

Garbage Gets Hot

Joan Pearlman interviews Gail Richardson



In the piece below Joan Pearlman interviews Gail Richardson, the vice-president for programs of Energy Vision, a national non-profit organization that analyzes and advocates for strategies that can move us most rapidly toward a sustainable transportation future. The organization is currently focusing on breaking the oil addiction of the nation's medium and heavy duty trucks and buses through an initial shift from petroleum-based diesel fuel to natural gas, and then a further shift to the renewable form of natural gas called biomethane. Biomethane can be made from garbage and other types of organic waste.

Joan Pearlman an award winning photographer. She lives in New York City where she lectures on folk art and is on the board of Energy Vision. For more information about Energy Vision, go to: <http://www.energy-vision.com>.

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Gail Richardson, vice-president for programs of Energy Vision talks with Joan Pearlman about biomethane, a commercial transportation fuel that is pollution-and-carbon-free, as well as renewable, since it can be made from garbage and many other types of organic waste.

Energy Vision (EV) is a national non-profit organization that analyzes, and advocates for strategies that can move our country most rapidly toward a sustainable transportation future. EV is currently focusing on breaking the oil addiction of the nation's medium and heavy duty trucks and buses via an initial shift from petroleum-based diesel fuel to natural gas, and then a further shift to the renewable form of natural gas, biomethane.

Introduction

"Global warming" is a term that entered our vocabulary years ago, yet this term is too gentle to describe the dangers we confront. As John Holdren, Assistant to the President for Science and Technology and Director of the Office of Science and Technology Policy points out, the changes in climate now occurring are not just a "warming" experience; they are rapid and uneven; they add up to a global "disruption". They involve unpredictable and violent fluctuations in wind, temperature, and precipitation patterns that have the power to melt icecaps, drown entire island nations, and redistribute animal and plant species. Most importantly, scientists widely concur, global climate disruption is a direct consequence of human activity—the combustion of vast quantities of fossil fuels.

To the ordinary citizen, the amount of information to be absorbed regarding global disruption is dizzying. Most are aware (others are just in denial) that we are already in a danger zone. If we are tempted to wonder if it is already too late to take action, the news from Energy Vision is heartening.

In this interview with Gail Richardson, the focus will be on transportation fuels. You will hear bad news about the disproportionate carbon footprint of toxic-spewing diesel-powered trucks and buses, and some new good news about natural gas and renewable natural gas ("biomethane"), transportation fuels that have the potential, starting tomorrow, to fully supplant diesel. Good news also comes from cities and towns in New York, New Jersey, and Pennsylvania where Energy Vision's research has helped persuade local officials to replace diesel refuse trucks with natural gas trucks, thus laying the foundations for a further shift to biomethane made from wastes.

Here is what Gail can tell us.

JP: You began working with EV two years ago. What attracted you?

GR: First, I greatly admire EV's president, Joanna Underwood for her pioneering environmental research and advocacy. I worked with Joanna at INFORM, an internationally recognized contributor to environmental solutions which she founded. Three years ago, Joanna started Energy Vision to put more than a decade's worth of research findings about alternative transportation fuels to practical use, on the ground, where it counts.

I am convinced Energy Vision is on the right track. We help towns and cities take immediate steps to reduce the dangerous 100% oil dependency of heavy duty fleets—the more than 8 million diesel-powered trucks and buses that hold our economy together.

Nationwide, these workhorses, constitute a mere 5%

JP: Can you say a little more about biomethane, what it is, and how it relates to natural gas fossils, including shale gas.

GR: Yes I can. But since you mentioned shale gas, I want to comment on that first. This is a very contentious issue today. Huge reserves of natural gas are trapped in vast shale layers underlying parts of Texas, Pennsylvania, NY State, and elsewhere. But to extract the gas the shale must be fractured by pumping water mixed with chemicals into the ground. We don't yet know enough about this process or the risks the chemicals may pose to surface and underground water supplies. Until we do, and until we have appropriate regulations in place, states and communities should proceed with great caution.

