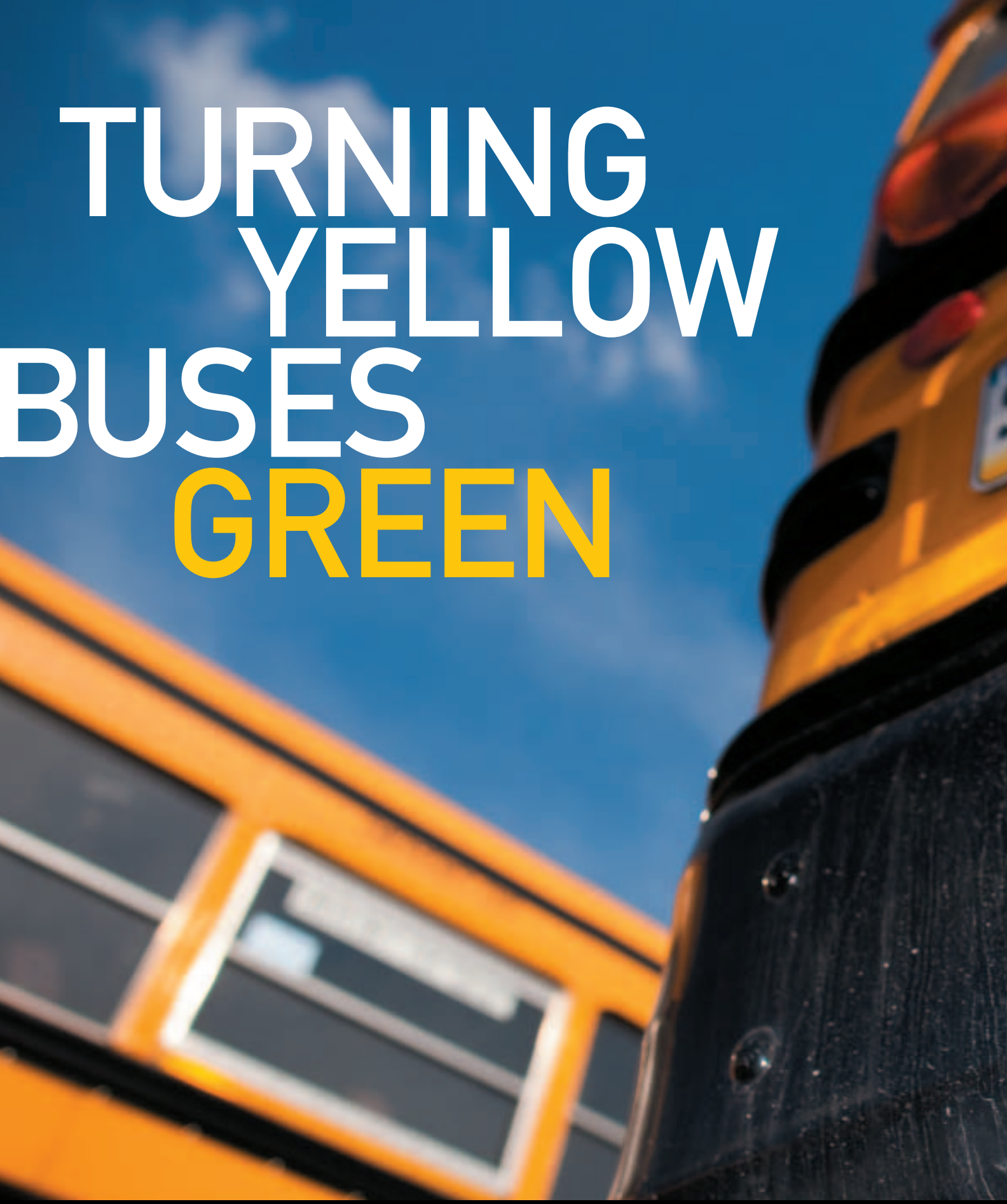

TURNING YELLOW BUSES GREEN

Q: WHY ARE THREE ENVIRONMENTAL GROUPS SO RELENTLESS IN THEIR CAMPAIGN
A REPORT ON HOW A MODEST RETROFIT FUND IS HELPING STUDENTS, SCHOOL OFFICIALS AND EVEN

