






REPUBLIC® SERVICES

We'll handle it from here.®

2020 Summary Annual Report



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This Summary Annual Report reflects results as of and for the year ended December 31, 2020, except where noted.

Company Overview

35K EMPLOYEES ★ **41** STATES ★ **$10B** IN REVENUE

75 landfill gas & renewable energy projects

76 RECYCLING PROCESSING CENTERS

5M AVERAGE PICKUPS PER DAY

186 active, modern-day landfills

6M tons of materials processed

85% employee engagement score

6 treatment, recovery & disposal facilities

345 hauling facilities

220 transfer stations

16K TRUCKS | 5TH LARGEST vocational fleet in the nation

21% of fleet powered by natural gas

9 salt water disposal wells

77% of residential routes automated

7 deep injection wells

39% better safety performance than the industry average
Based on OSHA recordable rates

$600M+ investment in acquisitions

REPUBLIC SERVICES CHARITABLE FOUNDATION

2.1 MILLION people positively impacted through charitable giving

A MESSAGE TO OUR SHAREHOLDERS

The Republic Services team began 2020 from a position of strength. Our dedication over the past decade to building a stable, predictable and resilient business model was essential to our ability to take care of our team, our customers and our communities throughout the COVID-19 pandemic. In fact, in many ways this unprecedented adversity propelled us to outperform expectations for the year. We were able to swiftly address numerous pandemic-related challenges through planning, relentless customer service and a passion for taking care of one another.

2020 Financial Highlights

Republic Services delivered record-setting financial results, exceeding the high end of the original guidance provided in early 2020. We generated $1.24 billion of adjusted free cash flow throughout the year, and improved free cash flow conversion to over 41 percent.

The resiliency of our business resulted in adjusted EBITDA of $2.99 billion and adjusted EBITDA margin of 29.4 percent, a 130 basis point improvement over the prior year. The outsized margin expansion is a direct result of pricing in excess of cost inflation and dynamically flexing our costs for changes in underlying demand.

We continued to prioritize acquisition opportunities to further strengthen our leading market positions and expand into new markets with attractive growth profiles, investing $613 million in acquisitions in 2020. As part of our balanced approach to capital allocation, we returned $621 million to our shareholders through dividends and share repurchases.

We also achieved record-setting operational results in 2020. Despite the year's challenges, our team increased customer retention rates to an all-time high at just above 93 percent and delivered record-setting safety performance.

Differentiating Capabilities

Our strategy is designed to generate profitable growth by sustainably managing our customers' environmental services needs. This includes growth opportunities in our most profitable lines of business and those with opportunity for outpaced volume growth. We continue to build on our success evolving municipal and recycling models. The environmental services industry presents new expansion opportunities, and we believe our environmental solutions business will experience above-average growth. The best use of free cash flow to increase long-term shareholder value continues to be investing in acquisitions with attractive returns, and our 2021 acquisition pipeline remains full.

To effectively execute our strategic plan, we prioritize the development of and investment in capabilities that will differentiate us in the marketplace. These capabilities include:

CUSTOMER ZEAL
We drive customer loyalty by offering differentiated products and services specifically designed to meet our customers' needs. We have a customer-centric culture and key initiatives to drive superior customer experience.

SUSTAINABILITY
We protect our Blue Planet® by providing customers with environmentally responsible solutions.

DIGITAL
We leverage data and technology to enhance our service offerings, drive operational efficiencies and provide a seamless customer experience.

8%
Increase in Adjusted EPS

$1.24B
of Adjusted Free Cash Flow Generated

$621M
Returned to Shareholders

$613M
Invested in Acquisitions

ENDNOTE: Adjusted free cash flow, adjusted EBITDA and adjusted EPS are defined in Republic's Current Report on Form 8-K, dated February 22, 2021.

Committed to Serve

As an essential services provider, Republic Services has remained fully operational throughout the pandemic. Most of our employees have remained in the field, taking care of our customers and communities. Republic immediately responded to the pandemic with swift and comprehensive action to help protect and support our employees, customers and communities. We distributed hundreds of thousands of masks and sanitation supplies to protect our employees, and made accommodations to our facilities to keep our people safe. We also transitioned more than 1,200 customer service employees to a remote work environment in only three days, while maintaining exceptional customer service.

To thank our frontline employees and to support local small businesses, many of which are our customers, we launched our $30+ million Committed to Serve initiative in early 2020. Committed to Serve was designed to support our team members and our customers in meaningful ways at a time when it was needed the most. You can read more about the initiative on pages 4 and 5 of this report.

> *Since day one of the pandemic, our priorities have been simple and remain unchanged. Put our people first, keep our facilities running safely and take care of our customers.*

We also enhanced benefits for our employees during this time. This included 10 additional days of PTO for any employee diagnosed with or required to quarantine due to exposure to COVID-19 as well as enhanced EAP support for mental health and wellness. Combined with Committed to Serve, this brings our direct financial support provided to our frontline employees to $45 million since the start of the pandemic.

Culture and Human Capital Management

We are committed to maintaining a culture where the best people come to work and where everyone always feels safe, valued and respected. What sets us apart from others is our view that the composite strength of our team, with their unique ideas, experiences and backgrounds, is essential to our ability to meet and anticipate our customers' needs. Our Mission of Supporting an Inclusive Culture (MOSAIC) is more important than ever, and is just one of the reasons Republic has been recognized on Forbes' Best Employers for Women list for the past two years and was recently certified for the fourth time as a Great Place to Work.

During 2020, we also continued to open up additional avenues for engagement among our employees with conversations about race through our "Let's Talk" series and leveraging our Business Resource Groups, which include Women of Republic, V.A.L.O.R. (Veterans, Advocacy, Learning, Outreach and Recruiting), Black Employee Network and our soon-to-launch Unidos, which will focus on the LatinX community. These networks are a foundational element in helping ensure an inclusive culture and a sense of belonging for our employees to both thrive and drive business impact.

We also believe that an engaged workforce is the greatest indicator of our success, which is why engagement is a core part of our strategy. Engaged employees deliver better customer service and are more productive. Our employee engagement scores and participation rates continue to reflect a high level of engagement by our people.

Our talent programs are a critical part of our human capital approach. We remain relentlessly focused on hiring and retaining the best talent. Our development programs help us train and advance a diverse and talented pool of individuals across the organization. We also partner with third parties, including Historically Black Colleges and Universities, to enhance the diversity of our talent pools.

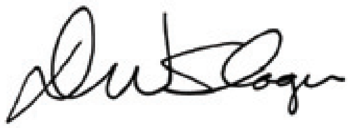
Our Blue Planet: 2030 Sustainability Goals

Throughout the year, we made meaningful progress toward our newest set of ambitious sustainability goals launched in 2019. Our efforts are designed to significantly benefit the environment and society while enhancing the foundation and profitability of our business for the long-term.

As part of our commitment to reduce carbon emissions, we have taken a leadership position in the industry to embrace electrification. We believe this emerging technology will be the preferred choice to power recycling and solid waste trucks and equipment in the future. In 2020, in addition to our ongoing electric vehicle pilots with multiple suppliers, we made a minority investment and entered into a strategic alliance with Romeo Power to further explore electric solutions for our fleet.

We are proud to be an industry leader in environmental services, and were honored to receive notable third-party recognition and rankings in 2020, including the World's Most Ethical Companies® list by Ethisphere, 2020 Dow Jones Sustainability World and North America Indices and 3BL Media's 100 Best Corporate Citizens.

I want to thank all of our employees for their extraordinary efforts during this unprecedented year and our Board of Directors for their continued guidance and support. Together, we will continue to manage the business to create long-term value for all of our stakeholders and provide essential environmental services for our customers.



Donald W. Slager
Chief Executive Officer

Committed to Serve

Republic Services is proud to be an essential environmental services provider making a difference for our employees, customers and communities.

Committed to Small Businesses

Small businesses are the cornerstone of strong and vibrant neighborhoods, and many have struggled to safely remain open. To help, the Republic Services Charitable Foundation contributed **$3 million** to three national nonprofit partners, which funded **grants to 29 local affiliates** across the country to support **more than 135 small business** revitalization projects.

Republic Services
Charitable Foundation

Habitat for Humanity | NeighborWorks America | Rebuilding Together

With the help of this funding, **Rebuilding Together St. Louis** is completing a range of projects at City Greens Market, Lift For Life Academy and the Wesley House Association to provide critical assistance that will help each organization overcome pandemic-related hurdles and better serve the community.

With revitalization projects at nine businesses, including Roma Pizzeria, **Rebuilding Together Northeast Ohio** is leveraging the Committed to Serve grant funding to create economic momentum in the Akron and Cleveland areas and support an entire community of entrepreneurs.

Dallas Area Habitat for Humanity is strengthening the community with its Committed to Serve grant and donations from local organizations. Dallas Habitat is providing critical repairs and resources to small businesses, including P&S Corner Store and Marsalis Urgent Care, that serve as community anchors.

OUR COMMITMENT

Committed to Serve is our **more than $30 million initiative** to recognize our **28,000 frontline employees** and help support small businesses at the heart of local economies.

$11M
gift cards to frontline employees to support the local economy

$6M
to local restaurants for meals for employees and their families

$3M
to the Republic Services Charitable Foundation to support local nonprofit projects to rebuild and revitalize small businesses

$14M
in Committed to Serve awards of $500 to each of our 28,000 frontline employees

Committed to Our Communities

From food and housing insecurity to lack of personal protective equipment, many communities have found themselves in need. In response, Republic Services teams across the country showed up every day to lend a helping hand – wherever and whenever needed.

Our Bellevue, Wash., team collected supplies for the Snoqualmie Valley Food Bank.

"Our employees and families have a deep connection with the people we serve. It is important for Republic Services to support local food banks during the COVID-19 crisis in order to keep communities like North Bend strong and vibrant."

— Russell J., Municipal Services Manager

Republic's team in South Bend, Ind., supported LOGAN Center, an organization that supports people with intellectual and development disabilities, with a donation of masks and sanitizer.

"Republic Services cares deeply about the communities we serve, and we are proud to support LOGAN so they can continue doing their important work. It's our way of saying thank you, from one essential services provider to another."

— Cody H., General Manager

Awards & Recognition

Forbes 2020 THE BEST EMPLOYERS for WOMEN
POWERED BY STATISTA

Great Place To Work® Certified
AUG 2020–AUG 2021
USA

3BL MEDIA
100 BEST CORPORATE CITIZENS 2020

2020 WORLD'S MOST ETHICAL COMPANIES®
WWW.ETHISPHERE.COM

MEMBER OF
Dow Jones Sustainability Indices
In collaboration with SAM
a RobecoSAM brand

National Waste & Recycling Association
Collect. Recycle. Innovate.

2020 Organics Recycler of the Year

The National Waste & Recycling Association (NWRA) named Republic Services the 2020 Organics Recycler of the Year. The industry award recognizes the Company's innovation and leadership in diverting food and yard waste from landfills through food recovery, organics pre-processing and composting. Republic's organics operations, which include 11 compost facilities in five states, help us recover more key materials from the waste stream and contribute to the circular economy.

Our Blue Planet®: 2030 Goals

In 2020, we made meaningful progress toward our ambitious set of sustainability goals. This progress is detailed in our Sustainability Report which can be found at **RepublicServices.com/sustainability**.

SAFETY GOALS

Safety Amplified

0
Zero employee fatalities

Reduce our OSHA Total Recordable Incident Rate (TRIR) to 2.0 or less by 2030

PEOPLE GOAL

Engaged Workforce

88%
Achieve and maintain employee engagement scores at or above 88% by 2030

OPERATIONS GOAL

Climate Leadership

35%
Reduce absolute Scope 1 and 2 greenhouse gas emissions 35% by 2030 (2017 baseline year)

★ **SBTi APPROVED**[1] ★

MATERIALS MANAGEMENT GOALS

Circular Economy

40%
Increase recovery of key materials by 40% on a combined basis by 2030 (2017 baseline year)

Regenerative Landfills

50%
Increase biogas sent to beneficial reuse by 50% by 2030 (2017 baseline year)

COMMUNITIES GOAL

Charitable Giving

20M
Positively **impact 20 million people** by 2030

1. SBTi is a collaboration between CDP, the United Nations Global Compact (UNGC), World Resources Institute (WRI) and the World Wide Fund for Nature (WWF)

Board of Directors

Manuel Kadre
Chairman of the Board

Tomago Collins
Chair, Sustainability & Corporate Responsibility Committee

Michael A. Duffy
Director

Thomas W. Handley
Chair, Management Development & Compensation Committee

Jennifer M. Kirk
Chair, Audit Committee

Michael Larson
Chair, Nominating & Corporate Governance Committee

Kim S. Pegula
Director

Donald W. Slager
Chief Executive Officer

James P. Snee
Director

Sandra M. Volpe
Director

Katharine B. Weymouth
Director

Executive Leadership Team

Donald W. Slager
Chief Executive Officer

Jon Vander Ark
President

Brian Bales
Executive Vice President, Chief Development Officer

Brian DelGhiaccio
Executive Vice President, Chief Financial Officer

Catharine Ellingsen
Executive Vice President, Chief Legal Officer, Chief Ethics & Compliance Officer and Corporate Secretary

Amanda Hodges
Executive Vice President, Chief Marketing Officer

Jeff Hughes
Executive Vice President, Chief Administrative Officer

Tim Stuart
Executive Vice President, Chief Operating Officer

Corporate Information

Headquarters
Republic Services, Inc.
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Phoenix, Arizona 85054
480-627-2700

Investor Relations
18500 N. Allied Way
Phoenix, Arizona 85054
investor@RepublicServices.com

Independent Registered Public Accounting Firm
Ernst & Young LLP
101 E. Washington St., Suite 910
Phoenix, Arizona 85004

Common Stock Transfer Agent & Registrar
EQ Shareowner Services
P.O. Box 64859
St. Paul, Minnesota 55164

Learn more about our products as well as view our Sustainability Report and Annual Report at RepublicServices.com

UNITED STATES SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
Form 10-K

☐ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For the fiscal year ended December 31, 2020

or

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For the transition period from _________ to _________

Commission file number: 1-14267

REPUBLIC SERVICES, INC.
(Exact Name of Registrant as Specified in its Charter)

Delaware	**65-0716904**
(State or Other Jurisdiction of Incorporation or Organization)	*(IRS Employer Identification No.)*
18500 North Allied Way Phoenix, Arizona	**85054**
(Address of Principal Executive Offices)	*(Zip Code)*

Registrant's telephone number, including area code: (480) 627-2700

Securities registered pursuant to Section 12(b) of the Act:

Title of Each Class	Trading Symbol(s)	Name of Each Exchange On Which Registered
Common Stock, par value $0.01 per share	**RSG**	**The New York Stock Exchange**

Securities registered pursuant to Section 12(g) of the Act:
None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☑ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes ☐ No ☑

Note – Checking the box above will not relieve any registrant required to file reports pursuant to Section 13 or 15(d) of the Exchange Act from their obligations under those Sections.