Fortunately, the US has plentiful natural gas supplies from other sources to support a shift of heavy duty transportation off diesel. Besides, Energy Vision views natural gas, not as a long-term answer, but as an interim "bridge," which makes possible a further shift to the renewable form of natural gas, biomethane.

Chemically, biomethane is absolutely the same thing—CH₄—as natural gas mined from the ground. CH₄ contains four atoms of hydrogen and just one atom of carbon, making it the simplest, lightest, and the easiest to burn hydrocarbon, and the one that most closely resembles pure hydrogen. There is this very important difference between natural gas and biomethane, however: Biomethane can be produced—eventually in vast quantities—by processing gases from organic wastes that we currently discard in municipal garbage, sewage sludge, animal manures, and crop and forest residues.

The US is just beginning to develop biomethane fuel. To date, the focus has been on liquid bio-fuels such as cellulosic ethanol and biodiesel, which can be blended with petroleum fuels but cannot, in the foreseeable future, move us decisively off oil.

There are several techniques for making biomethane. One is by feeding organic wastes or energy crops into an "anaerobic digester," a large "mixer" where, under controlled heat and moisture conditions, living microbes break down the organic matter and produce methane gas which is collected and cleaned for use as fuel. Another method is gasification. Here, organic material is "burned"—at high temperatures and with controlled oxygen or air—into a soup of carbon monoxide and hydrogen called syngas. Then the syngas can be turned into methane or any one of a number of other hydrocarbon fuels.

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of road vehicles, but they consume 20% of highway fuel, and they emit 26% of the highway emissions of CO₂, the most prevalent greenhouse gas (GHG). Energy Vision advocates shifting urban fleets from diesel fuel to natural gas on entirely pragmatic grounds.

Natural gas is the only commercial fuel in the world today with power and performance good enough to supplant petroleum-based diesel oil. The use of natural gas results in almost a third fewer GHG emissions compared to diesel, and, it is nearly free of the soot and of the toxic constituents emitted by diesel vehicles. A shift to natural gas is a crucial first step toward full sustainability, because a renewable form of natural gas, which is an identical "twin fuel" can be produced in various ways from wastes in every community and gradually supplant fossil fuel entirely.

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biomethane is to collect and clean the biogases that naturally form in landfills. Landfill gases are, approximately, half methane and half carbon dioxide. To make fuel from these gases, it is necessary to separate out the methane and strip away the impurities and toxics. The resulting gas, which is almost pure methane, can be either compressed or liquefied for use as vehicle fuel. By the way, the CO₂ that is stripped out of the biogases can be sold for use in making "dry ice" for refrigeration.

JP: Are we doing this?

GR: Well, first of all, there are hundreds of landfills in the US where the biogases are already being collected. This has been happening since the US Environmental Protection Agency banned the release of these methane-containing gases into the air, recognizing them to be significant greenhouse gases. At some sites, the gases, unfortunately, are just flared. At many other, the gases are used for home heating or are fed into natural gas pipelines. The government, recognizing the benefits of putting the gases to these uses established a federal tax credit. (The government did not until recently recognize the value of these gases for transportation.)

But now, in various states including Ohio and California we are beginning to see the even higher value of using cleaned-up landfill gas as a vehicle fuel. The biomethane price can become competitive if we "level the playing field" so that transportation uses of landfill gas get the same tax breaks as landfill-gas-powered electricity generation. There are bills in Congress right now to make this happen.

Let me emphasize a couple of very significant, related points about biomethane. Making biomethane actually involves recycling the greenhouse gas methane, which is emitted by decaying organic wastes. In other words, biomethane production turns a greenhouse gas into fuel, before it has a chance to escape from decaying organic material and warm the atmosphere.

For this reason, biomethane's "carbon intensity" can be from 85 to more than 100% less than diesel (depending on the wastes it is made from). In some cases, producing and burning biomethane can actually decrease overall GHG.

JP: Why are you optimistic about the actual production of renewable biomethane?

