



Environmental Services

Spotlight:

Waste to Energy and Renewables

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The corporate and investor communities share opinions on the state of the waste to energy and renewables markets in the United States in our spotlight survey. Industry executives provide insights into market trends that are driving growth and their outlook on future development activity.

June 2013

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Insider

A person wearing a dark blue, short-sleeved uniform with buttons and pockets is holding a small, white, speckled ceramic pot containing a green plant with long, thin leaves. The person's hands are visible, holding the pot from the bottom. The background is a dark, solid color.



The Environmental Services Insider discusses valuation metrics, recent mergers and acquisitions and capital markets activity, and select sector commentary for BGL's core focus areas within the environmental services industry:

- *Solid Waste (Non-Hazardous)*
- *Special Waste (Hazardous as well as other non-traditional waste streams)*
- *Environmental Engineering & Consulting (EE&C)*
- *Metals Recycling & E-Waste*
- *Reclamation & Remediation*
- *Waste-to-Energy (WtE)*
- *Cleantech*

Feature spotlights present our views and views of the market on certain sectors gathered through primary research and industry-focused transaction expertise.



M&A Activity

- The M&A pipeline is rebuilding following a slower than anticipated first quarter in 2013, driven in large part to pending tax changes which pulled more sellers into 2012. Despite underwhelming Q1 '13 deal flow in the broader market, overall middle market M&A activity is ahead of last year's pace, with deal volume and value up 11 percent and 8 percent, respectively, over the year-ago period. 2012 M&A activity was up a modest 6.7 percent over 2011, carried by record deal flow in the fourth quarter.
- The Environmental Services M&A market remains active. 2012 deal volume was up 9 percent year-over-year, with the largest gains in EE&C (60 percent increase) and Special Waste (31 percent). Positive momentum is continuing into 2013, with first quarter transaction activity up 23 percent over the year-ago period, weighted heavily to EE&C, which had more than a four-fold increase in volume.
- It is a favorable exit environment for prospective sellers. Middle market valuations are healthy, according to Standard & Poor's Leveraged Commentary & Data (S&P LCD), which reported median EBITDA multiples for strategic and financial buyers of 7.2x and 8.0x, respectively, through April 2013. A surplus of capital is chasing deals, and valuation multiples are expected to remain elevated as buyers and lenders compete aggressively for quality transactions in the marketplace.
- Middle market lenders are hungry and accommodating higher leverage and more favorable terms for borrowers for the right transactions. In April 2013, leverage multiples reached their highest levels since 2007, 4.2x senior and 4.8x total leverage, reported S&P LCD. Findings from our May 2013 semiannual survey of lenders showed contraction in senior cash flow spreads of 50 to 75 basis points and leverage multiple expansion of a quarter to a half turn of EBITDA during the first quarter. Higher leverage levels, lower pricing, and more aggressive structures are expected this year given the amount of capital to put to work.

Industry Valuations

- The public equity markets have rallied with the S&P 500 and DJIA gaining 12 percent and 13 percent year-to-date,* respectively, as positive data on the U.S. economy and corporate earnings is lifting investor confidence. BGL Environmental Services composite indices have also gained, led by Vertically Integrated Solid Waste and Other Special Waste, which are up 19 percent and 18 percent, respectively, through the year-to-date period. Solid Waste and EE&C saw EBITDA multiple expansion in Q1 '13.

**As of May 31, 2013.*



Operating Highlights

- Public solid waste companies are reporting greater pricing leverage and stabilizing volumes. Modest volume and pricing growth is forecasted in 2013. Following a lull in M&A activity in the first quarter of 2013, solid waste deal flow is expected to pick up during the second half of the year. Public company valuation multiples have expanded almost a full turn to a median of 8.7x versus a year ago.
- Special waste is seeing stable demand, with participants noting strength in medical and industrial markets. Oilfield services saw expected softening from weaker drilling activity. Used oil re-refining continued to experience a challenging pricing environment throughout Q1 '13. Group II base oil pricing is down over \$1.00 per gallon from June of last year.
- EE&C players are reporting strength in the energy sector citing robust prospects across the upstream, midstream, and downstream segments. Increased bidding activity was noted in the industrial sector, with lower energy costs supporting increased manufacturing activity. Upside in infrastructure is anticipated, with participants pointing to the aging transportation infrastructure in the United States as an area of growth. Companies are seeing continuing pressure in the federal sector resulting from budgetary uncertainty and the effects of sequestration. Funding for national security programs has been less affected.
- Metals recyclers continue to navigate a challenging operating environment in the face of tight domestic scrap supply, softening pricing, and excess capacity. Pricing remains volatile. Operators speak to soft demand in domestic and export markets.

For more information on how BGL's Global Energy and Environmental Services Practice can assist your company, please contact:

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Delivering Results to the Global Middle Market

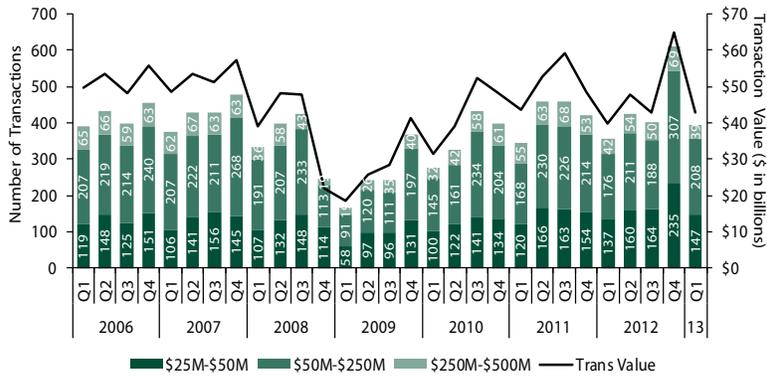




Environmental Services Insider Mergers & Acquisitions Overall M&A Activity

Mergers & Acquisitions Activity

Middle Market M&A Activity

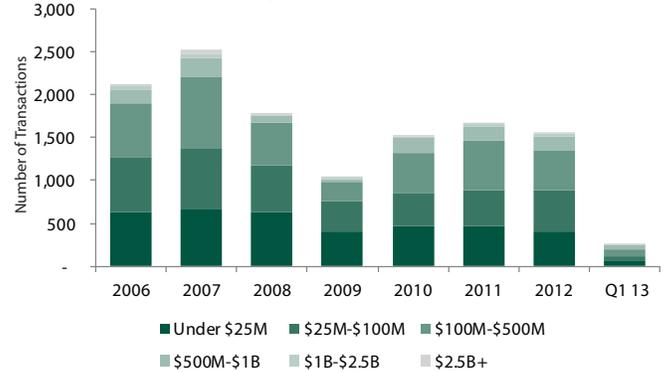


Based on announce deals, where the primary location of the target is in the United States. Middle market enterprise values between \$25 million and \$500 million.

Source: S&P Capital IQ.

Private Equity Transaction Activity

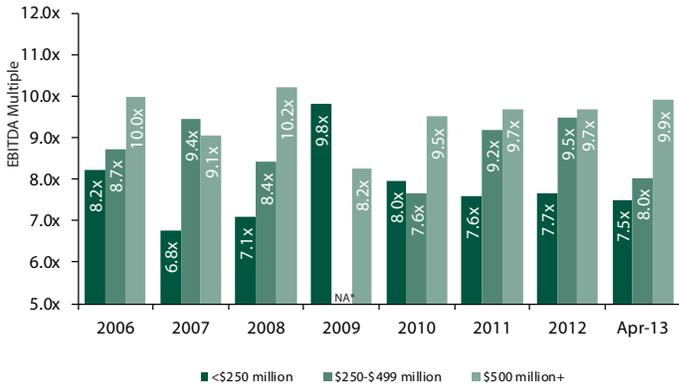
Transaction Count by Deal Size



Source: PitchBook.

Trends in Valuation

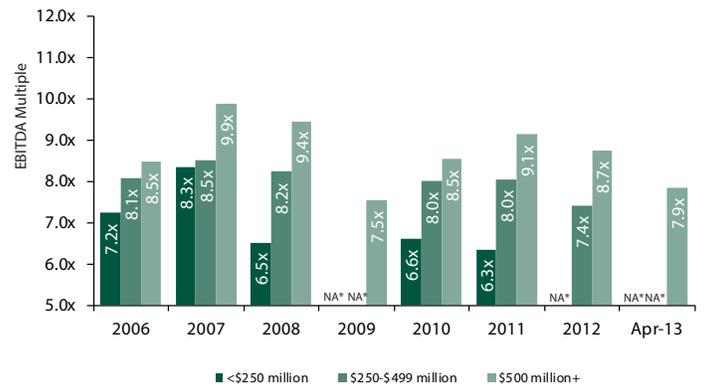
Transactions with Strategic Buyers



*NOTE: Data not reported due to limited number of observations for period.

Source: Standard & Poors LCD.

Transactions with Financial Buyers

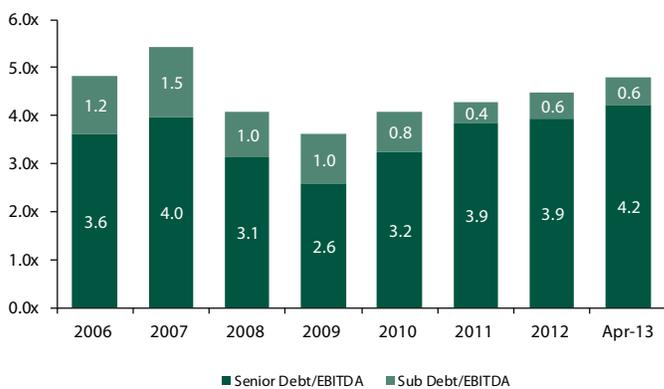


*NOTE: Data not reported due to limited number of observations for period.

Source: Standard & Poors LCD.

Acquisition Financing Trends

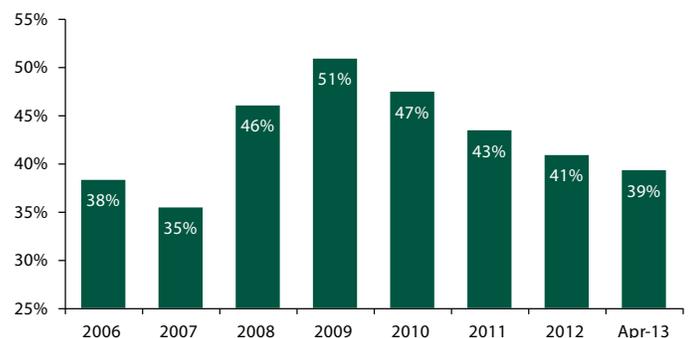
Leverage



Middle market enterprise values between \$25 million and \$500 million.

Source: Standard & Poors LCD.

Equity Contribution



Middle market enterprise values between \$25 million and \$500 million.

Source: Standard & Poors LCD.



Environmental Services Insider Mergers & Acquisitions Environmental Services M&A Activity

Notable M&A Activity in Solid Waste

SOLID WASTE

Arwood Waste acquisition of AllGreen Services

In February 2013, **Arwood Waste** acquired **AllGreen Services**. Based in Valdosta, Georgia, AllGreen provides residential collection service and roll-off container rentals and handles municipal solid waste, recycling, and construction and demolition materials. The purchase includes collection services in the Georgia counties of Ware, Chatham, Glynn, and Camden. The acquisition allows Arwood to access customers between the Florida and Southeast Georgia region.

Lancaster County Solid Waste purchase of Covanta Harrisburg

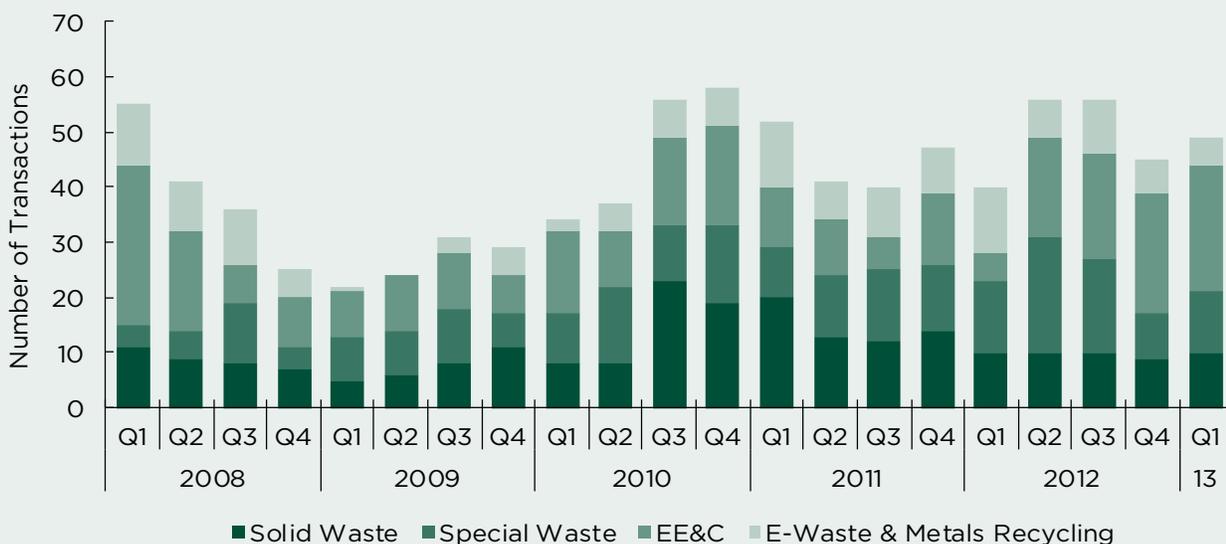
In February 2013, **Lancaster County Solid Waste Management Authority** announced the acquisition of **Covanta Harrisburg, Inc.**, which operates an energy from waste (EfW) facility that processes 800 tons of solid waste per day and generates up to 21.8 megawatts of renewable energy. The company also operates an on-site solid waste transfer station for municipal solid waste and construction

and demolition material. Lancaster County Solid Waste engages in managing solid waste and recyclable materials.

