mercury poisoning at Minamata Bay, Japan, where more than a thousand people died of "Minamata Disease" in the 1950s and 1960s, and thousands more were poisoned, after a chemical company dumped some 27 tons of mercury compounds into the bay that supplied the population with fish, a dietary staple. At the time, it was the largest case of industrial poisoning that had ever taken place (it has since been surpassed by the Bhopal disaster).

Fitzgerald began work to understand the biogeochemical mercury cycle and, in the early 1970s, set up The Mercury Laboratory in the University of Connecticut's Department of Marine Sciences. He has authored or co-authored more than 90 research papers, principally on the atmospheric and aquatic biogeochemical cycling of mercury and the influence of anthropogenic mercury emissions on the natural mercury cycle. He has received numerous honors and awards, including the University of Connecticut Chancellor's Award for Research Excellence, the Patterson Award and Medal from the Geochemical Society, and his recent election to the Connecticut Academy of Science and Engineering. Fitzgerald is a Distinguished Professor of Marine Sciences at the University of Connecticut, and Science Advisor to the EMEP program. His current and upcoming work includes studies of mercury fluxes and methylation processes in coastal and open ocean ecosystems, mercury depletion events in the Arctic, mercury and methylmercury cycling in tundra lakes and watersheds, and mercury bioaccumulation in the marine environment, where he is exploring the use of copepods (small crustaceans) as an indicator species.

> *"The ratio today [of mercury accumulation from atmospheric deposition], relative to pre-industrial deposition rates, is about three-to-one – a 200% increase."*
> *William Fitzgerald*

Dr. Fitzgerald discussed with EMEP staff, the current directions in mercury research.

How much do we understand about the biogeochemical mercury (Hg) cycle, and what do we need to understand better?

I think we understand the big picture reasonably well – principal sources, natural flows, anthropogenic inputs, depositional patterns – but our knowledge of the details is still quite limited. There are many challenging questions and poorly understood issues related to the production of methylmercury in nature and its movement and accumulation in the food chain, especially in the oceans [methylmercury is the bioavailable form of mercury which accumulates in food webs and therefore poses a danger to humans]. For example, how and why is mercury methylated? What are the controls, and how do they impact methylation and demethylation processes?

Sulfate-reducing bacteria are presumed to be the primary functional group of microorganisms mediating the transformation of mercury to methylmercury in freshwater/estuarine/marine sediments (although there is recent evidence suggesting dissimilatory iron-reducing bacteria also may be important). As sulphate-reducing bacteria process organic matter, they produce methylmercury; the question is, why? We know the availability of inorganic mercury is a key reactant, but we also have found that the mercury methylation process can be inhibited by the addition of organic compounds. Actually, organics both stimulate bacterial activity and bind mercury, but the latter effect is usually stronger, depending on the type of organic matter involved. For example, there is about 50 times more mercury in sediments in the New York-New Jersey Harbor compared to deposits 50 miles seaward on the continental shelf. However, the organic matter in the harbor (which is derived from the Hudson River and sewage) binds mercury much more effectively than the organic matter on the shelf (which is mostly from phytoplankton). As a consequence, and perhaps surprisingly, the bioavailable mercury and mercury methylation potential is about the same in both locations.

In the atmosphere, we know that gaseous elemental mercury is oxidized and eventually removed in precipitation and dry deposition, but our knowledge of the key reactions, their rates, and importance must be improved. There is great interest currently in the role of reactive gaseous mercury (RGM) in the atmosphere. Current models suggest it greatly enhances Hg deposition, perhaps doubling the amounts deposited via wet deposition; but this is based on limited data. NYSERDA has recognized the potential importance of RGM related fluxes to New York State, and is supporting research in this area.

William Fitzgerald and Chad Hammerschmidt change samples for in-situ photo-oxidation experiments with methylmercury in Toolik Lake, Arctic Alaska.
Source: William Fitzgerald.

Another very important issue is the production of elemental mercury in aqueous systems and its exchange with air. Ionic mercury is readily reduced in natural waters, much of it photochemically, so supersaturation is common and there are significant net mercury fluxes going from the aqueous phase to the atmosphere. This is an important feature of the biogeochemical cycling of mercury, and one that must be modeled with great care; but again, we are very data-limited, particularly in the oceans.

What do we know about the influence of human industry on the biogeochemical mercury cycle?

