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# Emptying landfills and debunking waste myths

May 17, 2010 by Michael Hart

**Sierra Energy's Michael Hart takes on misconceptions around waste, and argues gasification is now viable for large scale conversion of waste into useful products.**



Landfills are a bad idea.

This may not be a news flash, however there

seems to be an endless supply of subject matter experts on the topic that are all too willing to point to "solutions" with misleading or inaccurate explanations.

Landfills are bad because each ton of trash placed in a landfill emits two tons of **greenhouse gas**: one ton of CO<sub>2</sub> and another ton of methane, which is 23 times more destructive to the ozone layer than CO<sub>2</sub>. The net effect is that every ton of waste buried in a landfill puts 24 tons of CO<sub>2</sub> or its equivalent (CO<sub>2</sub>e) into the atmosphere.

Consider the fact that the United States produces 240 million tons of municipal solid waste each year. Despite efforts to reduce the amount of waste through recycling and other means, two-thirds of that waste still ends up in landfills, emitting **toxic methane levels** equating to 160 million tons per year or 3.8 billion tons of CO<sub>2</sub>e annually in the US. This is equal to the emission of all of the world's 600,000,000 vehicles on the road today. Clearly, one of the "Holy Grails" of the cleantech movement is a cost-effective means of cleanly and profitably recycling 100 percent of this waste.

Some landfill operators attempt to recover this greenhouse gas with a collection of pipes and barriers, but the Intergovernmental Panel on Climate Change (IPCC) estimates that even a well-managed landfill system only collects 20 percent of the greenhouse gases produced. Given that less than 50 percent of American landfills have any collection system at all, it is reasonable to conclude that no more than 10 percent of the greenhouse gas created by American landfills is captured. Worse yet, some landfills simply flare (burn-off) the gasses produced, which creates dioxins and furans that are arguably worse for the environment than the original greenhouse gasses.

Here are some long-standing myths when it comes to landfills and waste.

Myth 1:

*Every ton of waste sent to a landfill creates 71 tons of "upstream" waste.*

This statement has been bandied about for years, and is based on a single 1992 report, "**Managing Industrial Solid Wastes From Manufacturing, Mining, Oil and Gas Production, and Utility Coal Combustion.**" Unfortunately, that report addressed mining wastes and had nothing to do with this point or with recycling or land filling municipal solid waste. Nor does simple logic: can paper companies afford to create 71 tons of woody waste to make one ton of paper? Do glass companies pay for the creation of 71 tons of waste material for every ton of glass created? Do people who throw away a bag of carrot tops create 71 bags of green waste?



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Myth 2:

*Land filling and incineration create only one job while recycling creates 35 new jobs.*

While jobs are created to hand-sort garbage, this dramatically increases the cost to deal with garbage while doing nothing to help the environment. In fact, it would in all likelihood increase the amount of greenhouse gasses being produced. While land filling and incineration are bad ideas, they are dramatically less expensive than hand-sorting waste and composting the remainder. It is highly unlikely without a draconian set of enforcement laws (similar to the "Green Police" so ridiculed during the last Super Bowl) that anyone would actually take the effort to make this possible. The bottom line? It's too expensive, too unwieldy and completely unrealistic.

Myth 3:

*High temperature disposal technologies are bad.*

New gasification processes are emerging to convert an almost infinite variety of waste materials into usable products, with no process emissions and no leftover wastes. What was once a pipe dream is now becoming reality; gasification is proving to be a viable means of producing clean syngas for a fraction of the cost of fossil fuels like coal and natural gas.

Gasification and incineration have nothing to do with each other. Incineration takes place in an oxygen-rich environment that allows waste to burn; gasification takes place in an environment without enough oxygen to allow burning, so that waste breaks down into a synthesis gas that can be used to make cleaner diesel, ethanol, and electricity than with other practices.

Recycling waste through gasification both offsets our continued need for new fossil fuels and avoids creating many tons of greenhouse gasses that harm our atmosphere.

Viable, breakthrough technologies already exist to convert waste to clean fuels and energy without emissions, and U.S. President Obama has recognized the significant opportunity afforded by these technologies with his renewable energy plan.

From an energy policy perspective, the time has come to deploy the best available technologies to cleanly convert waste to renewable energy that reduces our dependence on foreign oil while improving our environment.

*Michael Hart is President and CEO of [Sierra Energy](#), which he founded in 2004. Named an "Environmental Hero" by the U.S. EPA, Hart also serves as president of Sierra Railroad Company, providing services throughout California. He is a graduate of U.C. Davis, where he frequently lectures.*

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##### **Organic Waste Products - Biomass for bio-fuels**

Submitted on May 20th, 2010 by Gunther W. Mothes (not verified)

Excellent article by Mr. Hart. All in all he is right on it. I was especially interested in his , "Myth 3"

In order for our company to boost our bio-jet fuel production operations, we are joining with another company that incorporates a gasification process that will utilize our 2nd most abundant feedstock - thousands and thousands of tons of sustainable, renewable organic waste found throughout our domain of operation. Mr. Hart correctly states that, "breakthrough technologies already exist to convert waste to clean fuels and energy without emissions." The "Mitchell Technology" Solid Waste Energy Plant Using Catalytic Ionic-Impact Decomposition and Combustion Product Regeneration, is a solid-waste conversion plant which produces useful products and electrical energy in a closed system with zero emission of pollutants into the atmosphere.

