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The Advantage in the Waste and Recycling Industry



**Sussex County, NJ
Municipal Utilities Authority:
30 Years of Solid Waste and Recycling**

**10 Types of Waste Hauling Containers
and How to Use Them**

**Event Preview:
Deconstruction & Reuse 19:
Building Reusable Communities**

From the Editor

EVERY DAY WE DIVE INTO THE ARRAY OF INTERESTING NEWS THAT EFFECTS

our industry—from mergers and business deals to environmental concerns, company transitions, innovators, new waste solutions, and other important items that catch our eye. Everything and everyone is important. All of you have moved the industry forward to what it is today—full of dynamic, energetic businesses and professionals who are passionate about what they do, and we are excited to work with you on a daily basis, sharing information pertinent to how you will view your next steps in the process.

Before we head into fall, we have a great final summer issue for you this month. Our Spotlight focuses on the Sussex County Municipal Utilities Authority in Lafayette, NJ, an effective and comprehensive operation that continuously looks for innovative solutions to not only move them forward, but also helps them to be a resource and good neighbor to the surrounding communities. They have a great story. Check it out on page 24. Other articles in this edition include, “Crunching the Numbers”, which goes over how to approach a trailer’s total cost of ownership (page 32), “Articulated Trucks in the Landfill” discusses how these types of vehicles are best suited to work in challenging landfill conditions (page 36), “Gasification Unlocks the Flexibility of Clean Energy” (page 40) details how clean, renewable electrical generation behind the meter and creation of Class A biosolids are possible through gasification and “10 Types of Waste Hauling Containers and How to Use Them” lays out the type of roll-off containers available for your business and which you should consider in your application (page 44)

And be sure to read up on the other great topics that include discussions on looking at different types of commodity trailers (page 48), the benefits of using third-party repair services (page 50), why you should consider performing a solid waste rate analysis (page 54), C&D attachment considerations, (page 58) examining the pros and cons of container choices for commercial dumpster service (page 60), and a preview of the upcoming event on building reusable communities hosted by Build Reuse (formerly BMRA) in September (page 64). Don’t miss any of these great stories!

Log on to <https://wasteadvantage.com> to check out all of the news and stories that are changing every day as well as look at the latest issues, videos and all of the events happening in the industry! Also, take a trip over to Waste Advantage Magazine’s MarketPlace section—find out what’s new, view additional categories, featured listings and more. Do not forget that to also download our dynamic app, keeping you up to date on the latest issues, news, trends, tips, products, etc. Log in and save articles to read offline at a later time or share content and MarketPlace listings to your favorite social platform. Visit iTunes or Google platforms to download it now and get the information you need instantly. Also keep an eye out for our e-newsletters going out Mondays, Wednesdays and Fridays filled with the latest industry news from around the country as well as a practical tip to read up on. As always, feel free to reach out to us anytime with any comments, questions, suggestions or otherwise. We always like to hear from you.

Best Regards,

Angelina Ruiz
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angelina@wasteadvantagemag.com

**July issue clarification: In CompuCycle’s “Spotlight” article, the company is Houston’s first R2:2013 certified company, ISO 14001 and OHSAS 18001.*

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Effective use of equipment at the SCMUA Landfill includes a compactor, track loader and bulldozer.

Photo courtesy of the Sussex County Municipal Utilities Authority (Lafayette, NJ).

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A detailed and comprehensive operation, the SCMUA continuously looks for innovative solutions that will not only make operations more efficient, but also helps them to 'be a good neighbor' and resource to the surrounding communities.



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64 | Event Preview Deconstruction & Reuse 19: Building Reusable Communities

As the only national conference that looks at how we can create, support and develop reuse economies to the benefit of our local communities, attendees will hear from deconstruction and reuse professionals across the nation, as well as architects, engineers, designers, and historic preservationists who are finding creative ways to build a world without waste.



Gasification Unlocks the Flexibility of Clean Energy

Gasification is flexible not only to what feedstocks it can use, but also to what end is needed from its conversion process. Clean, renewable electrical generation behind the meter and creation of Class A biosolids are possible through gasification.

■ By Nancy Cooper

Gasification has a long and rich history, and it is widely used in Europe. It is just now growing in popularity in the U.S. In recent years, the research has paid off with new technologies that make the process more efficient with less maintenance required.

The Global Syngas Technologies Council states that there are more than 272 operating gasification plants worldwide with 686 gasifiers. There are currently 74 plants under construction worldwide that will have a total of 238 gasifiers and produce 83 MWth. Thirty-three gasification plants are located in the U.S.¹ Currently, China has the largest number of gasification plants.

