Philadelphia: America's Next *Green* City?

Getting on Board with Alternative Fuels

Key Issues: Air Quality, GHG's and Energy Independence

Philadelphia is poised to become "America's Next Great City" as a national hub for cutting-edge musical and artistic events as well as national historic attractions. Though this metropolis may be attracting more and more tourists every year,[1] its citizens are suffering from poor air quality and high gasoline prices, and the city's essential services are increasingly at risk due to reliance on foreign oil for its diesel fleets.

Philadelphia's leaders are shaping measures to reduce health threatening ozone and particulate pollution and are creating a greenhouse gas (GHG) inventory and reduction plan. Comprehensive solutions will be needed to address the following problems:

Philadelphia's Air Pollution Problem

- In 2003, Philadelphia ranked in the **90-99th percentile** of dirtiest/worst counties in the US for carbon monoxide, nitrogen oxides, sulfur dioxides, particulate emissions and ozone.[1]
- Philadelphia is in an area that violates National Ambient Air Quality Standards (NAAQS) for **ozone**.[1]
- As of 2003, Philadelphia has had nearly **1.5 million person-days** in exceedance of NAAQS for fine particulate pollution (PM-2.5)[1]
- The Philadelphia area received an **'F'** in the 2007 American Lung Association's State of the Air Report for both ozone and particulate pollution.[2]
- Philadelphia's City Government 2006 emissions of carbon dioxide (CO_2) a primary greenhouse gas, stood at about **0.49 million tonnes**, which must be reduced to **0.477 million tonnes** by **2010**. As a major urban center, it contributes significantly to Pennsylvania's status as the 3rd highest contributor of GHGs in the US, emitting 1% of the total GHGs in the entire world.[3]

Philly's Diesel-related Health Issues

- **22% of children** in Philadelphia suffer from asthma, and diesel emissions are a known trigger of asthma attacks. African-American and Latino children are more likely to have asthma than white children in southeast PA.[7]
- In the Philadelphia region, diesel exhaust is responsible for approximately **3,000 cases of cancer** over an average lifetime.[8]
- In 1999, diesel PM emissions were found to cause **180 premature deaths** in Philadelphia county, costing **$990 million**. They also caused **20,000 days** of missed work, costing **$2.5 million**.[9]
- Diesel emissions exposure has been linked to low-birth weight babies and DNA damage to fetuses in the womb when inhaled by pregnant women.[10]

A major culprit in the fight for better air quality is diesel exhaust. According to Philadelphia Diesel Difference, Pennsylvania is the seventh highest emitter of diesel fumes in the country. This problem is exacerbated in the concentrated urban setting of Philadelphia's inner city.[5] The US Environmental Protection Agency (EPA) states that sources of diesel exhaust, heavy-duty diesel trucks and buses, are the cause of one third of nitrogen oxide (NOx) gases from transportation and one quarter of mobile particulate emissions.[6] Every gallon of diesel burned releases over 22 pounds of CO_2 into the atmosphere, contributing significantly to global warming.[7] Areas afflicted with severe diesel emissions are found to suffer many health problems related to lung impairment and cancer.

Not only are Philadelphians burdened with the costs of hospital bills and sick days, they are, along with 11 million other Pennsylvanians, paying upwards of $30 billion every year for

imported oil.[12] Most is used for transportation purposes. In order for Pennsylvania to become a truly energy independent state, as Governor Rendell calls for in the "Energy Independence Strategy," major cities like Philadelphia must begin to look at secure, cleaner alternatives to petroleum-based fuels, both to improve citizens' health and to reduce consistently rising energy costs and reliance on unfriendly foreign nations to meet energy needs. Fortunately, there are many options for big cities like Philadelphia to expand their energy portfolio and to move toward a healthier, safer and sustainable future.

The Solution: Secure, Clean Alternative Fuels!

In order to address all of these issues, petroleum products must be phased out of the transportation sector. Philadelphia's cars, trucks and buses must be powered by less harmful and more environmentally benign alternative fuels. Philadelphia is now experimenting with new biofuels: the city recently received a $365,000 state grant to retrofit an existing petroleum pump to supply biodiesel, a less polluting fuel likely made from soy. There is a city council resolution under discussion to mandate the use of biofuels (ethanol and biodiesel) in all city-owned cars, trucks and school buses.

While it is important for the city to investigate all feasible ways of developing better air quality and greater energy independence, what has been overlooked is the importance of the long term ability of fuels to serve the needs of a growing, energy-demanding population. Ethanol and biodiesel, while valuable for displacing some oil today, may make a limited contribution. If made from corn and soy as most are today, they may cut our dependence on foreign oil by some 15-20%, but only while raising serious questions about negative impacts on the food supply, water resources, and land use.

