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Hearing on Climate Change sponsored by the NYC Public Advocate

Manhattan Community College, Richard Harris Terrace, 199 Chambers St
November 29, 2017 - 9:30am to 12:00pm

Testimony by Matthew P Tomich, President, Energy Vision

Energy Vision is a national New York City based 501(c)(3) environmental organization. We would like to thank New York City's Public Advocate for setting up this important hearing, and for providing us with the opportunity to testify about the potential for New York City to combat climate change by moving its transit and municipal fleets to an ultra-low carbon, domestic, and renewable fuel option that is available now -- "biomethane" made from organic waste.

In response to the existential threat climate change poses, New York City has set an ambitious goal to reduce citywide greenhouse gas (GHG) emissions 80% below a 2005 baseline by 2050. The 2017 *OneNYC Progress Report* shows the City's GHG emissions have been cut 14%; that's a start, but there's a long way to go.

Several initiatives are rightly aimed at reducing the significant contribution of buildings to the City's carbon footprint. But to meet the 80x50 goal, transportation and waste-related emissions, which make up 26.8% of the total, must also be cut. The City's own 2015 *Clean Fleet Plan* sets an even more ambitious timeline for cutting emissions from the City's 27,000 fleet vehicles: 50% by 2025 and 80% by 2035, in support of which the City anticipates spending up to $6 billion on clean vehicles and fuels.

Toward meeting these critical transportation sector goals, the City has been deploying light-duty hybrid and electric vehicles. **But 5,600 heavy-duty trucks in the City's fleet consume the vast majority of fuel – 17.6 million gallons of diesel versus 11.6 million gallons of gasoline for light duty vehicles – and generate 60% of City fleet GHG emissions.** While mandated use of biodiesel blends in the City's diesel fleets, combined with electric and hybrid light duty vehicles, has helped reduce fleetwide emissions by 11%, it is not enough to get us to 80% by 2035.

Energy Vision has become recognized nationally and internationally as a leading independent expert in the alternative vehicle fuels arena, specifically for heavy fleets. Our research has led us to focus on a quickly emerging option – biomethane, also known as "renewable natural gas" or RNG. This fuel is made by capturing and processing the methane gases emitted by decomposing organic wastes.

The processing can take advantage of the biogas emitted by landfills around the country—including Fresh Kills—or collected in "anaerobic digesters," like the project now planned at the Newtown Creek Wastewater Plant. Biomethane is currently being used to fuel 20,000 buses and garbage collection trucks in more than 5 states, and hundreds of UPS long-haul trucks across several markets.

Biomethane has emerged as a clear climate change winner for heavy duty fleets. Since it is chemically identical to pipeline gas, it can be used as a drop-in fuel in any vehicle equipped with natural gas engines, and provides emissions reductions of 70%-300% relative to diesel fuel. That means on a lifecycle basis, this fuel can even be *net-carbon-negative*, the first fuel to earn this distinction. Combined with recently developed "near-zero" natural gas engines, it is also an air-quality winner, slashing emissions of health-threatening nitrogen oxides by 90% below the most stringent EPA requirements.

Leading candidates for the use of ultra-low-emission biomethane exist in the two of the City's most visible and most important heavy fleets—its buses and its garbage trucks. Of 5,700 buses, 1,000 are already CNG capable. By switching these to use of biomethane, which is available on the markets now for the same cost as conventional CNG, the MTA could reduce emissions from these vehicles by 40% or more. Of the Department of Sanitation's 2,200 standard collection trucks, 44 are currently powered by CNG. Every existing or new CNG vehicle powered by biomethane would meet or exceed the City's 2035 Clean Fleet target immediately.

With construction of appropriate infrastructure, NYC trucks and buses could be fueled with biomethane from the very "waste" the city collects, providing a closed-loop solution to both a fuel and a solid waste challenge—as is currently being done at several facilities in Los Angeles, Sacramento, San Francisco and others planned in Toronto and Vancouver.

The heavy-duty vehicle sector is particularly difficult to "decarbonize", largely because of the power and torque needs of these critical workhorse vehicles. For the moment, fleet electrification is prohibitively expensive, and in the case of sanitation trucks, simply incapable of meeting the waste collection and snow plowing requirements in NYC.

Biomethane is among the only commercial solutions available right now. New York City and the MTA have the opportunity to play a key role in technology selection, and we strongly encourage the deployment of proven, scalable, non-petroleum solutions like biomethane in the near-term.

Thank you for your time and consideration.