When organic materials are heated in an oxygen-starved, pressurized environment, the materials cannot ignite. The heat forces the complex carbon molecules to break apart forming a mixture of gases, called producer gas or synthetic gas. This gas can be combusted to produce electricity or steamed off without harming the atmosphere. All the organic materials are not converted to gas—part of them reform into a material called biochar, a carbon-rich soil amendment (which we discuss later). This environmentally friendly process is known as gasification.

To cite a recent EPA report entitled *Technology Assessment Report – Aqueous Sludge Gasification Technologies*: “Gasification offers a potentially viable option compared to conventional methods for sludge disposal. Gasification is capable of providing a clean and manageable process with the possibility of net energy gains. The variability and lack of information on commercial scale systems however, makes it difficult to ensure a complete analysis and concrete conclusions on sludge gasification’s viability.”²

So, what can be done with the syngas produced in the process? Let’s examine the four options of gasification process flow below.

#1: Fluidized Bed Gasification

Some fluidized bed gasification systems are designed specifically for processing biosolids. The system will reduce the volume of biosolids by 90 percent leaving only an inert biochar that will be beneficially used. The renewable energy that is generated from the biosolid-generated syngas is then recovered and used within the system, so no fossil fuels are used during operations. It will also reduce greenhouse gases due to the reduction in trucking miles associated with conventional disposal methods.

#2: Multi-Feedstock Electrical Production

In this example, multiple feedstocks are acceptable for biomass gasification. This can result in more organic material being diverted

from landfills and that will lower local carbon footprints. A perfect, clean energy storm exists for locations near wastewater treatment plants as the plant’s sludge now becomes a feedstock and not an addition to the local landfill. The wood waste from discarded pallets of local businesses and rights of ways’ street and park trimmings can be used as well. In addition, water from the plant can also be cycled through the gasification plant to be used for cooling instead of industrial fans or to power Organic Rankine Cylinder generators to produce power behind the meter. This method also eliminates costs associated with transportation of sludge disposal (see Figure 1).

The multiple feedstocks are sized and dried for best efficiency, then mixed together before entering the gasification chamber. The producer gas is sent to a thermal oxidizer where it is ignited and the energy from that is used for power generation or used to fuel a steam turbine that can power boilers, sludge dryers or kilns. Electrical generation can be used to offset current electrical utility costs or to supplement power needs. All gasification processes will have a leftover product—called biochar—that has value and can be repurposed further as a soil enhancement, carbon black production, etc.³

Examples of tested and proven feedstock include:

- Industrial or municipal sludge
- Food processing wastes
- Coal
- Chips from wood waste or forest residuals
- Purpose-grown biomass crops
- Crumbed tires
- Ag waste such as corn or cotton stalks
- Processed and pelletized municipal solid waste

#3: Wood Waste to Power

A wood waste feedstock plant is ideal for industries with solid wood waste streams. Examples would be hardwood floor or cabinet manufacturing. Also, companies with increasing loads of broken wood pallets that want to eliminate landfill trips and their associated costs. With a wood feedstock only, there is no mixing of materials. The chipped wood goes directly into the gasification reactor. From there, the syngas goes into the thermal oxidizer where it is combusted and the energy used to run a generator or kiln, etc.

#4: Creating Class A Biosolids

The EPA defines Class A biosolids as biosolids that contain no detectable levels of pathogens. Class A biosolids that meet strict vector attraction reduction requirements and low levels metals