Models and empirical studies of the mercury cycle point to significant anthropogenic impact on both the regional and global scale. Human-related mercury emissions dominate the cycle to such a degree that most of the mercury in the atmosphere and surface oceans is anthropogenic. The human influence is evident when pre-industrial mercury atmospheric deposition is compared to modern deposits. The ratio today, relative to pre-industrial deposition rates, is about three-to-one – a 200% increase. This represents a global average and is typical of remote locations. We have seen this 3:1 ratio in the Arctic tundra, New Zealand, Newfoundland, rural Minnesota, southern Alaska, and Uganda. We recently analyzed a dated sediment core from a permanently stratified estuary with anoxic bottom waters in Rhode Island. It shows a ratio of four-to-one. Though greater than pre-industrial ratios, these numbers represent a dramatic improvement relative to the 1960s and 70s, when the ratio was ten- or twelve-to-one. This dramatic reduction is due to national policy initiatives such as the Clean Air and Water Acts.

We are beginning to see that there's a strong connection between the delivery of mercury from the atmosphere, and the enhancement of methylmercury production, and, therefore, its accumulation in fish. Atmospheric loading is what we might call "the big hammer" or driver for methylmercury production – across New York State, for example, mercury bioaccumulation is very dependent on atmospheric deposition. This seems intuitively obvious, and was predicted by modeling, but had not been previously shown to be the case [the correlation was demonstrated in a 2006 paper by Hammerschmidt and Fitzgerald[1]].

Should policy makers be equally concerned with terrestrial, marine and freshwater systems when considering mercury emissions?

Absolutely. There are clear and documented concerns with terrestrial systems, and the bulk of research is focused on that component. For a number of years, however, I have been emphasizing that the marine environment has been neglected. Until recently, there hasn't been much sensitivity to the connection between atmospheric deposition of mercury to terrestrial systems and runoff from the watershed into rivers that deliver it to the coastal zone. This may be one of the most crucial routes for human exposure; most fish consumed by humans is of marine origin, and the coastal zone supports most marine fish productivity. Here in New York, we could focus on the delivery of mercury via the Hudson River where it empties into the coastal waters.

What is the future likely to bring for the northeastern US, in terms of mercury deposition?

I think it has leveled off in many locations. Although the anthropogenic impact remains significant, the three-to-one ratio in atmospheric mercury deposition hasn't changed over the last 8 to 10 years. This suggests that the net contributions from regional and global sources aren't changing that much. For example, while Asian emissions are going up, our national contribution is going down. So perhaps there is a broad-scale balancing that is occurring. Nevertheless, certain urban and industrialized regions, such as the NY/NJ harbor, continue to receive additional localized inputs.

[1]*Hammerschmidt, C.R., and Fitzgerald, W.F., 2006. Methylmercury in freshwater fish linked to atmospheric mercury deposition. Environmental Science & Technology. 40, 7764-7770*

NYSERDA's New President and Chief Executive Officer

Francis J. Murray, Jr. was appointed President and Chief Executive Officer of the New York State Energy Research and Development Authority (NYSERDA) on January 26, 2009.

Prior to his appointment, Mr. Murray served as Senior Advisor at the international environmental consulting firm Ecology and Environment, Inc., where he provided strategic policy and market development guidance on environmental and energy issues to a number of private sector and not-for-profit clients. Mr. Murray also represented the Pace Energy and Climate Center and the Natural Resources Defense Council in the New York Public Service Commission proceeding to establish an energy efficiency portfolio standard program.

From 1996 to 1997, Mr. Murray was policy advisor to the United States Secretary of Energy, assisting in the development of the Clinton Administration's national energy policy.

Mr. Murray served from 1992 to 1994 as the New York State Commissioner of Energy and Chairman of the NYSERDA Board of Directors, then a statutory function of the State Energy Commissioner. At that time, he also served as Chairman of the State Energy Planning Board, a multi-agency statutory board charged with the responsibility of developing a comprehensive, integrated energy plan for the State that integrated State energy, environmental, and economic development policies.

In 1985, Mr. Murray was appointed Deputy Secretary to the Governor for Energy and the Environment, a position he held until 1992. He served from 1983 to 1985 as Assistant Secretary for Energy and the Environment in the administration of New York State Governor Mario M. Cuomo. He represented New York in numerous national and regional energy and environmental activities, including the Coalition of Northeastern Governors, the National Governors' Association, and the Council of Great Lakes Governors. Mr. Murray began his work on New York State energy issues as legislative counsel and then as an energy and environmental policy advisor to Governor Hugh Carey from 1977 to 1982. He began his career in public service as a legislative assistant to Congressman James V. Stanton (D-Ohio).