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☑ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☑ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer ☑ Accelerated filer ☐ Smaller reporting company ☐ Emerging growth company ☐
Non-accelerated filer ☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes ☐ No ☑

As of June 30, 2020, the aggregate market value of the shares of the Common Stock held by non-affiliates of the registrant was $26.1 billion.

As of February 17, 2021, the registrant had outstanding 318,898,313 shares of Common Stock (excluding treasury shares of 33,294).

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the Registrant's Proxy Statement relative to the 2021 Annual Meeting of Shareholders are incorporated by reference in Part III hereof.

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Unless the context requires otherwise, all references in this Form 10-K to Republic, the Company, we, us and our refer to Republic Services, Inc. and its consolidated subsidiaries.

PART I

ITEM 1. BUSINESS

Overview

Republic is one of the largest providers of environmental services in the United States, as measured by revenue. As of December 31, 2020, we operated facilities in 41 states through 345 collection operations, 220 transfer stations, 186 active landfills, 76 recycling processing centers, 6 treatment, recovery and disposal facilities, 9 salt water disposal wells, and 7 deep injection wells. We are engaged in 75 landfill gas-to-energy and renewable energy projects and had post-closure responsibility for 128 closed landfills. We were incorporated in Delaware in 1996.

We believe the total addressable environmental services market in which we operate generates approximately $87 billion of annual revenue, which includes the $67 billion U.S. recycling and solid waste industry and $20 billion of the broader environmental services industry. Within our recycling and solid waste business, we prioritize investments in market verticals with above average growth rates and higher return profiles. Environmental services remains fragmented which provides consolidation opportunities to drive scale. We believe we will be able to further expand our addressable market into other segments of the environmental services industry over time by leveraging our differentiated capabilities.

Our operations are national in scope, but the physical collection and recycling or disposal of material is very much a local business and the dynamics and opportunities differ in each of our markets. By combining local operating management with standardized business practices, we drive greater overall operating efficiency across the Company while maintaining day-to-day operating decisions at the local level, closest to the customer.

We believe that our products and services are valuable to our customers and essential for long-term sustainability. Our focus and commitment to sustainability allows us to attract and retain the best talent, win more customers, increase customer loyalty, and ultimately drive higher revenue and profits.

In March 2020, the World Health Organization declared the outbreak of a new strain of coronavirus (COVID-19) a pandemic. The COVID-19 pandemic has impacted the global economy as well as certain aspects of our operations and performance. During this time, we continued to provide essential services to our customers while prioritizing the health and safety of our employees. In April 2020, we launched our Committed to Serve initiative to help our employees, customers and communities across the United States. The impact of COVID-19 on our business and associated costs are discussed in Item 7, *Management's Discussion and Analysis of Financial Condition and Results of Operations* in this Annual Report on Form 10-K.

Foundational Elements

Our strategy is designed to generate profitable growth by sustainably managing our customers' needs, and it is underpinned by three foundational elements – (1) our market position, (2) operating model, and (3) management of human capital through our people and talent agenda.

Market Position

Our goal is to develop the best vertically integrated market position to enable us to build density and improve returns. We strive to have a number one or number two market position in each of the markets we serve, or have a clear path on how we will achieve a leading market position over time. In situations where we cannot establish a leading market position, or where operations are not generating acceptable returns, we may decide to divest certain assets and reallocate resources to other markets.

We have a robust market planning process to identify opportunities to grow internally through capital investments and infrastructure development, and externally through acquisitions and public-private partnerships. Additionally, our market planning process allows us to analyze market conditions and proactively adjust to trends as they emerge, including the effects of demographic shifts, and changes in the market and the competitive landscape.

Internal Growth

- Volume Growth – We believe volumes are driven by population growth, household formation and new business formation. Volume growth through increases in our customer base and service offerings is the most capital efficient method to grow our business. We seek to obtain long-term contracts for collecting recyclable and solid waste material under residential collection contracts with municipalities, exclusive franchise agreements, and small-container and large-container contracts. We also look to enter into long-term disposal and recycling processing contracts with municipalities and other third parties. By obtaining such long-term agreements, we can grow our contracted revenue base at a rate consistent with the underlying economic growth in these markets. In addition, by securing long-term agreements, we are better able to help ensure we earn an appropriate return on the capital deployed.

- Price Increases – We seek to secure price increases necessary to offset increased costs, improve our operating margins and earn an appropriate return on our substantial investments in vehicles, equipment, landfills, transfer stations and recycling processing centers.

- Expansion of Recycling Capabilities - Based on the most recent U.S. Environmental Protection Agency (EPA) data, we believe approximately 32% of municipal solid waste is recycled and composted, and we expect that percentage to increase over the long-term. While there are examples of communities cancelling their recycling programs, many more communities remain committed to enhancing and expanding their recycling programs for their residents. We continue to focus on innovative material handling processes and programs to help our customers achieve their goals related to sustainability and environmentally sound waste practices while also generating an appropriate return. We will continue to look for opportunities to expand or enhance our recycling capabilities in markets where customers are demanding these services and demonstrating a willingness to pay, and we can earn an appropriate return on our investment.

- Infrastructure Development – We seek to identify opportunities to further our position as a vertically integrated service provider in markets where we are not fully integrated. Our goal is to create market-specific, vertically integrated operations typically consisting of one or more collection operations, transfer stations, landfills and recycling processing centers. Where appropriate, we seek to obtain permits to build transfer stations, recycling processing centers and landfills that would vertically integrate our waste services or expand the service areas for our existing disposal sites. Additionally, we seek opportunities to expand and permit new airspace at our existing landfills in order to replace airspace consumed. Development projects, while generally less capital intensive than acquisitions, typically require extensive permitting efforts that can take years to complete with no assurance of success. We undertake development projects when we believe there is a reasonable probability of success and where reasonably priced acquisition opportunities are not available.

External Growth

- Acquisitions and Public-Private Partnerships – Our acquisition growth strategy focuses primarily on acquiring privately held recycling and solid waste companies that complement our existing business platform. We believe our ability to successfully complete these acquisitions is enhanced by the challenges facing many privately-held companies, including increasing competition in the environmental services industry, increasing capital requirements due to changes in regulatory requirements and technology and the limited number of exit strategies for privately-held companies. We also evaluate opportunities to acquire operations and facilities that are being divested by other publicly-owned companies.

  We continue to invest in value-enhancing acquisitions in existing markets. Generally, we expect to maintain a steady pace of tuck-in acquisition investment of approximately $200 million annually. Given our free cash flow, availability under our credit facilities and our ability to access the public capital markets, we have the financial flexibility to make additional acquisitions that will complement our existing business platform, including larger acquisitions if the right opportunities present themselves.

We also focus on growth through public-private partnerships, which include the recycling and waste operations and facilities of municipal and other local governments. We believe over time we have an opportunity to acquire operations and facilities from municipalities and other local governments, as they seek to raise capital and/or reduce risk.

We realize synergies from consolidating businesses into our existing operations, whether through acquisitions or public-private partnerships, which allows us to reduce capital expenditures and expenses associated with truck routing, personnel, fleet maintenance, inventories and back-office administration.

Operating Model

Our operating model allows us to deliver a consistent, high-quality service to all our customers through the Republic Way: *One Way. Everywhere. Every day*. This approach of developing standardized processes with rigorous controls and tracking allows us to leverage our scale and deliver durable operational excellence. The Republic Way is the key to harnessing the best of what we do as operators and translating that across all facets of our business. Key elements of our operating model are our organizational structure, safety, fleet automation, compressed natural gas vehicles, fleet electrification and standardized maintenance.

Organizational Structure

A key enabler of the Republic Way operating model is our organizational structure that fosters a high performance culture by maintaining 360-degree accountability and full profit and loss responsibility with local management, supported by a functional structure to provide subject matter expertise. This structure allows us to take advantage of our scale by coordinating functionally across all of our markets, while empowering local management to respond to unique market dynamics.

Through this operating model, we have rolled out several productivity and cost control initiatives designed to deliver the best service possible to our customers in an efficient and environmentally sound way.

Safety

Republic is dedicated to the safety of our employees, customers and the communities we serve. We have a dedicated team of safety professionals at our corporate headquarters and in our field operations, the leader of which reports directly to our Chief Operating Officer. Due to the nature of our industry, we make safety a top priority and we recognize and reward employees for outstanding safety records. Over the past 10 years, our safety performance (based on OSHA recordable rates) has been 39% better than the industry average. Our *Think, Choose, Live* slogan encapsulates our everyday safety messaging to our employees to: *Think* about what you are doing, *Choose* the safe answer, and *Live* to go home to your family. With the phrase printed on numerous items, including hard hats and the equipment our employees touch, there are constant reminders for employees to go home in the same condition in which they came to work. Our goal is to ensure every one of our employees returns home safely each night.

Through our Safety Amplified program, we are providing even more tools and driving even greater awareness to help our teams better execute our safety standards. Regular training, multifaceted programs and strategic partnerships are key components to this program. It is simple by design and comprised of actions and activities that ensure safety is embedded in all we do. The program includes six initiatives to help us achieve our goal to have zero employee fatalities and reduce our OSHA Total Recordable Incident Rate.

- Focus Together: This is our core safety program created for our frontline employees and designed to help eliminate six types of serious incidents. We recently extended the scope and reach of the program to include all employees across the company.

- Lead Together: This focus area brings best-in-class communication channels to our employees and includes advanced training techniques for all supervisors and managers.

- Partner Together: We're initiating more frequent and higher quality leadership visits and interaction with frontline employees. These visits are designed to pull together leaders from a variety of departments to support the divisions' safety goals.

- Celebrate Together: We take pride in recognizing employees who demonstrate a relentless commitment to safety. Employees with the best driving records are eligible for the industry's most prestigious award, the National Waste & Recycling Association's Driver of the Year. Republic drivers have won 70% of the Driver of the Year awards issued for the large truck category since 2009. In addition, our best drivers are recognized and rewarded with competing in our National Road-EO competition.

- Analyze Together: We analyze real-time data to make short- and long-term decisions and identify opportunities for improvement. Examples include analysis of roadway awareness training, data mapping and other employee protection and preparedness insights. With these analytics we will be able to make proactive safety decisions to generate better results.

- Innovate Together: We leverage the latest technologies, including automation, and take a data-driven approach to support our employees. These innovations include rear cameras, in-cab backing alarm systems and event recording systems throughout our fleet. We're also working with equipment manufacturers to incorporate safety elements such as seat belt alarms, blind spot awareness, lane departure alarms and other potentially lifesaving equipment in our fleet.

We believe our Safety Amplified program will provide additional benefits for our Company and stakeholders including:

1. further strengthening relationships within the communities we service;

2. enhancing customer trust;

3. streamlining operational processes and increasing productivity;

4. delivering a reputational advantage, including positioning our Company as an employer-of-choice;

5. building and sustaining a safety culture in all areas of our business; and

6. contributing to employee engagement.

For more information regarding our safety performance, refer to our SASB report, which can be found at republicservices.com/sustainability. The information contained on our website shall not be deemed incorporated by reference in this Annual Report on Form 10-K or in any other filing we make under the Exchange Act.

Fleet Automation

Approximately 77% of our residential routes have been converted to automated single-driver trucks. By converting our residential routes to automated service, we reduce labor costs, improve driver productivity, decrease emissions and create a safer work environment for our employees. Additionally, communities using automated vehicles have higher participation rates in recycling programs, thereby complementing our initiative to expand our recycling capabilities.

Compressed Natural Gas (CNG) Vehicles

Approximately 21% of our fleet operates on natural gas. Approximately 13% of our replacement vehicle purchases during 2020 were CNG vehicles. We believe using CNG vehicles provides us a competitive advantage in communities with strict clean emission initiatives that focus on protecting the environment. Although upfront capital costs are higher, using CNG reduces our overall fleet operating costs through lower fuel expenses. As of December 31, 2020, we operated 38 CNG fueling stations.

Fleet Electrification

We are taking a leadership position in electric technology innovation for our fleet. This is a critical step toward reducing our environmental impact through lower fleet emissions, and we believe it will also improve our total cost of ownership while providing a competitive advantage in certain communities. We are partnering with multiple manufacturers to pilot electric-powered recycling and solid waste trucks. In addition, we are working with an electric battery manufacturer to retrofit diesel-powered trucks. We will apply what we learn from these programs to future electrification initiatives.

Standardized Maintenance

Based on an industry trade publication, we operate the fifth largest vocational fleet in the United States. As of December 31, 2020, our average fleet age in years, by line of business, was as follows:

	Approximate Number of Vehicles	Approximate Average Age
Residential	6,900	7.4
Small-container	4,900	6.8
Large-container	4,500	8.7
Total	16,300	7.6

OneFleet, our standardized vehicle maintenance program, enables us to use best practices for fleet management, truck care and maintenance. Through standardization of core functions, we believe we can minimize variability in our maintenance processes, resulting in higher vehicle quality and a lower environmental footprint, while extending the average service life of our fleet. We believe operating a more reliable, greener, safer and more efficient fleet will lower our operating costs. Additionally, our focus on preventative maintenance is improving the reliability of our fleet and enabling us to provide superior service to our customers, differentiating us from our competition. The entire fleet was certified under OneFleet in 2017.

Human Capital Management

Our management of human capital is embodied in our robust people and talent agenda, the goal of which is to maintain an environment that attracts and retains the best talent. Our 35,000 full-time employees continue to be a critical component in successfully executing our strategy and running our operations. We aspire to always be a company where the best people, with exceptional talents and diverse backgrounds, can thrive.

We are dedicated to driving our human capital objectives, which include (1) representing the diversity of the communities we serve and sustaining a safe and inclusive culture, (2) maintaining a highly engaged workforce, (3) developing our talent through learning and development experiences, and (4) offering compensation and benefits that attract and retain the best workforce. We review key progress metrics such as representation, engagement and turnover and regularly report on these metrics to our Board of Directors. This level of reporting holds all of our leaders accountable for advancing our human capital agenda.