Waste Management acquisition of Greenstar, LLC

In January 2013, **Waste Management, Inc.** (NYSE: WM) announced the \$210 million acquisition of Texas-based **Greenstar, LLC** from Ireland-based renewable energy company **NTR plc**, lifting its municipal, industrial, and commercial recycling capacity. Greenstar is one of the largest private recyclers in the United States, offering recyclables processing and upgrading, commodity marketing, outsourced management, document destruction, waste audit, and other services. The company currently processes roughly 1.5 million tons of recycled products through 12 recycling facilities in the United States, including seven high efficiency single-stream plants. Including Greenstar, WM is currently processing about 10 million tons with total available capacity of 15 million tons, furthering its stated goal to move its recycling tonnage processed toward 20 million tons by 2020. Greenstar's annual revenues are estimated at roughly \$200 million.

Historical Environmental Services M&A Activity
Quarterly M&A Activity by Sector



Based on announced deals, where the primary location of the target is in the United States.
Source: S&P Capital IQ, mergermarket, PitchBook, and BGL Research.



Environmental Services Insider Mergers & Acquisitions Environmental Services M&A Activity

Notable M&A Activity in Special Waste

SOLID WASTE (continued)

WM Recycle America, LLC paid cash consideration of \$170 million with up to an additional \$40 million payable through 2018 based on achievement of agreed upon performance targets.

Santek Waste Services acquisitions of Evans Recycling and Davis Disposal

In January 2013, **Santek Waste Services** announced the acquisitions of **Evans Recycling** and **Davis Disposal**, both located in Northwest Georgia. Evans Recycling provides waste and recycling services including a multiple stream materials recovery facility at the Redbone Ridges landfill in Calhoun, Georgia. Santek has a long-term agreement with Gordon County to manage that landfill and will operate the MRF to complement its industrial waste reduction efforts. Davis Disposal provides residential trash collection services to customers in Catoosa County, Georgia and gives Santek the ability to expand its service into the North Georgia market. Both companies are wholly-owned subsidiaries of Santek.

Fortistar acquisition of Vocational Energy

In December 2012, **TruStar Energy LLC**, a subsidiary of **Fortistar, LLC**, completed the acquisition of **Vocational Energy, LLC**. Florida-based Vocational Energy designs, builds, and installs compressed natural gas (CNG) fueling stations for solid waste management fleets. Offerings include time-fill, fast-fill, and portable CNG fuel stations. TruStar plans to continue Vocational's construction operations while expanding offerings with long-term fuel supply agreements to companies converting their fleets to CNG. Additionally, the firms will look to build a new division that provides operations and maintenance services to CNG facilities.

SPECIAL WASTE

Renewable Energy Group, Inc. (NasdaqGS:REGI) purchase of Soy Energy, LLC biodiesel plant

In May 2013, **Renewable Energy Group, Inc.** (NasdaqGS:REGI) announced the acquisition of an Iowa-based biodiesel plant from **Soy Energy, LLC**. The bio refinery produces biodiesel from animal fats and used cooking oil with current production of roughly 30 million gallons per year. Total transaction value was \$16 million

comprised of \$11 million cash and a \$5 million promissory note to Soy Energy.

Ridgeline Energy Services Inc. purchase of Changing World Technologies, Inc.

In March 2013, **Ridgeline Energy Services** (TSXV:RLE) acquired the assets of **Changing World Technologies, Inc.** (CWT) for \$33 million in stock and debt. Founded in 1997, CWT develops alternative fuels and specialty chemicals as well as converts organic and inorganic wastes, fats, bones, greases, and feathers into oils, gases, carbons, metals, and ash through its thermal conversion process. CWT's renewable oil is used for refrigeration, telecommunications, electricity generation, and potable water applications. The acquisition will combine Ridgeline's wastewater technology platform with CWT's production of renewable fuels.

Curtis Bay Energy LP acquisition of National Waste Management Inc.

In February 2013, **Curtis Bay Energy** acquired a **permitted medical waste transfer station** in Haverhill, Massachusetts from **National Waste Management**. The acquisition will allow Curtis Bay to add consulting, collection, transportation, and sustainable processing services to the New England area, expanding its medical waste service platform in the Northeast marketplace.

Main Street Capital Corporation purchase of Texas ReExcavation, LC

In January 2013, **Main Street Capital Corporation** (NYSE:MAIN) closed a new portfolio investment totaling \$8.9 million of invested capital in **Hydro Ex Acquisition, LLC**, the parent company of Texas-based **ReExcavation, LC** (T-Rex). Main Street's investment consists of \$6.0 million in second lien, secured term debt and a \$2.9 million direct equity investment. Founded in 2001, T-Rex provides hydro excavation and industrial vacuum services in Texas, Oklahoma, Louisiana, New Mexico, and Arkansas. The company offers hydro excavating services, such as potholing, trenching, tunneling, line locating/designating, tank cleaning, subsurface utility engineering, civil construction, and emergency response. It serves industrial construction, oil and gas, commercial construction, utility, municipal, electrical/mechanical, telecommunication, land-based drilling rigs, foundation repair, elevator, and tower erection clients.



Environmental Services Insider Mergers & Acquisitions

Environmental Services M&A Activity

Notable M&A Activity in Environmental Engineering & Consulting

SPECIAL WASTE (continued)

Energy Capital Partners purchase of EnergySolutions, Inc.

In January 2013, **Energy Capital Partners** announced entering into a definitive acquisition agreement to acquire **EnergySolutions** (NYSE:ES). Under the terms of the agreement, EnergySolution's shareholders will receive \$4.15 in cash for each share of common stock for an equity value of approximately \$378 million. Including debt assumption, the transaction is valued at \$945 million. The company offers a comprehensive range of integrated services and solutions, including nuclear operations, characterization, decommissioning, decontamination, site closure, transportation, nuclear materials management, processing recycling, and disposition of nuclear waste, as well as research and engineering services across the nuclear fuel cycle. **Transaction Multiples: .5x Revenue and 4.5x EBITDA**

ENVIRONMENTAL ENGINEERING & CONSULTING

Secure Energy Services Inc. (TSX:SES) acquisition of Frontline Integrated Services Ltd.

In April 2013, **Secure Energy Services Inc.**(TSX:SES) announced the acquisition of **Frontline Integrated Services Ltd.** for \$22.7 million including the issuance of \$16.3 million in SES common shares. Frontline is an integrated service provider to the energy, resource, and civil construction industries in Canada. Offerings include excavation, pipeline repair and construction services, remediation and reclamation services, soil excavation, groundwater control, landfill construction, decommissioning and demolition, and other construction services. The acquisition was targeted to create an expanded suite of services for Secure Energy Service's customers. **Transaction Multiples: .9x Revenue and 4.8x EBITDA**

Arcadis NV acquisition of Senes Consultants Limited

In March 2013, **Arcadis NV** (ENXTAM:ARCAD) announced the acquisition of **SENES Consultants Limited** and its affiliated company **Decommissioning Consulting Services Limited** (DCS). Canada-based SENES Consultants specializes in environmental, radiological, and risk assessment services for the energy, oil and gas, mining, and industrial sectors. The company has six offices in Canada, an office in the United States, and majority interest in a subsidiary with four offices in India. DCS is a provider of

site assessment and remediation services. Collectively, the two companies represent approximately 250 employees with annual revenues of roughly \$30 million. The acquisition grows Arcadis' Canadian presence as well as gains access to growing environmental markets in India and the Middle East.

TRC Companies Inc. purchase of the Air Emissions Testing Business from General Electric Company and Heschong Mahone Group

In January 2013, **TRC Companies Inc.** (NYSE:TRR) announced the acquisitions of **General Electric's** (NYSE:GE) **Air Emissions Testing Business** and **Heschong Mahone Group, Inc.** (HMG). The **GE Air Emissions Testing business** engages in sampling, analyzing, and measuring organic compounds, metals, and other toxic source emissions. The business has 55 employees with annual revenues of approximately \$12 million. Total transaction consideration was \$3.15 million. TRC has also entered into a three-year master service agreement with GE Power & Water.

California-based **Heschong Mahone Group** is a professional consulting services firm that focuses on energy efficiency building science, policy development, and program management. HMG implements building efficiency programs for new and existing home construction and provides technical support and tool development services for utilities, government, and private entities. The transaction is expected to bolster the company's position in the energy efficiency consulting and program management market.

Tetra Tech Inc. acquisitions of American Environmental Group, Ltd. and Parkland Pipeline Contractors Ltd.

In January 2013, **Tetra Tech Inc.** (NasdaqGS:TTEK) announced the acquisitions of **American Environmental Group, Ltd.** and **Parkland Pipeline Contractors Ltd.** Ohio-based **American Environmental Group** provides specialty environmental, construction, and maintenance services to solid and hazardous waste, environmental, energy, mining, and other clients throughout the United States and internationally. The company also offers landfill gas extraction, well drilling, and landfill gas construction services, as well as other landfill operations and maintenance services. American Environmental group has over 500 employees with annual revenues of approximately \$95 million.



Environmental Services Insider Mergers & Acquisitions Environmental Services M&A Activity

Notable M&A Activity in E-Waste & Metals Recycling

ENVIRONMENTAL ENGINEERING & CONSULTING

(continued)

Based in Alberta, Canada, **Parkland Pipeline Contractors (PPC)** engages in construction and maintenance of small to mid-bore pipeline and oilfield facilities, including construction, repair, and erection of pressure piping and vessels. PPC will join Tetra Tech's Remediation and Construction Management segment and is expected to strengthen its position in the North American energy market.

Great Lakes Dredge & Dock Corporation purchase of Terra Contracting, LLC

In January 2013, **Great Lakes Dredge & Dock Corporation** (NasdaqGS:GLDD) announced the acquisition of Michigan-based environmental contractor **Terra Contracting, LLC** in a transaction valued at \$20 million. Terra's services include soil and groundwater remediation, superfund site clean-ups, hazardous waste removal, facility decontamination, tank cleaning, hazardous material abatement, emergency response services, and wastewater infrastructure maintenance, among other services. The company has operations in over 30 states with more than 200 employees. Terra is expected to generate \$45 million in revenue with 15 percent EBITDA margins in 2013.

E-WASTE AND METALS RECYCLING

Aerc Recycling Solutions, Inc. purchase of 2nd Solutions, LLC

In March 2013, Pennsylvania-based electronic waste recycler **Aerc Recycling Solutions, Inc.** (Aerc) announced the acquisition of Virginia-based **2nd Solutions, LLC**. 2nd Solutions is a provider of data clearing, inventorying, and asset recovery solutions for mobile, wireless, and computer technologies. The company engages in enterprise buyback solutions for businesses, governments and schools, wireless and computer wholesale, and electronics recycling. Recycling Holdings LLC acquired a majority interest in Aerc in November 2012.

Sadoff Iron & Metal Company, Inc. acquisition of Aluminum Resources, Inc.

In March 2013, Nebraska-based **Sadoff Iron & Metal Company, Inc.** announced the acquisition of **Aluminum Resources, Inc.**, a processor and supplier of foundry and mill grade recycled aluminum products. The acquisition will provide complementary activities to Sadoff's current aluminum and non-ferrous recycling business while adding access to smaller niche markets.

Universal Scrap Metals acquisition of USM Alumacycle, LLC

In February 2013, Chicago-based **Universal Scrap Metals, Inc.** announced the acquisition of **USM Alumacycle, LLC** from Anheuser-Busch Recycling Corporation. USM Alumacycle comprises recycling assets and equipment in Kentucky used to prepare used beverage containers for processing at aluminum smelting facilities. The facility has the capacity to shred, sort, and process up to five million pounds of aluminum per month and is in close proximity to several of North America's aluminum sheet mills.

Gerdau Ameristeel Corporation purchase of Cycle Systems, Inc.

In February 2013, **Gerdau Ameristeel Corporation** announced the acquisition of certain assets of Virginia-based **Cycle Systems, Inc.** Cycle Systems provides recycling services to industrial, corporate, municipal, and private customers throughout Virginia. The company recycles ferrous and non-ferrous metals including copper, brass, aluminum, stainless steel, tin and aluminum cans, and automobile metals, as well as paper and plastics. Cycle Systems also provides industrial demolition and dismantling services.



Spotlight On: Waste to Energy and Renewables

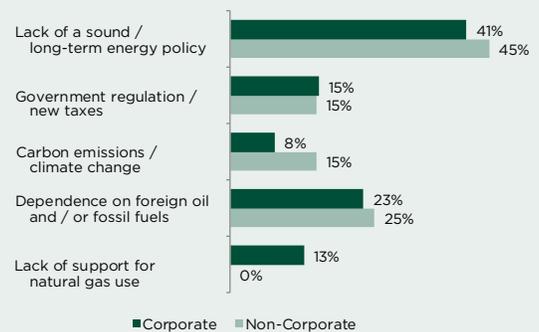
Building upon our successes in working with recyclers and other companies involved in waste recovery, we have expanded our expertise into other areas within waste conversion.

For this spotlight, we conducted a survey and series of interviews within the corporate and investor communities to gauge opinions on the state of the waste to energy and renewables markets in the United States. Questions ascertained views on the importance of alternative energy and the role waste conversion will play in energy production. Participants were also asked to provide insights into market trends that are driving growth and their outlook on future development activity. The survey and interviews were designed to obtain broad coverage of the waste to energy market and garner opinions from companies involved in solid and special waste management and environmental engineering and consulting, as well as the legal and investment community.

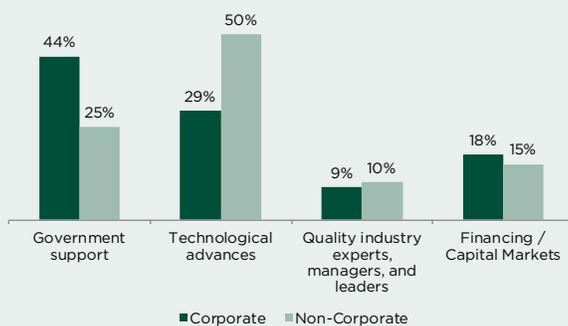
Our findings supported our underlying premise to this report: a dynamic and growing market in waste to energy. Interest in waste recovery is increasing as organics recycling takes center stage, with market forces underpinning a mounting capital need that investors believe will be met with successful adoption of developing conversion technologies.