There are two other alternative fuels that do not present these drawbacks but that have not enjoyed the same recent popularity as biofuels. However, it appears that these two energy sources, natural gas and biomethane, are real winners. Natural gas is a widely available fuel that burns cleaner and can completely displace gasoline or diesel in vehicles that are available commercially today. While it is a depletable fossil fuel, it can be combined with another renewable clean gas – biomethane – now beginning to be made from the gases escaping from landfills, sewage plants and other organic wastes. While use of these gas fuels requires building new refueling infrastructure, the good news is that investing in these fuel and vehicle systems paves the way to a completely sustainable economy tomorrow that will use non-polluting hydrogen gas. (**Over 6 million natural gas vehicles travel the world's roadways today**.)

Blast from the Past

Philadelphia, with a pioneering spirit, tried early generation natural gas vehicles in its city fleet and the Department of Streets purchased 10 natural gas fueled street sweepers. Their discouraging results led them to abandon this technology.

PGW, Philadelphia's natural gas supply company, also bought natural gas powered cars for its company fleet. While their performance was fine, the payment method PGW set up for the fuel sold was faulty; the company lost money and discontinued its program.

While these negative experiences deterred the city from pursuing the natural gas vehicle option further, there remain several stations throughout the city which still provide natural gas, albeit private access only:

- 3100 W Passyunk Avenue
- 900 W Norris Street
- 3100 E Venango Street[13]

The good news is that with natural gas refueling infrastructure available and/or expandable in Philadelphia, natural gas vehicle technology has now matured. An excellent opportunity for the City to take advantage of its facilities and capture the benefits of the new generation of natural gas vehicles would be to join the many cities, townships and private companies around the world that are revolutionizing the transportation sector through an often overlooked entity: their garbage trucks.

The Potential for Natural Gas Garbage Trucks in Philadelphia

Natural Gas Garbage Trucks are becoming more and more popular in the waste hauling

business because they are very reliable and can do the same work as a diesel truck while they are much cleaner, quieter, and run on a secure and cheaper fuel. From 2003 to 2005, the number of natural gas garbage trucks in the US rose 89%, compared to a 20% increase in all natural gas vehicles.[14] This is a testament to the growing trend of decision makers using the natural gas garbage truck option as a way to avoid high diesel prices, gain energy independence, improve air quality and meet the strict EPA 2007 and 2010 emissions standards for heavy-duty highway trucks.

Philadelphia's 351 city-owned garbage trucks (about 200 are in operation each day) consume approximately 90,000 gallons of diesel fuel every month, costing the city government nearly $2.5 million per year. If the city switched to natural gas trucks, they would save nearly $400,000 every year on fuel costs alone.*

Displacing diesel with natural gas garbage trucks would help the city to lower its particulate pollution levels greatly. The average emissions of a Philadelphia garbage truck, based on its age and horsepower, are 2.45 tons of PM and NOx per year. Replacing 50 diesel trucks with 50 new natural gas trucks would result in a 117 ton reduction of PM and NOx each year, bringing the city much closer to its air quality goals and reducing health care costs for those susceptible to dirty air. This is nearly a 2% reduction in PM emissions from all sources and nearly a 3% reduction from mobile sources.[15]

A natural gas garbage truck program would also help the city in reaching its greenhouse gas reduction goals as outlined in Philadelphia's Local Action Plan for Climate Change. Every natural gas truck that replaces a diesel truck reduces greenhouse gases from 11 to 23%. (Every gasoline burning sedan replaced with a natural gas sedan reduces these gases by up to 30%.)

Natural gas engines are noticeably quieter than diesel engines due to their spark ignition system, a fact that is not irrelevant for garbage trucks. A study done in the Netherlands found a 90% reduction in noise levels when natural gas engines were used in garbage trucks.[17] Given that these vehicles must travel up and down every street in the city, mostly during the early hours of the morning, citizens are much happier with the service of natural gas trucks. The waste haulers themselves are also able to talk and hear each other, and can enjoy themselves more while working, in addition to maintaining healthy hearing.

One of the most pressing reasons to adopt natural gas technology in the city fleet's heavy-duty trucks is to meet the new EPA particulate and NOx emissions standards set for 2007 and 2010 to protect public health. While new diesel trucks can meet the 2007 standards by using ultra-low sulfur diesel (ULSD) fuel and complex after-treatment pollution control equipment, it is not certain how they will meet the 2010 standards. By contrast, natural gas trucks can meet the 2007 and 2010 emissions standards today. They are the cleanest choice available.

