

Waste Connections (WCN)

September 17, 2018

Industrials – Waste Services

Stock Rating

Hold

Investment Thesis

We recommend HOLD for Waste Connections. The waste services industry is expected to grow at a CAGR of 1% over our investment horizon. However, Waste Connections has been aggressive in the M&A market and has been effective at increasing market share via its 40 plus acquisitions over the last 3 years. Due to an upside of 4% we recommend a HOLD.

Drivers of Thesis

- Being active in acquisitions, price appreciation, and growth in Exploration and Production (E&P) end markets will spur near term growth. We expect overall revenue growth of 7.4% in 2018 and 6.8% in 2019.
- In 2018 and 2019 we expect Waste Connections' waste collection revenue to grow by 8.5% and 6.5%, E&P waste treatment, recovery, and disposal to grow by 24.5% and 15% spurred by increased E&P activity in the Permian Region.
- Waste Connections' focus on rural and secondary markets differentiates them from their peers, allows them to control the waste stream, and allows them industry leading margins.

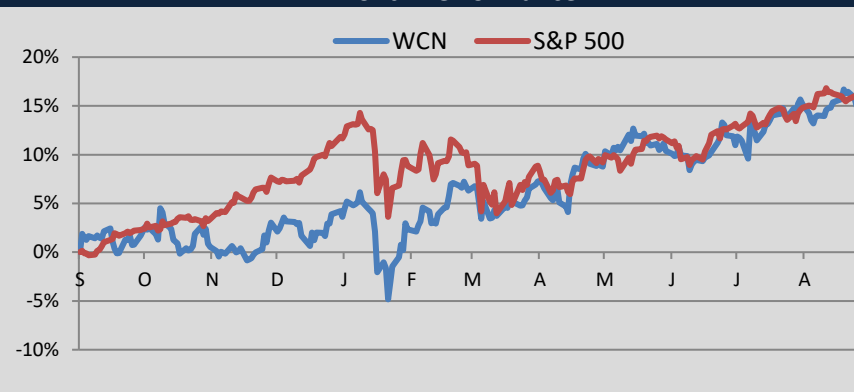
Risks to Thesis

- A tight labor market may necessitate Waste Connections to raise wages, cutting into firm profits.
- A depressed recycling commodities market has stymied growth in the recycling segment. We are uncertain as to when or whether the market will return to its previous form.

Earnings Estimates

Year	2015	2016	2017	2018E	2019E	2020E
EPS	-\$0.78	\$1.07	\$2.19	\$2.18	\$2.37	\$2.54
growth	-340%	173%	51%	-0.001%	8.4%	7.2%

12 Month Performance



Target Price

\$82-84

Henry Fund DCF	\$83.84
Henry Fund DDM	\$79.19
Relative Multiple	\$46.88

Price Data

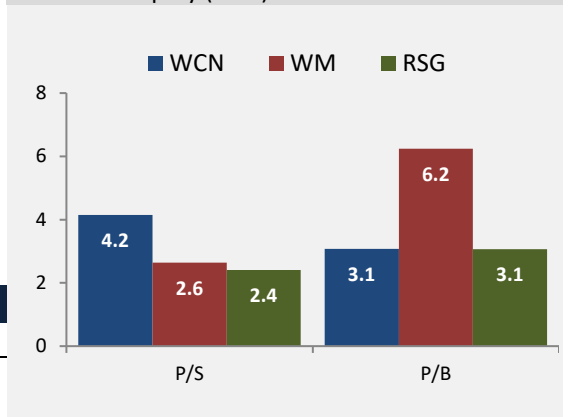
Current Price	\$79.11
52wk Range	\$65.03 – 81.36
Consensus 1yr Target	\$86.46

Key Statistics

Market Cap (B)	\$20.835
Shares Outstanding (M)	263.49
Institutional Ownership	90.8%
Five Year Beta	0.8
Dividend Yield	0.71%
Est. 5yr Growth	4.5%
Price/Earnings (TTM)	36.46
Price/Earnings (FY1)	30.28
Price/Sales (TTM)	4.15
Price/Book (mrq)	3.08

Profitability

Operating Margin	17.44%
Profit Margin	11.47%
Return on Assets (TTM)	4.59%
Return on Equity (TTM)	8.85%



Source: Bloomberg

Company Description

Waste Connections (WCN) is the third largest waste services company by market cap in North America. The services WCN provides include waste collection, transfer, disposal, and recycling. WCN's business focuses primarily on rural markets where it can control the entire waste stream. WCN reports earnings through six segments: Southern, Western, Eastern, Canada, Central, and Exploration and Production (E&P), geographic boundaries across North America.

EXECUTIVE SUMMARY

We recommend a HOLD for Waste Connections. Though the waste services industry is only expected to grow at a CAGR of 1% over our investment horizon, we expect WCN to grow inorganically via acquisitions and organically through increasing prices. Waste Connections also stands to benefit from increased E&P activity in the Permian basin. WCN will open 4 new facilities in the 2nd half of 2019 in order to take advantage of the region’s all-time high output. We forecast Waste Connections’ revenue to grow at 4.7%, outpacing expected industry growth of 1%.

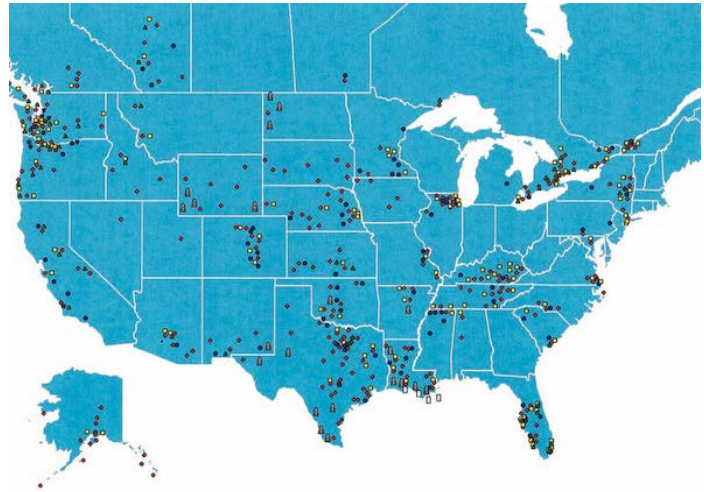
Waste Connections faces headwinds due to a tight labor market and depressed commodities market. The waste services industry is labor intensive and as such labor is one of the largest costs in the industry. As firms are forced to compete for labor, they may have to raise wages which will cut into firm profits. Additionally, China’s new contamination standard and ban on certain recycled commodities has depressed the recycled commodities market. While WCN has experienced profit loss as a result of the changes, they stand to weather the storm better than their competitors. WCN generates less of its total revenue from selling recycled commodities than either Republic Services or Waste Management.

We recommend a HOLD due to Waste Connections’ expected growth via acquisitions, revenue expansion in E&P, and our model suggesting an upside of 4%.

COMPANY DESCRIPTION

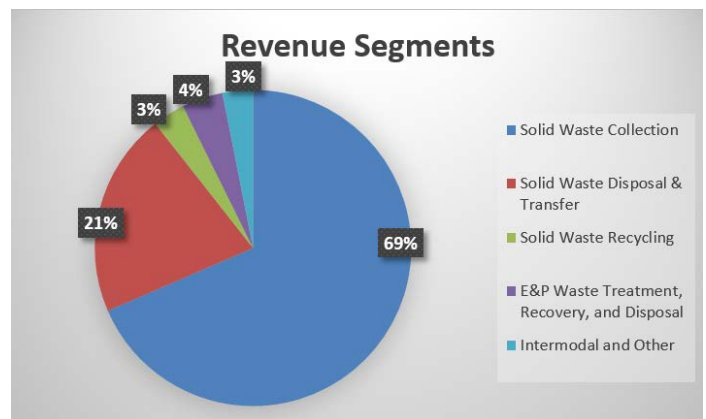
Waste Connections (WCN) is the third largest waste services company by market cap (\$20.8B) in North America. WCN provides comprehensive waste services including collection, disposal, transfer, recycling, E&P waste services, and intermodal. WCN operates in both the United States and Canada. As seen in the picture below, most of WCN’s operations (and approximately 80% of revenue) is based in the United States.

Map of WCN Operations



Source: WCN 2017 10k

Waste Connections reports revenue in five segments: solid waste collection; solid waste disposal and transfer; solid waste recycling; e&p waste treatment, recovery, and disposal, and; intermodal and other.



