

## Europe Finds Clean Energy in Trash, but U.S. Lags

By ELISABETH ROSENTHAL  
New York Times

HORSHOLM, Denmark — The lawyers and engineers who dwell in an elegant enclave here are at peace with the hulking neighbor just over the back fence: a vast energy plant that burns thousands of tons of household garbage and industrial waste, round the clock.

Far cleaner than conventional incinerators, this new type of plant converts local trash into heat and electricity. Dozens of filters catch pollutants, from mercury to dioxin, that would have emerged from its smokestack only a decade ago.

In that time, such plants have become both the mainstay of garbage disposal and a crucial fuel source across Denmark, from wealthy exurbs like Horsholm to Copenhagen's downtown area. Their use has not only reduced the country's energy costs and reliance on oil and gas, but also benefited the environment, diminishing the use of landfills and cutting carbon dioxide emissions. The plants run so cleanly that many times more dioxin is now released from home fireplaces and backyard barbecues than from incineration.

With all these innovations, Denmark now regards garbage as a clean alternative fuel rather than a smelly, unsightly problem. And the incinerators, known as waste-to-energy plants, have acquired considerable cachet as communities like Horsholm vie to have them built.

Denmark now has 29 such plants, serving 98 municipalities in a country of 5.5 million people, and 10 more are planned or under construction. Across Europe, there are about 400 plants, with Denmark, Germany and the Netherlands leading the pack in expanding them and building new ones.

By contrast, no new waste-to-energy plants are being planned or built in the

United States, the Environmental Protection Agency says — even though the federal government and 24 states now classify waste that is burned this way for energy as a renewable fuel, in many cases eligible for subsidies. There are only 87 trash-burning power plants in the United States, a country of more than 300 million people, and almost all were built at least 15 years ago.

Instead, distant landfills remain the end point for most of the nation's trash. New York City alone sends 10,500 tons of residential waste each day to landfills in places like Ohio and South Carolina.

"Europe has gotten out ahead with this newest technology," said Ian A. Bowles, a former Clinton administration official who is now the Massachusetts state secretary of energy.

Still, Mr. Bowles said that as America's current landfills topped out and pressure to reduce heat-trapping gases grew, Massachusetts and some other states were "actively considering" new waste-to-energy proposals; several existing plants are being expanded. He said he expected resistance all the same in a place where even a wind turbine sets off protests.

### Why Americans Are Reluctant

Matt Hale, director of the Office of Resource Conservation and Recovery of the United States Environmental Protection Agency, said the reasons that waste-to-energy plants had not caught on nationally were the relative abundance of cheap landfills in a large country, opposition from state officials who feared the plants could undercut recycling programs and a "negative public perception." In the United States, individual states and municipalities generally decide what method to use to get rid of their waste.

Still, a 2009 study by the E.P.A. and North Carolina State University scientists came down strongly in favor of waste-to-energy plants over landfills as the most environmentally friendly destination for

urban waste that cannot be recycled. Embracing the technology would not only reduce greenhouse gas emissions and local pollution, but also yield copious electricity, it said.

Yet powerful environmental groups have fought the concept passionately. "Incinerators are really the devil," said Laura Haight, a senior environmental associate with the New York Public Interest Research Group.

Investing in garbage as a green resource is simply perverse when governments should be mandating recycling, she said. "Once you build a waste-to-energy plant, you then have to feed it. Our priority is pushing for zero waste."

The group has vigorously opposed building a plant in New York City.

Even Mayor Michael R. Bloomberg, who has championed green initiatives and ranked Copenhagen's waste-fueled heating on his list of environmental "best practices," has shied away from proposing to get one built.

"It is not currently being pursued — not because of the technology, which has advanced, but because of the issue in selecting sites to build incinerators," said Jason Post, the mayor's deputy press secretary on environmental issues. "It's a Nimby issue. It would take years of hearings and reviews."

Nickolas J. Themelis, a professor of engineering at Columbia University and a waste-to-energy proponent, said America's resistance to constructing the new plants was economically and environmentally "irresponsible."

"It's so irrational; I've almost given up with New York," he said. "It's like you're in a village of Hottentots who look up and see an airplane — when everybody else is using airplanes — and they say, 'No, we won't do it, it's too scary.'"



