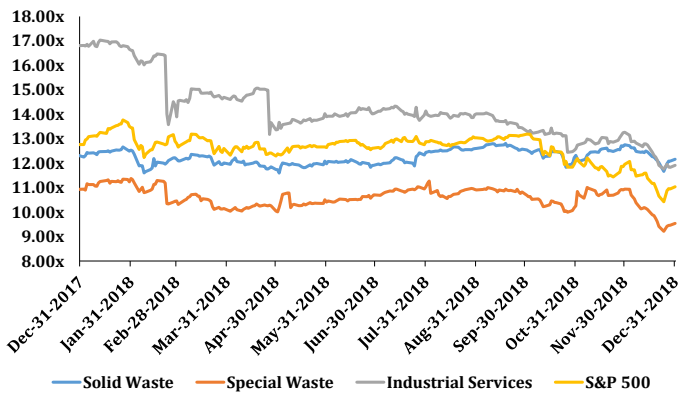


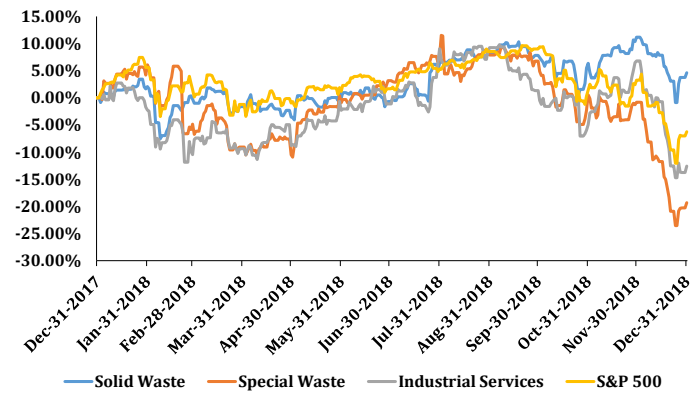
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Environmental Services LTM TEV/EBITDA



Environmental Services LTM Share Price (Shown as % change)



Indices Performance (% change)

	December 2018	LTM		December 2018	LTM
S&P 500	(10.5%)	(7.0%)	Solid Waste	(5.9%)	4.6%
Dow Jones	(10.1%)	(6.0%)	Special Waste	(18.7%)	(19.3%)
NASDAQ	(11.5%)	(5.3%)	Industrial Services	(18.2%)	(12.6%)

(Source: CapitalIQ)

Largest Environmental Services Movers and Losers (largest % changes in the month of December)

Ecology & Environment, Inc.	3.1%	Industrial Services of America, Inc.	(28.2%)
Sharps Compliance Corp.	3.0%	Stericycle, Inc.	(23.7%)
		Clean Harbors, Inc.	(23.5%)
		Perma-Fix Environmental Services, Inc.	(21.7%)
		Attis Industries, Inc.	(20.2%)

Environmental Services Industry Contacts

Tom Denison
 (312) 283-0819
thomas.denison@thechicagocorp.com

Phil Clarke
 (312) 283-0803
philip.clarke@thechicagocorp.com



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Select Public Trading Statistics (as of 12/31/2018)

Solid Waste:

(\$ in millions, except per share data)

