Garbage is NOT Renewable Energy

Problem

GREENHOUSE GASES AREN'T "GREEN" ENERGY

Landfill and incineration industries have lobbied to have the greenhouse gas emissions from their facilities considered "green energy," worthy of tax credits similar to the ones given to solar and wind energy projects. In fact, "garbage-to-energy" is now being legally classified in numerous states as a "renewable" energy source. This is in direct opposition to the Zero Waste Movement – our goal is to eliminate waste, not enshrine it as a renewable resource!

Giving tax credits and subsidies to the garbage industry competes against wind, solar and recycling projects, and creates a financial reward for producing garbage and destroying natural resources. In the battle against climate change, we need to act decisively against waste and greenhouse gas emissions by eliminating, not just reducing these sources, and giving priority to clean, carbon-free energy.

YOU MAY BE UNWITTINGLY SUPPORTING GREENHOUSE GAS ENERGY

You, the well-meaning public and business leaders working to offset your carbon emissions, may be inadvertently spending money on renewable energy credits (RECs) that support the destruction of natural resources and the polluting practices of burning and burying garbage.

Solutions: Yes… there are three things you can do.

Buy only "real green" RECs.

Fortunately there are many good options. Before you buy renewable energy credits (REC) or carbon offsets, ask where the energy comes from and make sure you're supporting new wind and solar projects, not supporting resource destruction and garbage generation. Find a list of garbage-free renewable energy retailers at www.grrn.org/landfill/notrenewableenergy.

Start composting and stop greenhouse gas production.

Rotting stuff in the landfill creates the greenhouse gas methane in huge amounts! Learn more about backyard composting and vermicomposting and support the development of municipal composting programs in your area by visiting www.grrn.org/landfill/notrenewableenergy.

Support politics mandating that landfill gas capture from existing landfills is a cost of doing business, and the immediate implementation of a regulated schedule to reduce the amount of landfill gas generated in the first place. Germany is doing this now, and it is our turn here in America! Take action at www.grrn.org/landfill/notrenewableenergy.

FACTS

What is landfill gas?

Modern landfills isolate our discards from water and air, and in particular, oxygen. This creates an anaerobic (oxygen-depleted) environment ideal for the proliferation of methanogenic bacteria. As these bacteria break down the organic (biodegradable) materials, the bacteria in turn release methane gas, a greenhouse gas 23 times more powerful than carbon dioxide. Landfills are the number one source of human-derived methane in the U.S., more than livestock emissions and wastewater treatment facilities.[1] Landfills in the U.S. generate more than 25% of the methane produced by landfills worldwide, despite handling the waste disposal for only 5% of the world's population.[2]

Landfill gas also includes hazardous air pollutants and volatile organic compounds, including known carcinogens. According to the U.S. Environmental Protection Agency (EPA), "landfill gas contains carbon dioxide, methane, [volatile organic compounds] VOC, [hazardous air pollutants] HAP, and odorous compounds that can adversely affect public health and the environment…exposure to HAP can cause a variety of health problems such as cancerous illnesses, respiratory irritation, and central nervous system damage."[3] When landfill operators capture landfill gas and either burn it off or use it for energy, human health and environmental concerns from the gas are reduced. For this reason, the EPA mandated gas collection at large landfills beginning in 1996.