TO ELIMINATE THE DIRTY AIR SPEWING FROM OLDER SCHOOL BUSES? **A:** PRECIOUS CARGO. BUS-FLEET OWNERS BREATHE EASIER. BY CHRISTINE H. O'TOOLE PHOTOGRAPHY BY JOSHUA FRANZOS

BILL ROENIGK is nobody's idea of a poster child. The affably blunt vice president of a southwest Pennsylvania school bus company has the crash-resistant build of the over-sized vehicles he manages. When local air pollution activists began their fight two years ago to limit pollution from school buses, they might have sought a frail young passenger as the face of the campaign. Instead, the 53-year-old Roenigk signed up for a pilot program to clean up part of his fleet and ended up as an unlikely environmental hero.

Bill Roenigk, vice president of W.L. Roenigk Inc., was the first to sign up his transportation company for an Endowments-supported effort to reduce school bus diesel emissions. Pictured standing in the Etna, Pa., lot of his family-owned firm, Roenigk has served as one of the more prominent faces in the local campaign to make school buses more environmentally friendly.

"I'm not a tree-hugger," he asserted on a damp May 1 morning before an informational meeting that doubled as a bargaining session. At the battered downtown office of the Pittsburgh School District's transportation department, cell phones buzzed with updates from dispatchers and drivers as Roenigk and a dozen other bus contractors gathered. The ensuing discussion wrapped children's health, green technologies and the ongoing struggle to clean Pittsburgh's air into a 60-minute presentation with a $600,000 carrot.

It was the $600,000 part that caught the contractors' attention. "Who gives bus companies money?" joked Rick Linder, whose firm runs 54 buses and 36 vans on city routes. The answer was a Heinz Endowments-supported effort to reduce school bus diesel emissions. Roenigk's family-owned company, W.L. Roenigk Inc., was the first to take advantage of the Pittsburgh Healthy School Bus Fund, which offers the companies a 100 percent rebate on the cost of retrofitting old engines with equipment that significantly reduces carcinogenic emissions. His firm has completed 50 retrofits and will put another 20 buses with modified engines on the road this fall. Linder expects his company, MIL Transit, to retrofit 40 buses over the summer using money from the fund and a similar Allegheny County program.

Both men had the foresight to voluntarily take advantage of available funding that would cover the upgrade costs before Pittsburgh school board members voted in May to approve among the country's most innovative contracts between a school district and local carriers. The agreements with 19 bus companies require them to have diesel particulate filters on at least 85 percent of their diesel-powered vehicles, and to have closed crankcase ventilation systems on all diesel vehicles by the