What do you think is the most important energy issue facing the U.S. today?

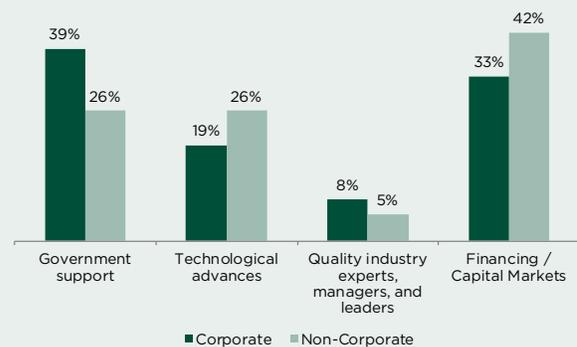
Public policy was cited as a key driver in renewables. Nearly half of companies surveyed point to the lack of a long-term energy policy as the most important energy issue facing the United States today.



What single factor will be the greatest catalyst for progress within the renewable energy sector?



What do you see as the greatest challenge to the growth for renewable energy?



Interestingly, government support earned a top ranking by survey participants as the catalyst that could either advance or impede project development in renewable energy alternatives.



Spotlight On: Waste to Energy and Renewables

Policy Drivers

The availability of renewable energy tax credits has stimulated growth in alternative energy projects in the United States. However, given the lack of a long-term energy policy, insiders are critical of their staying power. "If Congress would decide on an energy policy and put a tax or depreciation scheme in place, say for five years, you could actually plan projects," remarked Frank Starr at Energy Systems Group. "It is a year to year battle," said Thomas Hoffman at Ballard Spahr. "There is no 20-year strategy in the U.S. renewable energy industry for what happens if tax credits go away. That is a big cloud in the horizon." "Without an extension of the government production tax credit and investment tax credit programs, the industry is going to lose a lot of momentum," said Stefan Kershaw at Consortium Capital. "Clearly, the development curve will be much slower if those programs aren't extended."

The RIN program under the federal Renewable Fuels Standard (RFS) is incentivizing the production of renewable transportation fuels in the U.S. "The value of RINs is just now being demonstrated," Starr said. "Each year the mandate for renewable fuel use goes up. There is a market to take landfill gas or digester gas, clean it up, and put it into a fuel tank as CNG." Starr added, "RINs generated by biomethane from landfills and digesters finally made it into the market in the first quarter of 2013. This market is at its very earliest stages of growth. If you are looking for a game changer over the next five years, RINs would be it." There is no historical market for RINs and price has been volatile, however, which hampers the ability to secure long-term contracts from buyers on the RINs, Starr said.

In February 2013, the Biogas Investment Tax Credit Act of 2013 (HR 360) was introduced which would provide a 30 percent investment tax credit for qualifying biogas technologies. Biogas projects that inject renewable natural gas into the gas pipeline or use biogas to power vehicle fleets would benefit from the credit, according to a press release from the American Biogas Council (ABC). "The introduction of HR 360 reflects the importance that biogas can play in our nation's energy mix," said ABC executive director Patrick Serfass. Biogas projects that

generate electricity are eligible for a production tax credit under Section 45 of the federal tax code.

One of the biggest drivers for renewable energy projects was the state Renewable Portfolio Standard (RPS) program. Many states enacted an RPS program mandating utilities to use a specified percentage of electricity from renewable sources. "A number of states have allowed those programs to go dormant or have pulled back," said Bernie Laseke at GZA GeoEnvironmental. "The regulatory driver of state-driven renewable portfolio standards is no longer there."

Some progressive states have aggressively pursued goals through the RPS program. "California has a 30 percent RPS, and they are going to meet it. And they are meeting it without a lot of landfill biogas projects or dairy biogas projects," commented Starr. "So those industries lobbied and got special legislation passed last year to mandate at least 70MW of these kinds of biogas projects."

Environmental Drivers

Environmental compliance has been a big driver in renewable energy and is becoming a bigger driver, insiders say. "The air quality regulatory environment is driving everything toward gaseous fuels and renewable fuels," observed Laseke. "With the regulatory initiatives coming down against coal, companies are migrating over to natural gas pipeline quality or uplifted landfill gas." Another significant regulatory driver will be the air quality rules mandated under the oil and natural gas pipeline campaign, Laseke said. The new suite of air quality rules is dictating recovery of flare gas to reusable energy gas in the form of internal combustion engines or generators displacing flare stacks which will occur by January 2015.

"The environmental driver for anaerobic digestion is concentrated animal feeding operations (CAFOs), your natural fuel supply for an on-farm digester, whether it is hogs, dairy cows, or chickens. A tremendous amount of air and water pollution can take place when you concentrate that much manure in one place," commented Starr. "Over the next five years, the environmental standards for CAFOs will become more stringent, which will benefit renewable energy projects based on animal methane."



“Methane is a greenhouse gas (GHG) that is 20 times more potent as a GHG than carbon dioxide. Landfills are mandated to capture that gas and destroy it. Why not make some beneficial use out of it?” commented Frank Starr of Energy Systems Group.

Mandatory diversion of organic material from landfills will necessitate action and spur growth in waste to energy projects. “Industrial waste from food processing and waste oils and greases from restaurants are being banned from landfills and will require processing. You can either compost it or you could put it in a digester,” said Starr. “You will see renewable projects sprouting up because of that.”

“We don’t necessarily see a strong regulatory force behind the movement toward waste diversion,” commented Wendy Schlett at GZA GeoEnvironmental. “Much of that is being spurred by public opinion and market perception, as well as cost reduction for manufacturing facilities. Those seem to be some of the drivers for waste to energy.” Schlett continued, “The projects that are coming into fruition are to a great degree influenced by a company’s sustainability initiatives. The drivers may not just be the traditional need for energy. Companies are looking for other opportunities to minimize waste and to be able to publicize those efforts. For example, Nestle created a biomass waste to energy project for its Gerber Foods facility, which in part was centered on the need for energy but also to generate a strong public image.

We are also seeing companies look to minimize landfill disposal to be able to promote the tagline that they are a zero waste to landfill facility. Any sustainability initiatives undertaken must add to the bottom line.”

Competing Natural Gas

A “thorn” for renewable energy continues to be the price of natural gas. “Companies are converting from coal to cheap natural gas. The renewable energy sector is under pressure because of that,” commented Bernie Laseke at GZA GeoEnvironmental. “It is the only governor that I really see curbing expansion. It is holding back a lot of development that you would see under business as usual conditions three to five years ago.”

“It is certainly a concern,” commented Jonathan Abrams at Progressive Waste Solutions. “In Canada, the vast majority of new residential collection bids are calling for compressed natural gas vehicles. Municipalities would like to take the organic waste that is collected to the curb and essentially close the loop on the fuel. So digest, clean the gas, and put that gas back into their trucks. Regardless of what happens with natural gas, there will be a big push on the municipal side to do this.”

“Waste to energy projects offer numerous environmental benefits external to the price of power,” commented Thomas Hoffman at Ballard Spahr, “which include managing waste, greenhouse gas mitigation, avoiding landfill problems, and preventing environmental clean ups.”

The Impact of Public Policy: A Tale of Two Countries

Germany



Achieved since 2005

United States



As of 2010

Municipal
Solid Waste
Landfilled

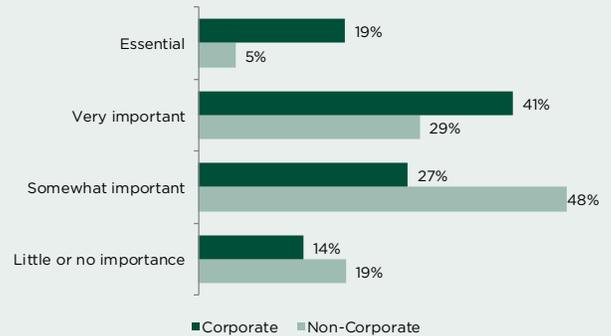
Source: “Biogas: Perspectives on Energy, Environmental Sustainability and Economic Development,” May 16, 2012, Turning Earth.



Spotlight On: Waste to Energy and Renewables

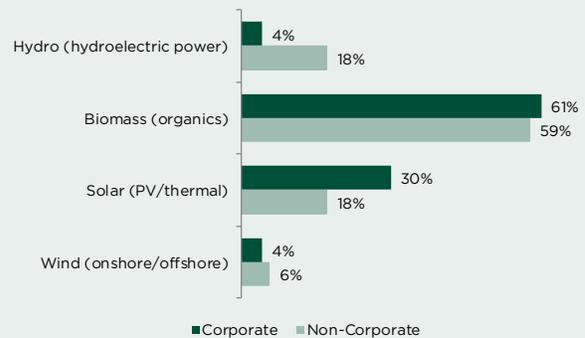
How important to energy production will the waste to energy and renewables market be over the next decade?

More than two-thirds of surveyed companies believe renewables will be important to energy production over the next decade. Sentiment is stronger among corporate respondents with 41 percent who believe alternative energy will be very important.



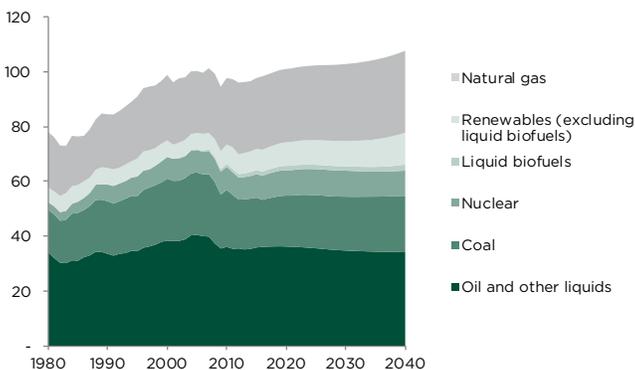
Where do you believe the industry should place the most emphasis in developing new technologies?

Biomass was the resounding choice of companies surveyed for future investment in technology development, receiving 61 percent of corporate and 59 percent of non-corporate responses.

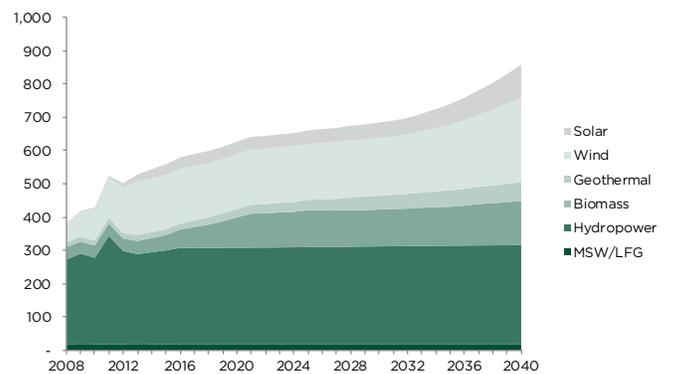


Energy Outlook in the United States

Primary energy use by fuel, 1980-2040 (quadrillion Btu)



Renewable electricity generation by type, including end-use generation, 2008-2040 (billion kilowatthours)



Renewables and natural gas will lead the rise in primary energy consumption, according to data reported by the U.S. Energy Information Administration. The renewable share of total energy use (including biofuels) is projected to grow from 9 percent in 2011 to 13 percent in 2040 in response to the federal renewable fuels standard; availability of federal tax credits for renewable electricity generation and capacity during the early years of the projection; and state renewable portfolio standard (RPS) programs.

Source: U.S. Energy Information Administration.



Opportunities

Energy demand and an increasingly stringent regulatory environment will spur investment in alternative energy projects. Insiders shared their insights on developing market opportunities:

Waste to Energy

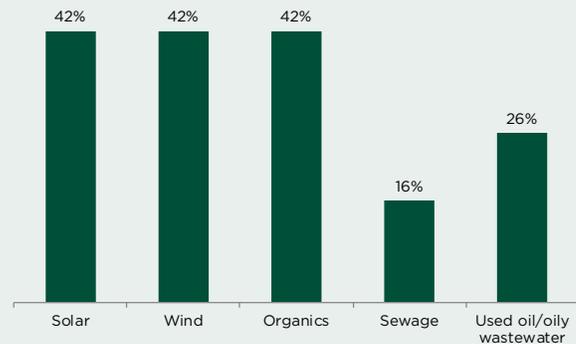
Bernie Laseke, GZA GeoEnvironmental. We have been involved in a number of anaerobic digestion projects for agricultural sites. Those can be attractive projects not only for energy recovery but also because they void out waste and bring you in compliance with regulations which are air quality and waste and wastewater driven. The challenges are that the projects can be small (1MW) and there is competition from the cheap supply and price of natural gas.

Solid waste disposal is interesting because a lot of the organic waste is now being diverted from landfills and going to digesters to produce biogas or biodiesel as a means of landfill site and volume preservation. You are seeing that a lot on the coasts, on the Northeast corridor and on the West Coast. It is making its way to the Midwest as it usually progresses.

Damon Yuzon, Equilibrium Capital. The undiscovered or overlooked area in renewable energy is the conversion of waste into energy through smaller, distributed projects. That is where we see the most opportunity for growth and attractive investment returns.

Unlike wind and solar, waste to energy projects based on anaerobic digestion deliver base load power locally, which is very beneficial to the grid, and allows projects to generate a stable revenue stream from the sale of electricity. There is also the opportunity to generate additional revenue streams from the sale of nutrients and carbon credits. Additionally, there is a positive environmental impact from these projects since they solve a waste management problem, mitigate damage to the air and water, and make farms more efficient while at the same time minimizing their environmental footprint.

What are the most common renewable and waste to energy opportunities you come across?