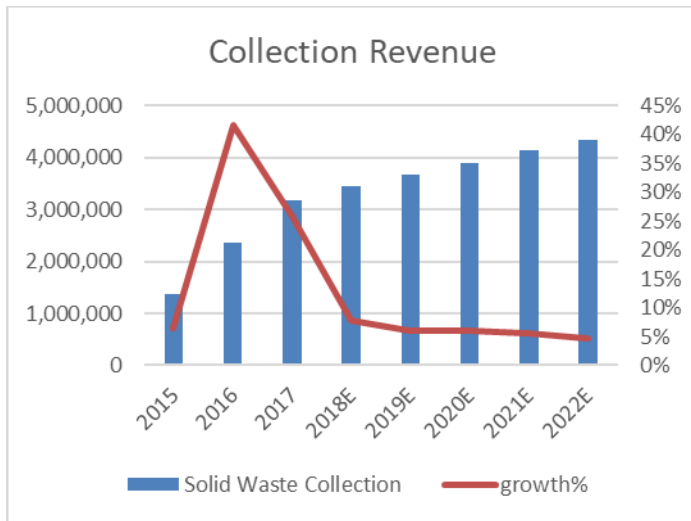
Source: WCN 2017 10k

Solid Waste Collection

Waste Connections collects the waste of residential, commercial, municipal, industrial and E&P (exploration & production) customers. Collection services are provided under the direction of an exclusive franchise agreement, exclusive municipal contract, residential subscription, residential contract, or a commercial/industrial/E&P service agreement. Franchise agreements give WCN the right to provide services to a specified territory for an exclusive period – which is typically seven years or longer. Municipal contracts differ from franchise agreements in

that they typically provide a shorter service period, more limited scope of services, and require competitive bidding at the end of the agreement term. In markets where exclusive waste collection agreements are not available, WCN will enter into residential contracts with homeowner’s associations, apartment owners, and mobile home park operators, or enter into agreements with individual households. In these same markets, WCN will also enter into commercial and industrial service agreements that span anywhere from one to five years. Due to the long-term nature of many of these agreements, WCN is unlikely to experience much revenue volatility.

Additionally, WCN’s contracted price for solid waste collection services is determined based on a number of factors, including: frequency, level of service, route density, volume, weight, and type of waste collected, type of equipment and containers furnished, the distance to the disposal or processing facility, the cost of disposal or processing, and prices charged by competitors for similar services.¹ Long-term solid waste collection contracts often contain a formula, generally based on a regional Consumer Price Index (CPI), that automatically adjusts fees to cover increases in some operating costs.²



Source: Henry Fund Model, WCN 2017 10k

Waste Connections’ solid waste collection segment generates the majority of the company’s revenue. The segment generated over \$3 billion in revenue in 2017, comprising 68.5% of the company’s revenue. The segment has been growing rapidly at a CAGR of 21.2% over the last five years. This rapid revenue growth can be primarily attributed to acquisitions and secondarily attributed to price and volume growth. We forecast that revenue from

the solid waste collection segment will grow at a rate of 8.5% in 2018, 6.5% in 2019, 6.5% in 2020, 6% in 2021, and 4.25% in 2022. We expect the growth in this segment to be driven by WCN being an active player in a robust M&A market in the short term.

Solid Waste Disposal and Transfer

Landfill Disposal Services

At the end of 2017, Waste Connections owned 66 municipal solid waste landfills, 11 E&P waste landfills, and 13 non-municipal solid waste landfills – which only accept construction and industrial waste. WCN owns and operates landfills to achieve vertical integration in the markets it serves. Additionally, municipal solid waste landfills generate methane, which can be converted into clean energy. Currently, WCN has gas recovery systems at 50 of its 66 landfills to collect methane. WCN believes 17 of its landfills have excess capacity, and is seeking permits to expand.³ If the permits are granted it would increase the capacity of the landfills by 237 million tons.

Transfer Station Services

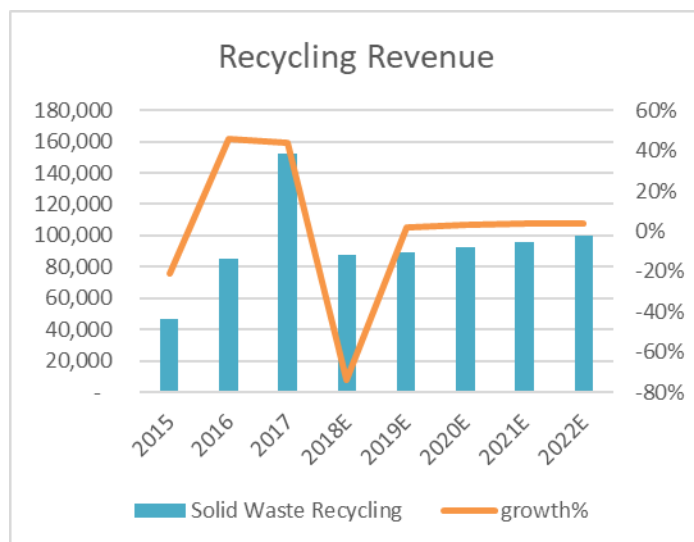
WCN owns or operates garbage transfer stations which receive garbage to be transported to landfills or treatment facilities via truck, rail, or ship. WCN also owns or operates E&P waste transfer stations with marine access. These stations compact and load waste to be shipped to treatment facilities by ship. Again, these transfer stations are a piece of the waste supply chain, which allows WCN to be vertically integrated.

Waste Connections’ solid waste disposal and transfer segment accounted for nearly 21% of the company’s revenue in 2017. The segment generated over \$960 million in revenue in 2017. The segment has been growing rapidly at a CAGR of 22.4% since 2013. This rapid revenue growth can be primarily attributed acquisitions and some price appreciation. We forecast that revenue from the solid waste disposal and transfer segment will grow at a rate of 9% in 2018, 7% in 2019, 6% in 2020, 5% in 2021, and 4% in 2022. We expect the growth in this segment to be driven by both price appreciation and inorganic growth.

Solid Waste Recycling

Waste Connections offers residential, commercial, industrial and municipal customers recycling services for a variety of recyclable materials. WCN owns or operates

recycling operations and sells other collected recyclable materials to third parties for processing before resale. Among recyclable products, WCN primarily processes and sells paper products. The majority of these products are sold to customers in Asia.



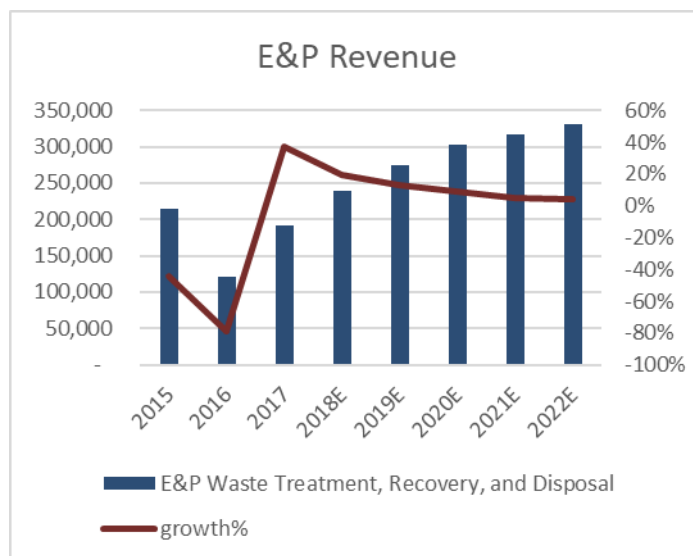
Source: Henry Fund Model, WCN 2017 10k

Waste Connections’ solid waste recycling segment generated 3.3% of the company’s revenue in 2017. The segment generated over \$150 million in revenue in 2017. The segment has been growing rapidly at a CAGR of 18.4% over the last five years. However, we expect that the new Chinese requirement that recycled products be 99.5% free of contamination will be a significant headwind in this category. Meeting this standard will be unobtainable for the industry and recycling will become an unprofitable venture as China is the largest buyer in recycled commodities market. For this reason we expect WCN’s recycling segment to experience a significant slide in 2018 with revenue dropping 74% from 2017. Until China changes its policy, the outlook for recycling as a profitable business is grim. We expect static growth over our forecast horizon of 1% in 2019, 3% in 2020, 4% in 2021, and 4% in 2022.

E&P Waste Treatment, Recovery, and Disposal

E&P waste refers to the by-products that occur as a result from oil and natural gas exploration and production activity. This type of waste includes: waste created throughout the initial drilling and completion of an oil or natural gas well, such as drilling fluids, drill cuttings,

completion fluids and flowback water; production wastes and produced water during a well’s operating life; contaminated soils that require treatment during site reclamation; and substances that require clean-up after a spill, reserve pit clean-up or pipeline rupture.⁴ Customers in this segment are oil and natural gas exploration and production companies operating in Arkansas, Louisiana, New Mexico, Oklahoma, South Dakota, Texas, Wyoming and along the Gulf of Mexico. Revenue in in this segment is driven by vertical and horizontal drilling, hydraulic fracturing, and production and clean-up activity. WCN provides E&P waste treatment, recovery, and disposal services from its 11 E&P landfills, municipal waste landfills, E&P liquid waste injection wells and E&P waste treatment and oil recovery facilities. At these locations E&P waste goes through processes to ensure that waste is treated and disposed of in compliance with the applicable laws and regulations of the respective market. After going through the treatment process, certain solids are able to be reused and are not designated a waste product. Some of the items available for reuse and resale are oil, fresh water, and brine water.