## The Blast

### Affordable Housing Gets Solar Water Heaters

With the addition of 24 solar water heaters at the Calabash Boom Townhome Development, completed in December, the American Recovery and Reinvestment Solar Thermal in Moderate Housing Communities program has now helped install solar water heaters on thirty, single-family homes.

The Virgin Islands Energy Office has partnered in these two projects with the Virgin Islands Housing Finance Authority (HFA) to administer the program geared to help moderate income housing projects get solar water heaters.

Calabash Boom is the first affordable home ownership subdivision on the Island of St. John. It is situated in Coral Bay and is comprised of two-story townhomes — all now with water heaters installed on their roofs. The ARRA program cost for the Calabash project

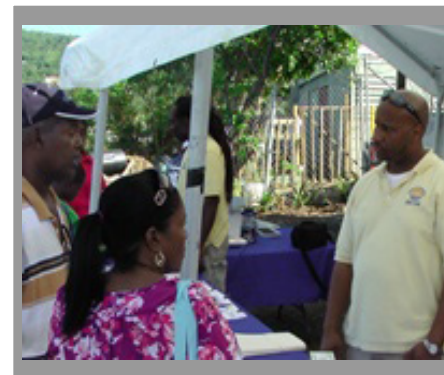
was \$148,000 and the contractor was Solar Delivered, a St. Croix company.

The first project under the program included five houses, constructed under the direction of the HFA, in Estate Solitude on St. Croix. That project cost \$18,500 and was completed in the summer of 2010. The HFA later added a sixth St. Croix residence.

Karl Knight, director of the Energy Office, said, "This program illustrates the wide variety of methods the Energy Office used ARRA funds to get energy solutions to the residents of the Virgin Islands."

John Green, HFA Director of Planning and Construction, says the HFA hopes to use more funds from the program for HFA affordable housing projects proposed on St. Thomas and St. Croix, but there is also the option on using the funds to put solar water heaters on independent, single-family homes being built under the affordable housing guidelines.

The goal of the program is to install solar water heaters to reduce electrical demand and associated cost, reduce greenhouse gas emission and create jobs.



Energy Office staff reached out to residents at Bordeaux Fair on St. Thomas. To see a video of the Fair, go to YouTube, type EnergyOffice, and click it to go to the Energy Office's YouTube Channel.

Program Events	
Jan. 30- Feb 4	The Virgin Islands Energy Office urges architects, drafters, contractors and other residents to attend the Division of Building Permits training seminars from 8:30am to 4:30 p.m. The seminars, presented in collaboration with the International Code Council (ICC), emphasizes reduced energy consumption and cost. The free seminars will be held at the UVI CELL Center on St. Thomas and at the UVI Extension Service on St. Croix.
Feb.18- Feb 20	St. Croix Agriculture and Food Fair. The Energy Office will have staff members at their booth in the fairgrounds in Estate Lower Love



Rooftops at Calabash Boom on St. John.

For more information on the EDIN-USVI energy revolution and how you can be part of the solution, visit [vienergy.org](http://vienergy.org) or [vienergy.org/usvi](http://vienergy.org/usvi)

## Testimony on the Alpine Project and Lease

By Karl Knight, Director  
January 10, 2012

The V. I. Energy Office fully supports the utilization of waste-to-energy technology as a component of the Virgin Islands' energy portfolio. The conversion of municipal solid waste to usable fuel represents a commercially-proven, renewable source of energy and provides a desirable alternative to oil-burning generating units for meeting base load requirements. The Energy Office is presently leading efforts to reduce the Territory's dependence on fossil fuel as a source of energy by 60% from the benchmark established in 2009. In achieving this goal, we anticipate that by 2025, 8% of our energy needs can be met through waste-to-energy conversion of municipal solid waste.

### Background

There are currently 87 waste-to-energy facilities in commercial operation throughout the United States. The state of Florida is the leader amongst the other states with 11 of these facilities in current operation. The island state of Hawaii is expanding the capacity of its waste-to-energy facility in Honolulu. There are over 400 facilities operating in Europe where waste-to-energy has emerged as a preferred alternative to land-filling due to tighter emissions standards. In the Caribbean, the island of Bermuda has had an operational waste-to-energy facility since 1994. The Government of Bermuda is now pursuing the expansion of this facility to 20 MW. Several other Caribbean nations are also aggressively pursuing waste-to-energy as critical components of their national energy policies. Curacao, St. Kitts, Jamaica, Barbados, St. Maarten, St. Lucia, and the Bahamas have all recently announced plans for the development of waste-to-energy facilities in their countries. The neighboring island of Puerto Rico is developing a \$500 million, 80 MW waste-to-energy project in Arecibo in conjunction with Energy Answers International and the Energy Investors Fund.