Survey responses could include multiple selections

We are seeing a lot of these projects generating unlevered IRRs of at least 15 percent and for the right ones, 20 percent-plus IRRs. The challenge is that they are smaller projects and require technical ability to operate.

Stefan Kershow, Consortium Capital. We certainly see the opportunity that is developing in biogas. It has taken time for the technology to reach a level to make more projects viable and economically feasible.

The U.S. market is immature and in the early stages of growth. The European market is more developed so you are seeing the larger companies looking for expansion opportunities and trying to gain a foothold in the states. These companies may not have the development expertise, so they need to find local partners to help them navigate the landscape. The fact that they are looking for projects should help the domestic biogas industry get some traction.

Roy Amitzur, Blue Sphere Corporation. I think the waste to energy market segment presents the biggest opportunity. Not only are you generating a renewable baseload energy, you are solving a problem—the problem of the waste. Waste to energy allows you to have multiple sources of revenue, from tipping fees and bidding of energy to composting and carbon credits.



Spotlight On: Waste to Energy and Renewables

Jeph Shaw, *New Energy Capital*. We see opportunity in waste to energy, converting biogas to compressed natural gas in transportation infrastructure. We are just now starting to see the infrastructure build out for distributed stationary use of natural gas—CNG filling stations or remote CNG terminals for commercial users. With incentive programs like the RFS, it will lay the groundwork for opportunities in renewable projects. Investors have seen stable value on the RINS, which will combine to push a lot of the waste to energy toward CNG/LNG.

In landfill gas to energy, projects with a strong gas resource and off-take would be attractive.

Solar

Damon Yuzon, *Equilibrium Capital*. Over the next 10 years, solar will probably continue to be one of the predominant renewable energy sources, but from a return standpoint not all that attractive. There has been so much capital and attention given to both wind and solar, and I don't necessarily see that much opportunity from an investment standpoint since the returns and yields are going into the single digits. However, solar will potentially make sense at a distributed, building-by-building level.

Stefan Kershow, *Consortium Capital*. The cost of solar has been declining dramatically over the last couple of years making more distributed generation projects immediately feasible. They are smaller scale projects with relatively low execution risk which is opening up more opportunities for investors.

Deal size can be a struggle. The large utility scale projects will typically get financed if they pencil out. Some of the smaller deals can get local banks to finance them with a guarantee, or for a rooftop project, if they are collateralized by the underlying real estate. It is the mid-tier deals that are commercial scale but not utility scale where there is not a lot of debt available.

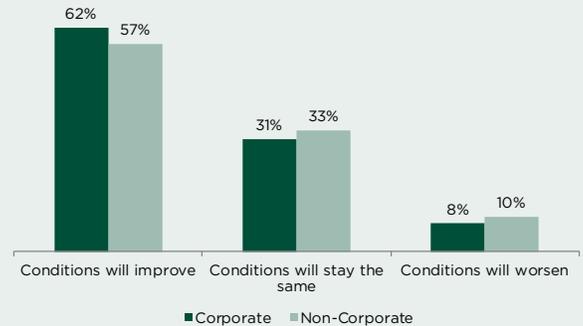
If you are looking at a project for a pre-tax, cash potential return, a good yield on solar is high single digits. For biogas, you are looking at 20 and 30 percent yields. However, the risk profile is completely different. The biggest difference is technology. For solar, there is perceived to be very little technology risk with the actual equipment. The track record for anaerobic digestion in this country has been poor. There were issues with a number of the earlier development projects which forced some to cease operations or be sold. Issues centered on poor siting; misapplication of technology for the type of effluent and feedstock; or inexperience of the project sponsor.

Jeph Shaw, *New Energy Capital*. Distributed solar; financial innovation in distributed solar with the potential to securitize solar as an asset class. Investors are starting to take advantage of the maturity that solar technology has gained over the years.



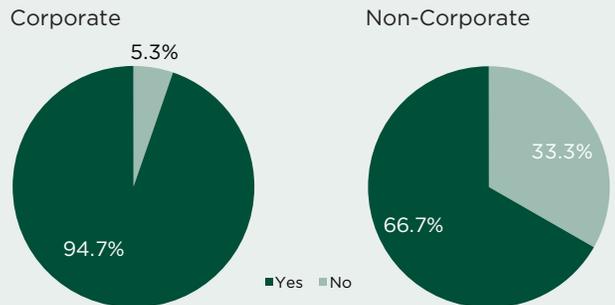
How would you characterize the outlook of the waste to energy and renewables market?

Survey respondents concur that the market outlook is favorable for waste to energy and renewables. Nearly two-thirds of companies surveyed believe market conditions will improve.



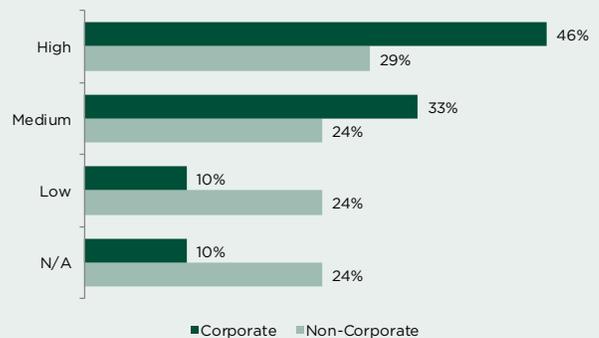
Do you believe the waste to energy and renewables markets are attractive opportunities for energy production?

Corporate respondents were decidedly more bullish about market opportunities in alternative energy, with 95 percent in agreement that the renewables market presents attractive opportunities for energy production, compared to 67 percent of non-corporates surveyed.



What level of interest does your organization have in supporting waste to energy and renewables solutions?

Survey responses were mixed on the level of support for renewables solutions, leaning again to corporate investors with nearly half that have a high level of interest compared to less than one-third of non-corporates surveyed.





Spotlight On: Waste to Energy and Renewables

Recovering Value from Waste

In a continuing push to extract value from waste, investment in waste to energy is shifting to emerging conversion technologies—biological processes such as anaerobic digestion and fermentation, and thermal processes—gasification and pyrolysis.

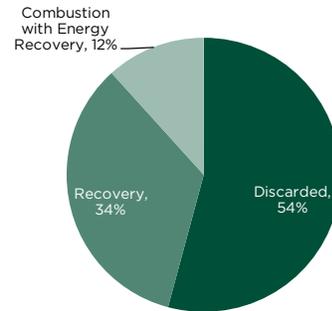
Expansion of energy from waste (EfW) or mass burn facilities that employ combustion for energy recovery has remained stagnant in the United States. While EfW is considered a source of clean, renewable energy by the U.S. Department of Energy (DoE) and produces electricity with “less environmental impact than almost any other source of electricity,” according to the EPA, the last new EfW plant constructed in the United States was in 1995.¹ In 2012, there were 86 U.S. EfW plants in operation, reported IBISWorld, which generated revenues of \$3.3 billion. Covanta Holding Corporation (CVA) and Wheelabrator (Waste Management) combined control more than a 50 percent share of the market.²

In most jurisdictions in North America, EfW facilities are considered to be a form of disposal, insiders said. “The definition of disposal is critical. From a permitting standpoint, disposal facilities are more challenging to site and can be as difficult to site as a landfill,” commented Geoff Rathbone at Progressive Waste Solutions. If a municipality or a company has waste diversion goals, any material that goes to an EfW facility would not count towards those goals. With recognition of the economic value achieved through waste diversion, states are looking at ways to streamline permitting and regulatory oversight of waste to energy facilities, with a move toward permitting facilities that utilize the newer conversion technologies as composting or conversion technology facilities rather than solid waste disposal facilities.

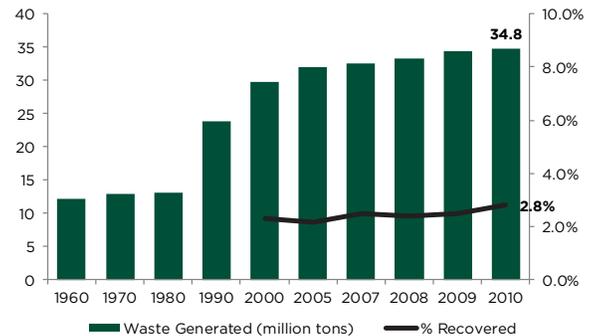
“We are beginning to see the convergence of the waste diversion movement with green energy. More of the waste diversion work that we are doing, particularly in organics, has an energy component, so it is now a very important part of our focus,” Rathbone offered. “Our waste collection fleet is rapidly moving from diesel to compressed natural gas.”

¹ Energy Recovery Council and Equity Research.
² “Waste-to-Energy Plant Operation in the US,” January 2013, IBISWorld.

MSW Management in the United States, 2010



Food Waste Generated in the United States



The waste industry is continuing to move towards more diversion as states and municipalities enforce mandatory recycling of organic waste and are instituting landfill bans. Insiders say North America is at an inflection point in managing organic materials, with organics being ushered in as the next recycling revolution to paper, metal, and plastics of the last few decades.¹

The organic fraction of the waste stream accounts for nearly one third of all waste. In 2010, 34 million tons of food waste was generated in the United States, of which only 3 percent was recovered, underscoring the need to leverage this resource for beneficial reuse.

¹ “Integrating Anaerobic Digestion into Our Culture. Part 1: Language, Visuals and Values.” Jan 2012, Harvest Power.

Source: EPA.



“We see the possibility of making our own natural gas either from landfill gas or from anaerobic digestion so the concept of being able to fuel your fleet from waste product or from source separated organics is definitely becoming a reality,” offered Geoff Rathbone at Progressive Waste Solutions.

Technology

Waste is a challenging feedstock because of its diversity and seasonality. It fluctuates daily with moisture and has long term composition change. The industry is still testing the technology to see if it can manage the waste streams. “If you are looking at a 20-year facility, trying to predict what the waste stream is going to look like in 2030 is very challenging,” said Rathbone.

“Of the four conversion technologies, we see anaerobic digestion coming to market first,” Rathbone offered. “There is always a chicken and egg in our business of which comes first, do you build the technology and hope that the supply of material will flow in or do you have the supply developed and create the technology. In this case, the municipalities are making the decision to start a green bin program, which is the collection of kitchen organic material, and they need processing capacity for the material they generate. We believe anaerobic digestion is the best way to treat that material.”

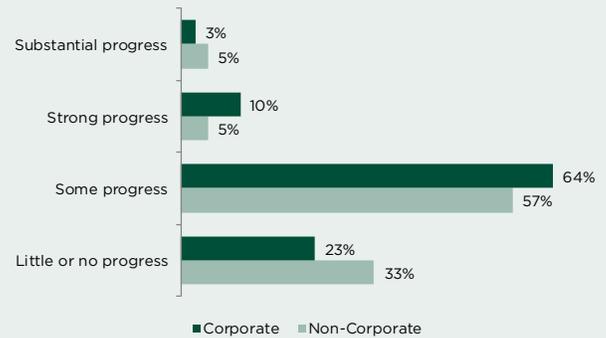
“With gasification and pyrolysis, we are not as convinced that the technology will work on the complex waste streams that we have. The technologies are three to five years behind anaerobic digestion and have not yet been proven on a commercial scale to be economically viable. Even the commercial scale plants that have been built are all subsidized plants.”

“The technology works where you have a homogeneous feedstock,” added Jonathan Abrams at Progressive Waste Solutions. “There have been stops and starts on the waste conversion technology, particularly on the thermal side with gasification and pyrolysis. There you are using raw mixed waste as the feedstock. We have yet to see where it is working on a commercial scale that is sustainable. It is still very early, but it will happen.”

Rathbone continued, “The immediate opportunity we see is in anaerobic digestion, particularly where you are extracting methane to create a renewable fuel.”

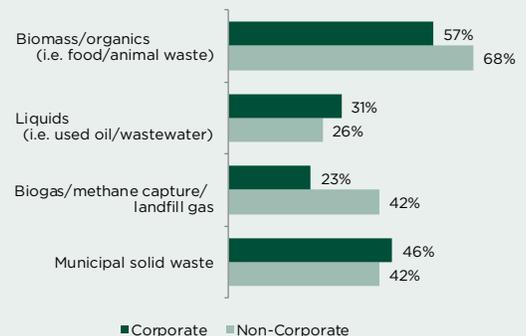
How would you characterize the progress that has been made in the last five years in the overall effort to convert waste into energy?

More work needs to be done to advance the nation’s efforts in waste recovery. Roughly two-thirds of surveyed companies believe some progress has been made in waste conversion, while nearly one-third believes little to no progress has been made at all.



Where do you see the most attractive opportunities to convert waste or other sources of feedstock into energy?

Biomass is growing in importance as waste diversion speeds the advancement of technologies for resource recovery.



Survey responses could include multiple selections



Spotlight On: Waste to Energy and Renewables

Waste companies are closely watching the new class of conversion technologies develop. According to Rathbone, there are an estimated 20 to 25 commercial scale conversion facilities under construction or coming online now and into 2014. “We are following the progress to see if the facilities operate technically and the pro-forma cost structures pencil out. There is still a lot of risk,” Rathbone said.

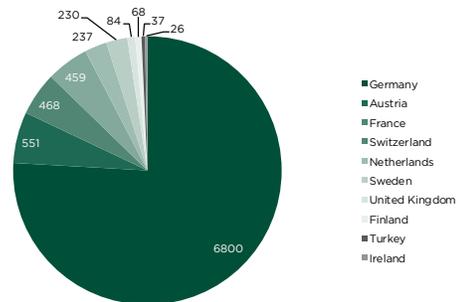
The city of Toronto is credited with constructing the first two anaerobic digestion facilities in North America. Before joining Progressive two years ago, Geoff Rathbone oversaw waste management for the city. “The city of Toronto work was pretty revolutionary,” Rathbone offered. “The plants have been operating at a commercial scale for six or seven years with real feedstock from real households. Any of the bugs between the European waste and North American waste have been vetted out so there is a high degree of confidence that the facilities will not fail because of technological problems.”