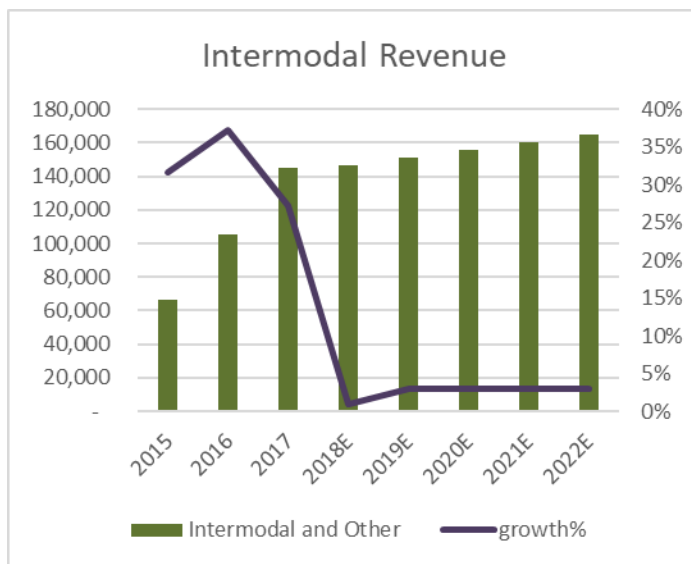
Source: Henry Fund Model, WCN 2017 10k

Waste Connections’ E&P waste treatment, recovery, and disposal segment generated over \$192 million in revenue in 2017, comprising 4% of the company’s revenue. The segment’s revenue has fluctuated dramatically over the last several years. The fluctuation in the segment has been tied to the volatility of crude oil prices. Since 2013, the segment has decreased at a CAGR of -5.2%. However, revenue from the segment did increase from 2016 to 2017 by 37%, tracking the rise in crude oil prices. We expect that

E&P waste treatment, recovery, and disposal revenue will grow by 24.5% in 2018 due to high crude oil prices. However, we expect crude oil prices to gradually decline in the long term. For that reason we expect revenue growth at 15% in 2019, 10% in 2020, 5% in 2021, and 4% in 2022.

Intermodal and Other

Waste Connections’ intermodal segment is its smallest segment by revenue. Revenue in this segment is generated from fees collected for providing the movement of containers using two or more modes of transportation – usually involving rail or truck. These services are available in the Pacific Northwest. WCN owns a fleet of double-stack railcars which are used to offer direct-line haul services among terminals in Portland, Boardman, Tacoma, and Seattle. WCN seeks to expand this segment by seeking contracts to transport the waste from the Tacoma-Seattle areas to landfills in eastern Washington and eastern Oregon.



Source: Henry Fund Model, WCN 2017 10k

The intermodal segment generated over \$145 million in revenue in 2017, comprising almost 3% of the company’s revenue. The segment has been growing rapidly at a CAGR of 26.4% since 2013. This rapid revenue growth can be primarily attributed to acquisitions. We forecast that revenue from this segment will experience slow but steady growth across our forecast horizon: 1% in 2018, 3% in 2019, 3% in 2020, 3% in 2021, and 3% in 2022.

Company Analysis

Acquisitions

Waste Connections’ revenue growth has been largely driven by acquisitions over the last several years. WCN seeks acquisitions where they are able to: 1) provide waste collection services under exclusive arrangements such as franchise agreements, municipal contracts and governmental certificates; (2) gain a leading market position and provide vertically integrated collection and disposal services; or (3) gain a leading market position in a niche market through the provision of treatment and disposal services.⁵ Management has demonstrated a commitment to growth via acquisitions and are optimistic about the acquisition pipeline for the remainder of 2018 though 2019.⁶ The table below demonstrates both the high number of acquisitions WCN engages in per year as well as how those acquisitions have contributed to revenue.

	Number of Acquisitions	Purchase Price	Contributed Rev.
2017	14	\$562.2 (M)	\$1 (B)
2016	13	\$5.184 (B)	\$1.27 (B)
2015	14	\$347.9 (M)	\$57.7 (M)

Source: WCN 2017, 2016, 2015 10k

Our model predicts that WCN will continue to be aggressive in the acquisition market. We predict, and our model reflects, that WCN will grow revenue by 4% per year via acquisitions, throughout our forecast horizon, in line with management’s 3%-4% revenue from acquisitions target.⁷ This growth is divided equally among all segments throughout the forecast horizon as it is impossible to know the proportion of growth each segment will experience as a result of future acquisitions.

Focus on rural and secondary markets

One point of differentiation between Waste Connections and its peers (Waste Management, and Republic Services) is its focus on rural and secondary markets. This strategy allows WCN a higher local market share than would be attainable in more competitive urban markets, which reduces their exposure to customer churn and improves financial returns. Additionally, attention to these markets allows WCN the ability to enter into long term contracts and control the waste stream which leads to industry leading margins. Further, in certain niche markets, like E&P waste treatment and disposal, early mover advantage in

certain rural basins has the potential to improve market positioning and financial returns given limited disposal alternatives. This strategy allows WCN to enter into long term contracts and allows for predictable revenue generation.

RECENT DEVELOPMENTS

2018 Q2 Earnings Call

In Waste Connections' 2018 Q2 earnings call, management was positive as they upwardly revised revenue, EBITDA, and free cash flow projections for the year.⁸ They noted that solid waste pricing growth, E&P waste activity, and acquisitions helped the company overcome headwinds from the recycling segment. In Q2 solid waste pricing growth was 4.2% while volume was down 1.5% YOY. The decrease in volume is due to WCN divesting of "less attractive revenue" from the 2016 acquisition of Progressive Waste. These divestitures are primarily located in Canada and the Northeastern United States.

WCN has acquired approximately \$175 million of annualized revenue in 2018. Approximately \$52 million of the \$175 million represent entry into new markets in Arizona, Rhode Island, and Virginia.

Looking forward to 2019, management is optimistic about continued revenue growth and margin expansion due to increasing solid waste pricing, E&P waste activity, and acquisition activity. Management expects 3% to 4% revenue growth from acquisitions as well as organic growth of between 4% to 6% led by price increases.

INDUSTRY TRENDS

China's Contamination Standard

Beginning in January 2018, China imposed a new contamination standard for imported recycling commodities of .5%. This means that of all the recycled materials imported, only .5% of the goods may be trash or items other than the desired import. This is a near impossible contamination rate to achieve. Waste Connections' CEO, Ron Mittelstaedt, stated that getting contamination down to between 2% to 3% is incredibly difficult.⁹ This new standard could cause those in the industry to explore and invest in artificial intelligence and other means to bring contamination down. However, many believe that the Chinese government will eventually

eliminate scrap material imports in the near future making industry players more likely to delay investment in the technology required to improve contamination rates.

This new contamination standard impacts Waste Connections directly. In 2017 WCN collected 2 million tons of recyclables in the U.S. and 72% of its recyclables were then sold to China. As of August of 2018, less than 2% of its recyclables are being sold to China. WCN is now selling 85% of its recycled material to domestic markets. The remaining 15% is being sold to India, Vietnam, and Eastern Europe. Though these markets are available for WCN to sell to, they are oversaturated and buying recycled materials at steep a discount.

In 2017 Waste Connections' recycling segment generated approximately \$154 million in revenue, which equated to 3.5% of WCN's total revenue. This year, management expects – and our model reflects – revenue from recycling to be down by approximately \$65 million. The expected dip is all due to price, and therefore profit.

Though negatively impacted, Waste Connections stands to fair better than its industry peers. In 2017 revenue from recycling was responsible for nearly 10% of Waste Management's total revenue¹⁰ and 5.4% of Republic Services' total revenue¹¹ compared to 3.5% of Waste Connections total revenue. As both Waste Management and Republic Services were reliant on China to sell their recycled products, they will both experience the same dip in revenues – only on a larger scale than Waste Connections.

Due to the enormous fall in demand, recycling commodity prices have dipped – resulting in a large dip in recycling profitability across the waste industry.

Population Growth

According to the Environmental Protection Agency, per capita production of waste has remained relatively steady during the past few decades. Therefore, overall waste generation is primarily driven by population growth. As the population increases, the amount of waste generated rises, which subsequently boosts demand for waste collection services. The population is expected to grow slowly in 2018.

Expected US Population Growth



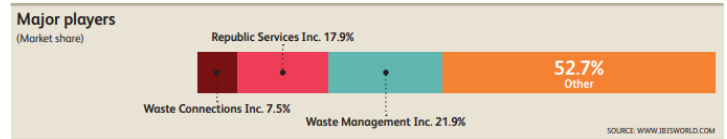
Source: US Census Bureau

As seen in the graph above, population growth in the US is expected to be low. From 2018 to 2025 population in the US is expected to grow at a CAGR of 0.8%. Thus, organic growth in the industry will primarily be driven by price increases rather than increasing volume.

Privatization of Waste Collection

One positive trend in the industry is the increasing privatization of waste collection. Traditionally, waste collection has been the responsibility local governments which provide the service to its residences and pay for the services via tax revenue.¹² As municipal governments face increasing budgetary constraints and pressures, local governments have outsourced waste services to private operators. Privatization of waste collection services increases demand for private operators and contributes to consolidation in the industry. As seen in the graphic below, the waste collection industry is somewhat fragmented but trending toward consolidation. Waste Management is the largest player in the industry with 22% of market share, Republic Services is the second largest with 18% market share, and Waste Connections comes in third with 7.5% market share. The remaining 52% of the industry is comprised of municipal governments and smaller operators.