Inclusion and Diversity

We are proud of the diversity of our front-line workforce, as it closely represents the demographics of the communities that we serve. We are relentless in our focus to improve representation of diverse groups across all levels of the Company. Our commitment to inclusion and diversity starts at the top of our organization, as outlined in our Mission of Supporting an Inclusive Culture (MOSAIC), established in 2013, and supported by the MOSAIC Council. The MOSAIC Council consists of leaders from across the Company who serve as ambassadors and thought partners for inclusion and diversity. This enables us to continue to develop new strategies and activities that are tied to the needs of our employees, customers and business with the goal of creating an even more inclusive work environment and diverse workforce.

We support inclusion and connectivity for our diverse populations through our business resource groups, including Women of Republic, VALOR (Veterans, Advocacy, Learning, Outreach and Recruiting), and the Black Employee Network (BEN) which we launched in early 2020. When the nation experienced an inflection point in race relations in 2020, we were well-positioned to address the call for social justice because it aligns with our value of respect and is reinforced by our existing commitment to advancing and supporting Black employees and Black communities.

We plan to launch a Hispanic business resource group in 2021 given the representation of LatinX employees in our workforce and the desire to create community amongst this valued population. While business resource groups help to drive a more inclusive environment for our diverse populations, we remain committed to driving inclusion for all of our employees.

In 2020, we also launched new programs and virtual events to advance awareness, education and connectivity across our workforce. Our “Let’s Talk” series has had over 3,000 virtual attendees, and is aimed to further our employees’ understanding and empathy related to the topic of inclusion and diversity. We will continue to offer opportunities to help our employees conduct courageous and authentic conversations with one another, and we are committed to maintaining a work environment where people of all backgrounds feel valued and safe to share their perspectives.

Employee Engagement

We believe an engaged workforce is the greatest indicator of our success. We measure employee engagement through a third party survey, assessing employee sentiment on a variety of topics such as pride for the Company, job satisfaction and intention to stay. We have found that business units with a highly engaged workforce experience less turnover. We have also found that employees whose leaders are highly inclusive are more likely to speak up and share their perspective. In addition, we believe that engaged employees deliver better customer service and are more productive, which is directly tied to the success of our business. Our goal is to achieve and maintain employee engagement scores at or above 88% by 2030. Our employee engagement score was approximately 85% in 2020, which was consistent with our score in 2019. Approximately 92% of our employees participated in the engagement survey process in 2020, which represented an all-time-high participation rate, compared to approximately 84% in 2019. Employee engagement is a core part of our business strategy, which is why we compensate our General Managers on their employee engagement scores. This helps to ensure that our leaders are held accountable and rewarded for their efforts to drive a more engaged workforce.

Talent Development

We are committed to providing our employees with opportunities to develop throughout their careers. Our programs, including new hire onboarding and new leader assimilation, reinforce our Company values, expectations, and business approach. Targeted development experiences support the growth of people in key roles, including Driver Training, Technician Training, Supervisor Training, Sales Acceleration, General Manager Onboarding, and more. We believe these programs provide the fundamental skills necessary to be successful across roles.

Our leadership programs are a critical part of our human capital approach. We remain focused on attracting, hiring and developing early career leaders. Our rotational training and development programs, including our General Manager Acceleration Program and Leadership Trainee Program, help us attract, develop and advance a diverse and talented pool of individuals from across our organization. These programs are sponsored by our

Executive Leadership team, which provides visibility and support for the career advancement of our high-potential talent across the organization. Since the beginning of these programs in 2017, over 40 leaders have graduated into leadership positions. We have found that these programs and experiences help ensure that the next generation of leaders build the necessary skills and experiences to be successful in their roles today, and in the future.

In 2020, seven of our leadership programs were converted to a virtual platform and delivered to over 2,550 employees. Providing development opportunities to distributed work forces requires innovative training methods, and we use mixed mediums to deliver trainings and instruction to our employees across the country. We remain committed to expanding employee participation in learning programs that are relevant to our business strategy and contribute to career advancement for our employees.

As we continue to grow as a Company, we are focused on developing a high performing workforce that is diverse, engaged, and well prepared to meet the needs of our customers and communities.

Rewards

We offer competitive compensation and benefits programs to our workforce to meet their personal and professional needs. Our commitment to paying market competitive wages enables us to attract and hire talent all across the country. Our approach to paying for performance supports our focus on pay equity. Our compensation packages are designed to provide employees with a stable and livable wage and growth potential. Our focus on wellness also provides our employees with access to preventative care, advice on financial planning and support for mental health, contributing to our efforts to provide a total rewards package that improves and enhances the lives of our employees.

Differentiating Capabilities

To effectively execute our strategic plan, we prioritize the development and investment in capabilities that will differentiate us in the marketplace. These capabilities include – (1) customer zeal, (2) sustainability, and (3) digital.

Customer Zeal

The goal of our customer zeal capability is to drive customer loyalty by offering differentiated products and services specifically designed to meet our customers' needs. We believe this increases customer loyalty and willingness to pay for a higher value service.

To help our sales team identify specific customer needs and configure the right offering, we use a Priority Based Selling (PBS) technique and our Capture pricing tool nationwide.

- PBS enables us to identify and segment customers' buying priorities, and attract customers that are willing to pay for enhanced offerings.

- Capture is a cloud-based pricing tool that creates a more professional sales experience, helps realize better pricing levels at the point of sale and provides enhanced controls over the price quoting process.

In response to our customers' requests, we expanded our suite of products to include electronics recycling with BlueGuard® and universal recycling. For those services that we don't provide, we fulfill demand through our alliance partnerships while maintaining the customer facing relationship.

To help ensure a consistent customer experience, we invested in our customer service capabilities and consolidated over 100 customer service locations into three Customer Resource Centers. These state-of-the-art centers and the technology deployed provide our customer service employees with the tools and capabilities they need to provide better levels of service though a variety of communication channels. These centers enhance the customer experience and provide us a platform to reduce the cost to service our customers.

To help ensure our efforts are making an impact and building customer loyalty, we solicit feedback from our customers, including Net Promoter Score℠, so that every General Manager receives recent, relevant feedback that allows him or her the ability to reach out to customers directly and address issues immediately.

Sustainability

The goal of our sustainability capability is to protect our Blue Planet® by providing our customers with environmentally responsible solutions that support a cleaner, safer, and healthier world. We are committed to focusing on the five elements of sustainability that underpin our business strategy: Safety, People, Operations, Materials Management and Communities. These elements continue to guide our short- and long-term sustainability and business goals.

Our Board of Directors' Sustainability and Corporate Responsibility Committee has oversight responsibility with respect to our sustainability performance, our corporate responsibilities, our role as a socially responsible organization and our enterprise risks, including cyber security, environmental, climate related risks and opportunities, and reputational risks. The Committee conducts a formal comprehensive review of the Company's performance in these areas on an annual basis.

Our Blue Planet: 2030 Goals

As we grow, so does our opportunity to make a meaningful positive impact on the environment and society. In 2019, we unveiled our ambitious 2030 goals, which are aligned with the UN Sustainable Development Goals(1). Each goal is aligned with the Company's five sustainability elements, and together they are designed to significantly benefit the environment and society while enhancing the foundation and profitability of our business for the long-term.

- *Safety Amplified:* Achieve zero annual employee fatalities and reduce OSHA Total Recordable Incident Rate (TRIR) to 2.0 or less by 2030
- *Engaged Workforce:* Achieve and maintain employee engagement scores at or above 88% by 2030
- *Climate Leadership:* Reduce absolute Scope 1 and 2 greenhouse gas emissions 35% by 2030(2), aligned with SBTi(2)
- *Circular Economy:* Increase recovery of key materials by 40% on a combined basis by 2030(2)
- *Regenerative Landfills:* Increase biogas sent to beneficial reuse by 50% by 2030(2)
- *Charitable Giving:* Positively impact 20 million people by 2030

We believe that reducing our impact on the planet and improving the quality of life for its inhabitants are the right things to do, and they are also necessary actions to ensure a vibrant future for our organization.

Refer to our sustainability reports for updates regarding our progress towards these goals, which can be found at republicservices.com/sustainability. The information contained on our website shall not be deemed incorporated by reference in this Annual Report on Form 10-K or in any other filing we make under the Exchange Act.

(1) We have aligned our 2030 goals with the following UN Sustainable Development Goals: (8) Decent Work and Economic Growth, (11) Sustainable Cities and Communities, (12) Responsible Consumption and Production and (13) Climate Action. SBTi, or Science Based Targets initiative, is a collaboration between CDP, the United Nations Global Compact (UNGC), World Resources Institute (WRI) and the World Wide Fund for Nature (WWF).

(2) Data points used 2017 as the baseline year.

Digital

The goal of our digital capability is to allow us to provide a consistent experience across our business while enabling our customers to do business with us through more channels and with better access to information.

We are responding to our customers' requests for options to do business with us digitally. By increasing the ease of use and functionality of our web-based market presence, we believe we enhance customer satisfaction, interaction, and connectivity while lowering our costs. These tools reinforce to our customers that they can rely on us to handle their recycling and waste service needs in a way that is easy and convenient for them.

- Our website and mobile app are online account management tools, allowing customers access to their accounts and our services.

- Our e-commerce sales channel allows customers to secure services on a real-time basis, provides capabilities to meet our customer's evolving buying preferences, and provides a lower cost sales channel.

We are also leveraging technology to digitally connect our customers, drivers, dispatchers, supervisors and trucks via our "RISE" dispatch platform and in-cab technology. We are utilizing an agile iterative approach to the development and multi-year roll-out of this technology to ensure durable adoption and an appropriate return on our investment. With the roll-out of this technology we will improve productivity through more real-time routing information and data visualization tools, increase customer connectivity and enable automated service verification communications, and enhance the employee experience by providing better tools and technology designed around employee interaction. In 2020, the rollout of the "RISE" dispatch platform was substantially completed. The rollout of the "RISE" in-cab technology enhancements will continue through 2021.

Cash Utilization Strategy

We take a consistent and balanced approach to capital allocation to drive long-term, sustainable value for our shareholders. The predictability of our free cash flows allows us to efficiently execute our capital allocation strategy, which includes investing in acquisitions and returning free cash flow to our shareholders through dividends and share repurchases. We are committed to an efficient capital structure and maintaining our investment grade credit ratings on our senior debt, which was rated BBB+ by Standard & Poor's Ratings Services, BBB by Fitch Ratings, Inc. and Baa2 by Moody's Investors Service, Inc. as of December 31, 2020. Such ratings have allowed us, and should continue to allow us, to readily access capital markets at competitive rates.

We manage our free cash flow by ensuring that capital expenditures and operating asset levels are appropriate in light of our existing business and growth opportunities, and by closely managing our working capital, which consists primarily of accounts receivable, accounts payable, and accrued landfill and environmental costs.

Dividends

In July 2020, our Board of Directors approved an increase in the quarterly dividend to $0.425 per share, which represents an increase of approximately 5% over the prior year. Over the last five years, our dividends have increased at a compounded annual growth rate of 7.2%. We expect to continue paying quarterly cash dividends and may consider additional dividend increases if we believe they will enhance shareholder value.

Share Repurchases

In October 2017, our Board of Directors added $2.0 billion to the existing share repurchase authorization, which continued through December 31, 2020. In October 2020, our Board of Directors approved a $2.0 billion share repurchase authorization effective starting January 1, 2021 and extending through December 31, 2023. Share repurchases under the current program may be made through open market purchases or privately negotiated transactions in accordance with applicable federal securities laws. While the Board of Directors has approved the program, the timing of any purchases, the prices and the number of shares of common stock to be purchased will be determined by our management, at its discretion, and will depend upon market conditions and other factors. The share repurchase program may be extended, suspended or discontinued at any time. On a quarterly basis, our Board of Directors reviews the intrinsic value of our stock and the parameters around which we repurchase our shares.

Shareholder Value

We are committed to creating long-term shareholder value by generating consistent earnings and cash flow growth, while continually improving returns on invested capital. Our incentive compensation programs are aligned with these objectives at all levels of management. We have an active shareholder outreach program and routinely interact with shareholders on a number of matters, including governance, executive compensation, environmental and social matters.

Management Team

We believe that building and blending a diverse team of strong industry veterans, along with talented people from other industries who bring unique skill sets, will contribute to what we call our Composite Strength. Composite Strength combines the vast, varied experience and capability of both strong environmental services industry veterans and talented people from other industries. Additionally, Composite Strength helps ensure the continuity of leadership and preservation of institutional knowledge, while also bringing in skills and new ideas from other companies outside of our industry - many of them from leading companies.

Donald W. Slager serves as the Company’s Chief Executive Officer, a position he has held since January 2011. He previously held the role of President and Chief Executive Officer from January 2011 to May 2019, and served as the Company’s President and Chief Operating Officer from the Allied Waste Industries, Inc. (Allied) acquisition in December 2008 until January 2011. Prior to the Allied acquisition, Mr. Slager worked for Allied from 1992 through 2008 and served in various management positions, including President and Chief Operating Officer from 2004 through 2008, and Executive Vice President and Chief Operating Officer from 2003 to 2004. From 2001 to 2003, Mr. Slager served as Senior Vice President, Operations. Mr. Slager held various management positions at Allied from 1992 to 2003, and was previously General Manager at National Waste Services, where he served in various management positions since 1985. Mr. Slager has over 35 years of experience in the solid waste industry. Mr. Slager has been a member of our Board of Directors since June 24, 2010.

Brian Bales was named Executive Vice President, Chief Development Officer in February 2015. Mr. Bales has been with Republic for over 20 years, serving as Executive Vice President, Business Development from December 2008 to February 2015, and Vice President, Corporate Development from 1998 until the Allied acquisition in December 2008. Prior to his time at Republic, Mr. Bales held roles of increasing responsibility in finance and business development for Ryder System, Inc. from 1993 to 1998, and served as chief financial officer for EDIFEX & VTA Communications from 1988 through 1993. Prior to that, Mr. Bales was an accountant for PwC (formerly Price Waterhouse) from 1986 to 1988.

Brian DelGhiaccio was named Executive Vice President, Chief Financial Officer in June 2020. Mr. DelGhiaccio has over 20 years of experience in a variety of roles of increasing responsibility. He was named Executive Vice President and Chief Transformation Officer in June 2019. Before that, Mr. DelGhiaccio served as Vice President, Investor Relations from 2012 to 2014, progressed to Senior Vice President, Finance from 2014 to 2017 and then to Senior Vice President, Business Transformation in 2017. Prior to his time at Republic Services, Mr. DelGhiaccio was a senior consultant with Arthur Andersen.