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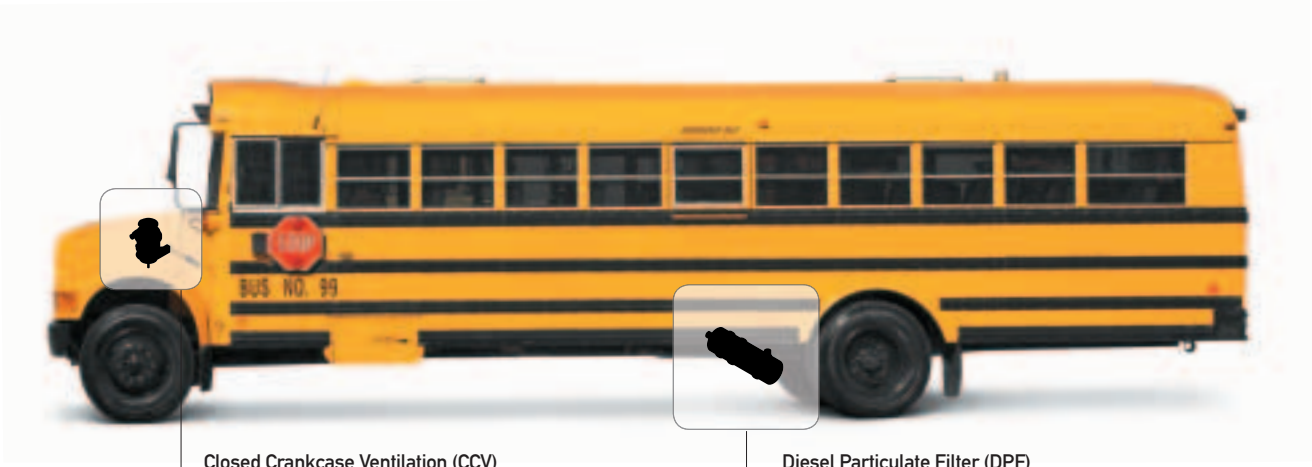
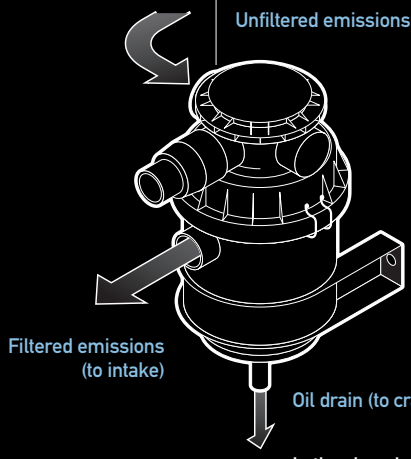
DIESEL RETROFIT 101

Upgrading a school bus to significantly decrease its diesel emissions is usually a two-stage process. A diesel particulate filter must be attached, often replacing the muffler, to pull fine particulates from the tailpipe, reducing the amount of pollutants released into the air. A closed crankcase ventilation system has to be installed to keep fumes from seeping into bus cabins.

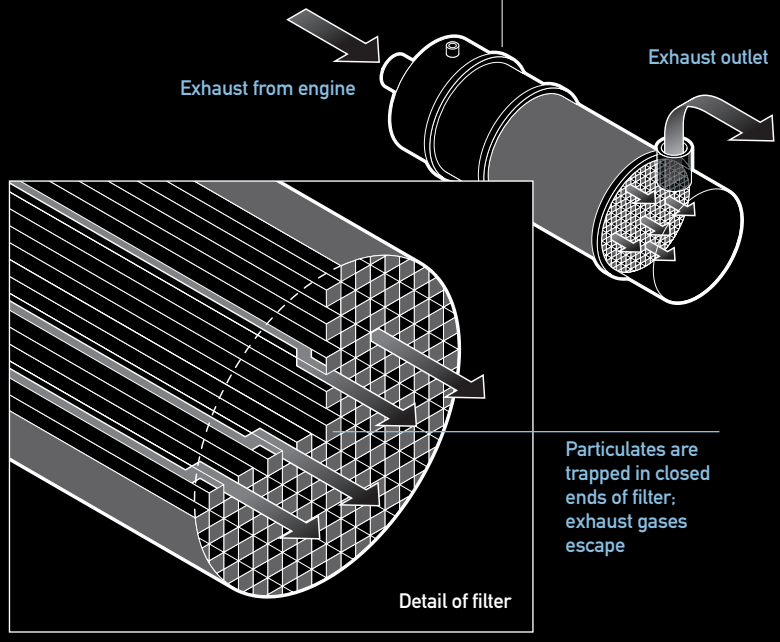


Closed Crankcase Ventilation (CCV)

Diesel Particulate Filter (DPF)



In the closed crankcase ventilation process, equipment is installed in the engine to close off exhaust that usually vents into the air and seeps into the bus cabin. The ventilation filter system reduces the amount of pollutants and reroutes the engine exhaust to the tailpipe, where a diesel particulate filter can further remove harmful contaminants.