Market Share in Waste Services



Source: IBIS World

As municipal governments continue to outsource waste services and small operators continue to sell to larger service providers, the industry will continue to trend toward consolidation.

MARKETS AND COMPETITION

Peer Comparisons

Within the waste services industry, Waste Connections primarily competes with Waste Management (WM) and Republic Services (RSG). WCN is the smallest of the three firms with a market cap of 20.8(B), WM is the largest with a market cap of 39.45(B), and RSG fits between the two with a market cap of 25.73(B). WCN also competes with small localized firms across the US and Canada. Below is a comparison of the three firms looking at valuation multiples as of 2017:

Valuation Multiples			
	WCN	WM	RSG
P/E	36.46	22.76	25.73
Forward P/E	30.28	22.04	24.35
P/S	4.15	2.64	2.41
P/B	3.08	6.24	3.07

Source: Bloomberg

As seen above, and reflected in our relative valuation, WCN trades at higher multiples than its peers. While WCN has experienced revenue growth at a rate above its peers, it is unclear whether WCN's expected growth justifies its trading at higher multiples than its peers.

Adjusted EBITDA Margin						
	2013	2014	2015	2016	2017	5-Year Avg.
WCN	34.0%	34.5%	33.6%	31.0%	30.9%	32.80%
WM	24.5%	25.3%	26.6%	27.4%	27.8%	26.32%
RSG	27.1%	28.0%	28.1%	28.2%	27.7%	27.82%

Source: Bloomberg

Adjusted Net Income						
	2013	2014	2015	2016	2017	5-Year Avg.
WCN	10.7%	11.6%	10.7%	10.0%	10.6%	10.71%
WM	6.6%	8.1%	9.4%	9.3%	10.0%	8.68%
RSG	7.3%	7.9%	7.9%	8.1%	8.2%	7.88%

Source: Bloomberg

When looking at the profitability metrics provided above, WCN is superior to its peers both in adjusted net income and adjusted ebitda margin. WCN's focus on secondary markets allows the firm to experience industry best margins and we expect that advantage to continue.

2017 Growth			
	WCN	WM	RSG
Sales Growth	6.56%	3.02%	2.13%
EBITDA Growth	7.51%	6.78%	2.44%
Net Income Growth	17.19%	24.99%	18.15%

Source: Bloomberg

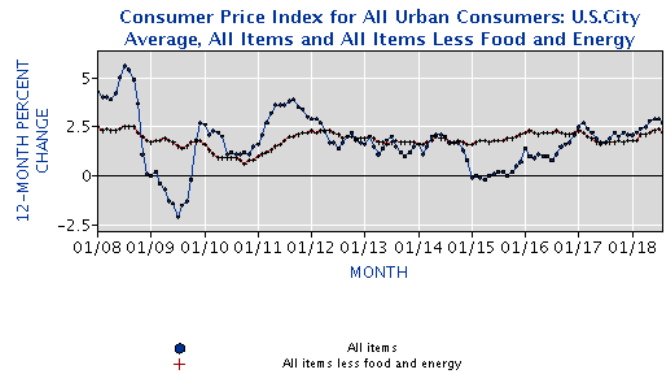
Finally, looking at growth in 2017 we see that WCN's revenue is growing at a rate over two times its competitors. This is attributed to its aggressive position in the M&A market. Additionally, and more importantly, WCN's EBITDA margin growth is also growing at rate above its peers.

WCN compares favorably to its peers in terms of profitability, revenue and EBITDA growth but not in terms of valuation multiple. We believe that WCN's margins will continue to improve as it fully integrates its most recent acquisitions.

ECONOMIC OUTLOOK

CPI Index

The Consumer Price Index (CPI) is an index tracking how much a basket of goods costs across different periods of time in the United States. As CPI measures the rise and fall of prices for the same basket of goods from month to month, it is a measurement of inflation in the U.S. economy. CPI is an important metric in the waste services industry because it is typically included in contracts between municipalities and waste service providers as a factor in the fee for services.



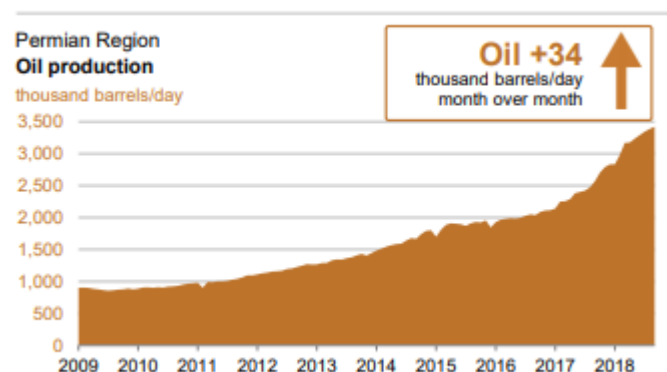
Source: Bureau of Labor Statistics

As seen in the graphic above, CPI has remained fairly steady at around 2% since 2013. If this pattern holds, and we expect it to, WCN can expect to have approximately 2% waste collection revenue growth per year from an increase in service price.

U.S. Oil Production

Oil production in the U.S. Permian Basin is at an all-time high, and is expected to continue growing to 5.4 million barrels per day in 2023.¹³ The growth will be driven by an expected 41,000 new wells and \$308 billion in exploration and production spending in basin.¹⁴ As seen in the graph below, oil production in the basin steadily increased from 2009 until 2017, and has rapidly increased from 2017 until now.

Oil Production in Permian Region



Source: US Energy Information Administration

Revenue from WCN's E&P segment is volatile as it relies on the output in the Permian region which is primarily driven by oil prices. In 2016, WCN's E&P segment

decreased 44% from 2015 due to reduced E&P volumes. This decrease was driven by a substantial decline in crude oil prices that began in 2014 and lasted through 2016 (as seen in the graph below) – which impacted the level of drilling and the need for E&P waste services.¹⁵

WTI Crude Oil Prices



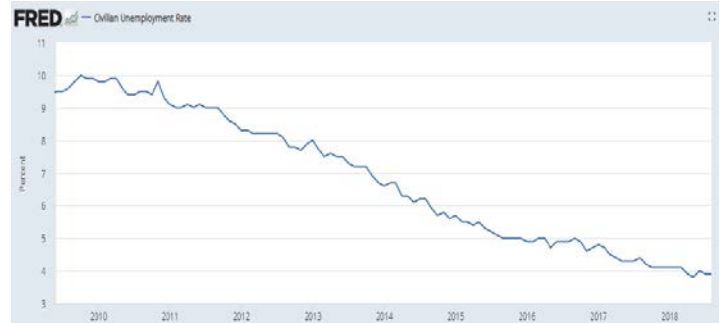
Source: Macrotrends

Currently Waste Connections owns and operates 19 E&P waste facilities primarily in the Permian region, and they are in the process of constructing four more – expected to be operational in the second half of 2019. Our model predicts that the increase in oil output in the region will drive revenue growth in WCN’s E&P waste segment, especially in the near term where oil prices are expected to remain high. We predict revenue growth of 20% in 2018 and 13% in 2019.

Labor Market

The labor market in the United States is extremely tight. As seen in the graphic below the country’s unemployment rate has been declining since 2010, recovering from the great recession.

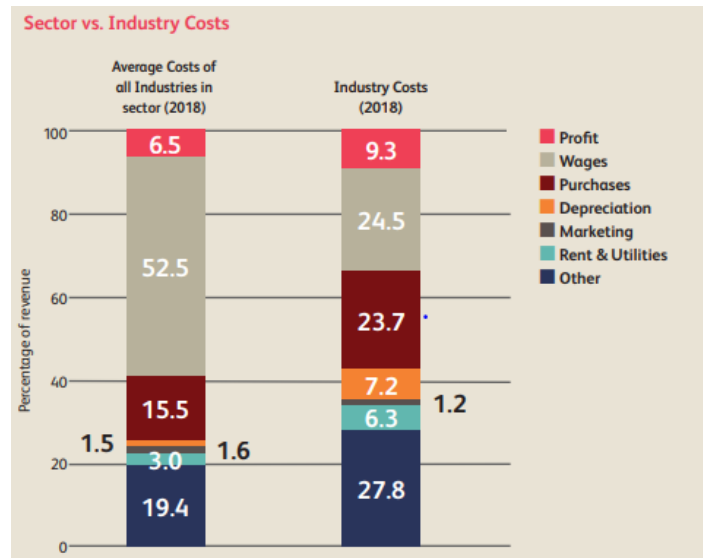
Unemployment Rate



Source: FRED

The current unemployment rate is 3.9%, which is the lowest rate in several decades. This, in turn, has created a tight labor market and has caused employers to compete for labor. As waste services is a labor intensive industry, labor is one of the highest costs in the industry. As seen in the graphic below, the cost of labor in the industry is equivalent to 24.5% of the industry’s revenue. Thus, if the labor market continues to tighten we would expect to see wage growth as firms compete for labor. This has the potential to negatively impact profitability of those in the waste services industry.