Catharine D. Ellingsen was named Executive Vice President, Chief Legal Officer, Chief Ethics & Compliance Officer, and Corporate Secretary in June 2016. Ms. Ellingsen joined Allied as Corporate Counsel in August 2001 and has experience in a variety of roles of increasing responsibility. She was named Managing Corporate Counsel in January 2003, Director, Legal and Associate General Counsel in January 2005, and Vice President and Deputy General Counsel in June 2007. Ms. Ellingsen continued as Vice President and Deputy General Counsel at Republic following the Allied acquisition in December 2008. She was then named Senior Vice President, Human Resources in August 2011 and served in that position until June 2016. Before joining Allied, Ms. Ellingsen was an attorney at Steptoe & Johnson LLP from 1996 to 2001 and at Bryan Cave LLP from 1993 to 1996.

Jeffrey A. Hughes was named Executive Vice President, Chief Administrative Officer in December 2008. Before that, Mr. Hughes served as Senior Vice President, Eastern Region Operations for Allied from 2004 until the Allied acquisition in December 2008. Mr. Hughes served as Assistant Vice President of Operations Support for Allied from 1999 to 2004 and as a District Manager for Allied from 1988 to 1999. Mr. Hughes has over 29 years of experience in the solid waste industry.

Tim Stuart was named Executive Vice President, Chief Operating Officer in May 2019. Prior to his current role, Mr. Stuart served as Executive Vice President, Operations from January 2016 to May 2019, where he was responsible for maximizing field performance, executing the operating plan, and achieving financial and operational results across the Company. Mr. Stuart previously served as the Company's East Region President from September 2013 to January 2016. He joined Republic in April 2006 as Director of Operations, and has held a variety of roles with the Company, including Area President, Vice President of Customer Experience, and Region Vice President. Mr. Stuart has over 20 years of experience in the waste industry.

Jon Vander Ark was named President in May 2019, and is responsible for overseeing the Company's operations, sales, marketing and business development. Mr. Vander Ark served as the Company's Executive Vice President, Chief Operating Officer from January 2018 to May 2019. Prior to that, Mr. Vander Ark served as the Company's Executive Vice President, Operations from March 2016 to January 2018. Mr. Vander Ark joined the Company in January 2013 as Executive Vice President, Chief Marketing Officer. Prior to joining the Company, he served as a partner at McKinsey & Company's Detroit office, managing clients across a variety of industries, including transportation, logistics, manufacturing and consumer products.

Our local and area management teams have extensive industry experience in growing, operating and managing environmental services companies and have substantial experience in their local geographic markets. This allows us to quickly respond to and meet our customers' needs and stay in touch with local businesses and municipalities. We believe our strong area management teams allow us to effectively and efficiently drive our initiatives and help ensure consistency throughout the organization. Our area management teams and area presidents have extensive authority and responsibility over operations within their respective geographic markets. As a result of retaining experienced managers with extensive knowledge of and involvement in their local communities, we are proactive in anticipating customers' needs and adjusting to changes in our markets. We also seek to implement the best practices of our various business units throughout our operations to continue improving our operations and our operating margins.

Integrated Operations

We have a strong, national, vertically-integrated operating platform that allows us to compete more effectively and efficiently in the local markets in which we operate. Where appropriate, we seek to achieve a high rate of internalization by controlling material streams from the point of collection through recycling processing or disposal. During the year ended December 31, 2020, approximately 68% of the total solid waste volume we collected was disposed at landfills we own or operate (internalization). Our fully integrated markets generally have a lower cost of operations and more favorable cash flows than our markets that are not fully integrated. Through acquisitions, landfill operating agreements and other market development activities, we create market-specific, vertically-integrated operations typically consisting of one or more collection operations, transfer stations and landfills. We also operate recycling processing centers in markets where diversion of waste is a priority, customers are willing to pay for the service, and we can earn an appropriate return on our investment.

Our operations primarily consist of providing environmental services, including the collection and processing of recyclable materials, collection, transfer and disposal of non-hazardous solid waste, and other environmental solutions.

Collection Services

We provide residential, small-container, and large-container collection services through 345 collection operations. In 2020, approximately 75% of our total revenue was derived from our collection business, of which approximately 23% of our total revenue related to residential services, approximately 31% related to small-container services, and approximately 22% related to large-container services.

Our residential collection business involves the curbside collection of material for transport to transfer stations, or directly to landfills or recycling processing centers. We typically perform residential collection services under contracts with municipalities, which we generally secure through competitive bids, which give us exclusive rights to service all or a portion of the homes in the municipalities. These contracts usually range in duration from one to five years, although some of our exclusive franchises are for significantly longer periods. We also perform residential services on a subscription basis, in which individual households contract directly with us. The fees received for subscription residential collection are based primarily on the market, collection frequency, type of service, the distance to the disposal facility and the cost of disposal. In general, subscription residential collection fees are paid quarterly in advance by the customers receiving the service.

In our small-container business, we supply our customers with recycling and waste containers of varying sizes. We typically perform small-container collection services under one- to three-year service agreements, and fees are determined based on a number of factors including the market, collection frequency, type of equipment furnished, type and volume or weight of the material collected, transportation costs and the cost of processing or disposal. Our small-container services are typically offered to small business complexes, multi-family housing and strip malls, and include industries such as restaurants, retail, real-estate, and professional and other services.

Our large-container collection business includes both recurring and temporary customer relationships. For the recurring portion, we supply our customers with recycling and waste containers of varying sizes and rent compactors to large generators of material. We typically perform the collection services under one- to three-year service agreements, and fees are determined based on a number of factors including the market, collection frequency, type of equipment furnished, type and volume or weight of the material collected, transportation costs and the cost of disposal. Our recurring large-container services are typically offered to larger facilities, hotels and office buildings, and include industries such as manufacturing, retail, hospitality, professional and other services.

For the temporary portion of our large-container collection business, the majority of the material relates to construction and demolition activities and is typically event-driven. We provide temporary collection services on a contractual basis with terms ranging from a single pickup to one-year or longer.

Transfer Services

We own or operate 220 transfer stations. Revenue at our transfer stations is primarily generated by charging tipping or disposal fees, which accounted for approximately 6% of our revenue during 2020. Our collection operations deposit material at these transfer stations, as do other private and municipal haulers, for compaction and transfer to disposal sites or recycling processing centers. Transfer stations provide collection operations with a cost effective means to consolidate material and reduce transportation costs while providing our landfills with an additional mechanism to extend their geographic reach.

When our own collection operations use our transfer stations, this improves internalization by allowing us to retain fees we would otherwise pay to third-party disposal sites. It also allows us to manage costs associated with material disposal because: (1) transfer trucks have larger capacities than collection trucks, allowing us to deliver more material to the landfill or processing center in each trip; (2) material is accumulated and compacted at strategically located transfer stations to increase efficiency; and (3) we can retain volume by managing the material to one of our own landfills or processing centers rather than to a competitor's.

Landfill Services

We own or operate 186 active landfills. Our tipping fees charged to third parties accounted for approximately 13% of our revenue during 2020. As of December 31, 2020, we had 38,481 permitted acres and total available permitted and probable expansion disposal capacity of 5.0 billion in-place cubic yards. The in-place capacity of our landfills is subject to change based on engineering factors, requirements of regulatory authorities, our ability to continue to operate our landfills in compliance with applicable regulations, and our ability to successfully renew operating permits and obtain expansion permits at our sites. Some of our landfills accept non-hazardous special waste, including utility ash, asbestos and contaminated soils.

Most of our active landfill sites have the potential for expanded disposal capacity beyond the currently permitted acreage. We monitor the availability of permitted disposal capacity at each of our landfills and evaluate whether to pursue an expansion at a given landfill based on estimated future waste volumes and prices, market needs, remaining capacity and the likelihood of obtaining an expansion. To satisfy future disposal demand, we are seeking to expand permitted capacity at certain landfills; however, we cannot assure you that all proposed or future expansions will be permitted.

Republic is committed to harnessing landfill gas, the natural byproduct of decomposing waste, and converting it to energy. The use of landfill gas provides economic and environmental benefits, including reducing air pollution through the capture and use of methane. As of December 31, 2020, we operated 75 landfill gas and renewable energy projects. The majority of these projects were developed and are owned by a third party.

We also have responsibility for 128 closed landfills, for which we have associated closure and post-closure obligations.

Recycling Services

We own or operate 76 recycling processing centers. These centers generate revenue through the processing and sale of old corrugated containers (OCC), old newsprint (ONP), aluminum, glass and other materials, which accounted for approximately 3% of our revenue during 2020. Approximately 78% of our total recycling processing center volume is fiber based and includes OCC, ONP and other mixed paper. During 2020, we processed and sold 2.1 million tons, excluding glass and organics, from our recycling processing centers. An additional 2.2 million tons were collected by us and delivered to third parties.

Changing market demand for recycled commodities causes volatility in commodity prices. At current volumes and mix of materials, we believe a $10 per ton change in the price of recycled commodities will change both annual revenue and operating income by approximately $12 million.

In certain instances, we issue recycling rebates to our municipal or large-container customers, which can be based on the price we receive upon the final sale of recycled commodities, a fixed contractual rate or other measures. We also receive rebates when we dispose of recycled commodities at third-party processing facilities.

As consumer demand for recycling services has increased, we have met that demand by integrating recycling components to each of our collection service offerings. Our goal is to provide a complete material stream management solution to our customers in a vertically integrated, environmentally sustainable way.

We continue to invest in proven technologies to control costs and to simplify and streamline recycling for our customers. For example, robotics and advanced sorting equipment, such as disk screens, magnets and optical sorters, identifies and separates different kinds of paper, metals, plastics and other materials to increase efficiency and maximize our recycling efforts.

Environmental Solutions

In addition to certain of our landfill disposal sites, we own or operate 6 treatment, recovery and disposal facilities, 9 salt water disposal wells and 7 deep injection wells. Environmental solutions volume is generated from the by-products of oil and natural gas exploration and production activity. Additionally, it is generated by the daily operations of industrial, petrochemical and refining facilities, including maintenance, plant turnarounds and capital projects. We provide these customers with environmentally responsible solutions to manage their waste needs including disposal of solid and liquid materials and in-plant services, such as transportation and logistics. In 2020, approximately 1% of our revenue was derived from environmental solutions.

Other Services

Other revenue consists primarily of National Accounts revenue generated from nationwide or regional contracts in markets outside our operating areas where the associated material handling services are subcontracted to local operators. Consequently, substantially all of this revenue is offset with related subcontract costs, which are recorded in cost of operations.

Competition

We operate in a competitive industry. Competition in the environmental services industry comes from a few other large, national publicly-owned companies, several regional publicly- and privately-owned companies, and thousands of small privately-owned companies. In any given market, competitors may have larger operations and greater resources. In addition, we compete with municipalities that maintain material collection or disposal operations. These municipalities may have financial advantages due to the availability of tax revenue and greater opportunities for tax-exempt financing.

We compete for collection accounts primarily based on our product offering, quality of service and price. From time-to-time, our competitors reduce the price of their services in an effort to expand market share or to win a competitively bid municipal contract. Our ability to maintain and increase prices in certain markets may be impacted by our competitors' pricing policies. This may have an effect on our future revenue and profitability.

Seasonality and Severe Weather

Our operating revenues tend to be somewhat higher in the summer months, primarily due to higher volumes of construction and demolition waste. The volumes of large-container and residential recycling and waste in certain regions of the country also tend to increase during the summer months. Our second and third quarter revenues and results of operations typically reflect this seasonality.

Our operations can be adversely affected by periods of inclement or severe weather, which could increase the volume of material collected under our existing contracts (without corresponding compensation), delay the collection and disposal of material, reduce the volume of material delivered to our disposal sites or delay the construction or expansion of our landfill sites and other facilities. Our operations also can be favorably affected by severe weather, which could increase the volume of material in situations where we are able to charge for our additional services.

Regulation

Our facilities and operations are subject to a variety of federal, state and local requirements that regulate, among other things, the environment, public health, safety, zoning and land use. Operating and other permits, licenses and other approvals generally are required for landfills and transfer stations, recycling centers, certain solid waste collection vehicles, fuel storage tanks and other equipment and facilities that we own or operate. These permits are subject to denial, revocation, modification and renewal in certain circumstances. Any revocation, modification or denial of permits could have a material adverse effect on us. Federal, state and local laws and regulations vary, but generally govern wastewater or storm water discharges, air emissions, the handling, transportation, treatment, storage and disposal of hazardous and non-hazardous waste, and the remediation of contamination associated with the release or threatened release of hazardous substances. These laws and regulations provide governmental authorities with strict powers of enforcement, which include the ability to revoke or decline to renew any of our operating permits, obtain injunctions, or impose fines or penalties in the event of violations, including criminal penalties. The U.S. EPA and various other federal, state and local authorities administer these regulations.

In order to comply with these regulations, we must incur substantial capital expenditures relating to our vehicles, landfills, transfer stations, and recycling processing centers, and in connection with our capping, closure, post-closure and environmental remediation activities. Compliance with existing and future legal and regulatory requirements, including changes relating to per- and polyfluoroalkyl substances (commonly referred to as PFAS) and other chemicals of emerging concern, and limitations or bans on disposal of certain types of wastes or on the transportation of waste, could increase our costs to operate or require additional capital expenditures.

A decrease in regulation may lower barriers to entry for our competitors. Further, we compete with counties and municipalities that operate their own collection and disposal facilities, have the benefits of tax revenue, and greater opportunities for tax-exempt financing.

We strive to conduct our operations in compliance with applicable laws, regulations and permits. However, from time to time we have been issued citations or notices from governmental authorities that have resulted in the need to expend funds for remedial work and related activities at various landfills and other facilities or in the need to expend funds for fines, penalties or settlements. We cannot assure you that citations and notices will not be issued in the future despite our strong regulatory compliance efforts. We have established final capping, closure, post-closure and remediation reserves that we believe, based on currently available information, will be adequate to cover our current estimates of regulatory costs; however, we cannot assure you that actual costs will not exceed our reserves.

Federal Regulation

The following summarizes the primary federal, environmental, and occupational health and safety-related statutes that affect our facilities and operations:

- *The Solid Waste Disposal Act, including the Resource Conservation and Recovery Act* (RCRA). RCRA establishes a framework for regulating the handling, transportation, treatment, storage and disposal of hazardous and non-hazardous solid waste, and requires states to develop programs to ensure the safe disposal of solid waste in sanitary landfills.