Company	Share Price 12/31/2018	% of 52 Wk High	Market Capitalization	Enterprise Value	Valuation Multiples			PE Multiples			LTM Operating Margins			Net Debt/EBITDA	
					TEV/Total Revenue	TEV/EBITDA	TEV/EBIT	LTM P/E	CY18 P/E	CY19 P/E	Gross	EBIT	EBITDA		
Waste Management, Inc.	WM	\$88.99	93.2%	\$37,941	\$47,876	3.3x	11.7x	18.1x	16.8x	23.5x	22.2x	38.0%	18.3%	28.1%	2.4x
Republic Services, Inc.	RSG	\$72.09	91.8%	\$23,398	\$31,570	3.1x	11.4x	19.1x	17.1x	24.5x	23.2x	38.3%	16.6%	27.8%	2.9x
Waste Connections, Inc.	WCN	\$74.25	91.3%	\$19,565	\$23,083	4.8x	15.1x	26.8x	26.9x	34.1x	29.9x	41.8%	17.9%	31.6%	2.3x
Advanced Disposal Services, Inc.	ADSW	\$23.94	85.7%	\$2,123	\$3,996	2.6x	10.4x	42.7x	43.9x	49.4x	43.7x	35.0%	6.0%	24.7%	4.9x
Casella Waste Systems, Inc.	CWST	\$28.49	82.6%	\$1,223	\$1,736	2.7x	14.8x	34.5x	30.8x	51.4x	39.5x	31.6%	7.9%	18.5%	4.4x
Mean				\$16,850	\$21,652	3.3x	12.7x	28.3x	27.1x	36.6x	31.7x	36.9%	13.3%	26.2%	3.4x
Median				\$19,565	\$23,083	3.1x	11.7x	26.8x	26.9x	34.1x	29.9x	38.0%	16.6%	27.8%	2.9x
High				\$37,941	\$47,876	4.8x	15.1x	42.7x	43.9x	51.4x	43.7x	41.8%	18.3%	31.6%	4.9x
Low				\$1,223	\$1,736	2.6x	10.4x	18.1x	16.8x	23.5x	22.2x	31.6%	6.0%	18.5%	2.3x

Source: Capital IQ

Total Enterprise Value (TEV) = Market Capitalization + Preferred Equity + Debt + Minority Interest - Cash

LTM = Last Twelve Months

Special Waste:

(\$ in millions, except per share data)

Company	Share Price 12/31/2018	% of 52 Wk High	Market Capitalization	Enterprise Value	Valuation Multiples			PE Multiples			LTM Operating Margins			Net Debt/EBITDA	
					TEV/Total Revenue	TEV/EBITDA	TEV/EBIT	LTM P/E	CY18 P/E	CY19 P/E	Gross	EBIT	EBITDA		
Stericycle, Inc.	SRCL	\$36.69	47.8%	\$3,324	\$6,121	1.7x	10.0x	17.7x	21.3x	14.3x	14.0x	39.6%	9.8%	17.3%	4.6x
Darling Ingredients Inc.	DAR	\$19.24	86.0%	\$3,168	\$4,827	1.4x	8.6x	20.0x	19.2x	62.6x	22.7x	21.8%	3.4%	12.5%	3.7x
Clean Harbors, Inc.	CLH	\$49.35	68.1%	\$2,764	\$4,135	1.3x	8.8x	23.6x	21.0x	NM	NM	29.9%	5.5%	14.7%	2.9x
US Ecology, Inc.	ECOL	\$62.98	81.6%	\$1,388	\$1,638	3.0x	13.3x	19.8x	20.8x	30.5x	25.7x	31.7%	15.3%	22.7%	2.0x
Sharps Compliance Corp.	SMED	\$3.45	67.0%	\$55	\$52	1.3x	NM	NM	NM	NM	NM	29.9%	0.4%	4.1%	(2.7x)
Perma-Fix Environmental Services, Inc.	PESI	\$2.35	45.6%	\$28	\$30	0.6x	15.9x	86.9x	14.8x	NM	NM	24.1%	0.7%	3.8%	1.9x
Mean				\$1,788	\$2,801	1.6x	11.4x	33.6x	19.4x	35.8x	20.8x	29.5%	5.8%	12.5%	2.1x
Median				\$2,076	\$2,887	1.3x	10.0x	20.0x	20.8x	30.5x	22.7x	29.9%	4.5%	13.6%	2.5x
High				\$3,324	\$6,121	3.0x	15.9x	86.9x	21.3x	62.6x	25.7x	39.6%	15.3%	22.7%	4.6x
Low				\$28	\$30	0.6x	8.6x	17.7x	14.8x	14.3x	14.0x	21.8%	0.4%	3.8%	(2.7x)