Sincerely,

Matt Tomich
President

ENERGY VISION

Biomethane: A Clean, Domestic, Ultra-Low-Carbon Fuel Option for NYC

Biomethane, also known as *renewable natural gas* ("RNG"), is a proven, commercial, yet underdeveloped ultra-low-carbon energy option that can displace fossil fuels, including diesel. The sources are abundant and the technologies are available, and the private sector is eager to develop and utilize this abundant resource.

Where does biomethane come from?

Biogas, the precursor of biomethane, is generated anywhere organic materials—food waste, animal manure, yard debris, crop cuttings, wastewater biosolids—decompose without oxygen. This process of *anaerobic digestion* produces a gas that is about 60% methane. When that gas is cleaned and upgraded to pipeline quality by removing CO2, moisture and other impurities, you have biomethane – nearly chemically identical to geologic natural gas, but **not a fossil fuel.**

How is biogas captured?

Anaerobic digestion ("AD") takes place in the airless environment of landfills, where biogas is captured by wells sunk into the landfill. Many wastewater treatment plants capture biogas from the sewage they process. The AD process is readily replicated using technology as simple as covered pits (common for manure-based farm operations) or as complex as multi-stage processing facilities with storage tanks and their own control rooms, which accelerate the natural decomposition process for anything from manure to food waste.

How much of it is there?

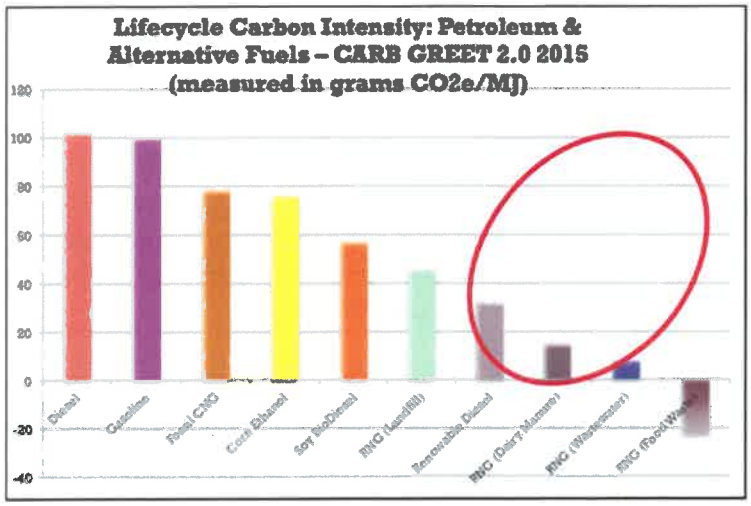
According to a Federal study, 2,100 biogas systems currently operate at landfills, farms and wastewater treatment plants nationwide, with the potential for nearly 11,000 more. In the last decade, more than 50 plants producing biomethane have been built. NYSERDA found total biogas potential in New York State to be the equivalent of about 230 million gallons of diesel fuel. DSNY has put the amount of commercial food waste alone in NYC at 657,000 tons annually; combined with residential organics and harnessed to produce biomethane in local anaerobic digesters, this fuel could replace ALL of the diesel fuel used by City fleets.

How can biomethane/RNG be used?

In all the same ways as geologic natural gas. It can be used on-site or injected into pipelines for generating electricity, cooking, heating/cooling homes, or as vehicle fuel. Energy Vision's research has documented its highest and best use—as a replacement for diesel fuel in heavy vehicles.

If it's the same as natural gas, what's the advantage of biomethane?

Production and use of biomethane in transportation reduces GHG emissions by 70%-300% compared to diesel. Because it is made from captured methane that would otherwise escape into the atmosphere, it can actually be **carbon-neutral or carbon negative**—that is, more GHGs are captured in producing it than are emitted by the vehicles burning it. No other vehicle fuel can currently make this impact. And with **feedstocks being renewed every day**, biomethane production can help address America's solid waste problem, as well as its energy and fuel needs.



Graph: California Air Resources Board

Why Use Biomethane for Transportation?

In 2014, transportation accounted for 28% of all US energy consumption, and 26% of US greenhouse gas (GHG) emissions. In Q1 2016, transportation overtook electricity generation as the single biggest US source of greenhouse gas (GHG) emissions. While other renewable technologies— solar, wind, geothermal, hydropower— are established and growing as sources of electricity, petroleum still accounts for 95+% of transportation fuel in the US. Vehicles equipped to use natural gas— and therefore biomethane/RNG— are already proven and commercially available in light, medium and heavy-duty models.

While electric vehicles will almost certainly play a role in the heavy duty sector, they currently lack the power and torque required in some heavy-duty applications—like using garbage collection trucks to plow snow in New York City. There are also negative social and environmental impacts associated with battery manufacture and disposal. And while electric vehicles have zero tailpipe emissions, they must still be charged, and are effectively only as clean as the grid that powers them.