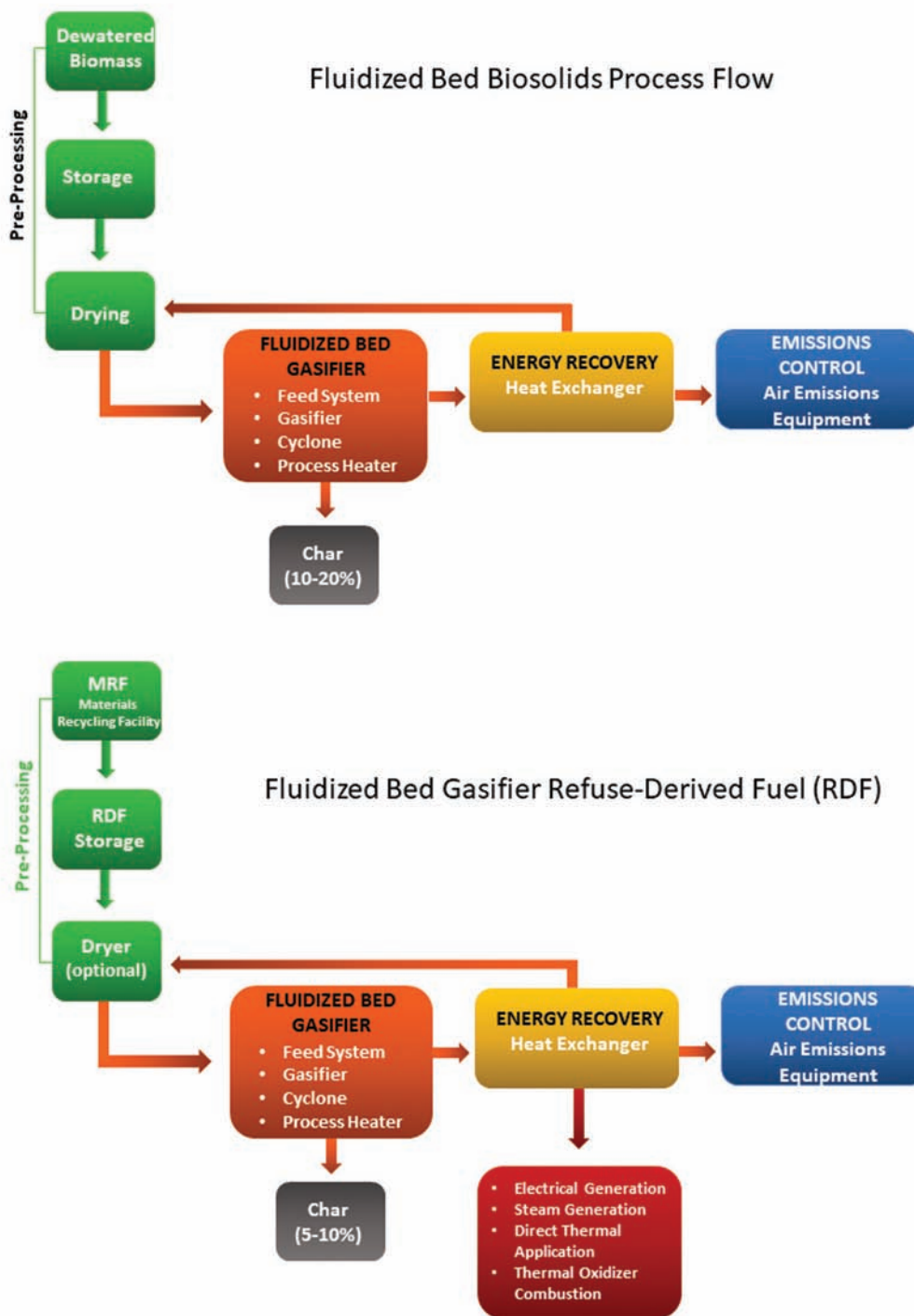


Figure 1

contents, only have to apply for permits to ensure that these very tough standards have been met. It further states that anyone who wants to use biosolids for land application must comply with all relevant federal and state regulations. In some cases a permit may be required.⁴

As we have said previously about the gasification process, wood is converted into a producer gas that can, when combusted, use that energy to fuel a sludge dryer. The sludge dryer will convert the sludge into a Class A material. Also, the condensed steam generated

during this process can also be sent back to the wastewater treatment company for other uses (see Figure 2, page 42).

Not all of the feedstock in any type of gasification process is used to generate energy. In some cases, as much as 85 percent of the feedstock converts to a syngas. The other 15 percent leaves the process as a carbon-rich charcoal type substance called Biochar. Biochar can be used in agriculture and in various industries. Benefits of biochar via gasification include, but are not limited to:

- As a soil amendment (farmers, golf courses, city and state parks)
- Industries readily purchase carbon black that can be made from

Biochar Resources

For more information and to catch up on some recent biochar agricultural research by the University of Tennessee, check out these articles:

- What is Biochar and How Different Biochars Can Improve Your Crops from the University of Tennessee Institute of Agriculture at <https://extension.tennessee.edu/publications/Documents/W829.pdf>

- Bioenergy Insight <https://ariescleanenergy.com/article-biochar-opportunities-knock-agricultural-research-may-open-tennessee-biochar-market/>

Also check out *The Biochar Journal* at:

- www.biochar-journal.org/en
- www.biochar-journal.org/en/ct/85-The-Biochar-Displacement-Strategy