Source: Capital IQ

Total Enterprise Value (TEV) = Market Capitalization + Preferred Equity + Debt + Minority Interest - Cash

LTM = Last Twelve Months

Industrial Services:

(\$ in millions, except per share data)

Company	Share Price 12/31/2018	% of 52 Wk High	Market Capitalization	Enterprise Value	Valuation Multiples			PE Multiples			LTM Operating Margins			Net Debt/EBITDA	
					TEV/Total Revenue	TEV/EBITDA	TEV/EBIT	LTM P/E	CY18 P/E	CY19 P/E	Gross	EBIT	EBITDA		
Covanta Holding Corporation	CVA	\$13.42	74.3%	\$1,739	\$4,182	2.2x	12.2x	34.3x	6.5x	NM	NM	31.1%	6.4%	18.3%	7.2x
Heritage-Crystal Clean, Inc	HCCI	\$23.01	80.2%	\$530	\$514	1.3x	11.9x	19.3x	22.4x	38.8x	22.9x	22.6%	6.7%	10.8%	(0.4x)
CECO Environmental Corp.	CECE	\$6.75	73.5%	\$236	\$288	0.9x	12.1x	29.9x	NM	30.8x	19.5x	34.1%	3.0%	7.5%	2.2x
Cypress Energy Partners, LP.	CELP	\$5.62	66.1%	\$67	\$154	0.5x	7.6x	10.4x	6.7x	NM	NM	14.0%	4.9%	6.8%	3.2x
Ecology & Environment, Inc.	EEI	\$11.34	78.5%	\$49	\$34	0.3x	6.4x	7.9x	23.0x	NM	NM	44.7%	4.1%	5.1%	(3.0x)
Fuel Tech, Inc.	FTEK	\$1.19	65.0%	\$29	\$25	0.5x	25.6x	NM	NM	NM	NM	36.6%	0.0%	1.8%	(4.4x)
Quest Resource Holding Corporation	QRHC	\$1.36	43.9%	\$21	\$25	0.2x	NM	NM	NM	NM	NM	15.3%	(3.9%)	(0.4%)	(8.9x)
Industrial Services of America, Inc.	ISDA	\$1.12	41.5%	\$9	\$17	0.3x	6.3x	28.2x	NM	NM	NM	6.6%	1.0%	4.4%	3.0x
Mean				\$335	\$655	0.8x	11.7x	21.7x	14.6x	34.8x	21.2x	25.6%	2.8%	6.8%	-0.1x
Median				\$58	\$94	0.5x	11.9x	23.7x	14.6x	34.8x	21.2x	26.9%	3.6%	5.9%	0.9x
High				\$1,739	\$4,182	2.2x	25.6x	34.3x	23.0x	38.8x	22.9x	44.7%	6.7%	18.3%	7.2x
Low				\$9	\$17	0.2x	6.3x	7.9x	6.5x	30.8x	19.5x	6.6%	-3.9%	-0.4%	(8.9x)

Source: Capital IQ

Total Enterprise Value (TEV) = Market Capitalization + Preferred Equity + Debt + Minority Interest - Cash

LTM = Last Twelve Months





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Select Mergers and Acquisitions & Capital Raising News

❖ Broadtree Partners Invests in Arwood Waste

December 3, 2018 – Broadtree Partners, a private equity firm focused on acquisitions in the middle market, announced it has completed a significant investment in Arwood Waste, a Jacksonville, Florida-based site services business. Arwood Waste provides temporary and permanent disposal, garbage collection, demolition, portable sanitation and storage rental services across both the U.S. and Canada. This strategic investment is intended to help Arwood Waste invest in technology, grow its footprint with vendors and expand its offerings to not only its existing customers but also new customers. Through the investment, Arwood Waste will look to increase its footprint in many of the largest regions of both the U.S. and Canada. Arwood Waste will also look to add more national, regional and local accounts into its network and increase the product offerings currently available. Sean Mahon will be joining Arwood Waste as the company's president.