Why Replace Diesel Specifically?

Diesel emits over 8.5% more GHGs per gallon than gasoline. In 2014, over 11.8 million trucks and buses in the US burned almost 38 billion gallons of diesel— nearly 25% of all on-road fuel— emitting roughly 25% of all transportation-related emissions, or 6.9% of total GHGs for the US. Natural gas (fossil or renewable) is among the only proven commercial non-diesel options that exist today for heavy vehicles.

Diesel is also a known carcinogen, according to the World Health Organization. But when biomethane is used in heavy duty vehicles, it results in virtually none of the health-threatening NOx and fine particulate emissions associated with diesel or biodiesel blends. When this fuel is burned in new "Near Zero" emission natural gas engines certified by US EPA and the California Air Resources Board in 2016, it reduces lung damaging nitrogen oxide emissions 90% below the EPA standard and cuts GHGs by another 8%.

Who is Already Using It?

Hundreds of CNG-capable UPS long-haul trucks in multiple markets use biomethane. Commercial waste-hauler Republic Services is fueling CNG collection trucks in locations around the country with biomethane. Santa Monica's Big Blue Bus fleet of 200 is being converted now to use of biomethane in Near Zero engines. LA Metro is switching 10% of its all-CNG bus fleet over to biomethane as a pilot, and is considering converting all 2,200 vehicles over the next five years. The Ports of LA and Long Beach have recently committed to converting some of the 12,000 diesel trucks using those facilities to the biomethane/ Near Zero engine combination. All told, more than 20,000 buses and trucks around the country are already using biomethane.

What Does the Opportunity for NYC Look Like?

- If all the residential and commercial organic wastes that New York City generates—about 1.25 million tons—were processed to make biomethane fuel, there would be enough to displace the 19.7 million gallons of diesel fuel now used in City fleets.
- Every fleet converted from diesel to RNG fuel can meet or exceeds the City's GHG reduction goals of 80% not decades from now but right away.
- Biomethane also represents a huge public health benefit for New Yorkers. Used in the new "Near Zero" natural gas engines, biomethane's emissions of lung-damaging nitrogen oxides are 90% below the most stringent EPA standards.

An average NYC bus travels 71 miles per day, and burns about 17 gallons of diesel. An average NYC garbage truck travels 50 miles per day, and consumes close to 19 gallons of diesel.

Meanwhile, New York City discards 1,800 tons of commercial food waste daily. Processed in local anaerobic digesters, that food waste could generate enough RNG to keep 1,800 buses or 1,600 refuse collection trucks on the road for the day, while displacing over 30,000 gallons of diesel fuel and 400 tons of CO2. To take advantage of that resource, MTA/NYCT would have to expand its CNG-capable fleet about 50% from the 800-1100 buses it now uses, while DSNY would need to add over 1,550 CNG capable collection trucks.

MTA/NYCT is already dispensing CNG from 5 garages in the Bronx, Brooklyn and Queens. DSNY's CNG fueling infrastructure is more limited, servicing only 44 trucks, but by accessing publicly available CNG resources to bridge the gap while expanding its own capabilities, DSNY could add 300 to 400 new NG trucks.

Is it Affordable?

The City has committed up to $6 billion for cleaner vehicles and fuels to meet its fleet emissions reduction goals– 80% by 2035. NG-capable trucks have a cost premium of about $40,000 over diesel models; replacing all the more than 2,200 DSNY standard collection trucks with NG-capable vehicles would cost about $100 million more, but with myriad environmental and public health benefits. The cost of modifying truck depots with the necessary ventilation systems would be about $300,000 to $400,000 per depot, but hundreds of DSNY trucks are stored outside.

Shouldn't organic wastes be composted?

Anaerobic digestion is a better option than composting for a number of reasons:

It produces two valuable products rather than one. While composting reduces GHG emissions and creates a useful soil enrichment product, AD facilities produce both biogas that can be upgraded into biomethane, and compost or liquid soil enrichment products made from the remaining biosolids.

Anaerobic digestion makes more economic sense. Because biogas fuel can be sold to displace diesel in heavy duty truck and bus fleets, and the soil amendment products are salable, there is a much greater economic incentive for the private sector to build these facilities. The payback time for investments in building ADs is between 5 and 12 years on average. But once the facilities are in place, the feedstock for them is renewable in perpetuity.

Anaerobic digestion takes up less space. For a region with such a dense population and space constraints, the same organics that could be processed on a 3 to 4 acre through anaerobic digestion site would require as much as ten times the land for composting.