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The Burning Issue

By Alyssa A. Lappen and Jack D. Lauber

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Establishing U.S. energy independence won the attention of President George W. Bush in his January 31 2006 State of the Union Address. The President called on research scientists and the energy industry to help the U.S. “replace more than 75 percent of our oil imports from the Middle East by 2025.”

To do that, the President seeks a 22 percent increase in Department of Energy research into clean energy, and heavy investment in “zero-emission coal-fired plants, revolutionary solar and wind technologies, and clean, safe nuclear energy.” He also urges the auto industry to promote a major fuel shift, from imported oil to better hybrid and electric car batteries and hydrogen. Furthermore, within six years he seeks a switch to “cutting-edge methods of producing ethanol, not just from corn, but from wood chips and stalks, or switch grass.”

The President's long-term goal is to “dramatically improve our environment, move beyond a petroleum-based economy, and make our dependence on Middle Eastern oil a thing of the past.”

Naturally, big oil executives pronounce, with doom and gloom, that such goals are implausible and unfeasible. At a February 8 energy conference in Houston, Exxon Mobil Senior Vice President Stuart McGill stated that it is a “misperception” that the U.S. can achieve energy independence any time soon.

“Realistically, it is simply not feasible in any time period relevant to our discussion today,” McGill said. Meanwhile, Chevron vice chairman Peter Robertson said that the U.S. would be better off working for "interdependence" with oil-producing countries rather than seeking to cut dependence. Others, including Renewable Fuels Association officials, agreed that the President's goals will be hard to meet.

But the U.S. could greatly improve its energy efficiency, and not only in areas that the President cited. One huge untapped energy resource is Municipal Solid Waste (MSW).

In a recent report entitled "The European Position," solid waste expert Dr. Ella Stengler notes that European Waste-to-Energy (WTE) facilities now create enough energy annually to supply electricity for 27 million people or heat for 13 million. Europe obtains an even higher percentage of its oil from imports than the U.S., and its engineers consider MSW's biodegradable fraction as biomass, in short, a renewable energy source.

Currently more than 600 successful waste energy facilities operate worldwide, including 89 in the U.S. that generate nearly 2,800 megawatts of electricity, and save approximately 1.4 billion gallons of fuel oil yearly. The U.S. plants include SEMass in Rochester, Massachusetts, the Montgomery County Waste to Energy Facility in Dickerson, Maryland, the Commerce Refuse-To-Energy Facility in Commerce, Ca. and Covanta facilities in Hempstead and Onandaga County, N.Y.

Several Florida communities also extract energy from their MSW, including Palm Beach County, where the $28 price-per-ton to dump garbage, or "tipping fee," has reportedly remained steady for the last six years. At the same time, Palm Beach has minimized consumer electrical rates and natural gas usage. By comparison NY City spends about$125 per ton for long range transport and landfilling of its municipal wastes.

But overseas, more than five times the number of WTE plants generate energy than in the U.S. Holland showcases the AEB facility in Amsterdam, and Germany and Italy operate hundreds more plants. Similarly, Japan uses 314 kilograms per capita of solid waste to produce fuel, more than three times the amount of waste used to produce energy in the U.S. By 1999, Japan was burning more than 74 percent of its municipal waste and landfilling only 20 percent. Japan even boasts a new state-of-the-art WTE facility in Hiroshima.

Two decades ago the public opposed waste to energy plants due to fears concerning toxic waste emissions. But uncontrolled New York City apartment building incinerators have long since been closed, along with old plants with emission problems and inadequate controls.

Moreover, by the mid 1980s, U.S. engineers were quickly overcoming these difficulties. Experts like Dr. Aaron Teller, the former dean of New York's Cooper Union Engineering School, developed and pioneered dry scrubbing, air cleaning, systems to minimize emissions. Teller (who worked with co-author Lauber to promote these controls) based his unique method on aluminum industry air-purification controls. Secondary controls have also since been added to reduce oxides of nitrogen, and acid rain emissions, further controlling dioxins and other contaminants. Improved activated carbon injection systems have further enhanced control of mercury and dioxin emissions and reduced them to trace levels.