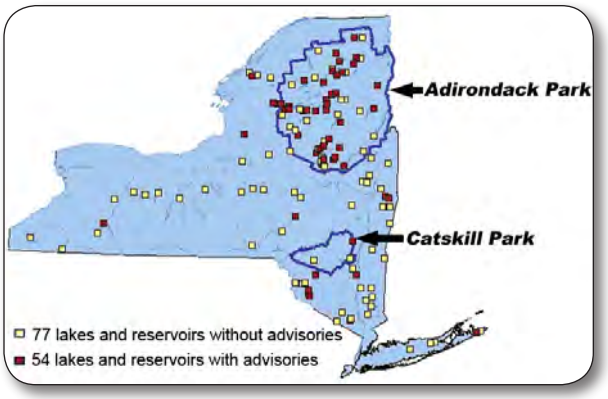
Mr. Murray received his Bachelor of Science in Foreign Service cum laude from the Edmund A. Walsh School of Foreign Service at Georgetown University, and his Juris Doctor from Georgetown University Law Center.

Four-Year Lake Monitoring Study Reveals Concentration of Mercury in Fish is Higher for Adirondack and Catskill Lake Regions

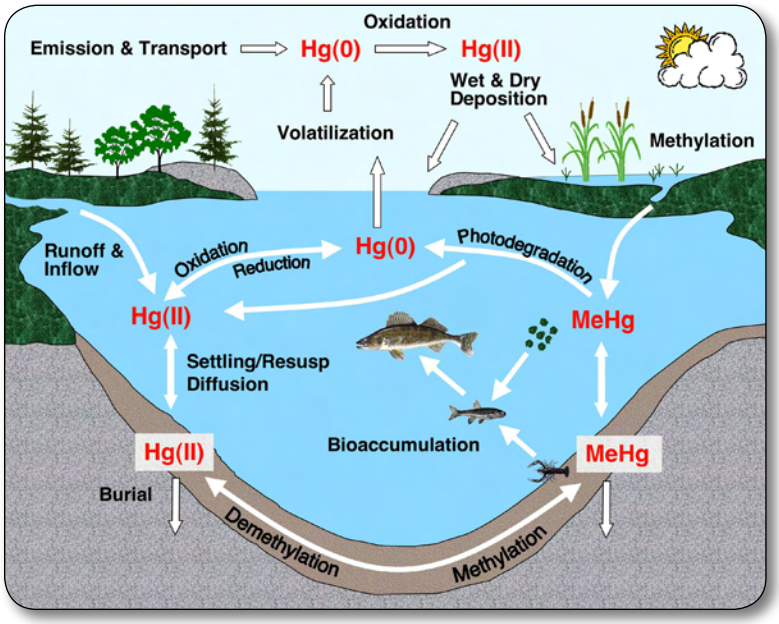
NYSERDA and New York State Department of Environmental Conservation (NYSDEC) have recently completed a four-year monitoring study of mercury levels in New York State fish. This represented the first comprehensive study of lakes in the State and provided critical data both to inform State environmental policy and to update fish consumption advisories from the New York State Department of Health (NYSDOH). The study also determined which variables are most highly correlated with levels of methylmercury in fish; using this information, a simple model was developed for use in predicting mercury concentrations in fish. The project targeted largemouth and smallmouth bass, walleye and yellow perch, all species previously found to have high mercury concentrations and all are important to local fisheries.

Data from this study also may contribute to a regional effort to reduce atmospheric mercury deposition from out-of-area sources. Currently, most mercury deposition in New York and New England is from sources outside the region. The New England Interstate Water Pollution Control Commission has filed a Clean Water Act petition with the U.S. Environmental Protection Agency (EPA) on this issue. The multi-state petition, which includes New York State, requests an EPA-led management conference that would assess the extent of mercury pollution from sources in other states, and develop a plan to reduce emissions from those sources.

According to the EPA, mercury, a naturally-occurring toxic metal, has become an important environmental and human health concern primarily due to anthropogenic processes such as coal burning, gold mining, chlor-alkali plants, industrial effluent and waste incineration. However, the Clean Water Act of 1970 and the Clean Air Act Amendments of 1990 reduced mercury emissions from most of these sources, leaving coal combustion at large power generating stations as the primary remaining source. Many of these coal-burning plants are located upwind of New York in states to the west and south, and atmospheric deposition from coal combustion is now recognized as the primary source of mercury pollution in most of the State.



Map of New York State showing locations of study lakes and resulting fish consumption advisories.
Source: NYSDOH, 2007.



