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Too good to be true?

Ten key questions for assessing four waste-to-energy technologies.

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Most communities without mass burn, waste-to-energy (WTE) plants have become completely dependent on landfill disposal. Privatization is on the rise, which often means longer, more costly hauls to remote facilities where tipping fees are also on the rise. Budgets are tight and everyone is looking to reduce costs.

Onto this scene enters a developer proposing a solid waste disposal facility based on "new" technology. "Waste conversion" has become synonymous with thermalchemical, biochemical, or hybrid processes that convert waste to energy. These technologies are popular for several reasons: the perception that conventional WTE projects are problematic from an air emissions health perspective; the search for sustainable, low-emission energy sources; and the desire for plants that can produce useable byproducts. Local officials get a proposal promising no upfront costs for a facility that will produce renewable energy and marketable byproducts with little or no air pollution; costs about the same as landfilling; and provides the opportunity to mine closed landfills, thus reducing local liabilities.

Anaerobic digestion, gasification, hydrolysis, and/or pyrolysis (see "Waste-conversion technologies" below) may indeed, in the future, be disposal game-changers in some locales. They're all successfully being used in some form in other industries, but in the United States, using certain parts of the municipal solid waste stream as a feedstock has been explored only since 2004. Large-scale plants based on pyrolysis that were developed and operated in the late 1970s and early 1980s closed prematurely because of technical issues that made them too expensive to operate. Whether this new breed of conversion technology has overcome problems that plagued predecessors remains to be seen.

In the meantime, with no commercial-level plants of any type operating here, the developer can't provide reliable capital and operating costs. How do you know the proposal isn't too good to be true?

Due diligence

All of the technologies convert waste into useful energy. They all also generate byproducts that may — or may not — have a market for beneficial reuse. Waste conversion is one of the most complex projects a solid waste agency can consider. Conduct a methodical feasibility assessment to resolve potential stumbling blocks before expending significant resources:

1. The technology's viability for your community and/or agency. In addition to scale-up issues, consider the developer's operating experience. Will the waste stream need to be preprocessed? How reliable is disposal?

2. Developer strength. Assess the company's ability to secure capital, intellectual property, and patent rights for the technology, and a parent company guarantee.

3. Compatibility with existing practices. What will it take for the system to mesh with current collection, recycling, and disposal programs? Will a transfer system and/or station be required? Who will pay for that, and how?

4. Volume. You'll probably be asked to provide legal or economic flow control. Can your agency provide the developer with sufficient waste to operate the plant? Will you need to import waste and, if so, from where? How much will that cost? Who pays?

5. Facility siting. Like any other project, you'll be asked if land is available with the proper zoning and setbacks, if necessary utilities are available at a reasonable cost, and if there's public buy-in.

6. Permittability. This can make or break a project. Look at air permits, local and state zoning, and comprehensive plan amendments to allow the project to move forward.

7. Markets for byproducts as well as energy. Do you have enough information to predict how much of each the proposed plant will generate? How far away are the potential buyers of char, digestate, gases, and slag? How great is the demand for each?

8. Short- and long-term costs. Use pro forma modeling to calculate capital and operating costs, determine if the project will cover operating costs, and decide if tipping fees will be required by the solid waste agency or the waste generators within the region.

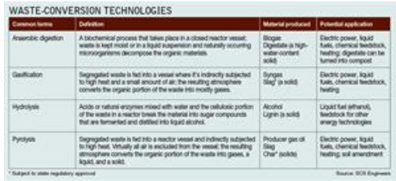
9. Financial risks. What's the role of your agency and any partners versus the developer if the system fails? Will taxpayers be on the hook for a loan?

10. Control. Which agency oversees the system? Where will waste go if the plant has to be shut down? Who's responsible for extra costs incurred in a system failure or extended shutdown?

A word on agreements

Developers often need some type of construction, design, and operating agreement outlining the above to obtain financing or investors. Because these legally binding documents often favor the developer, try to postpone signing until you've completed due diligence.

In addition to having your legal adviser renew the terms, consider contracting with a consultant to ensure technical conditions — both those that are missing or should be changed or dropped — are comprehensive, reasonable, and fair.



WASTE-CONVERSION TECHNOLOGIES

Common terms	Definition	Material produced	Potential application
Anaerobic digestion	A biochemical process that takes place in a closed reactor vessel; waste is kept moist or in a liquid suspension and naturally occurring microorganisms decompose the organic materials.	Biogas Digestate (a high-water-content solid)	Electric power, liquid fuels, chemical feedstock, heating; digestate can be turned into compost
Gasification	Segregated waste is fed into a vessel where it's indirectly subjected to high heat and a small amount of air; the resulting atmosphere converts the organic portion of the waste into mostly gases.	Syngas Slag* (a solid)	Electric power, liquid fuels, chemical feedstock, heating
Hydrolysis	Acids or natural enzymes mixed with water and the cellulosic portion of the waste in a reactor break the material into sugar compounds that are fermented and distilled into liquid alcohol.	Alcohol Lignin (a solid)	Liquid fuel (ethanol), feedstock for other energy technologies
Pyrolysis	Segregated waste is fed into a reactor vessel and indirectly subjected to high heat. Virtually all air is excluded from the vessel; the resulting atmosphere converts the organic portion of the waste into gases, a liquid, and a solid.	Producer gas oil Slag Char* (solids)	Electric power, liquid fuels, chemical feedstock, heating, soil amendment

* Subject to state regulatory approval

Source: SCS Engineers

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What's ahead

The market of new waste-conversion technologies is rapidly evolving with new facilities being announced and operating data on pilot facilities beginning to be received to fill in the current gaps with operating history. These developments will eventually make the job of assessing the claims for these technologies more efficient and accurate.

These assessments will also eventually help provide an unbiased tool that can be used to work through the decision-making process. By asking the right questions now, you can take steps to ensure that what's being promised is what you will receive.

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