Sector vs. Industry Cost



Source: IBIS World

CATALYSTS FOR GROWTH

- Waste connections exists in a mature market, and growth will continue in the industry as municipal governments continue to outsource waste services to private operators.

INVESTMENT POSITIVES

- WCN is well positioned to capitalize on expected increase in output in the Permian region via its new E&P facilities.
- WCN's focus on rural and secondary markets allow them to control the entire waste stream and enjoy industry leading margins.

INVESTMENT NEGATIVES

- The recycling commodities market is oversaturated and does not look like it will recover in the near term.
- WCN exists in a labor-intensive industry, and the tightening labor market could drive labor cost up, driving firm profitability down.

VALUATION

Revenue:

Our model forecasts revenue based on the individual revenue drivers unique to each business segment. The company description section of this report gives a detailed account of the individual drivers of each business segment. Overall revenue growth is forecasted to be 7.4% in 2018, 6.8% in 2019, 6.4% in 2020, 5.6% in 2021, and 4.1% in 2022.

COGS:

We forecasted COGS as a percentage of sales, based on a three-year average from FY 2015, 2016, and 2017. We project that WCN will realize merger related synergies which will decrease COGS 20 basis points per year throughout or forecast horizon.

SG&A Expense:

Our model projects SG&A expense as a percentage of sales from 2015 to 2017.

Cap Ex:

Our model further projects that Waste Connections will maintain capital expenditures of approximately 13% of revenue per year. This is in-line with historic capital expenditures and reflects management's commitment to acquisition-based growth.

Cost of Debt:

We used a cost of debt of 3.75% which was the rate Waste Connections offered its 2026 Senior Bonds.

Cost of Equity:

We used the CAPM formula to derive the cost of equity. The inputs used were a 30-year treasury bond as the risk-free rate at 3.1%, 5-year beta of 0.8, multiplied by an equity risk premium of 4.8%. These inputs generated a cost of equity of 6.94%.

Model Outputs:

Based on the above assumptions our DCF model produced a target price of \$83.84, which is slightly lower than the one-year consensus estimates of \$86.46 and slightly above its 52-week trading high of \$81.36.

Our dividend discount model (DDM) produced a target price of \$79.19, which is tracking WCN's current trading price of \$79.11. We believe that the DDM is not as accurate in projecting WCN's intrinsic value as it is based on the firms' historic payout percentage. Finally, our relative valuation produced a value of \$46.88. As WCN primarily competes with only two firms, we find this valuation metric to be skewed and not as reliable as the DCF valuation.

KEYS TO MONITOR

Looking to the future, it will be essential for Waste Connections' growth that a healthy M&A market exists in the waste services industry. Our model relies on this growth via acquisition and if the M&A pipeline were to dry up, WCN's growth would be stymied.

REFERENCES

1. Waste Connections 2017 Annual Report
2. *Id.*
3. *Id.*
4. *Id.*
5. *Id.*
6. Waste Connections 2018 Q2 Earnings Call.
7. *Id.*
8. *Id.*
9. Resource Recycling, Chinese Restrictions a 'Huge Deal' for Major Hauler
10. Waste Management 2018 Annual Report.
11. Republic Services 2017 Annual Report.
12. IBIS World, Waste Collection.
13. Reuters, Permian Basin Oil Production to Reach 5.4 MBD in 2023: IHS Markit.
14. *Id.*
15. See reference 1.

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Waste Connections*Revenue Decomposition*

<i>Fiscal Years Ending Dec. 31</i>	2015	2016	2017	2018E	2019E	2020E	2021E	2022E
Solid Waste Collection	1,374,056	2,353,047	3,171,975	3,441,593	3,665,296	3,903,541	4,137,753	4,313,608
growth%	6.39%	41.61%	25.82%	8.50%	6.50%	6.50%	6.00%	4.25%
Solid Waste Disposal & Transfer	415,169	712,388	968,408	1,058,960	1,133,087	1,201,072	1,261,126	1,311,571
growth%	8.16%	41.72%	26.44%	9.35%	7.00%	6.00%	5.00%	4.00%
Solid Waste Recycling	46,368	85,515	152,771	87,840	88,718.40	91,379.95	95,035.15	98,836.56
growth%	-21.01%	45.78%	44.02%	-42.50%	1.00%	3.00%	4.00%	4.00%
E&P Waste Treatment, Recovery, and Disposal	215,373	120,200	192,005	239,120	274,988	302,487	317,611	330,316
growth%	-43.97%	-79.18%	37.40%	24.54%	15.00%	10.00%	5.00%	4.00%
Intermodal and Other	66,321	105,713	145,329	146,630	151,029	155,560	160,227	165,033
growth%	31.60%	37.26%	27.26%	0.90%	3.00%	3.00%	3.00%	3.00%
Total	2,117,287	3,375,863	4,630,488	4,974,143	5,313,119	5,654,040	5,971,752	6,219,364
growth%	1.80%	37.28%	27.09%	7.42%	6.81%	6.42%	5.62%	4.15%

Waste Connections

Income Statement

<i>Fiscal Years Ending Dec. 31</i>	2015	2016	2017	2018E	2019E	2020E	2021E	2022E
Revenues	2117	3376	4630	4974	5313	5654	5972	6219
Cost of operations	1177	1958	2705	2852	3036	3219	3388	3516
Gross profit (loss)	940	1418	1926	2122	2277	2435	2584	2703
Selling, general & administrative expenses	237	474	510	580	620	660	697	726
Depreciation	240	394	530	512	569	625	681	738
Amortization of intangibles	29	70	102	105	107	109	111	113
Impairments & other operating items	494	28	156	0	0	0	0	0
Net gain on sale of assets	0	0	0	0	0	0	0	0
Operating income (loss)	-62	452	627	924	981	1041	1094	1126
Interest expense, net	64	93	130	159	177	187	196	206
Other income	0	1	4	0	0	0	0	0
Foreign currency transaction gain (loss)	0	1	-2	0	0	0	0	0
Income (loss) before income tax provision (benefit)	-126	361	509	765	804	854	898	921
Total income tax provision (benefit)	-32	114	-69	200	210	223	234	240
Net income (loss)	-95	247	577	565	594	631	664	680
Less: net income attributable to noncontrolling interests	-1	-1	-1	-1	-2	-2	-2	-2
Net income (loss) attributable to Waste Connections Inc.	-96	247	577	564	593	630	662	679
Shares outstanding	123	230	264	258	250	248	246	243
Basic earnings per share	-1	1	2.19	2.18	2.37	2.54	2.70	2.79
Dividends per share	0.54	0.41	0.50	0.56	0.62	0.68	0.74	0.80
Total Dividends	66	94	132	145	155	169	182	194

Waste Connections*Balance Sheet*

<i>Fiscal Years Ending Dec. 31</i>	2015	2016	2017	2018E	2019E	2020E	2021E	2022E
Assets								
Cash & cash equivalents	11	154	434	873	1046	1243	1455	1660
Accounts receivable	255	485	554	627	670	713	753	784
Deferred income taxes	50	89	0	0	0	0	0	0
Current assets held for sale	-	6	2	4	4	4	4	5
Prepaid expenses & other current assets	47	98	187	151	162	172	182	189
Total current assets	362	833	1177	1655	1882	2132	2394	2638
Restricted cash & investments	46	63	167	193	224	259	300	347
Property & equipment, net	2738	4738	4821	5351	5881	6411	6941	7471
Goodwill	1423	4390	4682	4682	4682	4682	4682	4682
Intangible assets, net	511	1067	1087	1108	1129	1151	1172	1195
Long-term assets held for sale		34	13	25	27	28	29	31
Other assets, net	41	68	68	68	69	69	70	70
Total assets	5122	11193	12015	13082	13893	14731	15587	16433
Liabilities and Shareholders' Equity								
Accounts payable	115	251	331	332	355	377	399	415
Book overdraft	12	11	19	21	23	25	27	30
Accrued liabilities	136	269	278	322	344	366	387	403
Deferred revenues	90	134	145	189	202	215	227	236
Current portion of contingent consideration	22	21	16	34	36	38	40	42
Current liabilities held for sale		3	2	3	4	4	4	4
Current portion of long-term debt & notes payable	2	2	12	18	19	20	21	22
Total current liabilities	378	692	803	919	982	1046	1105	1152
Long-term debt	2147	3617	3900	4371	4602	4834	5067	5298
Long-term portion of contingent consideration	27	30	31	47	51	54	57	59
Other long-term liabilities	125	331	316	308	329	351	370	386
Deferred income taxes	452	868	691	736	785	837	892	951
Total liabilities	3130	5538	5741	6383	6750	7121	7491	7846
Common stock	738	4277	4303	4308	4313	4318	4323	4328
Accumulated other comprehensive income (loss)	-12	-43	108	108	108	108	108	108
Retained earnings (accumulated deficit)	1259	1413	1857	2276	2714	3175	3655	4139
Noncontrolling interest in subsidiaries	7	7	5	6	7	8	9	10
Total Shareholders' Equity	1992	5655	6274	6699	7143	7610	8096	8586
Total Liabilities & Shareholders' Equity	5122	11193	12015	13082	13893	14731	15587	16433