❖ Gold Medal Acquires Apple Valley Waste

December 3, 2018 – Gold Medal Group and its wholly-owned subsidiaries, a portfolio company of Kinderhook Industries, and its minority partner BioHiTech Global announced the acquisition of Apple Valley Waste Services, Inc. The transaction represents Kinderhook's 36th investment in the environmental services sector. Apple Valley is a solid waste company that offers collection, processing, disposal and recycling services throughout the mid-Atlantic region. Apple Valley serves residential and commercial customers in West Virginia under certificates of necessity issued by the Public Service Commission of West Virginia and provides residential and commercial waste collection services in large metropolitan areas, such as Baltimore, Washington, D.C., and Southern Pennsylvania. Apple Valley and BioHiTech are also minority owners of Entsorga West Virginia, a company that is currently constructing the first facility in the United States to utilize Entsorga's HEBioT mechanical biological treatment (MBT) technology. By utilizing the HEBioT MBT system, Entsorga West Virginia will recover bio-mass, plastics and other carbon-based materials from the mixed municipal solid waste stream and convert them into a safe alternative fuel source. Once operational, the plant will be able to accept up to 120,000 tons per year of inbound municipal solid waste and convert approximately 45 percent into solid recovered fuel. Upon opening the Entsorga facility, Gold Medal will become a vertically integrated solid waste services provider. Less than 20 percent of the material Gold Medal delivers to the facility will end up in landfills, according to the company.

❖ Casella Acquires AI's Maintenance in Rochester, New York

December 4, 2018 – Casella Waste Systems, Inc., a regional vertically integrated solid waste, recycling and resource management services company, announced it has acquired the assets of AI's Maintenance on December 1. AI's is a provider of residential and roll-off collection services in the Rochester, New York, market. The company expects to generate approximately \$7 million of annualized revenue from the AI's acquisition.

❖ Waste Connections Acquires American Disposal Services

December 10, 2018 – During its third quarter 2018 earnings call, Toronto-based Waste Connections Inc. teased a soon-to-be-finalized, large acquisition. And today, the company revealed it has acquired American Disposal Services, Inc. and certain affiliates, one of the largest privately-owned solid waste collection and recycling businesses in the Mid-Atlantic. American Disposal has total annualized revenue of approximately \$175 million and serves about 400,000 customers in Virginia, Maryland, Georgia and Colorado. The acquisition, according to Mittelstaedt, is expected to bring total acquired annualized revenue to approximately \$360 million in 2018.

❖ Waste Management Acquires Tyler's Sanitation

December 11, 2018 – Waste Management recently acquired Aiken, South Carolina-based Tyler's Sanitation, which offers residential and commercial waste services to Aiken County. According to an Aiken Standard report, the acquisition was effective on November 30. The report also noted that Tyler's Sanitation will continue to operate in the midlands of South Carolina and that Tyler's Sanitation employees were transitioned to Waste Management earlier.

❖ BioHiTech Acquisition Makes it the Largest Owner of New HEBioT Facility

December 17, 2018 – BioHiTech Global, Inc., a technology and services company that provides sustainable waste management solutions, announced it has completed the acquisition of an additional 26.8 percent ownership stake in the nation's first high efficiency mechanical and biological treatment process (HEBioT) renewable resource recovery facility located in Martinsburg, West Virginia. According to the company, the acquisition makes BioHiTech the largest owner of the Martinsburg facility, enabling the company to consolidate the operations in its financial statements. The Martinsburg facility is expected to generate \$7 million of annual high margin revenue beginning in 2019. The facility utilizes a patented HEBioT process for the disposal and recycling of mixed municipal solid waste into solid recovered fuel. The process is expected to divert from landfills as much as 80 percent of the waste that enters the facility. BioHiTech acquired the additional ownership stake in the Martinsburg Facility from Entsorga USA in exchange for the issuance of \$1,886,330 million of newly issued Series E preferred stock, convertible into 714,519 shares of the company's common stock at a fixed price of \$2.64 per share. Entsorga USA, a company owned by the principals of the Italian engineering firm that developed the HEBioT technology, will remain as a minority owner of the Martinsburg facility. Under certain conditions, the



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company is obligated to redeem up to \$400,000, or 151,515 shares, of the Series E preferred at the request Entsoirga USA. A more detailed description of the transaction will be available in a current report on Form 8-K to be filed with the Securities and Exchange Commission.