Mercury cycling in a lake and its watershed. Mercury emissions are transported long distances, primarily as gaseous elemental mercury [Hg (0)], oxidized in the atmosphere to reactive gaseous mercury [Hg(II)], and deposited in precipitation and by surface contact (dry deposition). Anaerobic bacteria convert a small portion of the incoming Hg(II) to methylmercury (MeHg), which is then bioconcentrated in the aquatic food chain (by a factor of $\geq 10^6$). Various biotic and abiotic reactions interconvert the different forms of Hg, affecting uptake, burial, and evasion back to the atmosphere.
Source: Daniel R. Engstrom, 2007. *Fish Respond When the Mercury Rises.*

When deposited in water, mercury can be converted by bacteria into methylmercury, a highly toxic and biologically available form that bioaccumulates in organisms and biomagnifies up the food chain. For this reason, high concentrations of methylmercury can occur in large predatory fish, which presents a health risk when these fish are consumed. Fish consumption is the main route of mercury exposure in humans and wildlife. Mercury's health effects are primarily neurological, and developing fetuses are at the greatest risk.

Mercury cycling in the environment has been researched for many years – NYSDEC has been monitoring fish for mercury concentrations for more than three decades – yet questions remain as to why certain lakes and fish have higher mercury concentrations than others. Prior to this study, NYSDOH had determined that fish from 36 New York lakes and reservoirs had mercury concentrations high enough to warrant issuing consumption advisories. Mercury was the most prevalent fish contaminant of concern in the State. However, this was based on a relatively small number of sampled water bodies – only about 4% of the State's lakes, ponds and reservoirs. The vast majority of water bodies had never been surveyed for mercury concentrations in fish. Thus, while mercury in fish was clearly a significant concern, the overall magnitude of the problem was largely unknown, and substantial monitoring gaps remained.

The NYSERDA/NYSDEC project examined fish from 131 lakes throughout the State over a four-year period. The data showed that fish from most Adirondack and Catskill Forest Preserve lakes have higher mercury concentrations than fish from other regions of the State. For example, standard size (229 mm, 9 in.) yellow perch from Adirondack and Catskill lakes had a median mercury concentration of 382 nanograms (ng)/gram (g), whereas perch from lakes outside these parks had a median concentration of 162 ng/g.

Mercury can bioaccumulate and greatly biomagnify through the food chain in fish (as in this walleye shown above), humans and other animals.
Source: USDA Forest Service.

A total of 2,605 fish samples were analyzed. Mercury was detected in every sample. As found in other studies, the larger, predatory fish had higher concentrations, greater than 3,000 ng/g (3 parts per million [ppm]) in three of the four target species. Walleye, northern pike, and chain pickerel most often had the highest levels, although there was considerable variability among lakes. Smallmouth bass mercury concentrations were on average similar to or slightly higher than the mercury concentrations in largemouth bass of the same size. Yellow perch had the lowest concentrations of the species tested.

Of the study samples, 62% (1,630 fish) had mercury concentrations that exceeded the USEPA criterion (300 ng/g) for the protection of human health; 10% (263 fish) exceeded the USFDA marketplace standard (1,000 ng/g). Based on these data, NYSDOH has issued new advisories for 50 specific lakes throughout the State, many of which lie within the Adirondack and Catskill Parks. Sixty-two percent of the lakes surveyed within the Adirondack and Catskill Park regions were issued specific fish consumption advisories, whereas only 19% of the lakes surveyed outside of the parks were issued such advisories. This has resulted in regional consumption advisories for women and children in the Adirondack and Catskill Parks.

Project staff also gathered and analyzed data to create a simple predictive model for mercury levels in the four targeted fish species. Fish length, lake pH, specific conductivity of the water, and lake water mercury concentration were found to be significantly correlated with mercury in these species, with water acidity the most important variable. Lakes and ponds with low pH (i.e., acidic), low acid neutralizing capacity (ANC), low calcium, and low conductivity had fish with higher concentrations of mercury. In general, these water chemistry variables characterize most waters in the Adirondack and Catskill Park regions. Other important variables included cations, total dissolved aluminum, and the presence of a dam on the outlet. Chlorophyll-a was an important variable in the two bass species but not in yellow perch or walleye. The area of contiguous wetlands bordering the lake was also important in some cases and appeared to be more important for walleye and yellow perch than the other species.