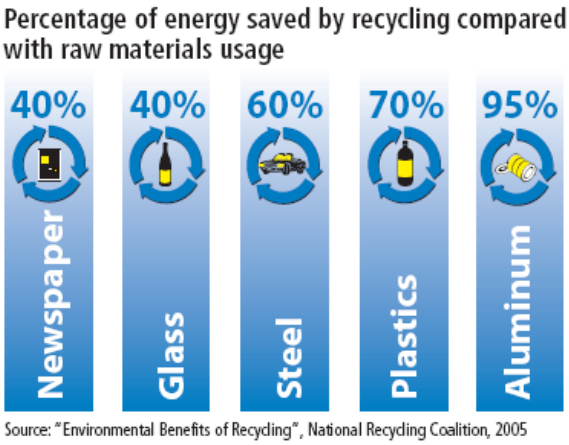
Legislative history

The Energy Policy Act of 2005, which extended federal tax credits for renewable energy projects, allocated tax credits of 1 cent per kWh to energy derived from landfill gas and "municipal solid waste (MSW) resources," and included these sources in renewable energy purchasing mandates for the federal government. (Traditional renewable energy sources such as wind, solar, geothermal, and closed-loop biomass received 1.5 cents per kWh.) The Act also provided tax credits for cellulosic ethanol production from MSW and loan guarantees for up to 80% of project costs. Prior to 2004, renewable energy legislation did not include MSW, even though the EPA began requiring landfill gas collection at select sites in 1996. The American Jobs Creation Act of 2004 was the first to label landfill gas and incinerators as sources of renewable energy.[4] Landfill gas is also considered a source of renewable energy in numerous state renewable portfolio standards (RPS), which legislate how much of the state's electricity is to come from renewable sources.[5]

FACT: Recycling is more effective at saving energy.

Mining for metals, drilling for fossil fuels, and logging for timber all consume vast amounts of energy and fuel, generate huge amounts of water and air pollution, and emit greenhouse gases. When new products are made from recycled materials instead of using freshly cut trees, raw metals or crude oil, the energy and pollution used to extract and transport these virgin materials is avoided. **By recycling 30% of our discards in 2003, U.S. communities saved 1,486 trillion BTU (compared to landfilling/combustion disposal)—an amount equivalent to the consumption of 11.9 billion gallons of gasoline or 256 million barrels of crude oil.[6]**

Manufacturing products with virgin materials also requires vast amounts of energy, most of which is produced from fossil fuels. Manufacturing with recycled products uses less energy, which reduces fossil fuel consumption and greenhouse gas emissions. The chart at right shows the energy savings of manufacturing with recycled vs. virgin materials for several products.



The benefits of recycling extend beyond energy savings. Recycling prevents air and water pollution, reduces acidification and eutrophication (excess nutrients in waterways), and reduces greenhouse gases. These savings have an economic value as well: **the pollution reductions from recycling are valued at more than $500 per ton of material recycled!**[7]

Crediting landfills and incinerators with the production of "green energy" undermines the potential of recycling in conserving energy. Furthermore, the "green energy" designation creates a social acceptance of waste and detracts from efforts to reduce waste and use resources more efficiently, both more important areas of focus in advancing toward sustainable resource management. Just as reducing energy use is preferable to greener energy production, waste reduction and recycling are preferable to landfilling and incineration. Our recycling efforts already save vast quantities of energy, but communities in the U.S. and around the world are demonstrating we could do much better. It is here we should put our focus and our incentives, not toward 20th century disposal practices.

FACT: Composting organics restores our soils and cools our atmosphere.

Food scraps and yard waste are 25% of U.S. discards, and while 60% of yard waste is recycled or composted, only 2% of food waste is recovered.[8] As bacteria break down these organic materials in the oxygen-depleted conditions of a landfill, the bacteria release methane gas, a greenhouse gas 23 times more powerful than carbon dioxide.[9]

More important than their global warming potential, organic materials have the potential to become valuable soil amendments. Composting these materials not only reduces greenhouse gas emissions by avoiding methane emissions, but it also decreases fertilizer and pesticide use, improves soil structure, reduces irrigation needs, decreases the effects of high salinity, increases soil productivity, limits erosion, and helps store carbon in our soils.[10] Long-term soil health and sustainable agriculture are essential to the health of our environment and economy, and we must develop and support organics recovery infrastructure to meet these goals. **Renewable energy credits for landfills create an incentive to continue the burying of these valuable organic resources and directly oppose the goals of long-term soil health and sustainable agriculture.**

The environmental and social benefits of composting have economic value as well. A 2007 life cycle assessment conducted by Morris and Bagby quantified the environmental benefits of natural lawn and garden care practices compared to conventional approaches. Morris calculated

the economic value of pollution reductions from backyard composting and reduced use of synthetic fertilizers and pesticides at $16-$21 per household, not including reduced hazardous waste management costs estimated at $5 per year and potentially more than $40 in irrigation savings. These benefits include reduced greenhouse gas emissions, reduced human and ecological toxicity, and reduced eutrophication (excess nutrients in waterways). [11]

FACT: Composting organics and generating landfill gas are not compatible.