GR: For two reasons. The first is because we are awash in wastes. The second is because we urgently need to reduce this country's reliance on foreign oil, and here is a fuel source that can help do it. Taking just the municipal solid waste sector about two-fifths of the 4.6 pounds of waste per person each American generates daily ends up in landfills. The 1750 largest landfills, which are EPA-regulated, emit enough methane to displace 9.4 billion gallons of diesel fuel a year. That's enough to power one out of every four trucks and buses in the country. We have a huge world of waste out there, and we're not paying enough attention to it.

JP: If the waste is so valuable, why are we dumping it in far-away landfills?

GR: While communities have been dumping their wastes in landfills for many decades, we realize now that it is obviously inefficient to do this. We should expand programs to prevent generation of these wastes at their source, and we should reuse and recycle more materials—we've already made progress in this area—so we can minimize what goes into holes in the ground. But it makes sense to use the gases that are generated by the landfills that already exist.

Looking ahead, biomethane does not need to be made at landfills. It can be made wherever enough waste exists without transporting it to a distant location. For example, at the Hunts Point terminal market in New York City, there is more than enough food waste to make fuel with on-site anaerobic digestion technology—and there are thousands of trucks in that neighborhood that could be converted to natural gas and biomethane, helping clean up some of the most polluted air in the country.

JP: Once you have made biomethane fuel, what must be done so that trucks and buses can run on it?

GR: This is the beautiful thing about biomethane. Because it is exactly the same as natural gas, it can be freely mixed with natural gas in any quantities for any end uses. In the transportation sector, it can be burned in the same motors, stored and pumped in the same way at fueling stations, and distributed through the same pipelines. Refueling facilities can be built right at landfill sites where the fuel is made, so the fleets of garbage trucks that come to dump their loads there can refuel at the same time. Or the biomethane can be put into pipelines and end up powering trucks at stations far away. What is important is that every truck that is using natural gas today could, if supplies were available, begin tomorrow to use biomethane.

There are still some issues to resolve concerning the injection into interstate pipelines of biomethane produced at landfills, but these issues will be resolved. We have, in place, more than 300,000 miles of interstate pipelines that could ship biomethane anywhere at all in the US, and hundreds of thousands more miles of local feeder and distribution lines. In fact one company, Clean Energy, through an arrangement with Shell Oil Company, is already shipping biomethane from the McCommas Bluffs Landfill in Texas to markets in California.

JP: Does this mean we are on the way to biomethane?

GR: Let's say that the faster we can move our essential diesel fleets of trucks and buses to natural gas, the more rapidly biomethane markets will develop. We can see how this works by looking at a number of European cities—in Sweden, in Germany, France, and Spain—where biomethane fuel is already well understood, in commercial use, and is supported as a sustainable fuel for heavy duty applications.

It still costs more to purchase a new natural gas truck

than a new diesel truck, but the price gap is narrowing as manufacturers begin to comply with expensive EPA air quality regulations that are raising the cost of diesel vehicles. In addition, there is an important bill in Congress, the "Nat Gas Act," which would extend through 2019 tax credits for buying and fueling natural gas vehicles and building fueling stations. This would give investors a longer timeline for planning and greater certainty about the return on investments in natural gas technology. We have a huge opportunity in the US. No other pathway off diesel is actually possible to follow today. If we are really serious about breaking the oil-dependency of the trucking industry, which is so vital to national economy and national security, we must do everything we can to shift essential service fleets to natural gas.

While the transition to natural gas trucks and buses began in California, the ball is now rolling on the East Coast. As of mid-2009 more than 1100 CNG transit buses and 400 CNG refuse trucks were operating or planned in the New York City metropolitan area and New Jersey. Interest is also growing in local biomethane resources—which could positively affect the local economy and job creation.

But the pace of change needs to quicken dramatically. We are nowhere close to achieving the oil displacement and greenhouse gas reductions that scientists tell us are needed to minimize climate-caused crises. We can't afford to wait for the federal government to take the lead in "greening" the transportation sector. And every citizen can not only help by supporting the policy recommendations that will be debated early in 2010 that would expand the economic incentives for moving fleets to natural gas, but they can actively support the conversion of their local fleets, beginning today, by calling for their local officials, working with private sector partners, to invest in the natural gas option for the health of their communities.

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