Waste Connections*Cash Flow Statement*

<i>Fiscal Years Ending Dec. 31</i>	2018E	2019E	2020E	2021E	2022E
Net income (loss)	563.96	593	630	662	679
Intangible assets	-20.66	-21	-21	-22	-22
Accounts receivable, net	-72.61	-43	-43	-40	-31
Prepaid expenses & other current assets	35.70	-10	-10	-10	-8
Deferred tax assets	0.00	0.00	0.00	0.00	0.00
Assets held for sale	-2.02	0	0	0	0
Accounts payable	1.45	23	23	21	17
Book overdrafts	1.74	2	2	2	2
Accrued liabilities	44.26	22	22	21	16
Deferred revenue	43.77	13	13	12	9
Current liabilities held for sale	1.23	0.23	0.23	0.22	0.17
Other current liabilities	17.79	2	2	2	2
Deferred tax liabilities	45.66	49	52	55	59
Net operating cash flows	660.25	629	669	704	723
Capital expenditures	-530.00	-530	-530	-530	-530
Restricted cash/investments	-26.27	-30.40	-35.19	-40.72	-47.13
Long-term assets held for sale	-12.70	-1.33	-1.33	-1.33	-1.33
Other noncurrent assets	-0.37	-0.38	-0.38	-0.38	-0.38
Net investing cash flow	-569.35	-562	-567	-572	-579
Short term & current portion of long term debt	6.65	0.97	0.97	0.97	0.97
Long term debt	471.73	230.81	232.11	232.38	231.14
Long term portion of contingent consideration	15.99	3.24	3.25	3.03	2.36
Other noncurrent liabilities	-7.81	21.02	21.14	19.70	15.35
Other comprehensive income	0.00	0.00	0.00	0.00	0.00
Noncontrolling interest	1.00	1.00	1.00	1.00	1.00
Common stock + additional paid in capital	5.00	5	5	5	5
Dividends	-144.71	-155.31	-168.64	-181.68	-194.45
Net financing cash flow	347.86	106.72	94.83	80.40	61.37
Net change in cash	438.76	174	197	212	205
Beginning year cash	433.82	872.58	1046.36	1243.17	1454.96
Ending year cash	872.58	1046.36	1243.17	1454.96	1660.06

Waste Connections
Cash Flow Statement

<i>Fiscal Years Ending Dec. 31</i>	2014	2015	2016	2017
Net income (loss)	233.327	-94.694	247.321	577.42
Loss on disposal of assets & impairments	8.239	518.657	26.741	134.491
Depreciation	230.944	240.357	393.6	530.187
Amortization of intangibles	27	29.077	70.312	102.297
Foreign currency transaction loss (gain)			-1.121	2.2
Deferred income tax expense (recovery), net of acquisitions	31.031	-132.454	42.298	-153.283
Amortization of debt issuance costs	3.085	3.097	4.847	4.341
Share-based compensation	18.446	20.318	44.772	39.361
Interest income on restricted assets	-0.446	-0.428	-0.477	-0.589
Interest accretion	5.076	6.761	10.505	13.822
Closure & post-closure accretion				
Excess tax benefit associated with equity-based compensation	-7.518	-2.069	-5.196	-
Payment of contingent consideration recorded in earnings	-1.074	-	-0.493	-10.012
Adjustments to contingent consideration	-4.148	-22.18	-2.623	17.754
Accounts receivable, net	-22.168	17.348	-5.252	-38.934
Prepaid expenses & other current assets	-3.868	-2.78	-21.65	-51.457
Accounts payable	10.173	-16.674	54.219	50.012
Deferred revenue	8.571	4.377	8.016	4.205
Accrued liabilities	5.759	8.217	-70.041	-15.002
Capping, closure & post-closure expenditures			-	-8.845
Other long-term liabilities	2.791	0.069	-0.466	-10.708
Net cash flows from operating activities	545.22	576.999	795.312	1187.26
Payments for acquisitions, net of cash acquired	-126.181	-230.517	-17.131	-410.695
Proceeds from adjustment to acquisition consideration				
Cash acquired in the Progressive Waste acquisition			65.768	-
Capital expenditures for property & equipment	-241.277	-238.833	-344.723	-479.287
Proceeds from disposal of assets	9.421	2.883	4.604	28.432
Change in restricted assets, net of interest income	-4.475	-2.225	-0.428	-102.218
Decrease (increase) in other assets			-	-
Other cash flows from investing activities	-0.896	-1.842	-4.485	-2.464
Net cash flows from investing activities	-363.408	-470.534	-296.395	-966.232
Proceeds from long-term debt	432.5	1489.5	3469.289	973.754
Principal payments on notes payable & long-term debt	-525.909	-1429.195	-3714.044	-770.106
Payment of contingent consideration recorded at acquisition date	-24.99	-2.19	-16.322	-17.158
Change in book overdraft	-0.011	-0.089	-1.305	8.241
Proceeds from option & warrant exercises	3.375	0.572	-	1.946
Excess tax benefit associated with equity-based compensation	7.518	2.069	5.196	-
Repurchase of common shares	-7.317	-91.165	-	-
Payments for cash dividends	-58.906	-65.99	-92.547	-131.975
Tax withholdings related to net share settlements of restricted share u	-6.814	-6.447	-11.497	-13.994
Distributions to noncontrolling interests	-0.371	-0.042	-0.003	-
Debt issuance costs	-0.125	-6.867	-13.506	-3.667
Proceeds from common stock offering, net				
Proceeds from sale of common shares held in trust			19.87	10.814
Other cash flows from financing activities			-	-1.095
Net cash flows from financing activities	-181.05	-109.844	-354.869	56.76
Effect of foreign currency translation on cash & cash equivalents			-0.598	1.795
Net increase (decrease) in cash & equivalents	0.762	-3.379	143.45	279.583
Cash & cash equivalents at beginning of year	13.591	14.353	10.974	154.382
Less: cash held for sale			-0.042	-0.15
Cash & cash equivalents at end of year	14.353	10.974	154.382	433.815
Cash paid during the year for income taxes	116.239	102.279	69.589	155.532
Cash paid during the year for interest	60.224	55.674	87.654	115.645

Waste Connections*Common Size Income Statement*

<i>Fiscal Years Ending Dec. 31</i>	2015	2016	2017	2018E	2019E	2020E	2021E	2022E
Revenues	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Cost of operations	55.61%	57.99%	58.41%	57.34%	57.14%	56.94%	56.74%	56.54%
Gross profit (loss)	44.39%	42.01%	41.59%	42.66%	42.86%	43.06%	43.26%	43.46%
Selling, general & administrative expenses	11.22%	14.05%	11.01%	11.67%	11.67%	11.67%	11.67%	11.67%
Depreciation	11.35%	11.66%	11.45%	10.30%	10.70%	11.05%	11.41%	11.86%
Amortization of intangibles	1.37%	2.08%	2.21%	2.12%	2.02%	1.93%	1.87%	1.82%
Impairments & other operating items	23.35%	0.82%	3.38%	0.00%	0.00%	0.00%	0.00%	0.00%
Net gain on sale of assets	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Operating income (loss)	-2.91%	13.40%	13.54%	18.58%	18.47%	18.41%	18.32%	18.11%
Interest expense, net	3.01%	2.75%	2.82%	3.20%	3.33%	3.30%	3.29%	3.31%
Other income	0.00%	0.02%	0.08%	0.00%	0.00%	0.00%	0.00%	0.00%
Foreign currency transaction gain (loss)	0.00%	0.03%	-0.05%	0.00%	0.00%	0.00%	0.00%	0.00%
Income (loss) before income tax provision (benefit)	-5.96%	10.70%	10.98%	15.38%	15.14%	15.11%	15.04%	14.80%
Total income tax provision (benefit)	-1.49%	3.38%	-1.49%	4.01%	3.95%	3.94%	3.92%	3.86%
Net income (loss)	-4.47%	7.33%	12.47%	11.37%	11.19%	11.16%	11.11%	10.94%
Less: net income attributable to noncontrolling interests	-0.05%	-0.02%	-0.01%	-0.03%	-0.03%	-0.03%	-0.03%	-0.03%
Net income (loss) attributable to Waste Connections Inc.	-4.52%	7.30%	12.46%	11.34%	11.16%	11.14%	11.08%	10.91%