A community committed to source separating organics for composting will greatly reduce or eliminate its landfill's generation of methane over the future life of the landfill. Landfills depend upon organic materials to generate the methane, and then convert the methane into energy, so no methane simply means no energy. Future landfill gas projects and gas volumes are therefore threatened by the removal of organic material from the landfill, and a landfill invested in gas recovery retains a financial interest in maintaining the status quo of landfilling biodegradable materials. **Relying upon landfills for "renewable energy" stands in direct opposition to the recovery of organics for composting, which is recognized universally as a higher use of resources on the waste hierarchy.**

FACT: Organic materials in the landfill threaten groundwater.

Organic materials in the landfill also lead to the production of leachate. The liquids produced from the biodegradation of these organic materials seep through the landfill and, along the way, collect toxic chemicals and heavy metals from the contents of the landfill. This leachate migrates to the bottom of the landfill and eventually leak through the liner[12], potentially contaminating local groundwater. **By removing organics from the landfill, a community can minimize the production and migration of leachate, therefore protecting its groundwater and potentially saving itself tens of millions of dollars in groundwater remediation and hazardous waste cleanup.**

FACT: Communities around the world are removing organics from landfills.

Around the world, communities and countries are recognizing the inevitable harm caused by landfilling and are committing to reducing this harm by removing organic materials from the landfill and reducing waste. In the U.S., more than 23 states and numerous communities have banned the landfilling of yard waste. Some of these laws have been in effect for more than 15 years.[13] More recently, cities such as Seattle are pushing beyond yard waste collections by also mandating the collection of food waste. In Canada, mandatory source separation of organics in Nova Scotia and Prince Edward Island has pushed both provinces to the forefront of resource management with recovery rates near 50% and 65%, respectively.[14] Throughout the European Union, countries are required to reduce the landfilling of biodegradable waste by 65% within 15 years under the Landfill Directive. The goal of the directive is to "prevent or reduce as far as possible negative effects on the environment, in particular the pollution of surface water, groundwater, soil and air, and on the global environment, including the greenhouse effect, as well as any resulting risk to human health, from landfilling of waste, during the whole lifecycle of the landfill."[15] At the leading edge of landfill regulations, Germany recently outlawed the landfilling of all untreated mixed waste, meaning all "leftover waste" (after recycling and composting) passes through mechanical, biological or thermal treatment to maximize recovery and to minimize the risks of landfilling.[16]

In committing to sustainability and the protection of environmental and human health, these countries and communities are removing organics from the landfill, not adopting energy policies dependent upon or creating incentives for the continued landfilling of organics. Policies that reward energy from waste stand in direct opposition to safer and more sustainable resource management, and are a step backward from cutting-edge policies to recover organic discards.

FACT: Methane emissions could be largely understated.

The contribution of landfill gas to climate change may be dangerously understated. The incredible heterogeneity of municipal waste and the wide variety of geographic conditions at landfills across the country are the primary factors preventing the use of a default calculation model for landfill gas production. However, it is the collection efficiency of landfill gas systems that may be the greatest source of discrepancy. The U.S. EPA assumes 75% gas collection efficiency but measured efficiencies have been reported as low as 9 percent. The 2006 Intergovernmental Panel on Climate Change (IPCC) report on greenhouse gas inventories suggests a default estimate of recovery efficiency of 20 percent. The IPCC cites studies measuring collection efficiencies ranging from 9-90 percent, representative of the many uncertainties involving modeling gas generation and collection efficiency. In general, closed sites with thicker and less permeable covers will demonstrate higher collection efficiencies while sites that are still open or with temporary, sandy covers will operate at the bottom end of the scale. [17]

The landfill industry itself attests methane emissions are not accurately tabulated: "Waste Management has determined that it is infeasible to make reliable measurements of methane emissions at the 243 landfills it operates…and the extraordinary diversity among landfills has made it impossible to develop a useful, broadly-applicable model of fugitive emissions."[18]

FACT: Incineration is a waste of energy and a dangerous source of pollution.