Waste-to-energy has been recognized as renewable source of energy by the federal government under a variety of statutes, regulations, and policies. These include the regulations of the Federal Energy Regulatory Commission, the Internal Revenue

Code, the Public Utility Regulatory Policy Act, the Energy Policy Act of 2005, and most recently by the American Recovery and Reinvestment Act of 2009. Waste-to-energy meets the two basic criteria for establishing what a renewable energy resource is—the fuel source -- trash, is sustainable and indigenous.

### Dispatchable energy

Unlike other sources of renewable energy, waste-to-energy has the additional advantage of being dispatchable. Dispatchable energy refers to an energy source that can generate power constantly day and night at a consistent level. The intermittent nature of wind power and solar power causes these sources of energy to be considered non-dispatchable.

In addition to the potential energy production from municipal solid waste, the Energy Office anticipates that another 2% of our energy demands can be met by processing other forms of biomass. In the Virgin Islands, biomass can consist of rum "bottoms" from the local rum distilleries or the production of energy crops. One such energy crop with significant energy content is the *Leucaena leucocephala*, known locally as tan tan. This plant is an invasive species that grows well in tropical climates and also serves as a nitrogen fixer. The Australian pine (*Casuarina equisetifolia*) is another fast-growing invasive species that grows locally and has potential as a biomass energy crop. These plants could be converted to wood pellets or simply shredded and used as fuel in a waste-to-energy plant. This source of energy is complementary and potentially supplemental to waste-to-energy as it can be processed in the very same combustion facilities used to process municipal solid waste.

### Less pollutants

While it may seem counterintuitive to suggest that clean energy can be derived from burning garbage, real world experience and environmental monitoring demonstrates this to be the case. The waste-to-energy industry in the United States changed dramatically in 1995, following EPA's development of Maximum Achievable Control Technology (MACT) standards under the Clean Air Act for municipal solid waste combustors. Modern waste-to-energy plants, on average produce 95% less pollutants than

the pre-1990 facilities. Waste-to-energy facilities also emit significantly less pollutants than fossil fuel power plants burning coal, petroleum coke, or oil. As an example, the proposed Alpine



Energy Group facility would immediately produce less harmful air pollutants than any of the Water and Power Authority's current power generating facilities. Furthermore, waste-to-energy facilities are recognized as cleaner alternatives to even properly designed landfills. Again, while it may seem counterintuitive, the combustion of biodegradable products such as wood, paper and food wastes produces comparatively less greenhouse gas emissions, than if that waste was allowed to decompose. The decomposition of biomass produces methane gas, a potent contributor to global climate change. European Union countries have acknowledged waste-to-energy as the preferred means of preserving valuable land space and achieving compliance with Kyoto Protocol mandates to reduce greenhouse gas emissions, while producing valuable energy.

### Costs

Yes, waste-to-energy projects are expensive undertakings. The more stringent environmental requirements implemented in the 1990s also greatly increased the cost of project development. The more sophisticated emissions control systems on modern waste-to-energy plants add significantly to the project costs. Additionally, the Alpine Energy Group proposal includes additional costs that are uniquely designed to address the needs of the Virgin Islands. The proposal calls for construction of two Refuse-Derived Fuel processing facilities instead of one which is not necessary for most waste-to-energy projects, but essential for a project in the Virgin Islands. The proposal includes upgrades to the transmission and distribution system on the island of St. Croix to accommodate the project. This proposal also includes the cost of ash disposal which is typically disposed of at a functioning landfill. The Waste Management Authority has effectively passed this responsibility to the project developer.

## Rate relief

Finally, most waste-to-energy projects offset their costs through the sale of power. Recognizing the high costs of energy in the Virgin Islands, the energy costs has been negotiated to the lowest rate possible, passing on the benefits of that rate relief to the ratepayers without the offset of the service fee on the solid waste side of the operation.