Extended producer responsibility laws could speed the development and utilization of thermal waste conversion technologies. Effective June 2014, brand owners of products in British Columbia will assume responsibility for the recycling program and be financially responsible for the cradle to grave life cycle of all the products they produce. They will also be required to divert 75 percent of that material from disposal. “We don’t believe they can get there just through traditional recycling. So this will probably be the first opportunity for some of these new conversion technologies like gasification and pyrolysis to help them get to the 75 percent target,” observed Rathbone. “The government recognizes this and will allow the fourth “R”, reduce, reuse, recycle—recovery—not traditional EfW but a conversion technology, to count towards the 75 percent target.”

Anaerobic Digestion

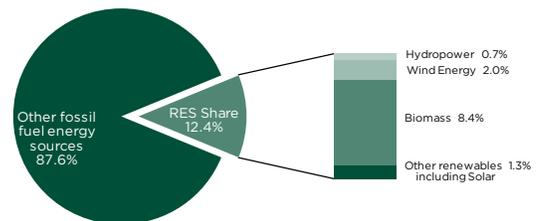
Industry leaders are calling anaerobic digestion the next generation of organics management.³ In anaerobic digestion, organic waste inputs such as manure, source separated municipal and industrial food waste, and

Anaerobic Digesters in Europe



Germany Renewable Energy Sources

Biomass Dominates



Source: Center for Climate and Energy Solutions, 2011 Data
Federal Ministry of the Environment, Nature Conservation and Nuclear Safety, 2011 Data

wastewater biosolids or sewage are processed to create biogas which can be converted to electricity, heat, pipeline quality gas, and vehicle fuels.

Anaerobic digestion is an integrated solution. Digesters will produce residuals that are used for soil amendment and fertilizer recovery. Wastewater can also be recovered to drinking grade quality water. Other non-energy benefits for on-farm applications include reduced odors and reduced surface and ground water pollution.

Nascent market in U.S.

Although anaerobic digestion has been in use in Europe for decades, North America is only just beginning to see the technology gain a foothold. Anaerobic digestion is the number one generator of green energy in Germany with an installed base that exceeds 6,800 systems, stimulating EUR 5.9 billion in annual revenue.⁴ Projections for 2020

³ “Integrating Anaerobic Digestion into Our Culture. Part 1: Language, Visuals and Values.” Jan 2012, Harvest Power.

⁴ Federal Ministry of the Environment, Nature Conservation and Nuclear Safety.



show rapid growth, with more than 25,000 digesters and EUR 26.2 billion in revenue.⁴ Progressive policies and incentives, namely a high feed-in tariff, have been the key drivers for growth outside the U.S. and led to the massive build out of these systems to make them immediately economically viable. “Germany has really been the cradle of digestion, and much of that has been spurred by government subsidies. It is certainly less prevalent in the United States as it has been in other areas of the world,” commented Jon Best at Caterpillar Financial Services Corporation.

Global investment in biomass and waste to energy is projected to increase from \$14 billion in 2010 to \$80 billion by 2020, according to Bloomberg New Energy Finance, which cites anaerobic digestion and other waste conversion technologies among the greatest beneficiaries. Another industry study completed by Pike Research estimates the global waste to energy market could grow to \$29.2 billion, and under an optimistic forecast, \$80.6 billion, by 2022. Globally, 75 percent of biogas potential lies in anaerobic digestion of agricultural crops, byproducts, and manure. Seventeen percent is in municipal and organic waste and eight percent in sewage and wastewater treatment.⁵

“The largest market for anaerobic digestion is Europe. Now we are seeing growth in AD systems all over the world, notably Africa and Latin America, because of the need to increase energy capacity in those countries,” observed Roy Amitzur at Blue Sphere Corporation. “We see AD growing in the United States. States are mandating diversion and banning organic materials from landfills, which will require an alternative solution like AD to process the waste.”

According to the American Biogas Council, there are 192 digesters in operation on farms in the United States,⁶ which comprises less than 2 percent of the potential in the livestock sector alone.⁷ The U.S. Environmental Protection Agency (EPA) has partnered with the U.S. Department of Agriculture (USDA) to promote growth in the area through the AgSTAR program. AgSTAR projects that the U.S. could have upwards of 8,000 anaerobic digesters producing biogas on farms across the country.⁵ In total, ABC projects that there are more than 12,000 sites available for biogas development in the United

The Biogas Opportunity in the U.S.

Biogas Producing Sites

2,000

Number currently in operation

Farm	192
Wastewater Treatment Plants	1,238*
Landfills	594

*Only 860 use biogas they produce

12,000+

Available for Development

Farm	8,241*
Wastewater Treatment Plants	2,378
Landfills	540
Private commercial/ industrial sites	Thousands

*Only counting dairy and swine

Source: American Biogas Council

States, exclusive of the thousands of potential commercial and industrial sites.⁶

“The majority of the installations to date were put in place not to generate electricity, but to solve a manure management or waste processing issue. The next wave of activity will come from professional developers/operators that recognize this business opportunity and can build, own and operate digesters on host sites, whether it is a farm or a food processing facility, to generate all of these revenue streams,” commented Damon Yuzon at Equilibrium Capital. “The good news is that we are going to be able to leverage the 10-plus years of German refinement to this process technology.”

“We believe the opportunity in the U.S. market is huge, starting with the agricultural industry,” Amitzur offered. “Our research supports some 50,000 farms (cow, chicken,

⁴ Federal Ministry of the Environment, Nature Conservation and Nuclear Safety.

⁵ Wisconsin Bioenergy Initiative.

⁶ American Biogas Council.

⁷ U.S. Environmental Protection Agency and AgSTAR.



Spotlight On: Waste to Energy and Renewables

and swine) with a potential need for digesters. The market expands when you include municipal solid waste and organic waste separation.”

“The U.S. market is wide open right now,” offered Damon Yuzon at Equilibrium Capital. He estimates the market opportunity at \$30 billion over the next five years for AD projects that have project costs of \$25 million or less and that target the agricultural waste, food waste, and municipal wastewater sectors.

State mandated diversion will be a major driver. “We are seeing developments on the East Coast and West Coast where, because of the concentration of people and animals, anaerobic digestion has to be adopted,” Yuzon commented. “We want to be heavily focused on the West Coast states (e.g., California, Oregon, Washington), and really any state that is either progressive or is facing waste management issues and landfill capacity constraints.”

“Education will be instrumental to the growth of the industry—educating the waste industry on this new opportunity in organics waste management. Anaerobic digestion is an economically viable solution that can reduce the cost of waste, eliminate the need for additional landfill and incineration capacity, and generate energy,” said Roy Amizur at Blue Sphere Corporation. “The second driver will be financial incentives or feed-in tariffs. In the U.S. market today we see very low electricity prices because of the availability of natural gas. Different states will have to find a way to calculate the cost of the environmental damage of the waste to the economy and translate it into some kind of benefit to a waste to energy facility.” “Waste generators are not bearing the full cost of their waste disposal,” added Jeph Shaw at New Energy Capital. “It is looking at how those costs can be allocated to the companies actually generating that waste. It brings out the true economics of waste to energy more so than if you have subsidized landfills.”

Case Studies in Diversion

CALIFORNIA

- New Goal: 75% Recycling
- AB 341: Policy goal that not less than 75 percent of solid waste generated be source-reduced, recycled, or composted by 2020. The 75 percent goal cannot be reached unless a significant amount of organics now being landfilled is instead used in new composting/anaerobic digestion facilities
- Strategic Directive 6.1: Reduce by 50 percent the amount of organic waste disposed in the state’s landfills by 2020
- Anaerobic Digestion Initiative: Encourage the development of anaerobic digestion facilities in California and actions to implement the policy
- Strategic Directive 9.2: Encourage the development of alternative energy and biofuels. The state should produce a minimum of 40 percent of biofuels within California by 2020 and 75 percent by 2050.

CONNECTICUT

Senate Bill 1081

- “Massive” expansion of food waste composting
- All generators will divert food waste from landfills by 2020

MASSACHUSETTS

Clean Energy Results Program

- Proposed landfill ban for organics slated for 2014
- Divert 350,000 tons of organics per year from landfills and incinerators by 2020
- Increase energy production from anaerobic digestion to 50MW by 2020

Solid Waste Master Plan

- Reduce waste by 30 percent by 2020 and by 80 percent by 2050
- Modifies decade-long moratorium on incineration
- Zero waste strategies include increasing diversion of organics and food waste, encouraging the growth of anaerobic digestion and composting capacity, and extending producer responsibility for a variety of products.

Source: CalRecycle, Turning Earth, Waste & Recycling News, Waste Age, MSW Management.

Diversion

How do you see waste diversion evolving?

“With all of the food waste that can’t go to the landfills any more, suddenly the municipal industry has awakened,” observed Frank Starr at Energy Systems Group.

“You have policies that are driving it, like organic bans and extended producer responsibility laws. You have financial drivers like high tipping fees. Clearly we are



continuing to move towards more waste diversion,” commented Geoff Rathbone at Progressive Waste Solutions.

“The major trigger tends to be the municipalities setting high diversion goals, and the only way to get to that high diversion goal is to have a kitchen organic program,” continued Rathbone. “Once decided upon, we can predict the amount and composition of material coming out of that program and have the confidence that we would invest capital in an anaerobic digestion facility, even privately owned, if we could secure that tonnage.”

“We need to know that the feedstock is going to be there at a price that is going to make it economically feasible,” commented Rathbone. “The challenge is really your disposal market,” added Jonathan Abrams at Progressive Waste Solutions. “In high tip fee markets, where the gap between diversion and disposal is very narrow, you see diversion programs advancing. You are typically dealing with capacity constraint and the prospect of siting or expanding landfills is extremely difficult.” Abrams continued, “In Canada, diversion is real. Especially in Western Canada, where you have tip fees approaching \$100/ton. Any market where you have a high tip fee pushing \$70 to \$90/ton, you can make these programs happen quite effectively.”

“A \$30 or \$35 tip fee market is probably not a market that is going to move to anaerobic digestion any time soon unless a municipality has other reasons for doing it, like an organic ban, where it must be done at any price. Normally it is in the higher tipping fee markets where you see the bans,” Rathbone added.

All the major cities in Canada are moving somewhat in lock step towards organics source separation, according to Rathbone. In the United States, it is regionally induced, and it is progressing from the Eastern and Western coasts and making its way to the central part of the country, insiders say. “We still have land

available in the Midwest,” commented Bernie Laseke at GZA GeoEnvironmental. “In the coastal states they do not, particularly in southern California, and as a consequence, need is driving them in the direction of solid waste avoidance, pollution prevention programs, and energy recovery.” “I also think the central part of the country is going to attempt to lag behind it because of their economic situation,” added Wendy Schlett at GZA. “For example, Michigan is trying to generate opportunities for business to come back to the state. They are competing

with the need for jobs versus the need for additional regulatory enforcement at a state level.”

The United States could have more than 300 million dry tons of unlocked biomass energy for biogas, much of it is currently waste.

Source: Harvest Power.

How would you characterize the progress in anaerobic digestion? What is your near-term outlook and where does it gain traction?

Jonathan Abrams, Progressive Waste Solutions. “The traction is there. Toronto has had tremendous success with its anaerobic digestion program. Every municipality wants one now.

Jon Best, Caterpillar Financial Services Corporation. Large municipalities are going to continue to have landfill space issues. There are very few permits being issued, if any, for new landfills, so we see a tremendous opportunity in digesters. You are going to see more, maybe even in conjunction with existing landfills. Another significant, untapped opportunity is in wastewater treatment plants and facilities that are flaring the gas. If digesters are already in place, they are probably old and in need of updating.

Paul Owen, Caterpillar Financial Services Corporation. The rest of the world, particularly Europe, has been ahead of the curve on anaerobic digestion for quite a long time. It is a proven technology and one that will continue to grow in the United States with organics diversion. In addition, the agriculture industry has to find solutions to properly manage animal waste. Anaerobic digestion is a good solution for that.



Spotlight On: Waste to Energy and Renewables

Steven Peterson, Union Bank. “It seems that people are really pursuing anaerobic digestion technology to process the organic waste stream. In California, there are 34 anaerobic digestion projects in various stages of feasibility and development to operation, including eight in permitting, four in pre-construction or construction, and five that are fully operational.

Geoff Rathbone, Progressive Waste Solutions. “I think you will see 5 to 7 large scale AD plants in Canada and maybe 1 or 2 in the United States.” According to Rathbone, a commercial scale anaerobic digestion facility would have a processing capacity of 50,000 to 100,000 tons/year with a capital cost of \$30 to \$50 million. A commercial scale gasification facility would have a processing capacity of 100,000 to 200,000 tons/year with a capital cost of \$50 to \$100 million. It is a multi-year project to build an anaerobic digestion or waste conversion facility versus a recycling plant which can take a year.

What efforts are waste management companies making to capitalize on waste conversion?

Geoff Rathbone, Progressive Waste Solutions. We have been working on building composting sites at our facilities that can also take nonfood organics like yard waste. It positions us to be ready for the digestate if and when we have that material.

Stefan Kershow, Consortium Capital. Waste operators have been very interested in capitalizing on the waste to energy movement. However, they view it more as an opportunity to create profit in their core business than an opportunity to create a new business line or diversify. They'd rather work alongside waste to energy project developers in a way that can reduce tipping fees or find them new customers, as opposed to developing and financing digester projects directly.

How do you see the market evolving over the next three to five years?

Jonathan Abrams, Progressive Waste Solutions. In North America, we are really at a turning point in the

Selected Waste to Energy Development in the U.S.