  Subtitle D of RCRA establishes a framework for regulating the disposal of municipal solid waste. Regulations under Subtitle D currently include minimum comprehensive solid waste management criteria and guidelines, including location restrictions, facility design and operating criteria, final capping, closure and post-closure requirements, financial assurance standards, groundwater monitoring requirements and corrective action standards. All of the states in which we operate have implemented permit programs pursuant to RCRA and Subtitle D. These state permit programs may include landfill requirements that are more stringent than those of Subtitle D. Our failure to comply with any of these environmental requirements at any of our locations may lead to temporary or permanent loss of an operating permit, which would result in costs in connection with securing new permits, reduced revenue from lost operational time, and increased third party disposal costs.

  All of our planned landfill expansions and new landfill development projects have been engineered to meet or exceed Subtitle D requirements, as applicable. Operating and design criteria for existing operations have been modified to comply with these regulations. Compliance with Subtitle D regulations has resulted in increased costs and may in the future require substantial additional expenditures in addition to other costs normally associated with our waste management activities.

- *The Comprehensive Environmental Response, Compensation and Liability Act of 1980* (CERCLA). CERCLA, among other things, provides for the cleanup of sites from which there is a release or threatened release of a hazardous substance into the environment. CERCLA may impose strict joint and several liability for the costs of cleanup and for damages to natural resources upon current owners and operators of a site, parties who were owners or operators of a site at the time the hazardous substances were disposed of, parties who transported the hazardous substances to a site, and parties who arranged for the disposal of the hazardous substances at a site. Under the authority of CERCLA and its implementing regulations, detailed requirements apply to the manner and degree of investigation and remediation of facilities and sites where hazardous substances have been or are threatened to be released into the environment. Liability under CERCLA is not dependent on the existence or disposal of only hazardous wastes, but also can be based upon the existence of small quantities of more than 700 substances currently characterized by the EPA as hazardous, many of which are found in common household waste. The EPA may also designate additional substances as hazardous. Among other things, CERCLA authorizes the federal government to investigate and remediate sites at which hazardous substances have been or are threatened to be released into the environment, or to order persons potentially liable for the cleanup of the hazardous substances to do so themselves. In addition, the EPA has established a National Priorities List of sites at which hazardous substances have been, or are threatened to be, released and which require investigation or cleanup.

CERCLA liability is strict liability. It can be founded upon the release or threatened release, even as a result of unintentional, non-negligent or lawful action, of hazardous substances, including very small quantities of such substances. Thus, even if we have never knowingly transported or received hazardous substances, it is possible that hazardous substances have been deposited or released at landfills or other facilities that we presently or historically have owned or operated, or at properties owned by third parties to which we have transported waste. Therefore, we could be liable under CERCLA for the cost of cleaning up, or protecting against the release of, such hazardous substances at such sites and for damages to natural resources, even if those substances were deposited at our facilities before we acquired or operated them. The costs of a CERCLA cleanup can be very expensive and can include the costs of disposing of hazardous substances at appropriately-licensed facilities. Given the difficulty of obtaining insurance for environmental impairment liability, any such liability could have a material effect on our business, financial condition, results of operations and cash flows.

- *The Federal Water Pollution Control Act of 1972* (the Clean Water Act). This act regulates the discharge of pollutants from a variety of sources, including solid waste disposal sites, into streams, rivers and other waters of the United States. Runoff from our landfills and transfer stations that is discharged into surface waters through discrete conveyances must be covered by discharge permits that generally require us to conduct sampling and monitoring, and, under certain circumstances, to reduce the quantity of pollutants in those discharges. Storm water discharge regulations under the Clean Water Act require a permit for certain construction activities and for runoff from industrial operations and facilities, which may affect our operations. If a landfill or transfer station discharges wastewater through a sewage system to a publicly-owned treatment works, the facility must comply with discharge limits imposed by that treatment works. In addition, states may adopt groundwater protection programs under the Clean Water Act or the Safe Drinking Water Act that could affect the manner in which our landfills monitor and control their waste management activities. Furthermore, if development at any of our facilities alters or affects wetlands, we may be required to secure permits before such development starts. In these situations, permitting agencies may require mitigation of wetland impacts.

- *The Clean Air Act.* The Clean Air Act imposes limitations on emissions from various sources, including landfills. In March 1996, the EPA promulgated regulations that require large municipal solid waste landfills to install landfill gas monitoring systems along with landfill gas control systems unless emissions are below established thresholds. These regulations apply to landfills that commenced construction, reconstruction or modification on or after May 30, 1991, and, principally, to landfills that can accommodate 2.5 million cubic meters or more of municipal solid waste. The regulations apply whether the landfills are active or closed. The date by which each affected landfill must have a gas collection and control system installed and made operational varies depending on calculated emission rates at the landfill. On July 14, 2016, the EPA issued final amendments to its regulations that require large landfills that commenced construction, reconstruction, or modification on or after July 17, 2014 to capture additional landfill gas to reduce emissions of methane and certain non-methane gases, which are recognized as greenhouse gases. In a separate rule finalized that same day, the EPA issued updates to its 1996 Emission Guidelines to reduce emissions of landfill gas from existing active landfills. Both actions were part of the Obama Administration's Climate Action Plan - Strategy to Reduce Methane Emissions. These and other efforts to curtail the emission of greenhouse gases and to ameliorate the effect of climate change may require our landfills to deploy more stringent emission controls and monitoring systems, with resulting capital or operating costs. Many state regulatory agencies also currently require monitoring systems for the collection and control of certain landfill gas. Certain of these state agencies are also implementing greenhouse gas control regulations that would also apply to landfill gas emissions. See Item 1A, *Risk Factors – Regulation of greenhouse gas emissions and other governmental regulations could impose costs on our operations, the magnitude of which we cannot yet estimate*, in this Form 10-K.

In addition, our vehicle fleet also may become subject to higher efficiency standards or other carbon-emission restrictions. Over the past decade, the EPA and the National Highway Traffic Safety Administration (NHTSA) have adopted regulations mandating the reduction of vehicle tail pipe emissions as a means of reducing greenhouse gas emissions. The regulations take the form of fuel economy standards. The EPA and the NHTSA have developed fuel economy standards in two vehicle categories: (1) passenger automobiles and light-duty trucks (collectively, light-duty vehicles); and (2) heavy-duty trucks, including solid waste collection vehicles and tractor trailers. We own and operate vehicles in both categories. For light-duty vehicles, in May 2010 the EPA and the NHTSA finalized fuel economy standards for model years 2012 through 2016. In October 2011, the EPA and the NHTSA initiated a second round of rulemaking for light-duty vehicles for model years 2017 through 2025. In 2018, the EPA and the NHTSA proposed to revise the light-duty vehicle standards for model years 2021 through 2024 to make them less stringent; final action on the proposal occurred in 2020 but has been challenged in court. In August 2011, the EPA and the NHTSA finalized standards for heavy-duty trucks, including solid waste collection vehicles and tractor trailers, for model years 2014 through 2018. On August 16, 2016, the EPA and the NHTSA jointly issued additional regulations that would impose more stringent standards for heavy-duty vehicles through model-year 2027. In issuing the proposed fuel economy standards for heavy-duty trucks (including tractor trailers), the government estimated that the increased equipment cost would be recouped over a period of two years for a tractor/trailer combo, and over a period of 6 years for a garbage truck, and each vehicle would continue to save fuel costs over its operating life.

- *The Occupational Safety and Health Act of 1970* (OSHA). This act authorizes the Occupational Safety and Health Administration of the U.S. Department of Labor to promulgate occupational safety and health standards. A number of these standards, including standards for notices of hazardous chemicals and the handling of asbestos, apply to our facilities and operations.

State and Local Regulation

Each state in which we operate has its own laws and regulations governing solid waste disposal, water and air pollution, and, in most cases, releases and cleanup of hazardous substances and liabilities for such matters. States also have adopted regulations governing the design, operation, maintenance and closure of landfills and transfer stations. Some counties, municipalities and other local governments have adopted similar laws and regulations. In addition, our operations may be affected by the trend in many states toward requiring solid waste reduction and recycling programs. For example, several states have enacted laws that require counties or municipalities to adopt comprehensive plans to reduce, through solid waste planning, composting, recycling or other programs, the volume of solid waste deposited in landfills. Additionally, laws and regulations restricting the disposal of certain waste in solid waste landfills, including yard waste, food waste, newspapers, beverage containers, unshredded tires, lead-acid batteries, electronic wastes and household appliances, have been adopted in several states and are being considered in others. Legislative and regulatory measures to mandate or encourage waste reduction at the source and waste recycling also have been considered, or are under consideration by, the U.S. Congress and the EPA.

To construct, operate and expand a landfill, we must obtain one or more construction or operating permits, as well as zoning and land use approvals. These permits and approvals may be burdensome to obtain and to comply with, are often opposed by neighboring landowners and citizens' groups, may be subject to periodic renewal, and are subject to denial, modification, non-renewal and revocation by the issuing agency. Significant compliance disclosure obligations often accompany these processes. In connection with our acquisition of existing landfills, we may be required to spend considerable time, effort and money to bring the acquired facilities into compliance with applicable requirements and to obtain the permits and approvals necessary to increase their capacity.

Other Regulations

Many of our facilities own and operate underground storage tanks that are generally used to store petroleum-based products. These tanks can be subject to federal, state and local laws and regulations that mandate their periodic testing, upgrading, closure and removal. In the event of leaks or releases from these tanks, these regulations require that polluted groundwater and soils be remediated. If underground storage tanks we own or operate leak, we could be liable for response costs and, if the leakage migrates onto the property of others, we could be liable for damages to third parties. We are unaware of facts indicating that issues of compliance with regulations related to underground storage tanks will have a material adverse effect on our consolidated financial condition, results of operations or cash flows.

With regard to our solid waste transportation operations, we are subject to the jurisdiction of the Surface Transportation Board and are regulated by the Federal Highway Administration, Office of Motor Carriers, and by regulatory agencies in states that regulate such matters. Various state and local government authorities have adopted, or are considering adopting, laws and regulations that would restrict the transportation of solid waste across state, county, or other jurisdictional lines. In 1978, the U.S. Supreme Court ruled that a law that restricts the importation of out-of-state solid waste is unconstitutional; however, states have attempted to distinguish proposed laws from those involved in and implicated by that ruling. In 1994, the U.S. Supreme Court ruled that a flow control law, which attempted to restrict solid waste from leaving its place of generation, imposes an impermissible burden upon interstate commerce and is unconstitutional. In 2007, however, the U.S. Supreme Court upheld the right of a local government to direct the flow of solid waste to a publicly-owned and publicly-operated waste facility. A number of county and other local jurisdictions have enacted ordinances or other regulations restricting the free movement of solid waste across jurisdictional boundaries. Other governments may enact similar regulations in the future. These regulations may cause a decline in volumes of waste delivered to our landfills or transfer stations and may increase our costs of disposal, thereby adversely affecting our operations and our financial results.

Liabilities Established for Landfill and Environmental Costs

We have established reserves for landfill and environmental costs, which include landfill site final capping, closure and post-closure costs. We periodically reassess such costs based on various methods and assumptions regarding landfill airspace and the technical requirements of Subtitle D of RCRA, and we adjust our amortization rates used to expense final capping, closure and post-closure costs accordingly. Based on current information and regulatory requirements, we believe that our recorded reserves for such landfill and environmental expenditures are adequate; however, environmental laws may change, and we cannot assure you that our recorded reserves will be adequate to cover requirements under existing or new environmental laws and regulations, future changes or interpretations of existing laws and regulations, or adverse environmental conditions previously unknown to us. Refer to the *Contractual Obligations* section of our Management's Discussion and Analysis of Financial Condition and Results of Operations contained in Item 7 of this Form 10-K and to Note 2, *Summary of Significant Accounting Policies*, to our consolidated financial statements in Item 8 of this Form 10-K for further information.

Liability Insurance and Bonding

The nature of our business exposes us to the possible risk of liabilities arising out of our operations, including damages to the environment, property, employees or the general public. We focus on operating safely and prudently, but occasionally we receive claims, alleging damages, negligence or other wrongdoing in the planning or performance of work, which resulted in harm to the environment, property, employees or the general public. These liabilities can be significant. We also could be subject to fines and civil and criminal penalties in connection with alleged violations of regulatory requirements. We maintain various policies of insurance that, subject to limitations, exclusions, or deductibles, provide coverage for these types of claims. While we believe the amount of insurance is appropriate for our type of business, we can neither assure you that such insurance would be adequate, in scope or amount, in the event of a major loss, nor that we will not be exposed to uninsured liabilities that could have a material adverse effect on our consolidated financial condition, results of operations or cash flows. We also cannot assure you that we would continue to maintain the insurance should market conditions in the insurance industry make such coverage cost prohibitive.

Accruals for deductibles are based on claims filed and actuarial estimates of claims development and claims incurred but not reported. Due to the variable condition of the insurance market, we have experienced, and may experience in the future, increased deductible retention levels and increased premiums or unavailability of insurance. As we assume more risk through higher retention levels, we may experience more variability in our insurance reserves and expense.

In the normal course of business, we also purchase surety bonds, insurance policies, letters of credit or marketable securities deposits in connection with municipal residential collection contracts, financial assurance for closure and post-closure of landfills, environmental remediation, environmental permits, and business licenses and permits as a financial guarantee of our performance.

Availability of Reports and Other Information

Our corporate website is republicservices.com. We make available on that website, free of charge, access to our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, Proxy Statements on Schedule 14A, and amendments to those materials filed or furnished with the Securities and Exchange Commission (SEC) pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934. We make such materials available as soon as reasonably practicable after we electronically submit them to the SEC. Our corporate website also contains our Certificate of Incorporation, Bylaws, Corporate Governance Guidelines, Code of Ethics and Conduct, Political Contributions Policy, Human Rights Policy, and Charters of the Audit Committee, Management Development and Compensation Committee, Nominating and Corporate Governance Committee, and Sustainability and Corporate Responsibility Committee of the Board of Directors. In addition, the SEC makes available at its website (sec.gov), free of charge, reports, proxy statements, and other information regarding issuers, such as us, that file electronically with the SEC. Information on our website or the SEC website is not part of this Annual Report on Form 10-K. We intend to satisfy the disclosure requirements under Item 5.05 of Form 8-K and applicable New York Stock Exchange (NYSE) rules regarding amendments to or waivers of our Code of Ethics by posting this information on our website at republicservices.com.