Exhaust from the engine enters one end of the diesel particulate filter and is forced through a series of honeycomb channels with porous walls that capture as much as 90 percent of the solid particles.

end of the 2013–14 school year. The filters are estimated to cut diesel emissions by as much as 90 percent, while the ventilation systems will help provide cleaner air for students to breathe inside the bus cabins.

"The school board decision to require cleaner buses over the life of the next contract showed leadership and a commitment to protecting children's health," says Rachel Filippini, executive director of GASP— Group Against Smog and Pollution. "Although including public health requirements is not uncommon in contracts for construction projects, it is unusual in school bus contracts. Based on the Pittsburgh success, this important and innovative approach is now being considered elsewhere to better protect children's health."

Combined with the county program and other projects in several suburban districts, the Healthy School Bus Fund has notched efforts in clearing the Pittsburgh region's air pollution a step forward. It also has been an example of regional organizations effectively pushing for transformative changes in attitudes and actions on a local level. In this case, two Endowments grantees, GASP and Clean Water Action, have been at the forefront of demanding stricter air quality standards in southwestern Pennsylvania. They teamed up two years ago with the Boston-based Clean Air Task Force, also supported by the Endowments, to develop the retrofit campaign. Clean Air administers the bus fund, and the three groups work together to raise awareness about Pittsburgh's air quality problems.

Bus exhaust is one of several culprits in the region's pollution. Each year, 2,000 diesel school buses spew about 12 tons of particulate matter and 367 tons of hydrocarbons into Allegheny County's atmosphere. While this is a small amount compared to other particulate sources such as older coal-fired power plants and industrial facilities, children are more directly exposed to the bus pollutants, and their developing lungs are more vulnerable to pollution's harmful effects.

The Healthy School Bus Fund was started in 2007 with $500,000 from the Endowments that was later augmented with $100,000 from the Pennsylvania Department of Environmental Protection. It has operated through a multi-step process in which bus operators for the Pittsburgh school district can purchase diesel particulate filters, which pull fine particulate matter from bus tailpipes, and crankcase ventilation systems, which keep fumes out of bus cabins. In the absence of regional regulations— and prior to a city school board vote in May— the fund offered one of the few incentives for private companies to make their old buses run cleaner.

"This is the hard part of environmental control," acknowledges Caren Glotfelty, program director for the Endowments' Environment Program and a 20-year veteran of clean air advocacy. "It's so decentralized that we absolutely needed voluntary compliance to achieve our larger goals."

Below, Rich Roman, a mechanic at Penn Detroit Diesel-Allison, removes the old muffler from a school bus as one of the first steps in installing a diesel particulate filter. The Cranberry Township firm north of Pittsburgh retrofits buses used by the Pittsburgh Public Schools.

A shiny new $100,000 school bus has no need for retrofits— models sold since 2007 meet the latest Environmental Protection Agency standards. But precisely because their simple, sooty engines chug reliably on, most school buses stay in service for a dozen or more years, each emitting twice the pollution of a tractor-trailer. As states like California and Connecticut mandate cleaner buses,

devices that can be added to older vehicles have debuted nationwide. However, in Allegheny County, strapped school districts and bus contractors can't write the near–$7,000 check required for every bus retrofit, even as evidence mounts that dirty diesel is harming the health of local children.

UNCONTROLLED ASTHMA AND UNSAFE AIR

In one of several experiments various groups have conducted in the United States to measure student exposure to diesel fumes, the Clean Air Task Force monitored emissions from conventional and clean school buses by following vehicles on routes around the country. The results, captured on video, graphed dramatic spikes in conventional buses' diesel exhaust, as the tailpipes blasted fine particulates into the atmosphere. Cabin exposures to the fumes started at unhealthy levels and climbed steeply each time bus doors were opened. By contrast, the study found that buses with tailpipe filters and crankcase ventilators were virtually emission-free.