BLUE SPHERE CORPORATION

- Develops, manages, and owns waste to energy projects.
- In October 2012, entered into a joint venture agreement with Biogas Nord AG, a German EPC and waste to energy technology company. Biogas Nord has successfully completed over 400 waste to energy installations in operation around the world.
- The two companies have signed a definitive project agreement to implement two waste to energy projects, a 5.2 MW plant in North Carolina and a 3.2 MW plant in Rhode Island and will work together to implement another 50 MW of waste to energy projects in the United States over the next few years, as Blue Sphere has an option to implement another 10 projects.
- “Endless supply to endless demand” is Blue Sphere’s corporate identifier, signifying the nature of the waste to energy market—endless supply of waste and endless demand for energy.

CLEAN WORLD PARTNERS

- Provides waste management solutions and technologies to convert organic waste into renewable energy, soil enhancement products, and other byproducts. Anaerobic phased solids (APS) digestion system treats advanced phased solids and green wastes, such as municipal solid, mixed green, and fruit and vegetable processing wastes, as well as agricultural residues.
- Partnered with Atlas Disposal Industries to construct a \$13 million anaerobic digester and renewable natural gas fueling station in Sacramento, California. The digester processes 25 tons of food waste a day (9,100 tons annually) with a planned expansion in 2013 that will increase processing capacity to 100 tons of waste per day (36,500 tons annually), making it the largest commercial-scale, high-solids anaerobic system in the United States, according to Clean World Partners.

ENERKEM

- Produces renewable biofuels and chemicals from waste.
- The company has its first waste-to-biofuels full-scale commercial plant under construction in Edmonton (Alberta) and is developing several similar facilities in the U.S. and Canada, such as in Pontotoc (Mississippi) and Varennes (Quebec). These plants will convert municipal solid waste into methanol and cellulosic ethanol.
- To date, has raised more than \$300 million in equity, debt, and grants according to PitchBook. Investors include Waste Management, Rho Ventures, Braemar Energy Ventures, BDR Capital, and Cycle Capital.

Source: PitchBook, Company Filings, and public data.

industry. You have a much more knowledgeable public and business community that want to do the right thing. Waste diversion has real traction. I expect you will see more material bans which will drive diversion programs because the material has to go somewhere.



Roy Amitzur, Blue Sphere Corporation. The large integrated waste companies have access to the feedstock. I think they will eventually realize the profit potential with anaerobic digestion and will want to be part of these new facilities. They will typically focus on the municipal and industrial (food processing) organic waste. The on-farm projects will likely be handled by private developers.

In other parts of the world, we are seeing partnerships or joint ventures with larger manufacturing companies in specific sectors. For example, we were approached by a large meat processing company, one of the largest in Chile, to solve issues related to their waste and energy needs. We installed a digester, supplying them with 3.5 MW of electricity, which increased their production capacity by 25 percent as a result of the increased access to energy.

Charles Henck, Ballard Spahr. The notion of public private partnerships is going to increase, driven in large part by the strain that the economy has put on municipal revenues. State and local governments are looking for ways to save money. If you layer in a state-imposed regulatory regime or state or local incentive, whether you are talking about RPS or water credits, for example, there are increasingly going to be privatization opportunities. In addition, there are a lot of municipalities that really don't understand the tax benefits available with waste to energy projects other than tax-exempt financing.

Steven Peterson, Union Bank. With the sheer volume of organic waste going to landfills, we think the waste conversion market is extremely ripe for development over the next three to five years. Legislative mandates in states like California and Massachusetts are dictating it sooner than the rest of the country. Many cities have developed zero waste mandates and in order to achieve set targets have to process the organic fraction of the municipal waste stream.

The biggest part of the recyclable waste stream still going to landfills is organics. It is really the low hanging fruit right now. There are so many positive ways to monetize that stream through energy recovery.

Selected Waste to Energy Development in the U.S.

FULCRUM BIOENERGY

- Produces renewable biofuels from municipal solid waste and other waste products
- On track to become one of the first companies to commercially produce renewable fuel from municipal solid waste, according to a company statement. In November 2012, secured commitments for \$175 million of financing for commercialization of a MSW to renewable fuels project (Sierra BioFuels Plant).
- To date, has raised more than \$150 million in equity and debt. Investors include Rustic Canyon Partners, US Renewables Group, and Waste Management.

HARVEST POWER

- Produces renewable energy and soil enhancement products from diverted organic materials through anaerobic digestion and composting.
- Manages more than 2 million tons of organic material through 28 operating sites in North America. The company has nearly 65,000 megawatt-hours of heat and power generating capacity and sells nearly 29 million bags of soil, mulch, and fertilizer products to agricultural producers and landscapers annually.
- In April 2013, Harvest Power received the Bloomberg 2013 New Energy Pioneer Award granted to "10 game-changing companies in the field of clean energy technology and innovation."
- To date, has raised more than \$275 million in equity, debt, and grants. Investors include Kleiner Perkins Caufield & Byers, Generation Investment Management LLP, Munich Venture Partners, Waste Management, and SAM.

INENTEC

- Produces renewable biofuels from waste.
- Proprietary plasma enhanced melter (PEM) gasification technology converts municipal, commercial, medical, and most industrial and hazardous wastes into syngas for conversion into renewable fuels and electricity.
- To date, has raised more than \$75 million in funding according to PitchBook. Investors include Lakeside Energy, backed by American Securities Capital Partners, which invests in power generation and related renewable energy businesses in North America and Waste Management, which invested \$22 million in October 2011 and is a significant shareholder.

Source: PitchBook, Company Filings, and public data.

The large integrated waste companies are concerned because their highest margin business is in the landfills, which is being disrupted by diversion. In order to meet the legislative mandates, they are scrambling to figure out how to monetize what they now see as an energy stream.

Jeph Shaw, New Energy Capital. Scarcity of other waste disposal alternatives (declining land availability for new landfills); developing natural gas markets in transportation infrastructure; and incentives, whether it is RECs or RFS, will allow waste to energy to prosper.



Spotlight On: Waste to Energy and Renewables

Financing

Securing the financing for a waste to energy project can present challenges. In addition to the high capital investment requirement, the short track record and project history in the domestic market and level of sponsor experience elicits heightened scrutiny. However, if certain conditions are satisfied, you have a closed loop system with a very predictable stream of cash flow, and there will be lending appetite. Industry insiders share their observations on key drivers to securing project financing:

Feedstock contracted under long-term supply agreements

“The key is to co-locate or be near any organic waste stream,” said Damon Yuzon at Equilibrium Capital. “On-farm is advantageous because you have a captive feedstock with the manure. You secure a 20-year feedstock agreement that includes an easement to be on the farm. The farmer agrees to provide the manure, and in addition, you may contract to have other materials (e.g. food processing waste) delivered to the site.” Yuzon added, “For pre-consumer food or beverage waste, you want to be near the various food manufacturing facilities that are generating that waste. All of these companies have wastewater issues and, to the extent there is nutrient value in the wastewater, it is energy that can be monetized. In the case of municipal wastewater treatment plants, there are a number of smaller facilities that either do not have digesters in place to process the biosolids coming through or if they have them, they are just flaring the gas.”

“The biggest challenge with on-farm projects can be the host,” remarked Stefan Kershow at Consortium Capital. “Many farmers are hesitant to do something they think could disrupt their farm operations,

so they are not always going to be a willing participant. Size can also be a challenge. On-farm projects can be small unless you have a really big operator.”

Projects need to have a captive gas resource or captive waste supply with a guaranteed tipping fee over an economically significant period that is going to at least get a return of capital to the project costs. “We have been focusing on the feedstock, which for us is the number one issue. You also need contracts on the off-take and be on target with your operating costs,” commented Geoff Rathbone at Progressive Waste Solutions. “On anaerobic digestion, we have much more comfort on those factors than we do gasification at this point.”

Secure off-take

Investors are looking to see that a project can generate multiple revenue streams which can be contracted with creditworthy counterparties.

“If you are going to make a waste to energy project work, you want a minimum 10-year off take agreement, whether it is a power purchase agreement or a gas sale agreement,” remarked Frank Starr at Energy Systems Group. Thomas Hoffman at Ballard Spahr added, “Utilities are more skittish today than they were three years ago about signing long-term contracts. Because of the low price of natural gas, they don’t want to lock in at a price that in three years makes them look foolish.”

“We spend a lot of time looking at counterparty risk. That includes parties to the feedstock and off-take contracts and ensuring that those contracts are in place for the tenor of our investment. Counterparty risk also includes the financial strength and viability of the equity investors in the project,” offered Paul Owen at Caterpillar Financial Services Corporation.

“The biggest part of the recyclable waste stream still going to landfills is organics. It is really the low hanging fruit right now.”

*—Steven Peterson
Union Bank*



“On the front end, it is about producing a consistent product that is marketable and having secure outlets on the back end. Otherwise it is all for naught,” commented Jonathan Abrams at Progressive Waste Solutions. “We know what we can do with the gas, whether it is to create power, combined heat and power, or pipeline quality natural gas that can be used as a compressed or liquefied vehicle fuel. It is still in the early stages, but there is work being done to take the digestate and make it a more marketable product versus making a compost.”

“Waste to energy is a long value chain. You really need to have multiple robust revenue streams to fully monetize the value that you are bringing to that value chain,” commented Jeph Shaw at New Energy Capital. “In addition to realizing the commodity value, if it is a natural gas LNG or CNG product, it is being able to monetize, whether it be a carbon tax, tradable effluent credits, or developing a market for organic fertilizer. Waste to energy projects will have not just one core but two or three key revenue streams. I think those will be what really make waste to energy soar.”

“There is a huge push for viable organic fertilizer,” added Jon Best at Caterpillar Financial Services Corporation. “If the organic fertilizers as byproducts of anaerobic digestion can be turned into revenue streams, that could certainly be a big opportunity.”

“We were involved with an onsite chicken waste project that, in addition to producing a biogas, generated water credits because they were reducing water runoff. In the state of Pennsylvania, there is a tradable market for that and those credits generate revenue that is significant to a project,” offered Darin Lowder at Ballard Spahr. “Could that be replicated, possibly? We are seeing some interesting opportunities. They are definitely not cookie cutter, but they are getting done.”

“Those value added products, in the case of higher value fuel, is a very nascent market,” remarked Starr. “I think electricity is very

moribund. Most of the RPS programs are filled up. With the recession, there is an oversupply of power in the Midwest market where there are a lot of farms. The sheer lack of electricity demand and fulfillment of the RPS programs make the economics very tough.”

Proven technology

Technology must be thoroughly vetted with a pilot facility or facilities running. “We have worked with a number of different technology vendors whose origins trace back to Europe and can demonstrate that they have multiple successful installations using their technology,” offered Jon Best at Caterpillar Financial Services Corporation. “We will not finance serial number one of anything.”

“Waste is extremely heterogeneous and unpredictable,” commented Jonathan Abrams at Progressive Waste Solutions. “There has been a big misconception as it relates to the quality of waste coming in on the front end and

what the technology is designed to do. It is getting better.” To process municipal solid waste, anaerobic digestion uses a source separated feedstock versus gasification and pyrolysis, which use mixed waste which is a more challenging feedstock. “We have to prove the technology can actually manage the material,” added Progressive’s Geoff Rathbone.

“The anaerobic digestion process seems to have advanced more rapidly in terms of commercial acceptance and is supported by long-term contracts. On gasification and pyrolysis, it is still smaller scale, and so far we haven’t seen a project come in that would fit the parameters for us to consider at this point. We know it’s moving forward,” commented Steven Peterson at Union Bank. “Gasification is a newer technology that we are certainly interested in learning more about and trying to support,” added Jon Best at Caterpillar Financial Services Corporation. “We have been approached to look at financing but have not yet found a developer who has been able to put together a project that pencils and is bankable. There is an advancement that needs to take place in the technology, but it is coming. That is on the horizon.”

“Waste to energy is a long value chain. You really need to have multiple robust revenue streams to fully monetize the value that you are bringing to that value chain.”

*—Jeph Shaw
New Energy
Capital*



Spotlight On: Waste to Energy and Renewables

Track record of sponsor

Investors need to see experience and financial depth to the project sponsors. A stipulation will be a full EPC contract which includes a performance guarantee from the EPC firm and a process guarantee from the technology provider. “Anaerobic digestion is a relatively new industry in the United States, so a lot of the developers are very inexperienced. This is often project number one for them,” observed Gary Gunn at Caterpillar Financial Services Corporation. “They may not associate themselves with strong counterparties that could mitigate some of that inexperience risk. That has been a key challenge for us from a debt perspective.”

“We are willing to take risk but want to have guarantees behind that risk on a project finance basis,” added Steven Peterson at Union Bank. “It really comes down to who is the project sponsor and their experience in developing facilities. There aren’t a lot of project sponsors in the U.S. that are experienced in these newer technologies. That might be our biggest challenge.”

Other considerations

Siting and permitting

Public perception plays a significant role in siting waste conversion facilities. “If you look historically, many of the project failures were caused by the inability to control odor at the facilities. That has been a root cause of many failures in the organics side of the business,” offered Jonathan Abrams at Progressive Waste Solutions. Investors say that site control and land and title issues can be challenging for on-farm projects.

Waste to energy projects are often shared site installations where you are co-locating at a recycling facility, landfill, or fuel refinery which can pose challenges. “You are beholden to the operations of

some other facility as opposed to other renewables that are more autonomous. Establishing templates for those business relationships will assuage that over time,” commented Jeph Shaw at New Energy Capital.

Project Size

Waste companies are looking at capital cost and return on investment. Anaerobic digestion projects can be three- or four-fold the cost of a recycling plant.

Project scale is a consideration for investors and lenders. Different institutions will have minimum thresholds on investment size and return parameters. Many of the international or European commercial banks are establishing U.S. offices and are looking at projects. Domestic banks are still very cautious but are starting

to get a little more aggressive because they see the opportunity, said some insiders. For some banks, the lending appetite for waste to energy projects can start at or around \$25 to \$50 million in order to make the economics work.