Burning our discards releases harmful pollutants into the air, recovers only a fraction of the energy used during the products' life cycle, and perpetuates the cycle of destroying natural resources to make new products. Incinerators produce dioxins, heavy metals such as mercury and lead, particulate matter, and hundreds of other byproducts, only a handful of which have been identified or studied. When air pollution controls are installed to capture these hazardous substances, the materials are just transferred from the air emissions to the fly ash and the scrubber residues, simply moving the hazardous waste problem from one medium to another without addressing the pollution generation. [19, 20]

In 2006 life cycle assessments conducted by the EPA on incineration and recycling, recycling was shown to provide greater net energy and greenhouse reductions than incineration across a wide range of materials, including aluminum cans, steel cans, glass, corrugated cardboard, magazines/third class mail, newspaper, office paper, phonebooks, textbooks, dimensional lumber, and medium-density fiberboard. Furthermore, the combustion of HDPE, LDPE and PET plastics in waste incinerators was shown to be a net contributor to greenhouse gas emissions.[21] (Even though plastics have a high energy content, their carbon content is considered anthropogenic, or derived from human activities, and results in net greenhouse gas emissions.) A

2006 report by Eunomia Research and Consulting (UK) found greenhouse gas emissions from incinerators were actually higher than those from conventional gas-fired power plants.[22]

Because incineration destroys materials, more resources must be continually extracted and manufactured to provide new materials. While incineration may replace power produced from fossil fuels, it also burns the fossil fuels embodied in the discarded products—fuel used to grow or extract, manufacture, transport, and consume these products. Furthermore, the non-biodegradable portion of the waste stream is primarily derived from fossil fuels, a non-renewable energy source, so burning these materials cannot be considered "green energy." Subsidizing incineration as "green energy" will only ensure more materials are sent to incinerators for destruction, contrary to the goals of sustainable resource management.

SOLUTIONS

Buy carbon credits and renewable energy certificates from truly renewable sources.
Not all renewable energy credit (REC) and carbon offset providers are created equal—numerous providers carry landfill gas and incineration projects in their energy mix as a way to lower their rates. Fortunately, there are plenty of new wind and solar projects for you to support, free of energy derived from waste. As a consumer or an institution, you can use your money to vote for these projects and to demand renewable energy really means renewable.

> **ACTION:** Use your purchasing power to choose only REC and carbon offset providers who provide waste-free energy. View our list at www.grrn.org/landfill/notrenewableenergy

Commit to Zero Waste
Tried and true, reducing waste is still the best decision you can make for the environment and the economy. Landfill leachate, greenhouse gas emissions, dioxins—these can all be minimized or avoided with waste reduction and material reuse. By recycling an additional 5% of our waste in the U.S., the EPA estimates we could save 1.8 billions gallons of gasoline, the equivalent of taking an additional 3.5 million cars off the road every year. [23]

Around the globe, communities large and small are committing to reducing waste and pollution with Zero Waste resolutions. Zero Waste is a philosophy and a design principle for the 21st century. It includes recycling, but goes beyond recycling by taking a whole system approach to the vast flow of resources and waste through human society. Zero Waste maximizes recycling, minimizes waste, reduces consumption and ensures that products are made to be reused, repaired or recycled back into nature or the marketplace.

> **ACTION:** Adopt a Zero Waste (ZW) resolution in your community. Find sample ZW ordinances at www.grrn.org/zerowaste/resource_zw.html and a list of communities committed to Zero Waste at www.zwia.org/zwc.html.