Diesel exhaust has been classified as a potential human carcinogen by the EPA since 2002. Humans routinely exposed to diesel fumes, such as bus drivers and truckers, show the hazards: Those exposed to high levels of diesel exhaust over many years consistently demonstrate a 20 to 50 percent increase in the risk of lung cancer or mortality.

While no research has been conducted on Pittsburgh's school buses, local activists infer that the national data indicates similarly dangerous exposure to students in southwestern Pennsylvania. The situation is exacerbated by the region's burden of having the nation's highest load of microscopic soot in its air.

In April, the American Lung Association again named Pittsburgh the country's second-worst offender for particulates, behind Los Angeles, and first in overall short-term fine particle pollution; year-round particle pollution; and ground-level ozone, which is the primary component of smog. The findings were based on data taken over a three-year period, 2005 through 2007.

As part of what is becoming a perennial debate, critics of the association's methodology, including the Allegheny Conference on Community Development and some local media, contended that the association based its findings on readings from monitors in the communities of Liberty Borough and Clairton, which are near the U. S. Steel Clairton Coke Works, thus skewing the results. But local environmental activists countered that other parts of the region also have high particulate concentrations, so even if the monitors in the Liberty–Clairton area were not included, there still would be a region-wide problem with particle pollution. Both the Allegheny Conference and the environmental groups involved in this debate have received Endowments grants.

Organizations like GASP estimate that diesel exhaust alone causes more than 237 local deaths in the region annually, in addition to 3,399 asthma attacks each year. With Pittsburgh's extremely high levels of uncontrolled childhood asthma — emergency room visits for the condition are four times the national average — there is an obvious correlation between air quality and short-term illness.

"Children are not exposed to pollution in a vacuum," says Dr. Fernando Holguin, director of the new, Endowments-funded Pediatric Environmental Medicine Center at Children's Hospital of Pittsburgh. In some local communities with high levels of particulates, particularly poorer ones like Braddock, one out of four children has asthma, and a variety of factors may predispose these youngsters to asthma attacks, Holguin notes.

"If children are obese or malnourished, they may be more vulnerable. Some studies show that inner-city children who have more stress are more likely to develop asthma when exposed to traffic pollution," he says. "It's a tremendous public health problem."

BY THE NUMBERS

Children can be exposed to diesel pollution both outside and inside a school bus because of exhaust from the tailpipe and the engine crankcase. Diesel exhaust has been classified as a potential human carcinogen by the U.S. Environmental Protection Agency. While no research has been conducted on school buses in the Pittsburgh region, several statistics raise concerns about the possible harmful effects of diesel exhaust on children's health.

60,000

On any given day of the school year, more than 60,000 school students in Allegheny County are exposed to diesel exhaust fumes from school buses.

367

Each year in Allegheny County, school buses emit 367 tons of toxic pollutants into the air. That equals the weight of about 26 school buses.

5X–10X

The amount of exposure to microscopic-particle pollution on school buses is usually five to 10 times greater than the levels of fine-particle pollution in the ambient air.

$7,000

In southwestern Pennsylvania, the average cost in 2006 for a child's hospitalization for asthma was more than $7,000, which is about what it costs to retrofit one bus to reduce diesel emissions.

The Endowments' Glotfelty sees that challenge as an opportunity. "If we care about children's health, how do we translate school bus exposure to the larger unhealthy environment?" she asks. "This is a chance to get people's attention."

LOCAL STRATEGY

GASP began targeting the connection between diesel vehicles and particulates in 2004 with a campaign against school bus idling. The campaign was "low-hanging fruit," says Filippini, focusing public attention on a problem easily addressed by passage of a county ordinance. A second anti-idling provision, covering all on-road diesel vehicles, passed a year later.