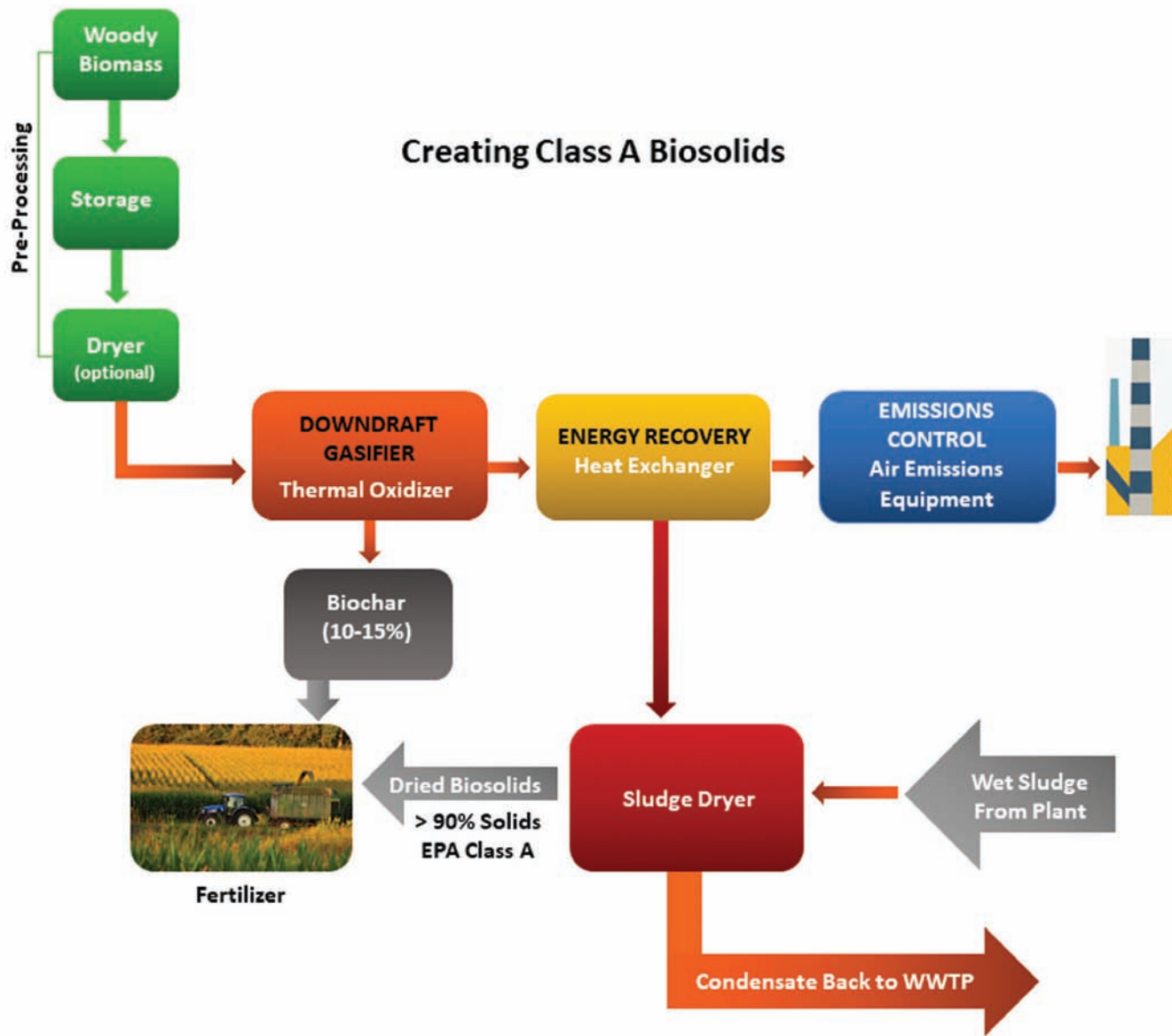


Figure 2

biochar. The EPA defines carbon black as a black, powder or granular substance made by burning hydrocarbons in a limited supply of air. Uses for carbon black include automotive belts and hoses, industrial rubber products, paint, inks, plastics, ceramics and tire production.⁴

- Opportunities for partnerships with local industry, municipal leaders
- New revenue stream for gasification plant owners
- Markets alleviate owners from transportation disposal costs
- The gasification process takes harmful particulates out of solid waste streams

Flexibility

Gasification is flexible not only to what feedstocks it can use

but also to what end is needed from its conversion process. Clean, renewable electrical generation behind the meter and creation of Class A biosolids are possible through gasification. The leftover biochar is gaining popularity and being further examined for new uses and possible new revenue streams. | **WA**

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Notes

1. https://www.globalsyngas.org/uploads/siteImages/2014_20_top_operating_Gasifiers_v2.jpg
2. EPA report: 600R12540 Technology Assessment Report Aqueous Sludge Gasification Technologies
3. <http://ariesenergy.com/?s=biochar>
4. <http://water.epa.gov/polwaste/wastewater/treatment/biosolids/genqa.cfm>