❖ Covanta and GIG to Break Ground on U.K. Energy-from-Waste Project

December 20, 2018 – Covanta Holding Corporation announced financial close of the Earls Gate Energy Centre with strategic development partner Green Investment Group (GIG). Covanta and GIG will each hold a 25 percent equity ownership in the project, with co-investor and developer Brockwell Energy owning the remaining 50 percent stake. “With today’s announcement, we mark our entry into the U.K. market alongside GIG, following on the heels of our very successful partnership on the Dublin project earlier this year,” said Covanta’s President and CEO Stephen J. Jones in a statement. “Earls Gate is the first of four advanced development projects in the U.K. to reach financial close, with the Rookery South, Protos and Newhurst projects lined up close behind. We are very pleased with our partnership with GIG and expect it to continue to add meaningful value as we bring additional projects to market. Our expectation remains that these U.K. projects alone will provide \$40 to \$50 million in incremental annual free cash flow to Covanta when they are all fully operational.” A combined heat and power facility located in Grangemouth, Scotland, Earls Gate will prevent approximately 216,000 tonnes of mixed household, commercial and industrial waste that cannot be recycled from entering landfills. Instead, the waste will be used as fuel to generate low-carbon heat and power that will be supplied to a co-located industrial site host. Construction of the facility will be led by Constructions Industrielles de la Mediterranee (CNIM) and is expected to take approximately 36 months to complete. CNIM will also provide operations and maintenance services when the project commences operations in late 2021. Covanta will provide technical oversight services during construction and operations. Earls Gate Project and Covanta investment details include the following: 216,000 metric tonnes per year of waste processing capacity; 21.5 megawatt equivalent generation capacity; 75 percent of the waste secured under long-term agreements; 100 percent of electricity and steam output under a long-term agreement with industrial site host; and total project cost of £210 million with approximately 70 percent financed through non-recourse project-based debt.

Select Industry News

❖ Study Shows Illinois Cities Struggle to Boost Recycling Rates

December 3, 2018 – A new report shows that Chicago, as well as five other cities in Illinois, are failing to meet the nation’s average recycling rates. The study, “The State of Recycling in Illinois,” was compiled by the Illinois chapter of the U.S. Public Interest Research Group. The nonprofit research group collected and examined recycled data from the past three years for some of the state’s largest cities. According to a WTTW report, recent changes in international trade—China’s import ban on plastic waste—gives Illinois and other states an opportunity to expand their recycling economies by investing in better collection, sorting and reprocessing systems.

❖ EPA Study Shows Plastic Waste Has Doubled Over Past Decade

December 7, 2018 – The Environmental Protection Agency of Ireland (EPA) has reported that plastic waste from the business sector—particularly from single-use coffee cups—has doubled over the past decade. According to the EPA’s latest study, single-use materials such as coffee cups have become a “very significant” part of what people throw away. The study also suggests that 14,000 tonnes of coffee cups are being generated annually, which accounts for roughly 4 percent of commercial and business waste.

❖ \$4.1M Settlement Approved in Dayton, Ohio Landfill Suit

December 7, 2018 – A class-action lawsuit over odors emitted from a Dayton, Ohio, landfill has been settled for \$4.1 million. The lawsuit was filed in 2016 and stemmed from odors coming from the Stony Hollow Landfill. According to a Dayton Daily News report, more than 2,000 class-action members signed up to share \$1.875 million included in the settlement, court documents show. The settlement deal can include a maximum of 2,039 class-action members, the report noted. The settlement also requires the Waste Management-owned site to invest \$1.45 million there to “reduce the potential for odor emissions,” according to court records.