“The key for funding is scale,” commented Frank Starr at Energy Systems Group. “The \$40 million anaerobic digestion projects are few and far between in this space. We have found more investor depth and interest at \$25 million—that is a big digester. The fuel supply can be difficult.” Starr illustrated project examples, like a dairy farm with 30,000 milking head which might amount to a \$40 million project producing 5MW of power, which contrasts with a 3,800 head farm, still a sizable operation, producing 1 MW of power. “I continue to market digesters to dairy farmers, hog farmers, and chicken farmers. I am telling them, if the environmental regulators are going to mandate this, and they are, the capital has to come from somewhere,” Starr said.

“We are willing to take risk but want to have guarantees behind that risk on a project finance basis.”

*—Steven Peterson
Union Bank*



Steven Peterson at Union Bank told us, “We would typically look for a project that meets a borrowing requirement, at the low end of \$7 to \$10 million and \$50 million at the high end. We have an energy finance team that will look at the larger projects.”

“We are seeing more onsite conversion, whether it is wastewater treatment or agricultural waste, as opposed to the large mega projects,” commented Darin Lowder at Ballard Spahr. “The challenge there is you are dealing with smaller system sizes (3MW to 5MW) where the feedstock is site specific. They are not the typical biomass projects where you are pulling feedstock from a number of suppliers in a broad territory. The projects are limited in scale and scope that way.”

Damon Yuzon at Equilibrium Capital commented, “Although they probably have more attractive returns, the smaller distributed waste to energy projects have difficulty attracting capital because they fall under the radar of the larger funds. The larger funds typically ignore projects of \$25 million or less.” Yuzon added, “Even a fairly large farm operation, whether it has 1,000 to 3,000 cows or a multiple of 10 times that for swine, might only be a \$10 million project. We are talking with a sizable food processing company that wants to install a digester to process its waste. That might be a \$17 million project. It is not the large scale facilities, \$50 to \$100 million in size.”

Yuzon continued, “A smaller distributed project, typically any project that is \$15 million or less (1.5 MW or less), has the advantage of being designated a qualified facility and becomes part of the carve out that requires utilities to buy your power. It varies state by state. For facilities less than 1.5 MW in the state of Oregon, the large utility here has to buy the power under a specified rate. The goal is to build out smaller distributed projects.”

What are the types of projects you are seeing?

Paul Owen, Caterpillar Financial Services Corporation. Landfill gas projects are becoming fewer and farther between. However, the investment cost of the other waste conversion technologies is substantially higher. Typically there needs to be additional sources of income outside of the electricity or fuel generation to make the projects cash flow to support that higher dollar of investment.

We have certainly seen an uptick in requests for digester project financing, particularly in urban areas where there is a big emphasis on diversion of organic waste streams. The low hanging fruit of the large landfill projects have largely been developed. The key trend is toward more digester projects.

Steven Peterson, Union Bank. Integrated waste companies have, in many cases, multiple long-term

franchise agreements or contracts with their municipalities to collect the waste stream. Those municipalities are coming to their contractors to meet their diversion requirements. Similar to their long-term contract or franchise agreement, municipalities are willing to give the waste company a long-term agreement to support long-term infrastructure financing for an anaerobic digestion facility.

The integrated waste companies that make up our client base typically have long-term operating histories and view themselves as solution providers for the municipalities they serve. They are coming to us and saying, here is the mandate and here are the next steps that are required, will you provide us long-term infrastructure financing for this project if we can show you these types of contracts? Initially, we were being pulled into it because our existing clients were saying to us, this is the next phase. You’ve got to do it.

“We have certainly seen an uptick in requests for digester project financing, particularly in urban areas where there is a big emphasis on diversion of organic waste streams.”

*—Paul Owen
Caterpillar
Financial Services
Corporation*



Spotlight On: Waste to Energy and Renewables

Steven Peterson, Union Bank (cont.). We are also seeing private project developers work with the municipalities and some of the integrated waste companies to advance anaerobic digestion projects. They might have experience in operating a facility or in structuring deals and will assist in bundling a group of contracts to lock up long-term supply of incoming feedstock, from municipal waste to pre-consumer industrial and agricultural waste. They will use a proven technology and secure a long-term contract from a credit rated company for the off-take of that energy stream. With long-term contracts on the feedstock and off-take and a proven process with a guarantee, we are seeing more of a viable project finance model.

Incentives

The investment tax credit and production tax credit, along with accelerated cost recovery depreciation, can supply over 50 percent of the capital for a renewable energy project, insiders said.

Waste to energy not only has the business model complexity but monetizing tax credits can be a challenge.

“The issue with biogas, as least for anaerobic digestion, the tax credit is expiring at the end of 2013. That is a critical incentive for financing,” said Stefan Kershow at Consortium Capital. “The alternative is that you don’t do a biogas project that produces electricity. However, if you’re not connected to the grid and don’t have the tax credit, most biogas projects won’t pencil out.”

“We are looking to make sure a project is bankable and can stand on its own with or without capital support in the form of grants or tax credit revenue,” offered Jon Best at Caterpillar Financial Services Corporation.

“RINs are another off-take and can be substantial in the pro-forma analysis,” said Geoff Rathbone at Progressive Waste Solutions. “That also adds a level of risk to

a 20-year project because the program could easily go away. We would be very cautious in modeling RINs for the full term of the pro-forma. We would want to see it without them first.”

“Generally speaking, the anaerobic digestion facilities are being built without government subsidy,” Rathbone said. “The economics can work with that \$70-plus tipping fee. But with gasification, we are still at the experimental level even though the scale is now where we need them to be.”

Capital Need

The waste to energy industry is projected to see significant growth as policy and environmental drivers mandate energy recovery from waste, underpinning a growing capital need in coming years to fund expansion.

Capital providers shared their observations:

“The concept of waste to energy has gained a lot more traction. If enough people make investments in these early stage commercial projects to achieve critical mass success, there will be significant attention in the space,” commented Stefan Kershow at Consortium Capital. “There are a lot of developers in the states that know how to manage biogas projects, but they don’t have the funding to get going.”

“I think we are going to see a material shift within the next five years. The early adopters are looking at the industry now,” added Damon Yuzon at Equilibrium Capital. “Financial incentives will be a driver and as more project installations come online and are successful, it will accelerate investment. The early adopters will inject the first round of capital, and when projects begin to show attractive returns, the next tier of capital providers will join the fray. So call it, the first \$100 million comes into this market, and then you will see \$500 million and \$1 billion. It will escalate. The market is wide open.”

“The concept of waste to energy has gained a lot more traction. If enough people make investments in these early stage commercial projects to achieve critical mass success, there will be significant attention in the space.”

*—Stefan Kershow
Consortium Capital*



Insiders believe the debt financing appetite from lending institutions for waste to energy projects will strengthen through education. “Lenders will begin to understand and get comfortable that these projects have long-term power purchase agreements with creditworthy utilities. If they can get a security interest in those contracts, they are looking at a very safe investment relative to what they are seeing on their real estate portfolios and business loans,” commented Damon Yuzon at Equilibrium Capital. “It is just an education. It is going to come.” Yuzon added, “To the extent that more equity can flow into this market, the debt financing will be there.”

“A key question is whether tax-exempt financing is available for some or a significant portion of the capital cost,” offered Charles Henck at Ballard Spahr. “For a waste to energy project, the chances are very good that 60 to 80 percent of your project is going to be eligible. Terms are typically more borrower-friendly.”

“We’ve had a lot of success talking to banks about financing these projects through government loan guarantee programs which are available. The USDA is very interested in helping on-farm projects and has the bandwidth and capacity. Plenty of banks like lending via USDA and SBA type programs. The challenge is the programs take longer and it is recourse financing, which most developers and project owners may forego even when there aren’t other viable options.”

“If a lender has a loan guarantee from the government, it makes it a lot easier to finance these projects,” remarked Steven Peterson at Union Bank. Peterson is critical, however, indicating that while both the Department of Energy and USDA have loan guarantee programs in place, they are not getting appropriation. “You have projects sitting idle,” Peterson commented. “If the government is really serious, they will put money behind the guarantees.”

“Today there is little competition in this space so you can be more selective about the projects you finance,” Peterson added.

“I think we are going to see a material shift within the next five years. The early adopters are looking at the industry now.”

*—Damon Yuzon
Equilibrium Capital*

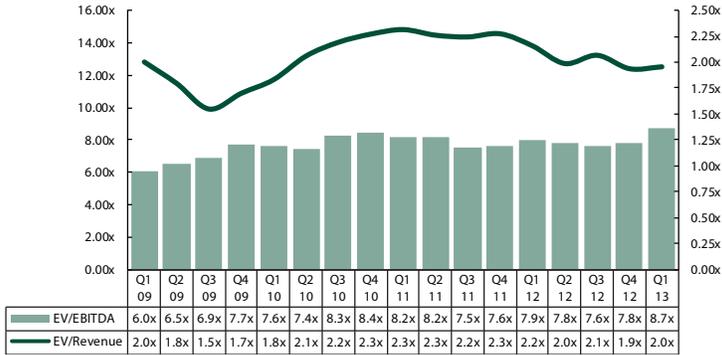


Environmental Services Insider

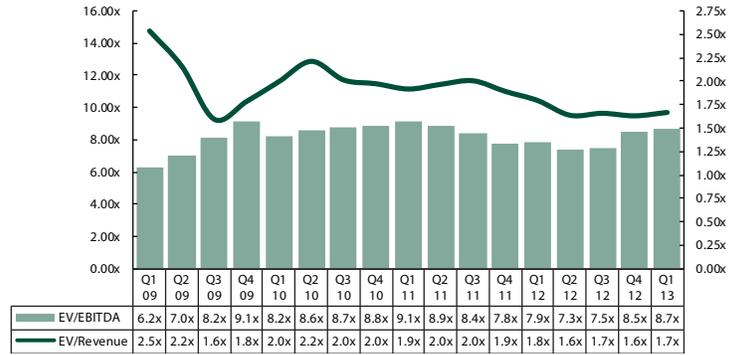
Industry Valuations

Relative Valuation Trends

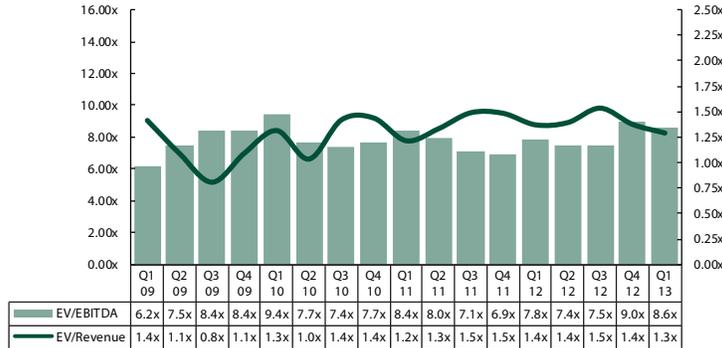
Solid Waste - Vertically Integrated



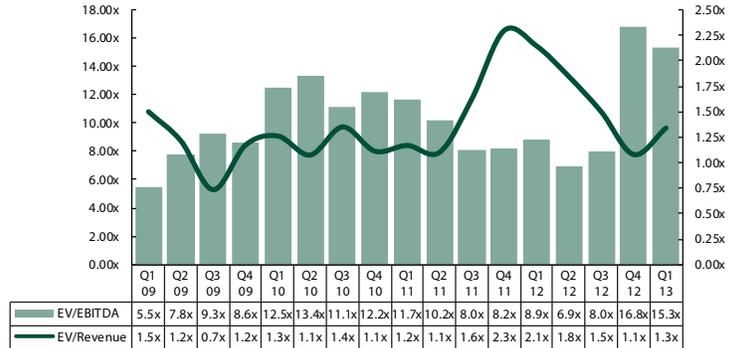
Solid Waste - Waste-to-Energy



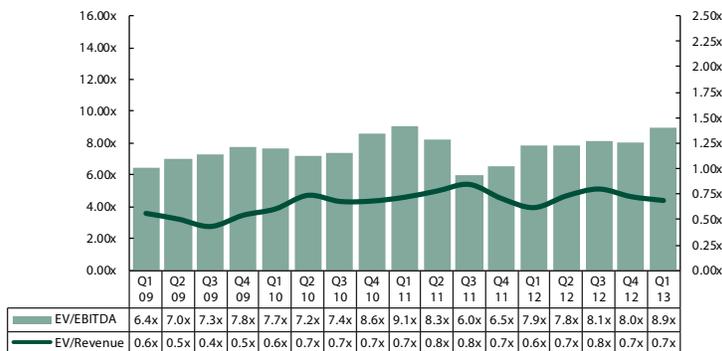
Special Waste - Broadly Diversified



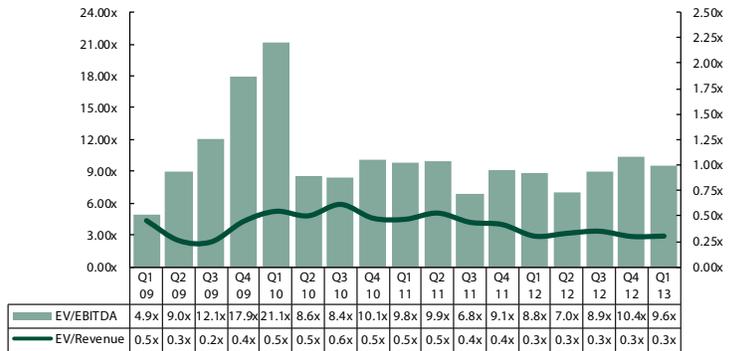
Special Waste - Other



Environmental Engineering & Consulting



E-Waste & Metals Recycling



BGL Environmental Services indices defined on Page 31.
SOURCE: S&P Capital IQ.