The natural gas option is also becoming more economically feasible for cities looking to break their ties to expensive, polluting petroleum products: the rising cost of diesel trucks with their added pollution controls, the federal tax incentives offered (as of 2006) for buying alternative fuel vehicles and building refueling infrastructure, and the alternative fuel excise tax credit all have made natural gas much cheaper than diesel fuel. Industry consultants who seek grants for municipalities wanting to use alternative fuels would be able to tap these economic resources and more.

* Taking into account that each truck uses about 300 gallons of diesel fuel per month, a tax excise credit and motor vehicle tax rate for natural gas and a 15% reduction in efficiency for natural gas engines.

Key Players: Who Can Help Make the Change

Making the switch to natural gas takes planning and cooperation among many individuals within the city government as well as the non-profit and private sectors.

- Mayor of Philadelphia: The city government has a very strong executive branch, and a final budget decisions are made by the mayor. Since this is a significant investment in the city's garbage fleet, the mayor will have to be a supporter of the project. [Interest in improving the transportation sector has been expressed by Michael Nutter: info@nutterformayor.com]
- City Council: Since the discussions over whether to make the change to a natural gas garbage fleet would most likely come from a city council resolution, one or more city councilmen would have to be an advocate of this change and willing to draft and present a resolution. [Councilman Kenney has played a leadership role in promoting biofuels (sarah.putnam@phila.gov) and Councilman DiCicco has expressed interest in investigating a natural gas refuse truck program (brian.abernathy@phila.gov)]
- Department of Streets: Decision-makers in this government body would have to be supportive of making this change and willing to adopt and be trained in this new technology. The Streets Department purchases new trucks every year (this year 35 new trucks were purchased, next year they hope to purchase 20 to 30 new trucks). [Fleet Manager Frank Leo: frank.leo@phila.gov, Assistant Fleet Manager Chris Cocci: christopher.cocci@phila.gov]
- Philadelphia Clean Cities: The Clean Cities program would be able to help set up informational training sessions for fleet directors and haulers on the benefits of natural gas and can act as a forum of communication between city officials and outside experts from the alternative fuels and natural gas field. [Coordinator Brinda Shetty: coordinator@phillycleancities.org]
- Department of Environmental Protection: The PA DEP would need to provide grants such as the Alternative Fuels Incentive Grant to cover the incremental costs of purchasing the natural gas trucks and the refueling station. Most likely a package of several grants would be necessary to cover all incremental costs. [Susan Summers, Alternative Fuels Program Manager: susummers@state.pa.us]
- PGW: Philly Gas Works will have to provide the natural gas fuel and would be involved in planning for opening an old refueling station or installing a new one.
- Refueling Station Provider: A private company would most likely provide the refueling station, using natural gas from PGW. Such a company, like *Clean Energy*, may offer a deal for discounted fuel prices and reduced costs for installing the station if guaranteed a certain volume of fuel consumption.
- Natural Gas Truck and Engine Providers: Truck providers like *Autocar* and *Crane Carrier* and the leading engine manufacturer, *Cummins Westport*, have ample experience in the natural gas field and are able to provide reliable truck parts that have been used in cities across the country.

How to Get Involved

If you are a citizen of Philadelphia and would like to see city government commit to an alternative fuels program, you can become involved in the following ways:

- Contact your city council representative (Find out who your councilman is at www.phila.gov/citycouncil/) and let them know that this issue is important to you.
- Use your vote in the upcoming mayor election to support a candidate with strong environmental credentials and contact

your candidate to let him know that this is an important election issue.

- Become involved in public outreach groups that are working for better air quality and greater environmental sustainability like Philadelphia Clean Air Council, Clean Cities, or Diesel Difference. Spread the word on the importance of cleaner fuels and help to educate the public on the benefits of a natural gas transportation system.
- Learn more about other cities that have made this switch by contacting experts in the alternative fuels field:

  Energy Vision
  www.energy-vision.org
  138 East 13th Street
  New York, New York 10003
  Tel: 212 228-0225
  joannaunderwood@gmail.com

The state of Philadelphia's air quality and overall environmental health is in the hands of informed citizens. By working in cooperation with elected officials and non-profit agencies, the city will be able to take another step towards becoming "America's Next Great City" as a innovative leader in environmental and health solutions. This can happen through a well-organized alternative fuels program.

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This report could not have been assembled without the help of Bryn Mawr College Faculty and Staff, namely Don Barber and Wil Franklin; Philadelphia Streets Department Assistant Fleet Manager Christopher Cocci; Philadelphia Clean Cities Coordinator Brinda Shetty; and Philadelphia Diesel Difference.

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