In 2006, GASP joined with Clean Water Action, an environmental ally, on the Allegheny County Partnership to Reduce Diesel Pollution. Modeled on a national effort, it seeks to reduce diesel pollution overall by 40 percent by the year 2012. Retrofitting pre-2007 vehicles is a current priority for the partnership. Filippini ticks off community briefings, how-to sessions like the May 1 meeting for Pittsburgh school bus contractors and a city-wide petition drive as recent efforts.

"We know that 75 percent of particulates in local air come from outside the state and are out of our control," says Glotfelty. "We asked, 'What could we do locally?' School buses are not a big slice of the pie, but they are adjacent to pedestrians. So we started there."

Ellen Dorsey, a former Endowments Environment program officer who is now executive director of the Washington, D.C.–based Wallace Global Fund, spearheaded the development of the foundation-supported bus fund. "We need the community to embrace the air pollution issue," she told the Pittsburgh Tribune-Review in 2007 after the Healthy Bus Fund was announced. "We need corporations and government agencies to take the health of our children and communities seriously."

More recently, Clean Water Action and GASP organized testimony before the Pittsburgh school board this spring. One participant was Peter Bartholomew, a 14-year-old who spends an hour on Pittsburgh buses each day and says the commute often gives him a headache. Peter attends Falk Laboratory School at the University of Pittsburgh, but like many other local students enrolled in schools that are not part of the public school system, he still depends on the city district for transportation.

"I ride the bus back and forth every day from my house in Squirrel Hill to school in Oakland. I have asthma and so do a lot of my friends who live in Pittsburgh," he told board members during a March 16 public hearing. "I know that the school board cares about kids and their health and learning, and doesn't want them to miss school from being sick from asthma. I believe that the school board must require that every bus company that they hire to transport students have non-polluting buses."

Peter, who says his asthma is generally under control, has used diesel's health risks as a subject for a Falk School term project and created posters for the cause. He also has galvanized online support for the local Healthy School Bus campaign with a Facebook page that has garnered nearly 400 members to date. "We are making a difference through how many people have heard about the campaign," he says confidently.

Even more worrisome than asthma attacks, however, is the long-term damage that diesel particulates can wreak on children's developing lungs. The ultrafine pieces of unburned carbon, one-seventy-fifth the diameter of a human hair, carry toxins and metals past the body's usual defenses and deep into the lungs. Repeated exposure can cause lung cancer and also has been linked to heart disease.

"My background helped me put the pieces together," says Nancy Bernstein, a local activist with a background in environmental health. "Children are the canary in the coal mine, the most vulnerable population, but the truth is, we're all affected."

Bernstein credits a 2007 Endowments-sponsored conference on women and environmental health as a catalyst for volunteering in the bus pollution effort. She took her concerns to the Pittsburgh school board's March 16 meeting, comparing the cost of bus retrofits to pediatric emergency visits.

"Data from the Pennsylvania state health department show that three-quarters of children visiting emergency rooms for asthma end up hospitalized," she told the board. "In southwestern Pennsylvania in 2006, the average cost for a child's hospitalization for asthma was over $7,000. That's about what it costs to retrofit one bus to reduce diesel emissions by 90 percent… . The cost of managing asthma attacks far outweighs the cost of retrofitting a school bus."

Public outreach and public funds moved the retrofit campaign forward. "We have made progress," says Filippini, pointing to efforts in five local school districts, including Pittsburgh's. "But [retrofitting buses] is easier for districts that own their own buses, and most districts contract out." Among those is the city school district, with more than 350 standard buses run by private contractors. The Endowments-led Healthy School Bus Fund zeroed in on the Pittsburgh district to effect change.