Keep organics out of the landfill
With less than 60% of yard waste recycled or composted and only 2% of food waste recovered in the U.S., there is a strong need to invest in organics recovery infrastructure, such as local and regional compost facilities to capture these valuable resources. In conjunction, there is also a need to develop the end-use markets for compost soil amendments, to create incentives for farmers to apply these products, to include local soil amendments in municipal landscaping contracts and projects, to develop onsite commercial and institutional applications, and to promote compost to local residents.

Governments and large institutions play a crucial role in driving the market demand for high quality soil amendments. By giving preference to local compost soil amendments in landscaping contracts, governments and institutions help establish a secure, high volume end-use market for new compost infrastructure.

> **Colleges and universities**

ACTION: Adopt a campus landscaping policy that gives preference to local soil amendments. Find a draft policy at www.grrn.org/landfill/notrenewableenergy

Municipalities

ACTION: The COOOL 2012 campaign (Compostable Organics Out of Landfills) will contain all the information you need to move toward composting organic discards in your community. Look for the COOOL 2012 campaign at www.grrn.org in mid-2008.

Support renewable energy legislation that recognizes waste as a problem, not as a solution

With climate change dominating media and legislative attention, anything spun as "green" or "renewable" receives attention and accolades. A slew of national and state legislation in the last four years has classified landfill gas and incineration as sources of renewable energy and provided varying degrees of tax credits or subsidies to the industry.

ACTION: Help keep waste out of future energy legislation and legislative updates by signing up for action alerts through the Global Alliance for Incinerator Alternatives (GAIA) by emailing Dave Ciplet at dave@no-burn.org. Find a draft statement against waste as a form of renewable energy at www.grrn.org/landfill/notrenewableenergy

Mandate methane capture and remediation at all active landfills

In 1996, the EPA mandated gas collection systems at landfills that meet the following criteria: "have a design capacity of at least 2.5 million metric tons and 2.5 million cubic meters; are calculated to emit more than 50 metric tons of non-CH_4 organic compounds per year; and received waste on or after November 11, 1987." [24] The capture of landfill gas for energy generation or flaring reduces threats to environmental and public health, and is mandated as an operational requirement under the same rationale as the existing requirements for liners, leachate treatment, and emission controls. This rule established landfill gas collection as a cost of doing business in the landfill industry, and allows landfills that utilize the methane for heat or energy to sell the power produced and recoup some of the collection costs.

This policy should be expanded to all landfills as a means to protect public health and reduce environmental impacts. **Landfills should not be lured into protecting the public health and internalizing the costs of doing business by incentives meant for true sources of renewable energy.** "Greenwashing" practices that allow landfill operators to claim renewable energy credits and greenhouse gas reductions are just a phony green front to the full bore wasting taking place across our country.

ACTION: Demand the EPA and state governments mandate landfill gas capture at all active and future sites as a cost of doing business. Find sample statements at www.grrn.org/landfill/notrenewableenergy.

Oppose bioreactors as an unsafe solution

Bioreactors are an emerging landfill technology that seeks to accelerate the decomposition of waste by circulating liquid (leachate) and frequently air (oxygen) throughout the landfill. In theory, the forced decomposition produces methane emissions along a shorter time frame, stabilizes the waste, and increases landfill capacity. As most bioreactors attempt to optimize methane production to recover the gas for energy and to mitigate greenhouse gas emissions, a

bioreactor will thus produce methane much earlier in the landfill's life and will generate methane at a much higher rate than traditional dry tomb landfills. Estimates of the collection efficiency of landfill gas systems differ widely among experts and models, and due to heterogeneity of the waste mass, there may be no clear model of landfill gas production and capture (see earlier section on landfill gas collection). On top of increased gas generation, several other concerns surround bioreactor technology, most notably the physical instability of the landfill and the instability of and stress upon liner systems meant to prevent leachate seepage, both due to the additional weight and momentum of the increased moisture content. [25] More than a dozen bioreactor landfills currently operate in the U.S. as pilot projects to evaluate the economic, environmental, and engineering feasibility of this technology.[26] Since bioreactors demand higher capital costs and more diligent monitoring, securing renewable energy tax credits will be a huge gain for the industry to defray operating and construction costs. This will also ensure organic materials are buried as mixed waste for decades to come, a wasted opportunity for healthier soils and safer communities.