❖ Spokane, Washington Selects Rubicon Global for New Smart City Solution

December 16, 2018 – Rubicon Global announced the city of Spokane, Washington, has selected Rubicon in a competitive bid process for a new three-year contract to provide smart city solutions to help benefit citizens and businesses in 189,000 service locations across the city. Starting this month, Spokane will begin using the RUBICONSmartCity platform, which includes a tablet-based mobile app, a plug-in device and a web-based portal. The technology will allow the city’s solid waste collection utility to track key metrics, including service confirmations, missed pickups, landfill diversion and recycling rates, leading to more efficient operations and ultimately improved service for its customers and citizens. Rubicon’s fleet management technology will be installed in approximately 100 solid waste vehicles, and a vehicle telematics system also is available for the city’s wider fleet of more than 1,000 vehicles. Rubicon was awarded the contract in September 2018, and the city has an option for two one-year contract renewals. Tablets loaded with the Rubicon mobile app, as well as onboard plug-in devices,



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will be placed in Spokane's fleet of residential and commercial waste and recycling collection vehicles. With the mobile app and plug-in device, the city will be able to take and organize pictures at customer locations, flag locations, dispatch alerts and provide real-time GPS monitoring of each vehicle. The app will also help deliver precise pick-up times, optimize routes and reduce the need for truck repairs.

❖ Boston Enacts Plastic Bag Ban

December 17, 2018 – As of December 14, a ban on plastic bags at large and mid-sized grocery stores in Boston has gone into effect. The ban also applies at restaurants, where takeout orders will be packaged in non-plastic or renewable bags moving forward. Late last year, the City Council passed an ordinance to ban plastic bags at grocery stores. Customers are now expected to bring their own reusable bags or stores will bag goods in paper. According to Boston Magazine, the ban currently applies to stores larger than 20,000 square feet. In April, stores larger than 10,000 square feet will have to comply, and then everyone else will be required to follow suit by July. Exempted are newspaper bags, laundry and dry-cleaner bags, plastic wrapped around meats and trash bags.

❖ SWEEP Releases New Municipal Standard Proposal

December 17, 2018 – The Solid Waste Environmental Excellence Protocol (SWEEP) Municipal Standard has just been published in draft form, Waste Dive reports. The new standard includes six categories, and SWEEP is accepting public comments through the end of January. It follows the Leadership in Energy and Environmental Design (LEED) model to evaluate the environmental, economic and social aspects of providing municipal solid waste services. According to Waste Dive, the new draft comes after more than two years of meetings and calls to hash out the finer points of how waste and recycling operations around the country can, and should, run under the most ideal conditions. Municipalities will eventually be able to apply for SWEEP certification or contract with certified service providers, the report notes.

❖ Waste and Recycling Industry Fatalities Down Slightly in 2017

December 19, 2018 – The Bureau of Labor Statistics (BLS) has published its annual review of fatal occupational injuries, which reveals that fatalities of all U.S. workers remained flat in 2017. In the public and private waste and recycling industry, fatalities declined slightly from 31 in 2016 to 30 in 2017. However, the fatal work injury rate increased in 2017 from 34.1 to 35.0 per 100,000 full-time equivalent workers. Despite this slight decrease in fatalities, the occupation of refuse and recyclable material collector remains the fifth most dangerous private sector job in the U.S.

❖ Maite Quinn Joins Closed Loop Partners

December 21, 2018 – Materials recovery facility (MRF) veteran Maite Quinn has joined Closed Loop Partners as the group's managing director. Quinn's most recent position was marketing New York City's curbside recyclables for Sims Municipal Recycling. Before joining the recycling industry, she worked as a former television producer who was introduced to the recycling industry in 2002 when she was pitched an idea for a documentary on the flow of recovered materials, Resource Recycling reports. Quinn holds leadership roles with the Institute of Scrap Recycling Industries' Plastics Division and MRF Council, and she has served on the board of the Association of Plastic Recyclers.

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Sources include Waste360, Waste Dive and various publicly available news publications. Additional information is available upon request.

