



Game Changers in Sustainable Transportation: Communities Can Turn Wastes Into Renewable Fuel for Trucks And Buses

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Every year, U.S. households, institutions, factories, and farms throw away enough garbage, yard trimmings, crop residues, and other organic waste to power every urban truck and bus fleet in the nation with a climate-neutral gaseous fuel that is just like natural gas - but requires no drilling! They thereby destroy a vast renewable fuel feedstock and also drain public budgets.

In New York City, for example, taxpayers spend more than \$325 million each year to export their garbage to distant landfills. If, instead, the City invested in garbage-to-fuel plants, it could slash waste management costs and keep thousands of trucks and buses on the road day after day, year after year, for additional big reductions in annual fuel expenditures.

Turning waste into renewable natural gas fuel sounds like alchemy. But it is just an everyday fact of nature, the 24-7 occupation of mega-hoards of microscopic organisms that eat through dead organic materials trapped in airless spaces, for example, at a landfill or in an anaerobic digester. Human technology applied to these environments can enhance microbial action, increase biogas production, and extract a purified stream of sustainable transportation fuel.

Compared to other alternative vehicle fuels to date, waste-based renewable natural gas, also known as biomethane, is the lowest in “lifecycle” greenhouse gas emissions and the most efficient to produce from the widest range of feedstocks. It could quickly go commercial in many U.S. locations - if, that is, there were natural gas vehicles to use it.

Here’s where public agencies for sanitation or parks or transportation can come in. These agencies are owners and contractors of truck and bus fleets. They have the authority and the budgets either to purchase outright or to require contracting companies to purchase natural gas vehicles, as is already the case in dozens of cities, towns, and counties from Long Island to southern California. Every community that invests in natural gas fleets can also run these vehicles on waste-based renewable gas, or on a blend of the two fuels, which are fully interchangeable.



Tankers, like the one shown above, transport liquefied natural gas (LNG) produced at the Altamont Landfill in California to fueling stations serving 300 to 400 refuse trucks owned by Waste Management. WM, in partnership with Linde, built and operates the Altamont plant, the world’s largest landfill-based LNG production facility.

Medium- and heavy-duty trucks and buses are uniquely appropriate end-users of conventional and renewable natural gas. They comprise 4% of all road vehicles and consume more than 20% of the U.S. supply of oil-derived highway fuel, most of it

imported at significant cost to the economy and risk to national security. These workhorses have only one realistic path off diesel fuel for years to come and that is to shift to conventional or renewable natural gas. Heavy-duty natural gas engines are a commercial choice today, and they eliminate most of the health-endangering sooty pollution and nitrogen oxide emissions spewed by pre-2010 diesel engines.



On “opening day,” March 18, 2011, John Welch, an engineer with Dane County, Wisconsin (left), and Joe Falle, project engineer with Cornerstone Environmental Group, pump renewable natural gas into the first county vehicle (a pickup truck) to run on this sustainable fuel made at the Rodefild Landfill. By the end of the year, 10 to 15 vehicles will fuel up at the landfill.

But what about communities without natural gas fleets to begin with? They can also plan a waste-to-fuel production facility once they line up vehicles to use the supply. In Madison, Wisconsin, for example, a small production facility at a public landfill is designed to fuel 15 county trucks, and is already fueling several. A much larger facility, at the Altamont landfill in CA, makes fuel for 300 to 400 refuse trucks, including some of those that bring waste to the landfill from nearby communities.

Overall, the U.S. could make enough renewable natural gas from waste to replace 25 to 50% of all diesel fuel. What is happening in Madison and Altamont could occur, using road-tested, off-the-shelf technology, not just at landfills, but at wastewater plants, livestock farms, and other waste-rich sites. Making fuel from wastes is best done on a

modest scale in multiple locations because organic wastes are so widely distributed and so heavy and expensive to haul.

Urban fleets in many parts of Europe already run on waste-based renewable gas. These include 500 refuse trucks in Madrid, 200 city buses in Oslo, 760 buses and most of the refuse trucks in sixteen Swedish cities.

It's time for U.S. communities to take stock of their own discarded fuel feedstocks. By tallying these wastes, communities could see at once the benefits of converting them to fuel - budget savings, secure energy resources, cleaner air, non-exportable new jobs. They could become game changers in transportation by "greening" their own trucks and buses and supporting federal and state incentives to accelerate the pace of change. Overall, the multiplication of local initiatives could transform urban transportation in the U.S. and constitute a big step forward in protecting the global climate.