Waste Connections

Common Size Balance Sheet

<i>Fiscal Years Ending Dec. 31</i>	2015	2016	2017	2018E	2019E	2020E	2021E	2022E
Assets								
Cash & cash equivalents	0.52%	4.57%	9.37%	17.54%	19.69%	21.99%	24.36%	26.69%
Accounts receivable	12.05%	14.37%	11.97%	12.61%	12.61%	12.61%	12.61%	12.61%
Deferred income taxes	2.35%	2.64%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Current assets held for sale	0.00%	0.19%	0.03%	0.07%	0.07%	0.07%	0.07%	0.07%
Prepaid expenses & other current assets	2.20%	2.89%	4.04%	3.04%	3.04%	3.04%	3.04%	3.04%
Total current assets	17.12%	24.66%	25.42%	33.26%	35.42%	37.71%	40.09%	42.41%
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Restricted cash & investments	2.18%	1.88%	3.61%	3.89%	4.21%	4.58%	5.02%	5.57%
Property & equipment, net	129.33%	140.35%	104.11%	107.57%	110.69%	113.39%	116.23%	120.12%
Goodwill	67.20%	130.05%	101.11%	94.12%	88.12%	82.80%	78.40%	75.28%
Intangible assets, net	24.15%	31.61%	23.48%	22.28%	21.25%	20.35%	19.63%	19.21%
Long-term assets held for sale	0.00%	1.01%	0.27%	0.51%	0.50%	0.50%	0.49%	0.49%
Other assets, net	1.92%	2.00%	1.47%	1.38%	1.29%	1.22%	1.16%	1.12%
Total assets	241.90%	331.56%	259.47%	263.01%	261.48%	260.55%	261.02%	264.22%
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Liabilities and Shareholders' Equity	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Accounts payable	5.44%	7.44%	7.14%	6.67%	6.67%	6.67%	6.67%	6.67%
Book overdraft	0.58%	0.32%	0.42%	0.42%	0.43%	0.44%	0.46%	0.48%
Accrued liabilities	6.42%	7.98%	6.00%	6.48%	6.48%	6.48%	6.48%	6.48%
Deferred revenues	4.27%	3.97%	3.14%	3.80%	3.80%	3.80%	3.80%	3.80%
Current portion of contingent consideration	1.05%	0.64%	0.34%	0.68%	0.68%	0.68%	0.68%	0.68%
Current liabilities held for sale	0.00%	0.10%	0.05%	0.07%	0.07%	0.07%	0.07%	0.07%
Current portion of long-term debt & notes payable	0.10%	0.05%	0.25%	0.37%	0.36%	0.36%	0.36%	0.36%
Total current liabilities	17.87%	20.50%	17.33%	18.49%	18.49%	18.49%	18.51%	18.53%
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Long-term debt	101.41%	107.14%	84.22%	87.88%	86.62%	85.50%	84.84%	85.18%
Long-term portion of contingent consideration	1.28%	0.90%	0.68%	0.95%	0.95%	0.95%	0.95%	0.95%
Other long-term liabilities	5.90%	9.81%	6.83%	6.20%	6.20%	6.20%	6.20%	6.20%
Deferred income taxes	21.37%	25.71%	14.92%	14.81%	14.78%	14.80%	14.94%	15.30%
Total liabilities	147.83%	164.05%	123.97%	128.33%	127.04%	125.95%	125.45%	126.16%
Common stock	34.85%	126.69%	92.93%	86.61%	81.18%	76.38%	72.40%	69.59%
Accumulated other comprehensive income (loss)	-0.57%	-1.27%	2.34%	2.18%	2.04%	1.92%	1.82%	1.74%
Retained earnings (accumulated deficit)	59.49%	41.87%	40.10%	45.76%	51.08%	56.15%	61.20%	66.55%
Noncontrolling interest in subsidiaries	0.31%	0.22%	0.12%	0.13%	0.14%	0.15%	0.16%	0.17%
Total Shareholders' Equity	94.07%	167.51%	135.49%	134.68%	134.44%	134.59%	135.57%	138.06%
Total Liabilities & Shareholders' Equity	241.90%	331.56%	259.47%	263.01%	261.48%	260.55%	261.02%	264.22%

Waste Connections
Value Driver Estimation

Fiscal Years Ending Dec. 31	2015	2016	2017	2018E	2019E	2020E	2021E	2022E
EBITA								
Sales	2117.3	3375.9	4630.5	4974.1	5313.1	5654.0	5971.8	6219.4
COGS	1177.4	1957.7	2704.8	2852.1	3035.8	3219.3	3388.2	3516.3
Depreciation expense	240.4	393.6	530.2	512.4	568.7	625.0	681.4	737.7
Amortization expense	29.1	70.3	102.3	105.3	107.3	109.3	111.4	113.5
SG&A expense	237.5	474.3	509.6	580.3	619.9	659.6	696.7	725.6
Implied Interest on Operating Lease Obligations	19.1	26.6	26.3	27.3	28.3	29.3	30.3	31.3
EBITA	452.0	506.6	809.9	951.4	1009.8	1070.1	1124.4	1157.6
Adjusted Taxes								
Federal Tax Rate	-0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.2
State Tax Rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deferred Income Tax Liability Adjustments	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Effect of International Operations	0.0	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0
Marginal Tax Rate	-0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Income Tax Expense	-31.6	114.0	-68.9	199.7	210.0	222.9	234.3	240.3
Tax Shield on Loss of Sale of Assets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tax Shield on Impairments and Other Operating Items	-189.9	7.9	39.1	0.0	0.0	0.0	0.0	0.0
Tax Shield on Other Expense (Income), Net	0.0	0.2	0.9	0.0	0.0	0.0	0.0	0.0
Tax on Foreign Currency Transaction Gain	0.0	0.3	-0.6	0.0	0.0	0.0	0.0	0.0
Tax on Lease Interest	-7.3	7.6	6.6	7.1	7.4	7.6	7.9	8.2
Total Adjusted Taxes	-228.8	129.4	-21.7	206.8	217.3	230.6	242.3	248.4
Change in Deferred Taxes	-86.4	375.9	-87.9	45.7	48.7	51.9	55.3	59.0
NOPLAT	594.4	753.1	743.7	790.3	841.1	891.4	937.4	968.2
Net Operating Working Capital								
Normal Cash (up to 2% of sales)	11.0	67.5	92.6	872.6	1046.4	1243.2	1455.0	1660.1
Accounts Receivable	255.2	485.1	554.5	627.1	669.8	712.8	752.8	784.1
PrePaid Expenses	46.5	97.5	187.0	151.3	161.6	172.0	181.6	189.2
Accounts Payable	115.2	251.3	330.5	332.0	354.6	377.3	398.6	415.1
Book Overdrafts	12.4	11.0	19.2	21.0	22.9	24.9	27.2	29.7
Accrued Liabilities	136.0	269.4	278.0	322.3	344.3	366.3	386.9	403.0
Deferred Revenue	90.3	134.1	145.2	189.0	201.8	214.8	226.9	236.3
Other Current Liabilities	0.0	3.4	2.2	3.4	3.6	3.8	4.1	4.2
Net Operating Working Capital	-41.2	-18.9	58.9	783.4	950.6	1140.7	1345.8	1545.1
Net PP&E	2738.3	4738.1	4820.9	5350.9	5880.9	6410.9	6940.9	7470.9
Intangible Assets	511.3	1067.2	1087.4	1108.1	1129.2	1150.6	1172.5	1194.7
Other Noncurrent Assets	40.7	67.7	68.0	68.4	68.8	69.2	69.5	69.9
Capitalized PV of Operating Leases	89.9	135.5	155.8	172.9	190.1	207.2	224.3	241.5
Other Noncurrent Liabilities	124.9	331.1	316.2	308.4	329.4	350.5	370.2	385.6
Net Invested Capital	3255.3	5677.3	5816.0	6392.0	6939.5	7487.4	8037.0	8591.5
ROIC								
NOPLAT	594.4	753.1	743.7	790.3	841.1	891.4	937.4	968.2
Beginning Invested Capital	3163.8	3255.3	5677.3	5816.0	6392.0	6939.5	7487.4	8037.0
ROIC	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1
FCF								
NOPLAT	594.4	753.1	743.7	790.3	841.1	891.4	937.4	968.2
Change in Invested Capital	91.4	2422.1	138.7	576.0	547.5	547.8	549.7	554.4
FCF	503.0	-1669.0	605.0	214.3	293.6	343.6	387.8	413.7
EP								
Beginning Invested Capital	3163.8	3255.3	5677.3	5816.0	6392.0	6939.5	7487.4	8037.0
ROIC	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1
WACC	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
EP	397.1	550.1	389.7	427.6	442.5	458.6	470.5	466.9

Waste Connections

Weighted Average Cost of Capital (WACC) Estimation

30-Year Treasury	3.10%
Marginal Tax Rate	26.10%
Beta	0.79
Equity Risk Premium	4.80%
Cost of Equity	6.89%
Pretax Cost of Debt	3.75%
Shares Outstanding	263,683,000
Share Price	\$80.58
Market Value of Equity	21,247,576,140

Short Term Debt & Current Portion of

Long Term Debt	11,659,000
Long Term Debt	3,899,572,000
PV of Operating Leases	155,819,207
Market Value of Debt	4,067,050,207
Market Value of Firm	25,314,626,347
Equity/Total Market Value	83.93%
Debt/Total Market Value	16.07%

WACC	6.2%
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Waste Connections*Discounted Cash Flow (DCF) and Economic Profit (EP) Valuation Models*

Key Inputs:

CV Growth	4.15%
CV ROIC	12%
WACC	6%
Cost of Equity	6.89%

<i>Fiscal Years Ending Dec. 31</i>	2018E	2019E	2020E	2021E	2022E	2023E
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DCF Model

NOPLAT		790	841	891	937	968
Beginning IC		5816	6392	6940	7487	8037
Ending IC		6392	6940	7487	8037	8591
Change in IC		576	548	548	550	554
ROIC		14%	13%	13%	13%	12%
Free Cash Flows		214	294	344	388	414
Terminal Value						30375
Discount Rate		1.062	1.129	1.199	1.274	1.274
PV of FCF		\$ 201.73	\$ 260.13	\$ 286.55	\$ 304.43	\$ 23,846.52
Total		\$24,899.36				