It not only produces a high heat source that will be utilized by our refining plant, but also gases that can be utilized for electric energy from turbines or piston engines. (Which is good for our District Center Power Plant providing needed electricity for the community and it's citizens). It also provides a saleable Urea, an excellent fertilizer. Several other saleable chemicals are also side-products of this method. Of course the principal product is the oil produced for our Bio-Jet Fuel refinery, directly adjacent to the Mitchell Biomass Plant. Instead of having only a 20,000,000 gpy bio-jet fuel capability, we will now have the means to produce over two billion gpy of JP-8 or Jet-A bio-jet fuels. Mr. Mitchell holds a U.S. Patent for his method of solid waste regeneration. We are both looking forward to helping to fulfill the requirements of the U.S. Air force by 2015.

Gunther Mothes

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**some pieces here are correct, some are wacky, arranged so as to**

Submitted on May 20th, 2010 by brendan (not verified)

support his goal: energy recovery through gasification. Nothing wrong with waste gasification as it is theorized and expected to work. it doesn't yet, but we aren't on Mars yet and this does not invalidate NASA's work.

Landfills are certainly as dreadful a waste handling method as he states here, but his 'analysis' of the labor intensive recycling processes is either ignorant or intentionally misleading--hard for me to say which. only the author would know for sure.

briefly, yes hand sorting is messy and inefficient in many ways, but all the analysis of various recycling methods and processes of all kinds of materials over several years now have shown it to be massively conserving of greenhouse gases compared to landfilling (and compared to manufacture using virgin materials).

besides, most large scale recyclers do a great deal of the separation by mechanical means now, sometimes using optical sorting for plastics and glass, eddy currents for aluminum, and of course magnets for ferrous, anyway. they hand sort a great deal of the various grades of paper, but that is because the return on investment there is huge--weel sorted paper grades sell for a bundle on the materials markets.

and besides that (or , on the third hand as my mom used to say), it's the 'inefficiency' of hand-sorting that makes recycling a job creator.

by and large, recycling paper, wood, steel and aluminum consume anywhere from much less to SEVERAL TIMES less energy --especially aluminum==and produce much, much less ghg than landfilling and manufacture from virgin materials.

For glass it is a closer call, but still even there the energy balance (carbon equation) favors recycling.

almost all plastics--among the most recent materials to reach major tonnage in the recycling industries--are showing energy conservation ratios way up there similar to aluminum, of all things, and recycling plastics averts petroleum use in the bargain.

the man is wrong, dead wrong, about recycling. and it's all to cast a more favorable light on gasification--that is, on what his company is hoping to sell.

nothing wrong with favoring your own products/processes, but presenting your (falsely reasoned) sales pitch as dispassionate environmental analysis is not so benign.

just sayin'.

reply

**Michael Hart and landfill comments**

Submitted on May 20th, 2010 by Ron Sherga (not verified)

Michael, Thank you for your comments. I am a big supporter of your position, but also wish to add....there is no ONE single solution to this issue. It is really setting up a balance of recycling AND waste to energy that will offer the best scenario. Pre sorting and channeling to well established markets eager for certain materials is one step and not a myth as you stated.LCA's and LCIA's have been done showing this. Understanding the often unique stream that some landfills have; because of large industrial presence or hazardous content from a medical complex, will lend themselves to WTE and cogeneration ,far more easily and economically. Since, MSW is also considered renewable, tax credits and other subsidies can and do help. We also see vast improvements in technology such as carbon and plasma arc.Even though their track record is rather lacking , I think the time has come to make it happen. If arc(gasification)technology can work on US Naval ships...why not some landfills?

reply

**Waste to energy company**

Submitted on May 21st, 2010 by Unregistered user (not verified)

Is a company like Covanta Holding Corp (CVA)implementing the type of gasification processes you describe?

reply

**Integrating organics from Solid Waste & sewerage sludge is better**

Submitted on May 21st, 2010 by Frank J. Heller (not verified)

Integrating organic waste streams from landfills, esp. green waste; and sewerage sludge in an anaerobic digester gives far more 'bang for the buck' when it comes to producing natural bio-gas on a sustainable basis.

Several key obstacles...traditionally one or both are regional quasi public agencies; integrating them requires a dictatorship or an act of god or a TEA party revolt; You produce a lot of gas; so you need a distribution system that most european cities have and few in the U.S. and in some areas there is a pipeline monopoly to deal with.

Otherwise the technology for melding these various substrats is pretty solid---lots of bidders for RFPS; and there are side benefits like processing out toxics and using the effluent as a compostable fertilizer on carbon plantations for example.

My targets of opportunity are housing projects that are off the sewerage system and require septs for each house...centralize it, and use natural gas for heating with a distribution system.

The manager becomes a small utility disposing sewerage and organic solid waste; and selling natural gas back to home owners. Should be profitable and sustainable, no?

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