Waste-to-energy projects often generate criticism from proponents of recycling initiatives. However, strong recycling programs are not incompatible with waste-to-energy technology. Recycling and reducing excessive consumption should be our first priorities, but for as long as we keep producing trash, generating energy should be an important part of any waste management strategy. There are no jurisdictions in the United States that have achieved zero waste production. We can increase recycling and reuse, but at some point, we're going to end up with waste that cannot be recycled economically or residual waste that will need to be landfilled or otherwise disposed of. With energy rates being what they are in the Virgin Islands we cannot afford to bury this commodity when an opportunity exists to convert it to low-cost electricity. Furthermore, while the majority of recyclable materials are currently buried at the landfills, a waste-to-energy facility will capture a considerable amount of those recyclables. The reality is, upon the start of its operations, the Alpine waste-to-energy facility would essentially become the largest recycler in the Territory.

### Alpine experience

There has been considerable concern expressed about the lack of project experience for the Alpine Energy Group as a corporate entity. It should be noted however, that waste-to-energy utilizing direct combustion as proposed is not an

experimental technology. The proposed waste-to-energy project consists of two primary components, the conversion of municipal solid waste to a refuse-derived fuel (RDF) and the combustion of that fuel to make electricity.

There are already 11 waste-to-energy facilities in the United States utilizing refused-derived fuel as a feedstock. The technology is essentially the same at each facility with only slight variations in the developers' claims on the efficiency of the conversion process utilizing their proprietary technology. Furthermore, the exact technology proposed by the Alpine Energy Group is presently in use on the island of Aruba.

The combustion of the refuse-derived fuel is typical of the hundreds of power plants throughout the nation that burn solid fuels such as wood pellets, coal, petroleum coke, and municipal solid waste to produce electricity. The fuel is burned, releasing heat. The heat turns water into steam. The high-pressure steam turns the blades of a turbine generator to produce electricity.

Putting these two components together does not pose any significant technological challenges that have not been fully addressed through numerous commercial deployments of these technologies.

It should be further noted, that 55 of the 87 waste-to-energy facilities currently operating in the United States are operated by one of two companies, Covanta Energy and Wheelabrator. Several of the other facilities were constructed and are operated by a utility company. Unlike Europe, there is not an abundance of experienced waste-to-energy companies seeking to do business in the United States. Most proposed projects are developed by one of these two large players or by small start-ups like the Alpine Energy Group.

The federal Department of Energy's

National Renewable Energy Laboratory evaluated the Alpine Energy Group's proposal in August 2011 and published a report which stated the following conclusions:

- The proposed facility has economics similar to WTE facilities in the continental United States in terms of waste disposal fees and overall life-cycle costs to the community (higher costs in the USVI are expected due to lack of economies of scale)
- It offers a lower life-cycle impact on the environment (in terms of energy consumption and net greenhouse gas emissions)
- It has the potential to meet all EPA emissions standards (based on similar WTE plants in the United States).

## Due diligence

The Virgin Islands Energy Office has done its due diligence on the potential for waste-to-energy technology here in the Virgin Islands and is convinced that it must be considered as part of our energy future sooner than later. The entire Caribbean region is simultaneously arriving at the same conclusion. The Alpine Energy Group proposal is in line with what we would expect in the development of a modern waste-to-energy project for the Virgin Islands. I congratulate the Water and Power Authority and the Waste Management Authority on the thoroughness and effectiveness of the contracts they have negotiated with AEG on behalf of the people of the Virgin Islands. I urge your full support of the project and the supporting legislation.

All politics aside, our utilities need help. The opportunity to purchase electricity at 14 cents per kilowatt-hour is too valuable a proposition to reject without sound, rational alternatives. Development of a modern waste-to-energy facility in the Virgin Islands promises to be less polluting than the current 60's vintage generating units at the power plants and to break the stranglehold that our dependence on fuel oil has on the territory's economy. A modern waste-to-energy facility would also definitively answer our concerns about solid waste disposal in the Territory for the first time in over a generation. The options throughout this period of time have remained the same, build more landfills, start shipping our trash off-island, or develop a waste-to-energy project as part of an integrated solid waste solution.



**Carl Joseph, energy analyst for the Energy Office, center, met with wind turbine installers on St. Croix in January.**