Other sources for retrofit dollars include the EPA, Obama administration stimulus funds, state grants and local initiatives such as the Clean Air Fund, which is administered by the Allegheny County Health Department and still has about $485,000 remaining for school bus retrofits. In bypassing those avenues to create a generous rebate program, the Healthy School Bus Fund found eager takers.

"This public–private partnership is unique in the national diesel campaign," says Brooke Suter, national campaign director of the Clean Air Task Force. "The Endowments grant streamlined and simplified the way funding is distributed. It allowed us to test some ideas, like applying a rebate concept."

IDLE CONCERNS

chool buses on the road cause only part of Pittsburgh's air pollution. Some local programs take aim at other particulate offenders.

In October, the state of Pennsylvania followed Allegheny County's lead in passing anti-idling legislation, designed to prevent vehicles of more than 10,000 pounds from idling more than five minutes in a 60-minute period.

The Allegheny County Partnership to Reduce Diesel Pollution campaigned for the local ordinance, which passed in 2005. The group set an overall goal of reducing emissions by 40 percent by 2012 and 70 percent by 2020.

"It is going to take a combination of strategies, including advocating for aggressive on- and off-road diesel fleet turnover, retrofitting diesel engines, better emission standards, and anti-idling programs to make a real difference in our region," says Rachel Filippini of GASP, one of the partnership's leaders.

Efforts to improve local air quality have reduced particulates. An EPA study released in January showed annual fine particulate measurements dropping from near 30 micrograms per cubic meter between 1979 and 1983 to slightly more than half that number from 1997 through 2001. However, that means the county still exceeds the federal annual standard of 15 micrograms per cubic meter, and marine traffic and construction vehicles, significant sources of air pollution, are not covered by the county regulations because of various delays or obstacles in getting legislation passed. Moreover, anti-idling legislation is difficult to enforce. Warnings must precede actual citations, and only one fine has been assessed to date, according to Jim Thompson, director of the Allegheny County Clean Air Program.

One simple solution — posting "No Idling" signs in school parking lots and other truck sites — has actually been hampered by the passage of the state law, which differs from the local regulation on the size and display of signs. Representatives from both sides are now meeting to resolve the discrepancies. Meanwhile, some school districts have posted their own reminders, and feisty parents have knocked on bus doors to remind drivers about the new rules.

The county effort also has concentrated on government-owned vehicles in the City of Pittsburgh and in municipalities in areas with the highest local levels of particulate emissions. With $127,000 in federal funds, Pittsburgh is retrofitting 13 waste haulers to reduce diesel exposure for neighborhood residents and sanitation workers. And in Liberty, Clairton and three adjacent boroughs, where childhood asthma rates reach 25 percent, three dozen municipal vehicles are getting similar makeovers.

Vendors and applicants for other retrofit programs complained that they spent too much time writing proposals to compete for funds, knowing that only one entity in the group could get retrofit money. The Healthy School Bus Fund process was designed to be more straightforward, Suter recalls. The best technology was identified; contractors were then invited to reserve a rebate amount for the total number of buses they planned to upgrade. Equipment vendors agreed to contain costs. When the work's done, the contractors submit documentation, and the payment goes straight to the vendor, usually within 30 days.

With a commitment to funding the full cost of a top-quality retrofit — one that reduces 90 percent of emissions— the Healthy School Bus Fund pays nearly $7,000 for every bus conversion. That's more generous than Allegheny County's Clean Air program, which requires a 25 percent match from all but the poorest local districts. Faced with an out-of-pocket expense for a voluntary improvement, most districts and contractors have ignored the two-year-old program. To date, only four of the county's 42 suburban districts have updated their fleets. Two used county funds while the other two relied on federal or corporate sources to defray expenses. One city contractor, MIL Transit's Linder, is planning to apply for the county program because Pittsburgh is one of the districts exempted from the 25 percent match.

"What's really amazing is that with retrofits, we can virtually eliminate this problem," says Suter.