Overall, mercury levels in fish in New York appear to be declining in conjunction with recent declines in mercury deposition and acid deposition. For example, limited data indicate an average decline of about 16% in yellow perch from 12 Adirondack lakes over the past 15 years. However, the data vary considerably from lake to lake. Analysis of fish from seven lakes that had been monitored during previous surveys showed declining concentrations in four lakes, but significant increases in two. There also remain many lakes and ponds that have never been monitored for mercury in biota. Despite decreasing average mercury concentrations, mercury remains a problem of significant magnitude in New York State.

Additional research, conducted in 2008 and 2009, will supplement the study summarized in this report. Approximately 50 additional NYS water bodies are being sampled, predominantly within the State's parks. This continued effort will include collection of young-of-year perch for temporal analysis. Samples will be analyzed for selenium as well as for mercury, in an effort to better understand the interaction of both elements in fish.

NYSERDA Launches Biomass Combustion Research Program

New Project Evaluates High-Efficiency, Wood-Fired Heating

After a 15-year hiatus, NYSERDA has resumed research and development in the area of biomass-fired heating, with a joint effort of the Environmental and Buildings R&D Programs. While this effort is outside of the EMEP program, it is heavily influenced by the EMEP Strategic Plan and findings from EMEP projects. The return to this energy area was prompted by several factors. Among these are:

- The increased use of wood for heating as the cost of home heating oil has increased over the last several years;
- The findings of the EMEP funded study "Carbonaceous PM2.5 for New York and the Region," which demonstrated that residential wood heat is a major contributor to primary PM2.5 (Figure 1), and that this PM (particulate matter) has important human health consequences;

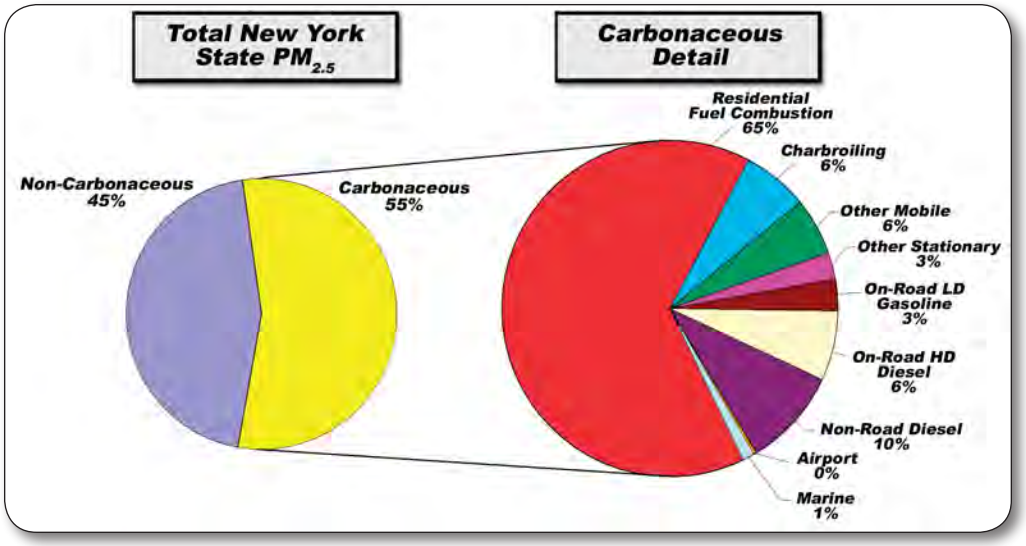


Figure 1. Total New York State PM2.5 and Carbonaceous Detail. Note the large contribution from residential fuel combustion (65%), of which almost all is from wood combustion.
Source: NYSERDA Report, 2008. *Assessment of Carbonaceous $PM_{2.5}$ for New York and the Region.*

- The emergence of the outdoor wood boiler, an inefficient, unregulated technology that has very high PM emissions rates;

- Efforts at New York State Office of the Attorney General, New York State Department of Health, and New York State Department of Environmental Conservation to address the numerous complaints resulting from wood smoke issues; and

- The general need for improved energy efficiency in all wood combustion devices.

When "Energy and Environmental Performance of Biomass-fired Heating Equipment" (PON 1156) was released in 2007, it invited proposals for laboratory and field testing of existing technologies as well as development of innovative technologies. The emissions testing was encouraged to be multi-pollutant in design and expressed as the unit of pollutant per unit of useful energy (i.e., output-based emissions rates). All emissions and energy efficiency rates were to be compared to the modern oil technologies that the biomass combustion technologies would be displacing. Product development projects were encouraged to be innovative and to use staged combustion with gasification. This type of design has emerged in European technologies in the last 15 years, and was illustrated in the EMEP 2007 Conference by Thomas Nussbaumer of Switzerland.