ITEM 1A. RISK FACTORS

Disclosure Regarding Forward-Looking Statements

This Annual Report on Form 10-K contains certain forward-looking information about us that is intended to be covered by the safe harbor for “forward-looking statements” provided by the Private Securities Litigation Reform Act of 1995. Forward-looking statements are statements that are not historical facts. Words such as “guidance,” “expect,” “will,” “may,” “anticipate,” “plan,” “estimate,” “project,” “intend,” “should,” “can,” “likely,” “could,” “outlook” and similar expressions are intended to identify forward-looking statements. Among other sections of this Form 10-K, the Risk Factors and Management’s Discussion and Analysis of Financial Condition and Results of Operations include forward-looking statements. These statements include statements about our plans, strategies and prospects. Forward-looking statements are not guarantees of performance. These statements are based upon the current beliefs and expectations of our management and are subject to risk and uncertainties that could cause actual results to differ materially from those expressed in, or implied or projected by, the forward-looking information and statements. Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot assure you that the expectations will prove to be correct. Among the factors that could cause actual results to differ materially from the expectations expressed in the forward-looking statements are:

- general economic and market conditions, including inflation and changes in fuel, interest rates, labor, risk, health insurance and other variable costs that generally are not within our control, and our exposure to credit and counterparty risk;

- fluctuations in prices for recycled commodities that we sell to customers;
- the effects of the evolving COVID-19 pandemic and actions taken in response thereto;
- whether our estimates and assumptions concerning our selected balance sheet accounts, income tax accounts, final capping, closure, post-closure and remediation costs, available airspace, projected costs and expenses related to our landfills and property and equipment, fair values of acquired assets and liabilities assumed in our acquisitions, and labor, fuel rates and economic and inflationary trends, turn out to be correct or appropriate;
- competition and demand for services in the environmental services industry;
- price increases to our customers, which may not be adequate to offset the impact of increased costs, including labor, third-party disposal and fuel, and may cause us to lose volume;
- our ability to manage growth and execute our growth strategy;
- our compliance with, and future changes in, environmental and flow control regulations and our ability to obtain approvals from regulatory agencies in connection with operating and expanding our landfills;
- the impact on us of our substantial indebtedness, including on our ability to obtain financing on acceptable terms to finance our operations and growth strategy and to operate within the limitations imposed by financing arrangements;
- our ability to retain our investment grade ratings for our debt;
- our dependence on key personnel;
- our dependence on large, long-term collection, transfer and disposal contracts;
- the capital intensive nature of our business, which may consume cash in excess of cash flow from operations;
- exposure to environmental liabilities or remediation requirements, to the extent not adequately covered by insurance, which could result in substantial expenses;
- risks associated with undisclosed liabilities of acquired businesses;
- risks associated with pending and future legal proceedings, including litigation, audits or investigations brought by or before any governmental body;
- severe weather conditions, including those brought about by climate change, which could impair our financial results by causing increased costs, loss of revenue, reduced operational efficiency or disruptions to our operations;
- compliance with existing and future legal and regulatory requirements, including changes relating to PFAS and other chemicals of emerging concern, and limitations or bans on disposal of certain types of wastes or on the transportation of waste, which could limit our ability to conduct or grow our business, increase our costs to operate or require additional capital expenditures;
- safety and operational risks, including the risk of personal injury to our employees or third parties;

- potential increases in our costs if we are required to provide additional funding to any multiemployer pension plan to which we contribute or if a withdrawal event (including our voluntary withdrawal, which we consider from time to time, or the mass withdrawal of all contributing employers from any underfunded multiemployer pension plan) occurs with respect to any such plan;

- the negative impact on our operations of union organizing campaigns, work stoppages or labor shortages;

- the negative effect that trends toward requiring recycling, waste reduction at the source and prohibiting the disposal of certain types of wastes could have on volumes of waste going to landfills;

- changes by the Financial Accounting Standards Board or other accounting regulatory bodies to generally accepted accounting principles or policies;

- the impact of U.S. and international tax laws and regulations on our business;

- risks related to interruptions and breaches of our information technology systems that could adversely affect, or temporarily disable, all or a portion of our operations or have a negative effect on our infrastructure;

- the negative impact that a cyber-security incident could have on our business and our relationships with customers and employees; and

- acts of war, riots or terrorism, including the continuing war on terrorism, as well as actions taken or to be taken by the United States or other governments as a result of further acts or threats of terrorism, and the impact of these acts on economic, financial and social conditions in the United States.

The risks included here are not exhaustive. Refer to the Risk Factors in this Item 1A for further discussion regarding our exposure to risks. You should be aware that any forward-looking statement in this Annual Report on Form 10-K and the documents incorporated herein by reference or elsewhere, speaks only as of the date on which we make it. Additionally, new risk factors emerge from time to time and it is not possible for us to predict all such risk factors, or to assess the impact such risk factors might have on our business or the extent to which any factor or combination of factors may cause actual results to differ materially from those contained in any forward-looking statements. You should not place undue reliance on any forward-looking statement. Except to the extent required by applicable law or regulation, we undertake no obligation to update or publish revised forward-looking statements to reflect events or circumstances after the date of this Annual Report on Form 10-K and the documents incorporated by reference, as the case may be, or to reflect the occurrence of unanticipated events.

Risks Related to Our Business and Operations

The environmental services industry is highly competitive and includes competitors that may have greater financial and operational resources, flexibility to reduce prices or other competitive advantages that could make it difficult for us to compete effectively.

We principally compete with large national waste management companies, numerous municipalities, and numerous regional and local companies. Competition for collection accounts is typically based on the quality of services, ease of doing business and/or price. Competition for disposal business is primarily based on geographic location, quality of operations, and price. One of our competitors may have greater financial and operational resources than we do. Further, many counties and municipalities that operate their own collection and disposal facilities have the benefits of tax revenue and greater opportunities for tax-exempt financing. Our ability to obtain solid waste volume for our landfills also may be limited by the fact that some major collection operations also own or operate landfills to which they send their waste. In certain markets in which we do not own or operate a landfill, our collection operations may have difficulty competing effectively. If we were to lose market share or if we were to lower prices to address competitive issues, it could negatively impact our consolidated financial condition, results of operations and cash flows.

Increases in the cost of fuel or petrochemicals would increase our operating expenses, and we cannot assure you that we would be able to recover such cost increases from our customers.

We depend on fuel purchased in the open market to operate our collection and transfer trucks and other equipment used for collection, transfer and disposal. Fuel prices are unpredictable and fluctuate significantly based on events beyond our control, including geopolitical developments, actions by the Organization of the Petroleum Exporting Countries and other oil and gas producers, changes in refinery operations, supply and demand for oil and gas, war, terrorism and unrest in oil-producing countries, adverse weather and regional production patterns. Due to contractual or market factors, we may not be able to offset increased fuel costs resulting from such volatility through fuel recovery fees. Our fuel costs were $271.7 million in 2020, or 2.7% of revenue, compared to $347.9 million in 2019, or 3.4% of revenue.

At current consumption levels, a twenty-cent per gallon change in the price of diesel fuel changes our fuel costs by approximately $25 million on an annual basis. Offsetting these changes in fuel expense would be changes in our fuel recovery fee charged to our customers. At current participation rates, we believe a twenty-cent per gallon change in the price of diesel fuel changes our fuel recovery fee by approximately $25 million. A substantial rise or drop in fuel costs could materially affect our revenue and cost of operations.

Over the last decade, regulations have been adopted mandating changes in the composition of fuels for motor vehicles. The renewable fuel standards that the EPA sets annually affect the type of fuel our motor vehicle fleet uses. Pursuant to the Energy Independence and Security Act of 2007, the EPA establishes annual renewable fuel volume requirements for four different categories of renewable fuels (renewable fuel, advanced biofuel, cellulosic biofuel, and biomass-based diesel). These volume requirements set standards for the proportion of refiners' or importers' total fuel volume that must contain renewable fuels (as designated by regulation). The total volume metrics for each year vary based upon a number of factors (e.g., the availability of such fuels), and it is difficult to predict the ultimate quantity that the EPA will eventually mandate for future years. These regulations are one of many factors that may affect the cost of the fuel we use.

Part of our fleet of vehicles is powered by CNG and we also operate CNG fueling stations. We have invested higher upfront capital costs in order to purchase and support our CNG vehicles and fueling stations in order to reduce our overall fleet operating costs through lower fuel expenses and to create a competitive advantage in communities that focus on protecting the environment. CNG is not yet widely adopted in North America. As the CNG industry develops, new regulations, the availability of alternative fuel technologies, fluctuations in the price or availability of CNG or reductions in tax incentives for the use of CNG vehicles could substantially affect our revenue and costs of operations and reduce the benefits sought by investing in CNG vehicles and fueling stations.

Our operations also require the use of products (such as liners at our landfills) whose costs may vary with the price of petrochemicals. An increase in the price of petrochemicals could increase the cost of those products, which would increase our operating and capital costs. Petrochemical prices, and hence our operating and capital costs, may be further affected by regulatory efforts to reduce greenhouse gases from the industries that produce such petrochemicals. We are also susceptible to increases in fuel recovery fees from our vendors.

Fluctuations in prices for recycled commodities that we sell to customers may adversely affect our consolidated financial condition, results of operations and cash flows.

We purchase or collect and process recyclable materials such as paper, cardboard, plastics, aluminum and other metals for sale to third parties. Our results of operations may be affected by changing prices or market requirements for recyclable materials. The resale and purchase prices of, and market demand for, recyclable materials are volatile due to changes in economic conditions and numerous other factors beyond our control. For instance, in 2017 the Chinese government imposed strict limits on the import of recyclable materials, including by restricting the amount of contaminants allowed in imported recycled paper. These limitations significantly decreased the global demand for recyclable materials and resulted in lower commodity prices. Significant price fluctuations or increased operating costs may affect our consolidated financial condition, results of operations and cash flows. In 2020, approximately 78% of our recycling processing center volume was fiber based and included OCC, ONP and other mixed paper.

At current volumes and mix of materials, we believe a $10 per ton change in the price of recycled commodities would change annual revenue and operating income by approximately $12 million on an annual basis. Accordingly, a substantial rise or drop in recycled commodity prices could materially affect our revenue and operating income. Although we have entered into hedging agreements to help offset volatility in recycled commodity prices in the past, we cannot provide assurance that we will enter into these agreements in the future.

Adverse weather conditions, including those brought about by climate change, may limit our operations and increase the costs of collection, transfer, and disposal.

Our collection, transfer, and landfill operations could be adversely impacted by extended periods of inclement weather, or by increased severity of weather and climate extremes resulting from climate change, some of which we may already be experiencing. Recent studies suggest that global warming is occurring faster than previously projected, with the EPA projecting a 3° to 12° Fahrenheit temperature increase in the United States by the end of the century. In addition to sea level rise, this temperature increase is expected to result in more severe droughts, floods, and other extreme weather events. Any of these factors could increase the volume of material collected under our existing contracts (without corresponding compensation), interfere with collection, transfer station and landfill operations, delay the development of landfill capacity or reduce the volume of material generated by our customers. In addition, adverse weather conditions may result in the temporary suspension of our operations, which can significantly affect our operating results in the affected regions during those periods.

The environmental services industry is a capital-intensive industry and our capital expenditures may exceed current expectations, which could require us to obtain additional funding for our operations or impair our ability to grow our business.

Our ability to remain competitive and to grow our business largely depends on our cash flow from operations and access to capital. If our capital efficiency programs cannot offset the effect of inflation and business growth, it may be necessary to increase the amount we spend. Additionally, if we make acquisitions or further expand our operations, the amount we spend on capital, capping, closure, post-closure, environmental remediation and other items will increase. Our cash needs also will increase if the expenditures for capping, closure, post-closure and remediation activities increase above our current estimates, which may occur over a long period due to changes in federal, state or local government requirements and other factors beyond our control. Increases in expenditures would negatively impact our cash flows.

We may be unable to obtain or maintain required permits or to expand existing permitted capacity of our landfills, which could decrease our revenue and increase our costs.

We cannot assure you that we will be able to obtain or maintain the permits required for our operations because permits to operate new landfills and transfer stations, or to expand the permitted capacity of existing landfills or increase acceptable volume at transfer stations, have become more difficult and expensive to obtain and maintain. Permits often take years to obtain as a result of numerous hearings and compliance requirements with regard to zoning, environmental and other regulations. These permits are also often subject to resistance from citizen or other groups and other political pressures. Local communities and citizen groups, adjacent landowners, governmental agencies and others may oppose the issuance of a permit or approval we may need, allege violations of the permits under which we currently operate or laws or regulations to which we are subject, or seek to impose liability on us for environmental damage. Such actions could also create risks related to our reputation, which may limit our ability to do business. Responding to these challenges has at times increased our costs and extended the time associated with establishing new landfills and transfer stations and expanding existing landfills. In addition, failure to receive regulatory and zoning approval may prohibit us from establishing new landfills or transfer stations or expanding existing landfills. Our failure to obtain the required permits to operate our landfills and transfer stations could have a material adverse effect on our consolidated financial condition, results of operations and cash flows. In addition, we may have to dispose collected waste at landfills operated by our competitors or haul the waste long distances at a higher cost to one of our other landfills, either of which could significantly increase our waste disposal costs.

If we do not appropriately estimate landfill capping, closure, post-closure and remediation costs, our financial condition and results of operations may be adversely affected.

A landfill must be closed and capped, and post-closure maintenance commenced, once the landfill's permitted capacity is reached and additional capacity is not authorized. Further, we undertake remediation activities at some of our solid waste facilities. We have significant financial obligations relating to capping, closure, post-closure and remediation costs at our existing owned or operated landfills, and will have material financial obligations with respect to any future owned or operated landfills. We establish accruals for the estimated costs associated with capping, closure, post-closure and remediation obligations. We could underestimate such costs, and our financial obligations for capping, closure, post-closure or remediation costs could exceed the amounts accrued or amounts otherwise receivable pursuant to trust funds established for this purpose.

Additionally, if a landfill must be closed earlier than expected or its remaining airspace is reduced for any other reason, the accruals for capping, closure, post-closure and remediation could be required to be accelerated. If our capping, closure, post-closure or remediation costs exceed the amounts accrued, or if such accruals are required to be accelerated, this could have a material adverse effect on our consolidated financial condition, results of operations and cash flows.