+ Excess Cash	341
- Total Debt	3,911
- Other Long Term Liabilities	316
- PV of Operating Leases	156
Value of Equity	\$20,857.33
Share Outstanding	264
Intrinsic Value	<u>79.10</u>

EP Model

NOPLAT		790	841	891	937	968
Beginning IC		5816	6392	6940	7487	8037
ROIC-WACC		7%	7%	7%	6%	6%
EP		428	442	459	470	467
Terminal Value						22338
Discount Rate		1.062	1.129	1.199	1.274	1.274
PV of EP		402	392	382	369	17537
Total		19083				

Beginning IC	5816
Value of Operating Assets	24899
+ Excess Cash	341
- Total Debt	3,911
- Other Long Term Liabilities	316
- PV of Operating Leases	156
Value of Equity	\$20,857.33
Share Outstanding	263.7
Intrinsic Value	<u>79.10</u>
Partial Year Adjustment	<u>83.84</u>

Waste Connections

Dividend Discount Model (DDM) or Fundamental P/E Valuation Model

<i>Fiscal Years Ending Dec. 31</i>	2018E	2019E	2020E	2021E	2022E
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EPS	\$ 2.18	\$ 2.37	\$ 2.54	\$ 2.70	\$ 2.79
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Key Assumptions

CV growth	4.15%
CV ROE	7.90%
Cost of Equity	6.89%

Future Cash Flows

P/E Multiple (CV Year)					28.86569
EPS (CV Year)					2.79
Future Stock Price					80.58
Dividends Per Share	0.56	0.62	0.68	0.74	
Future Cash Flows	<u>0.56</u>	<u>0.62</u>	<u>0.68</u>	<u>0.74</u>	<u>80.58</u>
Discounted Cash Flows	0.55	0.59	0.63	0.66	72.31
Intrinsic Value	\$ 74.73				
Partial Year Adjust	\$ 79.21				

Waste Connections

Relative Valuation Models

Ticker	Company	Price	EPS		P/E 18	P/E 19	Est. 5yr EPS gr.	PEG 18	PEG 19
			2018E	2019E					
WM	Waste Management	\$90.38	\$4.08	\$4.41	22.2	20.5	8.1	2.73	2.53
RSG	Republic Services	\$73.25	\$3.05	\$3.28	24.0	22.3	7.6	3.16	2.94
			Average		23.1	21.4		2.9	2.7
WCN	Waste Connections	\$79.61	2.18	2.37	36.5	33.6	6.7	5.4	5.0

Implied Value:

Relative P/E (EPS18)	\$ 50.38
Relative P/E (EPS19)	\$ 50.69
PEG Ratio (EPS18)	\$ 43.10
PEG Ratio (EPS19)	\$ 43.36

Waste Connections*Key Management Ratios*

<i>Fiscal Years Ending Dec. 31</i>		2015	2016	2017	2018E	2019E	2020E	2021E	2022E
Liquidity Ratios									
Current Ratio	Current Assets/ Current Liabilities	0.96	1.20	1.47	1.80	1.92	2.04	2.17	2.29
Quick Ratio	Cash + AR/ Current Liabilities	0.70	0.92	1.23	1.63	1.75	1.87	2.00	2.12
Activity or Asset-Management Ratios									
Receivables Turnover	Sales/ Average AR	8.07	5.72	6.49	7.84	7.67	7.69	7.72	7.77
Fixed-Asset Turnover	Revenue/Avg PPE	0.78	0.57	0.71	0.91	0.89	0.86	0.85	0.83
Total Asset Turnover	Revenue/Total Assets	0.41	0.30	0.39	0.38	0.38	0.38	0.38	0.38
Financial Leverage Ratios									
Debt-Total Assets Ratio	Total Liabilities/Total Assets	0.61	0.49	0.48	0.49	0.49	0.48	0.48	0.48
Debt-Equity Ratio	LT Debt + ST Debt/Equity	1.08	0.64	0.62	0.66	0.65	0.64	0.63	0.62
Capitalization Ratio	LT Debt/LT Debt + Equity	0.52	0.39	0.38	0.39	0.39	0.39	0.38	0.38
Interest Coverage Ratio	EBIT/Interest Expense	6.64	4.71	5.42	5.32	5.10	5.15	5.16	5.07
Cash Flow to Debt Ratio	Operating Cash Flow/Total Debt	0.27	0.22	0.30	0.15	0.14	0.14	0.14	0.14
Profitability Ratios									
Gross Profit Margin	Gross Margin/Revenue	44.4%	42.0%	41.6%	42.7%	42.9%	43.1%	43.3%	43.5%
Operating Margin	Operating Profit/Revenue	-2.9%	13.4%	13.5%	18.6%	18.5%	18.4%	18.3%	18.1%
Pretax Profit Margin	EBIT/Revenue	20.0%	12.9%	15.3%	17.0%	17.0%	17.0%	17.0%	16.8%
Net Profit Margin	Net Income/Revenue	-4.5%	7.3%	12.5%	11.3%	11.2%	11.1%	11.1%	10.9%
Effective Tax Rate	Tax Expense/EBIT	-7.5%	26.1%	-9.7%	23.6%	23.3%	23.2%	23.1%	23.0%
Return on Assets	Net Income/Average Total Assets	-1.8%	3.0%	5.0%	4.5%	4.4%	4.4%	4.4%	4.2%
Return on Equity	Net Income/Average Equity	-4.5%	6.4%	9.7%	8.7%	8.6%	8.5%	8.4%	8.1%

WACC vs. CV Growth

WACC											
CV Growth	83.84	3.95%	4.00%	4.05%	4.10%	4.15%	4.20%	4.25%	4.30%	4.35%	
	5.32%	137.92	142.80	148.07	153.78	159.96	166.70	174.08	182.17	191.10	
	5.55%	115.95	119.36	123.00	126.89	131.05	135.53	140.35	145.55	151.19	
	5.78%	99.77	102.25	104.88	107.66	110.61	113.75	117.10	120.67	124.49	
	6.01%	87.40	89.27	91.23	93.29	95.47	97.76	100.19	102.75	105.47	
	6.24%	77.69	79.12	80.63	82.20	83.84	85.57	87.39	89.29	91.30	
	6.44%	70.81	71.97	73.18	74.44	75.76	77.14	78.58	80.08	81.66	
	6.64%	65.04	65.99	66.98	68.00	69.07	70.18	71.34	72.55	73.81	
	6.84%	60.14	60.92	61.74	62.58	63.46	64.37	65.32	66.30	67.32	
	7.04%	55.93	56.59	57.27	57.97	58.70	59.45	60.22	61.03	61.87	

Cost of Equity vs. Pre-Tax Cost of Debt

Cost of Equity											
Pre-Tax Cost of Debt	83.84	2.95%	3.15%	3.35%	3.55%	3.75%	3.95%	4.15%	4.35%	4.55%	
	6.09%	143.11	140.20	137.38	134.67	132.04	129.51	127.06	124.68	122.39	
	6.29%	124.97	122.67	120.43	118.27	116.18	114.14	112.17	110.25	108.39	
	6.49%	110.50	108.63	106.82	105.05	103.34	101.67	100.05	98.47	96.93	
	6.69%	98.68	97.14	95.64	94.17	92.74	91.35	89.99	88.66	87.37	
	6.89%	88.85	87.56	86.29	85.05	83.84	82.66	81.51	80.38	79.28	
	7.09%	80.55	79.44	78.36	77.30	76.27	75.25	74.26	73.29	72.33	
	7.29%	73.44	72.48	71.55	70.63	69.73	68.85	67.99	67.14	66.31	
	7.49%	67.28	66.45	65.63	64.83	64.04	63.27	62.51	61.77	61.04	
	7.69%	61.90	61.16	60.45	59.74	59.04	58.36	57.69	57.03	56.39	

Beta vs. Equity Risk Premium

Beta											
Equity Risk Premium	83.84	4.60%	4.65%	4.70%	4.75%	4.80%	4.85%	4.90%	4.95%	5.00%	
	0.59	161.56	157.89	154.36	150.98	147.72	144.59	141.57	138.67	135.87	
	0.64	136.43	133.48	130.64	127.90	125.27	122.72	120.27	117.90	115.61	
	0.69	117.47	115.02	112.65	110.37	108.17	106.04	103.98	101.99	100.06	
	0.74	102.65	100.56	98.55	96.60	94.71	92.89	91.12	89.41	87.75	
	0.79	90.75	88.94	87.18	85.49	83.84	82.25	80.71	79.21	77.76	
	0.84	80.98	79.38	77.84	76.34	74.88	73.47	72.11	70.78	69.49	
	0.89	72.82	71.39	70.01	68.67	67.37	66.10	64.88	63.69	62.53	
	0.94	65.89	64.61	63.36	62.15	60.97	59.83	58.72	57.64	56.59	
	0.99	59.95	58.78	57.64	56.53	55.46	54.42	53.40	52.42	51.46	