Environmental Services Insider Industry Valuations

Relative Valuation Trends

(\$ in millions, except per share data)

Company Name	Country	Ticker	Current Stock Price (1)	% of 52W High	Market Capitalization (2)	Enterprise Value (3)	TTM Revenue	Enterprise Value / EBITDA	Total Debt/ EBITDA	TTM Revenue	TTM Gross	TTM Margins EBITDA
SOLID WASTE (VERTICALLY-INTEGRATED)												
Waste Management, Inc.	United States	NYSE:WM	\$41.93	97.5%	\$19,582.4	\$29,645.4	2.2x	9.1x	3.0x	\$13,690.0	34.8%	24.2%
Republic Services, Inc.	United States	NYSE:RSG	34.10	96.7%	12,341.1	19,246.6	2.4x	8.4x	3.1x	8,134.5	38.2%	28.3%
Waste Connections Inc.	United States	NYSE:WCN	40.24	98.1%	4,966.4	7,110.7	4.1x	12.8x	3.9x	1,735.1	42.8%	32.0%
Progressive Waste Solutions Ltd.	Canada	TSX:BIN	23.35	98.7%	2,681.7	4,294.4	2.2x	8.1x	3.1x	1,945.0	39.0%	27.7%
Casella Waste Systems Inc.	United States	NasdaqGS:CWST	4.01	68.2%	159.0	654.1	1.4x	9.0x	6.5x	465.7	28.7%	16.2%
Median			\$34.10	97.5%	\$4,966.4	\$7,110.7	2.2x	9.0x	3.1x	\$1,945.0	38.2%	27.7%
Mean			\$28.73	91.8%	\$7,946.1	\$12,190.2	2.5x	9.5x	3.3x	\$5,194.1	36.7%	25.7%
SOLID WASTE (WASTE-TO-ENERGY)												
Covanta Holding Corporation	United States	NYSE:CVA	\$20.45	96.0%	\$2,670.4	\$4,864.4	3.0x	11.4x	5.8x	\$1,625.0	40.1%	25.7%
Shanks Group plc	United Kingdom	LSE:SKS	1.31	87.8%	521.4	989.0	1.0x	23.2x	13.7x	1,017.4	13.6%	4.2%
Median			\$10.88	91.9%	\$1,595.9	\$2,926.7	2.0x	11.4x	9.8x	\$1,321.2	26.8%	14.9%
Mean			\$10.88	91.9%	\$1,595.9	\$2,926.7	2.0x	11.4x	9.8x	\$1,321.2	26.8%	14.9%
SPECIAL WASTE (BROADLY DIVERSIFIED)												
Veolia Environnement S.A.	France	ENXTPA:VIE	\$12.46	86.6%	\$6,325.8	\$23,424.4	0.6x	6.4x	6.1x	38,814.0	16.4%	9.5%
Clean Harbors, Inc.	United States	NYSE:CLH	57.20	92.3%	3,462.5	4,636.0	1.9x	12.6x	3.8x	2,478.0	28.3%	14.9%
Newalta Corporation	Canada	TSX:NAL	13.52	85.3%	741.7	1,116.1	1.6x	8.8x	2.9x	718.7	22.5%	18.0%
Median			\$13.52	86.6%	\$3,462.5	\$4,636.0	1.6x	8.8x	3.4x	\$2,478.0	22.5%	14.9%
Mean			\$27.72	88.1%	\$3,510.0	\$9,725.5	1.4x	9.3x	3.4x	\$14,003.6	22.4%	14.1%
SPECIAL WASTE (OTHER)												
Stericycle, Inc.	United States	NasdaqGS:SRCL	\$109.76	97.0%	\$9,470.2	\$10,746.0	5.5x	18.3x	2.2x	\$1,966.9	47.3%	29.9%
Secure Energy Services Inc.	Canada	TSX:SES	13.10	94.1%	1,397.3	1,563.4	1.5x	15.9x	1.7x	1,056.6	10.0%	9.4%
US Ecology, Inc.	United States	NasdaqGS:ECOL	27.38	91.4%	504.1	540.6	3.0x	8.8x	0.7x	179.0	38.9%	34.1%
Renewable Energy Group, Inc.	United States	NasdaqGS:REGI	13.53	93.2%	414.7	512.4	0.4x	5.3x	0.7x	1,166.1	11.0%	8.3%
Heritage-Crystal Clean, Inc.	United States	NasdaqGM:HCCI	15.05	72.0%	274.4	252.8	1.0x	22.1x	1.9x	262.0	14.7%	4.4%
Vertex Energy, Inc.	United States	NasdaqCM:VTNR	2.99	71.2%	52.0	62.7	0.5x	14.2x	2.7x	133.0	7.8%	3.3%
Perma-Fix Environmental Services Inc.	United States	NasdaqCM:PESI	0.67	53.1%	38.0	52.1	0.5x	NM	NM	109.4	11.1%	-4.5%
Median			\$13.53	91.4%	\$414.7	\$512.4	1.0x	15.1x	1.8x	\$262.0	11.1%	8.3%
Mean			\$26.07	81.7%	\$1,735.8	\$1,961.4	1.8x	14.1x	1.6x	\$696.1	20.1%	12.1%
ENVIRONMENTAL ENGINEERING & CONSULTING												
Chicago Bridge & Iron Company N.V.	Netherlands	NYSE:CBI	\$63.30	97.5%	\$6,775.6	\$8,354.5	1.3x	13.7x	3.2x	\$6,535.4	12.2%	9.0%
AMEC plc	United Kingdom	LSE:AMEC	15.54	87.3%	4,620.2	4,476.2	0.7x	8.7x	0.5x	6,758.2	12.8%	7.9%
URS Corporation	United States	NYSE:URS	48.44	98.0%	3,676.5	5,653.3	0.5x	5.9x	2.5x	11,413.5	7.7%	7.4%
AECOM Technology Corporation	United States	NYSE:ACM	30.79	93.0%	3,173.9	3,893.9	0.5x	8.0x	2.9x	8,185.0	5.4%	5.5%
Arcadis NV	Netherlands	ENXTAM:ARCAD	27.89	96.1%	1,996.8	2,507.6	0.8x	9.8x	2.8x	3,272.4	20.3%	7.8%
Tetra Tech Inc.	United States	NasdaqGS:TTEK	27.57	87.6%	1,790.1	1,897.2	0.9x	8.8x	1.2x	2,071.3	17.4%	10.4%
Cardno Limited	Australia	ASX:CDD	5.16	62.3%	741.8	879.6	0.8x	6.8x	1.7x	1,163.1	16.3%	12.1%
Great Lakes Dredge & Dock Corporation	United States	NasdaqGS:GLDD	8.30	82.4%	492.9	760.1	1.1x	12.6x	4.5x	721.5	10.3%	8.4%
TRC Companies Inc.	United States	NYSE:TRR	5.92	69.3%	171.8	169.3	0.5x	7.9x	0.4x	312.8	16.6%	6.9%
Median			\$27.57	87.6%	\$1,996.8	\$2,507.6	0.8x	8.0x	2.5x	\$3,272.4	12.8%	7.9%
Mean			\$25.88	85.9%	\$2,604.4	\$3,176.8	0.8x	8.0x	2.2x	\$4,492.6	13.2%	8.4%
E-WASTE & METALS RECYCLING												
Sims Metal Management Limited	United States	ASX:SGM	\$9.31	85.0%	\$1,901.1	\$2,154.0	0.3x	18.0x	2.9x	\$8,190.7	8.7%	1.6%
Commercial Metals Company	United States	NYSE:CMC	15.42	88.3%	1,802.3	2,924.2	0.4x	8.3x	3.7x	\$7,403.8	9.4%	4.8%
INTERSEROH SE	Germany	DB:ABA	79.08	90.0%	778.2	833.7	0.3x	19.5x	1.5x	\$2,546.6	8.3%	1.7%
Schnitzer Steel Industries, Inc.	United States	NasdaqGS:SCHN	24.70	74.8%	633.2	1,030.2	0.4x	8.3x	3.3x	\$2,897.2	8.1%	4.3%
Metalico Inc.	United States	AMEX:MEA	1.44	49.7%	69.1	191.1	0.3x	11.6x	7.6x	\$547.3	8.1%	3.0%
Industrial Services of America, Inc.	United States	NasdaqCM:IDSA	3.25	61.9%	23.0	44.3	0.3x	36.7x	18.9x	\$167.3	4.6%	0.7%
Median			\$12.36	79.9%	\$705.7	\$931.9	0.3x	8.3x	3.1x	\$2,721.9	8.2%	2.3%
Mean			\$22.20	74.9%	\$867.8	\$1,196.2	0.3x	9.4x	2.8x	\$3,625.5	7.9%	2.7%

NOTE: Figures in bold and italic type were excluded from median and mean calculation.

(1) As of 5/31/2013.

(2) Market Capitalization is the aggregate value of a firm's outstanding common stock.

(3) Enterprise Value is the total value of a firm (including all debt and equity).

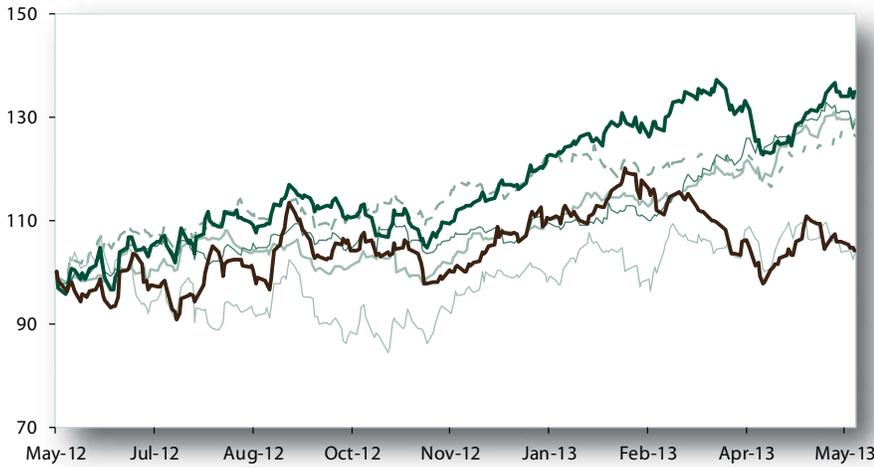
Source: S&P Capital IQ.



Environmental Services Insider Industry Valuations

Sector Performance

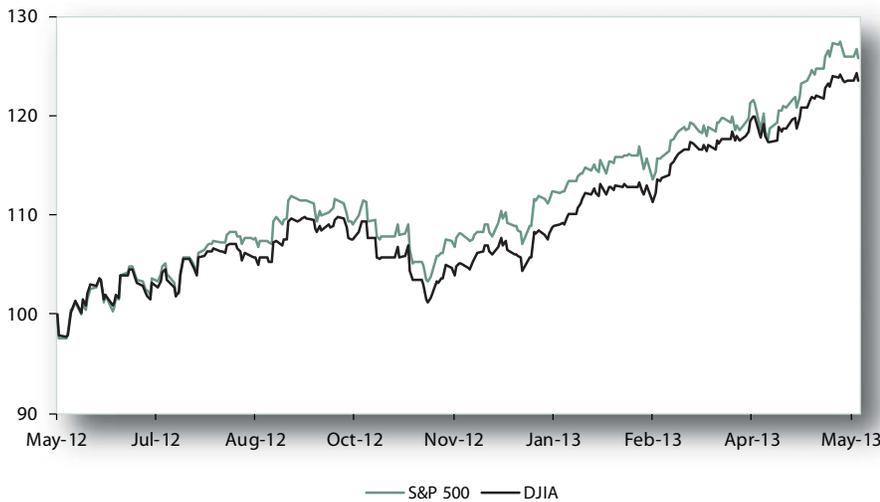
By Sector



- BGL Solid Waste - Vertically Integrated
- - BGL Solid Waste - Waste-to-Energy
- BGL Special Waste - Broadly Diversified
- BGL Special Waste - Other
- BGL Environmental Engineering & Consulting
- BGL E-Waste & Metals Recycling

	1 Year
Solid Waste - Vertically Integrated	28.4%
Solid Waste - Waste-to-Energy	26.1%
Special Waste - Broadly Diversified	2.80%
Special Waste - Other	29.2%
Environmental Engineering & Consulting	34.0%
E-Waste & Metals Recycling	2.6%

Overall Market



	1 Year
S&P 500	24.5%
DJIA	22.0%

Index: May 31, 2012= 100.

Source: S&P Capital IQ.



Global Energy and Environmental Services Practice

- Solid Waste (Non-Hazardous)
- Special Waste (Hazardous as well as other non-traditional waste streams)
- Environmental Engineering & Consulting (EE&C)
- E-Waste & Metals Recycling
- Reclamation & Remediation
- Waste-to-Energy (WtE) and Cleantech

Who We Are

Leading Independent Firm

- Independent investment banking advisory firm focused on the middle market
- Senior bankers with significant experience and tenure; partners average over 20 years of experience
- Offices in Chicago, Cleveland, Salt Lake City, and Seattle
- Founding member and exclusive U.S. partner of Global M&A, the world's leading partnership of investment banking firms focusing on middle market transactions
- Deep industry experience across core sectors of focus, including: Business Services, Energy and Environmental Services, Consumer Products, Healthcare and Life Sciences, Industrials, and Real Estate

Comprehensive Capabilities

M&A Advisory	Private Placements	Financial Advisory
Sell-Side Advisory General Financial & Strategic Advice Acquisitions & Divestitures Public & Private Mergers Special Committee Advice Strategic Partnerships & Joint Venture Formation Fairness Opinions & Fair Value Opinions	All Tranches of Debt & Equity Capital for: Growth Acquisitions Recapitalizations Dividends	General Financial & Strategic Advice Balance Sheet Restructurings Sales of Non-Core Assets or Businesses \$363 Auctions

Representative Transactions:

Recapitalization	Strategic Advisory	Sale	Capital Raise	Capital Raise
Solid Waste Collection, Hauling, and Recycling	Solid and Oilfield Waste Disposal Assets	Emergency Response and Environmental Remediation	Liquid Waste Collection and Recycling	Series of U.S.-based Waste to Energy Facilities
BROWN GIBBONS LANG & COMPANY	BROWN GIBBONS LANG & COMPANY	BROWN GIBBONS LANG & COMPANY	BROWN GIBBONS LANG & COMPANY	BROWN GIBBONS LANG & COMPANY

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