But the task of educating contractors, connecting them to equipment vendors and making sure retrofitted fleets run smoothly is more circuitous. Also, with the cost of the equipment and installation climbing—possibly reaching as much as $11,000 this year—carriers might have to dip into their own funds or turn to state, federal or corporate sources that are often more competitive, as the amount of uncommitted dollars in the Healthy School Bus Fund and the county program dwindles.

TREE-HUGGERS AND MOTORHEADS UNITE

Ted Vasser, pupil transportation chief of the Pittsburgh school district, is a no-nonsense veteran of negotiations with its bus contractors. When the district commenced talks on a five-year contract this spring, Vasser built in opportunities to promote the Healthy School Bus Fund. After sponsoring two informational sessions on the

TAKING ACTION

Dr. Fernando Holguin, opposite page, clinical director of the Children's Hospital of Pittsburgh's Pediatric Environmental Medicine Program, explains the impact of air pollution on the respiratory system during a presentation at the Imagine Environmental Charter School at Frick Park. Holguin is a nationally renowned asthma researcher whose hospital position is funded by the Endowments. Fourteen-year-old Peter Bartholomew, above left, attends the Falk School in Pittsburgh and galvanized support through his Facebook page for the local Healthy School Bus campaign. As part of his efforts, he used a chalkboard design to create a poster promoting bus retrofits. At a May 27 meeting, Pittsburgh school board members, below left, approved five-year contracts with 19 bus carriers, who are now required to have diesel particulate filters installed on 85 percent of their vehicles by the end of the 2013–14 school year.

retrofit program, he laid down the law for the May 1 meeting: "This one's mandatory. It's part of the actual contract negotiation — if you are interested in being a contractor, you must attend." Vasser had developed another contract sweetener: The new contract allows fleets to run retrofitted buses up to 12 years old, offering a two-year grace period over the normal 10-year limit.

As the meeting began, GASP's Filippini and Clean Water Action's Kathy Lawson reviewed the health risks and the rebate program, and vendors looked over products that could help companies meet the program requirements.

"The devices are similar, but not identical," says Suter of the Clean Air Task Force. "No single company makes all the pieces of the final device. It's a long assembly line, with mark-up all along the way."

And once fleets roll out the retrofits, owners still have to grapple with the costs of maintenance and fuel efficiency. Filters need to be cleaned regularly and must reach a high engine heat to burn soot properly. As an incentive, the Healthy School Bus Fund throws a filter cleaner into the deal for companies retrofitting 50 or more vehicles. Retrofitted engines burn slightly more fuel than their former models. Fuel costs are a growing expense for all fleets because of more costly ultra low–sulfur diesel, mandated by the EPA in 2007. For a company that purchases millions of gallons of fuel a year, a few pennies per gallon adds up.

A particularly thorny issue for the contractors at the meeting was reliability. If not properly maintained and fueled, a retrofitted engine can lock, leaving students stranded. Some bus models made between 2004 and 2006 were particularly balky, leading some to blame retrofitting for the breakdowns. The first question during the discussion was: Does it really work?

From the back of the room, Roenigk assured his fellow Pittsburgh contractors that his 50 retrofitted buses are problem-free. Emission expert Tom Balon, who certifies retrofits for the Healthy School Bus program, confirmed Roenigk's experience. "The filter does not cause the problem," he says. "Half of the transit buses in the United States have had filters for a decade, and plenty of people have no problem."

Despite the complexities of the process, Roenigk believes it offers the most practical solution for reducing school bus pollution. "Purchasing all new buses is not the answer," he argues. "And every idea, including natural gas buses, has been explored. There are limitations everywhere. So it's amazing that this many local people have made this effort."

Linder, whose MIL Transit is preparing for more than three dozen retrofits, believes that there's no escaping a fix for dirty diesel. "In the future, the carbon footprint of buses will be penalized," he says. "And if moms think retrofitting is healthier, this is all good. Let's use the money. Let's not contribute to the problem." *h*