Not surprisingly, WTE emissions now comply with stiff international, national and state air pollution control standards. The German Ministry of the Environment, for example, reports that home fireplaces have more than 20 times the dioxin, or TCDD, emissions of 66 modern German WTE plants: In recent years, German WTE plants have cut their dioxin emissions by more than 99 percent.

In the U.S., Environmental Protection Agency data show that waste-to-energy dioxin emissions have also decreased by 99% in the last decade. Today, WTE dioxin emissions account for less than 0.5 percent of the U.S. national dioxin inventory. The U.S. WTE industry now generates $10 billion in annual revenues. Despite this growth, the industry has also cut mercury emissions by more than 95 percent, to only two percent of the national U.S. inventory of man-made mercury emissions.

In absolute terms, federal Maximum Available Control Technology (MACT) regulations cut overall WTE plant mercury emissions from 80 tons annually in 1989 to two tons annually in 2000, and dioxin emissions from 10,000 grams in 1987 to 12 grams currently for the entire U.S. By comparison, backyard barrel burning of municipal waste, still allowed in some rural areas, generates 580 grams of dioxins yearly nationally—little more than one pound.

Dry-scrubbers at the Covanta's New York WTE facilities in Hempstead and Onandaga nearly eliminated all its emissions. The plants now provide a model that could easily be followed in nearby New York City. Likewise, dry scrubbers installed in 1988 in at the Commerce, Ca. reduced dioxin emissions there to undetectable levels. California environmental officials subsequently found the plant's stack gas sample to be cleaner than typical ambient Los Angeles air.**[1]**

The WTE industry has not only cut its own emissions, however. Current WTE programs in the U.S. also eliminate 33 million metric tons annually of atmospheric carbon dioxide pollution from landfills.

According to the EPA, organic waste in landfills annually generates about 2 million tons of methane, which is 25 times more potent a greenhouse gas than carbon dioxide. US landfills also shoot into the air many thousands of tons of sulfides, mercaptans, chlorinated hydrocarbons, and other volatile toxic organic compounds.**[2]** Landfills exude 50 to 100 times more greenhouse gases than WTE plants. Even controlled landfills that reclaim gas emissions produce many times more greenhouse gases than WTE plants. (Indeed, municipal solid waste landfills are now banned in Europe, largely because of such concerns.)

The WTE industry also eliminates garbage-carting costs and energy use. New York City, for example, spends roughly $1 million daily to transport solid wastes some 25 million miles a year to Pennsylvania and Virginia landfills. Add diesel fuel, and the city wastes more than 5 million gallons, at an estimated annual cost of $13 million. As many studies have shown, diesel trucks emit five times more particulate matter per ton of waste than if municipal solid wastes were burned in WTE facilities. They also emit toxic dioxin and polycyclic aromatic hydrocarbon emissions that can pose serious public health risks. Diesel truck dioxins can be expected to increase, moreover, as lower sulfur content in fuels stops offsetting their atmospheric accumulation.

Finally, WTE combustion residue together with air pollution control systems also yield road-building and construction materials. In short, WTE converts solid waste into usable energy and recycled by-products.

Despite the myriad benefits of WTE, however, the U.S. has yet to fully exploit it to significantly cut national oil dependency. One problem stymies the industry more than all the others to date— a radical public attitude called BANANA—Build Absolutely Nothing Anywhere Near Anyone. This roadblock to WTE plants rests on the mistaken belief that they pollute and pose public health risks. Those that oppose WTE, also tout zero waste solutions. However, intransigence, awaiting idealistic, unrealistic solutions to our waste disposal problems, is making our environment worse.

But according to recent research by Pearl Moy, waste-to-energy combustion may represent 30 times fewer public health risks than dumping garbage in landfills. What is the U.S. waiting for?

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[1] Personal communication with Dr. A.J. Teller, Palm Beach Fl 4/16/05

[2] Columbia University WTERT Report, Dr. N. Themelis, 4/13/05