Alternatives to landfill disposal could reduce our disposal volumes and cause our revenues and operating results to decline.

Most of the states in which we operate landfills require counties and municipalities to formulate comprehensive plans to reduce the volume of solid waste deposited in landfills through waste planning, composting, recycling or other programs. Some state and local governments mandate waste reduction at the source and prohibit the disposal of certain types of wastes, such as yard waste, at landfills. Further, many of our customers voluntarily are diverting waste to alternatives to landfill disposal, such as recycling and composting, while also working to reduce the amount of waste they generate. Many of the largest companies in the U.S. are setting zero-waste goals in which they strive to send no waste to landfills. Some jurisdictions have enacted extended producer responsibility regulations, which are designed to make producers fund the post-use life cycle of their products by providing recycling programs for their products or otherwise taking their post-use products back from consumers. Although such actions help to protect our environment and reduce the impact of waste on climate change, they have reduced, and will in the future reduce, the volume of waste going to landfills and may affect the prices that we can charge for landfill disposal. Accordingly, we cannot assure you that we will be able to operate our landfills at their current volumes or charge current prices for landfill disposal services due to possible decreases in demand for such services. If we cannot expand our service offerings and grow lines of business to service waste streams that do not go to landfills and to provide services for customers that wish to reduce waste entirely, this could have a negative effect on our consolidated financial condition, results of operations and cash flows. Further, even if we can develop such service offerings and lines of business, disposal alternatives nonetheless could have a negative effect on our consolidated financial condition, results of operations and cash flows.

The possibility of landfill and transfer station site development projects, or expansion projects not being completed or certain other events could result in material charges to income.

In accordance with U.S. GAAP, we capitalize certain expenditures relating to development, expansion and other projects. If a facility or operation is permanently shut down or determined to be impaired, or a development, expansion or other project is not completed or is determined to be impaired, we will charge against earnings any unamortized capitalized expenditures relating to such facility or project that we are unable to recover through sale, transfer or otherwise. We also carry a significant amount of goodwill on our consolidated balance sheets, which we must assess for impairment annually, and more frequently in the case of certain triggering events. We may incur charges against earnings in accordance with this policy, or other events may cause impairments. Such charges could have a material adverse effect on our results of operations.

The business and assets we operate expose us to safety, operational and other risks, including the risk of personal injury to our employees or third parties.

The provision of environmental services, including the operation of landfills, CNG fueling stations, a substantial fleet of trucks and other waste-related assets, involves risks. These risks include, among others, the risk of truck accidents, equipment defects, malfunctions and failures, improper use of dangerous equipment, the release of hazardous substances, fire and explosion, any of which could result in environmental liability, personal injury, loss of life, business interruption or property damage or destruction. While we carry insurance to cover many contingencies, and seek to minimize our exposure to these risks through maintenance, training and compliance programs, any substantial losses could have a material adverse effect on our business, results of operations and financial condition.

We may be subject to workforce influences, including work stoppages, which could increase our operating costs and disrupt our operations.

As of December 31, 2020, approximately 24% of our workforce was covered by collective bargaining agreements. If our unionized workers were to engage in strikes, work stoppages or other slowdowns, we could experience a significant disruption of our operations and an increase in our operating costs, which could have an adverse effect on our consolidated financial condition, results of operations and cash flows. Additional groups of employees may seek union representation in the future and, if successful, the negotiation of collective bargaining agreements could divert management's attention and result in increased operating costs. If a greater percentage of our workforce becomes unionized, our consolidated financial condition, results of operations and cash flows could be adversely impacted due to the potential for increased operating costs.

Risks Related to our Legal and Regulatory Environment

We are subject to costly environmental regulations and flow-control regulations that may affect our operating margins, restrict our operations and subject us to additional liability.

Complying with laws and regulations governing the collection, treatment, storage, transfer and disposal of material, air quality and emissions of greenhouse gases, water quality and the remediation of contamination associated with the release of hazardous substances is costly. Laws and regulations often require us to enhance or replace our equipment and to modify landfill operations or initiate final closure of a landfill. We cannot assure you that we will be able to implement price increases sufficient to offset the costs of complying with these laws and regulations. In addition, environmental regulatory changes, including those relating to per- and polyfluoroalkyl substances (commonly referred to as PFAS) and other chemicals of emerging concern, could accelerate or increase expenditures for capping, closure, post-closure and environmental and remediation activities at solid waste facilities and obligate us to spend sums in addition to those presently accrued for such purposes, which could have a negative effect on our consolidated financial position, results of operations and cash flows. For example, the EPA has indicated it is considering listing certain PFAS as hazardous substances under CERCLA, which if finalized could trigger additional obligations or liabilities under CERCLA or other laws and regulations.

Our business is and will continue to be affected by state or local laws or regulations that restrict the transportation of solid waste across state, county or other jurisdictional lines or that direct the flow of waste to a specified facility or facilities. Such laws and regulations could negatively affect our operations, resulting in declines in landfill volumes and increased costs of alternate disposal.

Regulation of greenhouse gas emissions and other governmental regulations could impose costs on our operations, the magnitude of which we cannot yet estimate.

Efforts to curtail the emission of greenhouse gases and to ameliorate the effects of climate change continue to progress. Our landfill operations emit anthropogenic methane, identified as a greenhouse gas, and our vehicle fleet emits, among other things, carbon dioxide, which also is a greenhouse gas. While passage of comprehensive, federal climate change legislation appears unlikely in the near term, we expect any such legislation, if enacted, to impose costs on our operations, which could be material.

Absent comprehensive federal legislation to control greenhouse gas emissions, the EPA has taken certain actions administratively under its existing Clean Air Act authority. The EPA is compelled to issue rules by the U.S. Supreme Court's April 2007 *Massachusetts v. EPA* ruling that greenhouse gases are pollutants for purposes of the Clean Air Act and the EPA's December 2009 finding that continued emissions of greenhouse gases endanger human health and welfare. With respect to our light- and heavy-duty vehicle fleet, the EPA has finalized regulations limiting greenhouse gas emissions and increasing fuel economy standards. The EPA and the NHTSA have finalized such regulations applicable to light-duty vehicles through model year 2025. In 2018, the EPA and the NHTSA proposed to revise the light-duty vehicle standards for model years 2021 through 2024 to make them less stringent; final action on the proposal took place in 2020 but has been challenged in court. On August 16, 2016, the EPA and the NHTSA issued additional regulations that would impose more stringent standards for heavy-duty vehicles through model-year 2027. These standards and further federal efforts to curtail greenhouse gas emissions and to increase the fuel efficiency of light-duty and heavy-duty vehicles could have a material adverse effect on our consolidated financial condition, results of operations and cash flows.

With regard to greenhouse gas emissions from our landfills, on July 14, 2016, the EPA issued amendments to its regulations that require large landfills that commenced construction, reconstruction or modification on or after July 17, 2014 to capture additional landfill gas to reduce emissions of methane and certain non-methane gases, which are recognized as greenhouse gases. In a separate action finalized that same day, the EPA issued updates to its 1996 Emission Guidelines to reduce emissions of landfill gas from existing active landfills. Both actions were part of the Obama Administration's Climate Action Plan - Strategy to Reduce Methane Emissions. The Trump Administration proposed to reconsider these rules, but its action has been subject to litigation, which is still pending. The Biden Administration has announced that climate change is one of its top priorities. If these regulations, or an amended version of them eventually goes into effect, they may require our landfills to deploy more stringent emission controls and monitoring systems, with resulting capital or operating costs. The application of these or other greenhouse gas regulations to our landfills could have a material adverse effect on our landfill operations and on our consolidated financial condition, results of operations and cash flows. We cannot predict what other actions or regulations the current administration may undertake that would affect our industry. While increased or decreased regulations may affect our operating costs, the substantial cost of regulatory compliance reduces the ability of new competitors to enter the industry.

We may have environmental liabilities that are not covered by our insurance. Changes in insurance markets also may impact our financial results.

We may incur environmental liabilities arising from our operations or properties. We maintain high deductibles for our environmental liability insurance coverage. If we were to incur substantial liability for environmental damage, our insurance coverage may be inadequate to cover such liability. This could have a material adverse effect on our consolidated financial condition, results of operations and cash flows.

Also, due to the variable condition of the insurance market, we have experienced, and may experience in the future, increased insurance retention levels and increased premiums or unavailability of insurance. As we assume more risk for insurance through higher retention levels, we may experience more variability in our insurance reserves and expense.

Despite our efforts, we may incur additional liability under environmental laws in excess of amounts presently known and accrued.

We are a potentially responsible party at many sites under CERCLA, which provides for the remediation of contaminated facilities and imposes strict, joint and several liability for the cost of remediation on current owners and operators of a facility at which there has been a release or a threatened release of a hazardous substance. CERCLA liability also extends to parties who were site owners and operators at the time hazardous substances were disposed, and on persons who arrange for the disposal of such substances at the facility (e.g., generators of the waste and transporters who selected the disposal site). Hundreds of substances are defined as hazardous under CERCLA and their presence, even in minute amounts, can result in substantial liability.

Notwithstanding our efforts to comply with applicable environmental laws, we may have additional liability under environmental laws in excess of our current reserves because, among other things, hazardous substances may be present in waste collected by us or disposed of in our landfills (or in waste collected, transported or disposed of in the past by businesses we have acquired), environmental laws or regulations may change, or there may be adverse environmental conditions that develop or were otherwise previously unknown to us. For example, during 2012 through 2014, we recorded an aggregate of approximately $400 million in charges relating to environmental remediation at our closed landfill in Bridgeton, Missouri. Actual costs for liabilities at Bridgeton or other sites could be significantly greater than amounts we have accrued for these purposes. Environmental liabilities in excess of our current reserves could have a material adverse effect on our consolidated financial position, results of operations and cash flows.

Currently pending or future litigation or governmental proceedings could result in material adverse consequences, including judgments or settlements.

We are and will continue to be involved in lawsuits, regulatory inquiries, and governmental and other legal proceedings. Many of these matters raise complicated factual and legal issues and are subject to uncertainties. The timing of the final resolutions to lawsuits, regulatory inquiries, and governmental and other legal proceedings is uncertain. Further, the possible outcomes or resolutions to these matters could include adverse judgments or settlements, either of which could require substantial payments and adversely affect our consolidated financial condition, results of operations and cash flows.

For example, we incur costs to defend against litigation brought by government agencies and private parties who allege we are in violation of our permits and applicable environmental laws and regulations, or who assert claims alleging nuisance, environmental damage, personal injury or property damage. As a result, we may be required to pay fines or judgments or implement corrective measures, or we may have our permits and licenses modified or revoked. A significant judgment against us, the loss of a significant permit or license, or the imposition of a significant fine could have a material adverse effect on our consolidated financial condition, results of operations and cash flows. We establish accruals for our estimates of the costs associated with lawsuits, regulatory, governmental and other legal proceedings. We could underestimate such accruals. Such shortfalls could result in significant unanticipated charges to income.

Risks Related to Financial Strategy and Indebtedness

We have substantial indebtedness, which may limit our financial flexibility.

As of December 31, 2020, we had approximately $9 billion in principal value of debt and finance leases outstanding. This amount of indebtedness and our debt service requirements may limit our financial flexibility to access additional capital and make capital expenditures and other investments in our business, to withstand economic downturns and interest rate increases, to plan for or react to changes in our business and our industry, and to comply with the financial and other covenants of our debt instruments. Further, our ability to comply with these financial and other covenants may be affected by changes in economic or business conditions or other events that are beyond our control. If we do not comply with these covenants, we may be required to take actions such as reducing or delaying capital expenditures, reducing or eliminating dividends or stock repurchases, selling assets, restructuring or refinancing all or part of our existing debt, or seeking additional equity capital.

We may be unable to maintain our credit ratings or execute our financial strategy.

Our ability to execute our financial strategy depends in part on our ability to maintain investment grade ratings on our debt. The credit rating process is contingent upon a number of factors, many of which are beyond our control. We cannot assure you that we will be able to maintain our investment grade ratings in the future. If we were unable to do so, our interest expense would increase and our ability to obtain financing on favorable terms may be adversely affected.

Our financial strategy also depends on our ability to generate sufficient cash flow to reinvest in our existing business, fund internal growth, acquire other environmental services businesses, pay dividends, repurchase stock, and take other actions to enhance shareholder value. We cannot assure you that we will succeed in executing our broad-based pricing initiatives, that we will generate sufficient cash flow to execute our financial strategy, that we will be able to pay cash dividends at our present rate, or increase them, or that we will be able to continue our share repurchase program.

Weakness in the U.S. economy may expose us to credit risk for amounts due from governmental entities, large national accounts, industrial customers and others.

Weakness in the U.S. economy, including contractions caused by the COVID-19 pandemic, reduces the amount of taxes collected by various governmental entities. We provide services to a number of these entities, including numerous municipalities. These governmental entities may suffer financial difficulties resulting from a decrease in tax revenue and may ultimately be unable or unwilling to pay amounts owed to us. In addition, weakness in the economy may cause other customers, including our large national accounts, or industrial or environmental services clients, to suffer financial difficulties and ultimately to be unable or unwilling to pay amounts owed to us. This could negatively impact our consolidated financial condition, results of operations and cash flows.

Our consolidated financial statements are based on estimates and assumptions that may differ from actual results.

Our consolidated financial statements have been prepared in accordance with U.S. GAAP and necessarily include amounts based on management's estimates. Actual results may differ from these amounts. Significant items requiring management to make subjective or complex judgments that are inherently uncertain include the recoverability of long-lived assets, the depletion and amortization of landfill development costs, accruals for final capping, closure and post-closure costs, valuation allowances for accounts receivable and deferred tax assets, liabilities for potential litigation, claims and assessments, and liabilities for environmental remediation, multiemployer pension plans, employee benefit plans, deferred taxes, uncertain tax positions, insurance and our estimates of the fair values of assets acquired and liabilities assumed in any acquisition. We cannot assure you that the liabilities recorded for items such as these will be adequate to cover the costs we ultimately will face.

Our obligation to fund multiemployer pension plans to which we contribute, or our withdrawal from such plans, may have an adverse effect on us.

We participate in multiemployer pension plans that generally provide retirement benefits to participants of contributing employers. We do not administer these plans and generally are not represented on the boards of trustees of these plans. The Pension Protection Act enacted in 2006 (the PPA) requires under-funded pension plans to improve their funding ratios. Based on the information available to us, we believe that some of the multiemployer plans to which we contribute are either critical or endangered as those terms are defined in the PPA. We cannot presently determine the amount of additional funding, if any, we may be required to make to these plans. However, plan assessments could have a material adverse effect on our results of operations or cash flows for a given period.