> **ACTION:** Oppose state permits for bioreactor pilot projects and oppose bioreactors as a source of renewable energy in state renewable energy standards. Find draft statements at www.grrn.org/landfill/notrenewableenergy.

Resources for more information and action

Eco-Cycle: www.ecocycle.org

- Fact sheets on the benefits of recycling and composting
- Getting started with Zero Waste and ZW resources

GrassRoots Recycling Network (GRRN): www.grrn.org

- Getting started with Zero Waste and Zero Waste resources
- Additional information on the dangers of landfills
- Additional information on wasteful energy and other tax subsidies for landfills
- Compostable Organics Out Of Landfills (COOOL 2012) campaign coming soon

Global Alliance for Incinerator Alternatives (GAIA): www.no-burn.org

- In depth analysis of the flawed economics on incineration
- Reports on the environmental costs and hazards of incineration
- Information on conversion technologies as a disguised form of incineration

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[1] Intergovernmental Panel on Climate Change (IPCC), 2001. "Technical Summary of Working Group I report." Accessed at http://www.ipcc.ch/pub/wg1TARtechsum.pdf

[2] Methane to Markets, 2000. "Landfill Background Information." Accessed at http://www.methanetomarkets.org/landfills/landfills-bkgrd.htm

[3] U.S. Environmental Protection Agency (EPA), 2006. "Frequently Asked Questions about Landfill Gas and How It Affects Public Health, Safety and Environment." Accessed at http://www.epa.gov/lmop/faq-3.htm#3

[4] EPA, 2005. "Summary—Energy Policy Act of 2005." Accessed at http://www.epa.gov/lmop/docs/engy_pol.pdf

[5] American Wind Energy Association, 2006. "State-Level Renewable Energy Portfolio Standards." Accessed at http://www.awea.org/legislative/pdf/State_RPS_Fact_Sheet_UPdated.pdf

[6] U.S. Environmental Protection Agency, 2005. "Waste Management and Energy Savings: Benefits by the Numbers." Accessed at http://yosemite.epa.gov/OAR/globalwarming.nsf/UniqueKeyLookup/TMAL6GDR3K/$File/Energy%20Savings.pdf

[7] Morris, J., 2004. "Comparative LCAs for Curbside Recycling Versus Either Landfilling or Incineration with Energy Recovery." International Journal of Life Cycle Assessment.

[8] U.S. Environmental Protection Agency, 2006. "Municipal Solid Waste in the U.S.: 2005 Facts and Figures." Accessed at http://www.epa.gov/msw/msw99.htm

[9] IPCC, 2001.

[10] European Commission, 2001. "Waste Management Options and Climate Change." Accessed at http://ec.europa.eu/environment/waste/studies/climate_change.htm

[11] Morris J., Bagby J., 2007. "Measuring Environmental Value for Natural Lawn and Garden Care Practices." International Journal of Life Cycle Assessment. DOI: http://dx.doi.org/10.1065/lca2007.07.350

[12] 46 FED. REG. 11128-11129 (February 5, 1981). "A liner is a barrier technology that prevents or greatly restricts migration of liquids into the ground. No liner, however, can keep all liquids out of the ground for all time. Eventually liners will either degrade, tear, or crack and will allow liquids to migrate out of the unit. Some have argued that liners are devices that provide a perpetual seal against any migration from a waste management unit. EPA has concluded that the more reasonable assumption, based on what is known about the pressures placed on liners over time, is that any liner will begin to leak eventually." FEDERAL REGISTER (July 26, 1982), at pp. 32284-32285.

[13] DSM Environmental Services, 2004. "Analysis of the Impact of a Yard Waste Ban On Landfill Quantities and Household Costs." Accessed at http://www.dnrec.state.de.us/DNREC2000/Divisions/AWM/YardWaste/PDF/DSM%20Yard%20Waste%20Report.pdf