Combustion check of the 0.5 MMBtu wood-pellet boiler by Advanced Climate Technologies (ACTBioenergy.com) during the boiler commissioning at Clarkson University's Walker Center.
Source: Advanced Climate Technologies.

The Econoburn high-efficiency wood boiler by Alternative Fuel Boilers. This boiler burns split wood, has an energy efficiency of 87% and is made for the residential market.
Source: Alternative Fuel Boilers.

Nine research projects resulted, including:

- Alternative Fuel Boilers based in Dunkirk, NY, (alternativefuelboilers.com), will evaluate the environmental and energy performance of a residential size wood gasification boiler.

- Advanced Climate Technologies located in Schenectady, NY, (ACTbioenergy.com), is partnering with the Cayuga Nature Center, Clarkson University, and Cornell University to demonstrate and evaluate the emissions and energy performance of a 0.5 MMBtu wood chip-fired boiler.

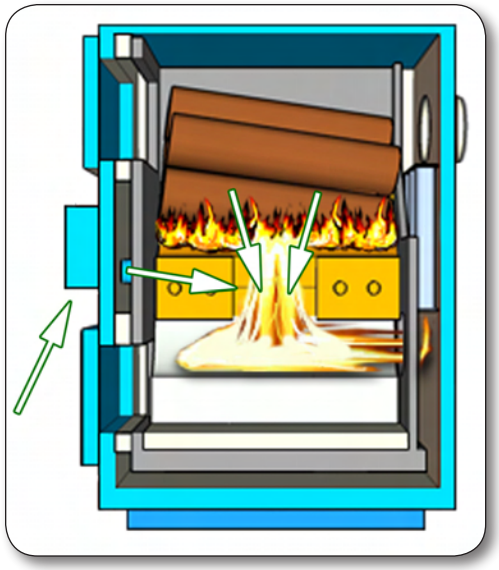
- The Northeast States for Coordinated Air Use Management (NESCAUM) will evaluate the energy and environmental performance of conventional commercial-scale biomass technology. Comparison testing will also be performed on oil-fired boilers. Results from this study will be compared to high-efficiency wood gasification units in the ACT and Clarkson projects.

- Clarkson University will demonstrate an advanced 0.5 MMBtu pellet-fired boiler and evaluate energy efficiency and emissions. The project will be conducted at Clarkson University's Energy Park.

- Cornell University will evaluate high- and low-ash content grass-based pellets and mixtures of grass and wood pellets. The project will test the functionality of pellet stoves in managing and removing ash residue from the burn chamber.

- SUNY Canton and Cornell Cooperative Extension of St. Lawrence County will produce grass pellets and test them in a variety of pellet burning equipment.

- U.S. EPA Office of Research and Development will evaluate the energy efficiency and emissions from conventional and advanced residential-size wood boilers.



The multi-step combustion process in an Econoburn wood boiler, by Alternative Fuel Boilers. First, wood fuel is conventionally ignited in the upper combustion chamber. When the upper boiler door is closed, the draft fan draws in fresh air, which is forced down through the logs and coals, intensifying the initial combustion. Additional super-heated air is forced into the lower chamber producing intense heat and nearly complete combustion (as shown here). The remaining gases pass through the back of the lower chamber and up through the turbulators for final heat transfer and exhaust.
Source: Alternative Fuel Boilers.

- Brookhaven National Laboratories will test the energy and emissions performance of outdoor wood boilers, advanced gasification boilers, pellet stoves, and wood stoves. This project will also coordinate with the SUNY Canton and Cornell projects to test the energy efficiency and emissions of stoves and boilers burning grass pellets.

- NESCAUM and the University of British Columbia will measure the contribution of wood smoke to local air quality in the Adirondacks during winter with special emphasis on effects due to topography and meteorology.

NYSERDA expects to continue building on these efforts through a new solicitation (PON 1272) released in 2008. This solicitation targets product development, demonstration, and energy and environmental performance, but places added emphasis on high-efficiency wood-fired combustion, control technologies, fuel characterization, and communication and outreach efforts. Awards are expected to be announced in early 2009.

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Mail form to:
Amanda Stevens
New York State Energy Research and Development Authority
17 Columbia Circle
Albany, NY 12203

Fax form to: 518-862-1091
Questions: 866-NYSERDA, ext. 3325
Email: emep@nyserda.org