Further, under current law, upon the termination of a multiemployer pension plan, or in the event of a withdrawal by us (which we consider from time to time) or a mass withdrawal of contributing employers (each, a Withdrawal Event), we would be required to make payments to the plan for our proportionate share of the plan's unfunded vested liabilities. We cannot assure you that there will not be a Withdrawal Event with respect to any of the multiemployer pension plans to which we contribute or that, in the event of such a Withdrawal Event, the amounts we would be required to contribute would not have a material adverse effect on our consolidated financial condition, results of operations and cash flows.

For additional discussion and detail regarding multiemployer pension plans see Note 12, *Employee Benefit Plans,* of the notes to our consolidated financial statements in Item 8 of this Form 10-K.

The costs of providing for pension benefits and related funding requirements are subject to changes in pension fund values and fluctuating actuarial assumptions, and may have a material adverse effect on our financial condition, results of operations and cash flows.

We sponsor a defined benefit pension plan that is funded with trustee assets invested in a diversified portfolio of debt and equity securities. Our costs for providing such benefits and related funding requirements are subject to changes in the market value of plan assets. Our pension expenses and related funding requirements are also subject to various actuarial calculations and assumptions, which may differ materially from actual results due to changing market and economic conditions, interest rates and other factors. A significant increase in our pension obligations and funding requirements could have a material adverse effect on our consolidated financial condition, results of operations and cash flows.

Risks Related to Our Growth Strategy

We may be unable to manage our growth effectively.

Our growth strategy places significant demands on our financial, operational and management resources. To continue our growth, we may need to add administrative, managerial and other personnel, and may need to make additional investments in operations and systems. We cannot assure you that we will be able to find and train qualified personnel, or do so on a timely basis, or to expand or otherwise modify our operations and systems to the extent, and in the time, required.

We may be unable to execute our acquisition growth strategy.

Our ability to execute our growth strategy depends in part on our ability to identify and acquire desirable acquisition candidates and on our ability to successfully integrate acquired operations into our business. The integration of our operations with those of acquired companies may present significant challenges to our management. In addition, competition for acquisition candidates may prevent us from acquiring certain acquisition candidates. Thus, we cannot assure you that:

- desirable acquisition candidates exist or will be identified;
- we will be able to acquire any of the candidates identified;
- we will effectively integrate and manage companies we acquire; or
- any acquisitions will be profitable or accretive to our earnings.

If any of these factors force us to alter our growth strategy, our growth prospects could be adversely affected.

Businesses we acquire may have undisclosed liabilities.

Our due diligence investigations of acquisition candidates may fail to discover certain undisclosed liabilities. If we acquire a company with undisclosed liabilities such as environmental, remediation or contractual liabilities, as a successor owner we may be responsible for such undisclosed liabilities. We try to minimize our exposure to such liabilities by conducting due diligence, by obtaining indemnification from each seller of the acquired companies, by deferring payment of a portion of the purchase price as security for the indemnification, by obtaining representations and warranties insurance and by acquiring only specified assets. However, we cannot assure you that we will be able to obtain indemnification or insurance coverage or that any indemnification or insurance coverage obtained will be enforceable, collectible or sufficient in amount, scope or duration to fully offset any undisclosed liabilities arising from our acquisitions.

Risks Related to Technology and Intellectual Property

Our strategy includes an increasing dependence on technology in our operations. If any of our key technology fails, our business could be adversely affected.

Our operations are increasingly dependent on technology. Our information technology systems are critical to our ability to drive profitable growth through differentiation, continue the implementation of standardized processes and deliver a consistent customer experience. One of our three differentiating capabilities is to enable our customers to do business with us through more channels and with better access to information and, accordingly, we have made substantial investment in our e-commerce platform. Problems with the operation of the information or communication technology systems we use could adversely affect, or temporarily disable, all or a portion of our operations. Inabilities and delays in implementing new systems can also affect our ability to realize projected or expected revenue or cost savings. Further, any systems failures could impede our ability to timely collect and report financial results in accordance with applicable laws.

Emerging technologies, including those that are used to recycle and process waste as an alternative to disposal of waste in landfills, represent risks, as well as opportunities, to our current business model. The costs associated with developing or investing in emerging technologies could require substantial capital and adversely affect our results of operations and cash flows. Delays in the development or implementation of such emerging technologies and difficulties in marketing new products or services based on emerging technologies could have similar negative impacts. Our financial results may suffer if we are not able to develop or license emerging technologies, or if a competitor obtains exclusive rights to an emerging technology that disrupts the current methods used in the environmental services industry.

A cyber security incident could negatively impact our business and our relationships with customers.

We use information technology, including computer and information networks, in substantially all aspects of our business operations. We also use mobile devices, social networking and other online activities to connect with our employees and our customers. Such uses give rise to cyber security risks, including security breach, espionage, system disruption, theft and inadvertent release of information. Our business involves the storage and transmission of numerous classes of sensitive and/or confidential information and intellectual property, including customers' personal information, private information about employees, and financial and strategic information about us and our business partners. We also rely on a Payment Card Industry compliant third party to protect our customers' credit card information. In connection with our strategy to grow through acquisitions and to pursue new initiatives that improve our operations and cost structure, we are also expanding and improving our information technologies, resulting in a larger technological presence and corresponding exposure to cyber security risk. If we fail to assess and identify cyber security risks associated with acquisitions and new initiatives, we may become increasingly vulnerable to such risks. Additionally, while we have implemented measures to prevent security breaches and cyber incidents, our preventive measures and incident response efforts may not be entirely effective. Also, the regulatory environment surrounding information security and privacy is increasingly demanding, with the frequent imposition of new and constantly changing requirements. This changing regulatory landscape may cause increasingly complex compliance challenges, which may increase our compliance costs. Any failure to comply with these changing security and privacy laws and regulations could result in significant penalties, fines, legal challenges and reputational harm. The theft, destruction, loss, misappropriation, or release of sensitive and/or confidential information or intellectual property, or interference with our information technology systems or the technology systems of third parties on which we rely, could result in business disruption, negative publicity, brand damage, violation of privacy laws, loss of customers, potential liability and competitive disadvantage.

Other Risks Relevant to Our Business

The COVID-19 pandemic has negatively impacted, and is likely to continue to negatively impact, our business, results of operations and financial performance.

The COVID-19 pandemic is having an unprecedented effect on the U.S. economy, which has created significant uncertainties. These uncertainties include, but are not limited to, the potential adverse effect of the pandemic on the economy, our supply chain partners, our employees and our customers. As a result of the COVID-19 pandemic, our costs of doing business have increased, including for the purchase of additional safety equipment and hygiene products, increased facility and equipment cleaning, meals for our frontline employees, the expansion of certain aspects of our existing healthcare programs, and the guarantee of a minimum hourly work week to certain frontline employees regardless of service decreases. Additionally, if the pandemic continues and conditions worsen or if there is a large outbreak or resurgence of COVID-19 in various regions, we expect to experience additional adverse impacts on our operational and commercial activities and our collections of accounts receivable, which adverse impacts may be material. The degree to which COVID-19 impacts our results going forward will depend on future developments, which are uncertain and cannot be predicted, including, but not limited to, the duration and spread of COVID-19, its severity, the actions to contain the virus or treat its impact, and how quickly and to what extent normal economic and operating conditions can resume. Any of the foregoing factors, or other cascading effects of the COVID-19 pandemic that are not currently foreseeable, could materially increase our costs, negatively impact our business and damage our results of operations and our liquidity position, possibly to a significant degree.

Price increases may not be adequate to offset the effect of increased costs and may cause us to lose volume.

We seek to secure price increases necessary to offset increased costs, improve our operating margins and earn an appropriate return on our substantial investments in assets such as our landfills. From time to time, our competitors reduce their prices in an effort to expand their market share. Contractual, general economic or market-specific conditions also may limit our ability to raise prices. For example, many of our contracts have price adjustment provisions that are tied to an index such as the consumer price index. Particularly in a weak U.S. economy, our costs may increase in excess of the increase, if any, in the consumer price index. This may continue to be the case even when the U.S. economy recovers because a recovery in the environmental services industry historically has lagged behind a recovery in the general economy. As a result, we may be unable to offset increases in costs, improve our operating margins and obtain adequate investment returns through price increases. Price increases also might cause us to lose volume to lower-cost competitors.

The loss of key personnel could have a material adverse effect on our consolidated financial condition, results of operations, cash flows and growth prospects.

Our future success depends on the continued contributions of several key employees and officers. The loss of the services of key employees and officers, whether through resignation or other causes, or the inability to attract additional qualified personnel, could have a material adverse effect on our consolidated financial condition, results of operations, cash flows and growth prospects. In some of our markets, we compete with other similar businesses which may drive labor costs or reduce the amount of available qualified personnel.

The introduction of new accounting rules, laws or regulations could adversely impact our reported results of operations.

Complying with new accounting rules, laws or regulations could adversely impact our results of operations or cause unanticipated fluctuations in our results of operations or financial conditions in future periods.

Weakened global economic conditions, including those resulting from the recent COVID-19 pandemic, may harm our industry, business and results of operations.

Our business is directly affected by changes in national and general economic factors and overall economic activity that are outside of our control, including consumer confidence and interest rates. For example, the

COVID-19 pandemic has negatively impacted the global economy, disrupted global supply chains and created significant volatility and disruption of financial markets. A weak economy generally results in decreases in volumes, which adversely affects our revenues. In addition, we have certain fixed costs (e.g., facility expense associated with long-term leases, depreciation expense and accretion expense), which may be difficult to adjust quickly to match declining volume levels. Consumer uncertainty and the loss of consumer confidence may decrease overall economic activity and thereby limit the amount of services we provide. Additionally, a decline in volumes may result in increased competitive pricing pressure and increased customer turnover, resulting in lower revenue and increased operating costs. Operating in an environment of worsening economic conditions could have a material adverse effect on our consolidated financial condition, results of operations and cash flows. Further, recovery in the environmental services industry historically has lagged behind recovery in the general economy. Accordingly, we cannot assure you that an improvement in general economic conditions will result in an immediate, or any, improvement in our consolidated financial condition, results of operations or cash flows.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

Our corporate office is located at 18500 North Allied Way, Phoenix, Arizona 85054, where we currently lease approximately 145,000 square feet of office space.

Our principal property and equipment consists of land, landfills, buildings, vehicles and equipment. We own or lease real property in the states in which we conduct operations. As of December 31, 2020, we operated facilities in 41 states through 345 collection operations, 220 transfer stations, 186 active landfills, 76 recycling processing centers, 6 treatment, recovery and disposal facilities, 9 salt water disposal wells and 7 deep injection wells. In the aggregate, our active solid waste landfills total approximately 106,731 acres, including 38,481 permitted acres. We are engaged in 75 landfill gas-to-energy and renewable energy projects and had post-closure responsibility for 128 closed landfills. We believe that our property and equipment are adequate for our current needs.

ITEM 3. LEGAL PROCEEDINGS

General Legal Proceedings

We are subject to extensive and evolving laws and regulations and have implemented safeguards to respond to regulatory requirements. In the normal course of our business, we become involved in legal proceedings. Some may result in fines, penalties or judgments against us, or settlements, which may impact earnings and cash flows for a particular period. Although we cannot predict the ultimate outcome of any legal matter with certainty, we do not believe the outcome of any of our pending legal proceedings will have a material adverse effect on our consolidated financial position, results of operations or cash flows.

As used in the immediately following paragraph, the term *legal proceedings* refers to litigation and similar claims against us and our subsidiaries, excluding: (1) ordinary course accidents, general commercial liability and workers' compensation claims, which are covered by insurance programs, subject to customary deductibles, and which, together with self-insured employee health care costs, are discussed in Note 7, *Other Liabilities,* to our consolidated financial statements in Item 8 of this Form 10-K; and (2) environmental remediation liabilities, which totaled $462.8 million at December 31, 2020 and which are discussed in Note 8, *Landfill and Environmental Costs,* to our consolidated financial statements in Item 8 of this Form 10-K.

We accrue for legal proceedings when losses become probable and reasonably estimable. We have recorded an aggregate accrual of approximately $27 million relating to our outstanding legal proceedings as of December 31, 2020. As of the end of each applicable reporting period, we review each of our legal proceedings and, where it is probable that a liability has been incurred, we accrue for all probable and reasonably estimable losses. Where we are able to reasonably estimate a range of losses we may incur with respect to a matter, we record an accrual for the amount within the range that constitutes our best estimate. If we are able to reasonably estimate a range but no amount within the range appears to be a better estimate than any other, we use the amount that is the low end of such range. If we had used the high ends of such ranges, our aggregate potential liability would be approximately $10 million higher than the amount recorded as of December 31, 2020.

Legal Proceedings over Certain Environmental Matters Involving Governmental Authorities with Possible Sanctions of $1,000,000 or More

Item 103 of the SEC's Regulation S-K requires disclosure of certain environmental matters when a governmental authority is a party to the proceedings and the proceedings involve potential monetary sanctions unless we reasonably believe the monetary sanctions will not equal or exceed a threshold which we determine is reasonably designed to result in disclosure of any such proceeding that is material to our business or financial condition. We have determined such disclosure threshold to be $1,000,000. We are disclosing the following matter in accordance with that requirement:

Pine Avenue Landfill Matter

On December 20, 2016, the EPA issued a Finding of Violation (FOV) to Allied Waste Niagara Falls Landfill, LLC (Allied-Niagara). The FOV alleges violations of the Clean Air Act and associated regulations relating to operation of Allied-Niagara's Pine Avenue Landfill in Niagara County, New York. On October 16, 2017, Allied-Niagara received a civil penalty demand from the EPA. The demand proposes a penalty of $0.6 million or $2.5 million, depending on the results of requested sampling analysis at the site. Allied-Niagara is negotiating a resolution to the FOV, including the amount of the penalty.

ITEM 4. MINE SAFETY DISCLOSURES

None.

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

Market Information, Holders and Dividends

The principal market for our common stock is the New York Stock Exchange, and it is traded under the symbol RSG.

There were 547 holders of record of our common stock at February 17, 2021, which does not include beneficial owners for whom Cede & Co. or others act as nominees.

In October 2020, our Board of Directors declared a regular quarterly dividend of $0.425 per share for shareholders of record on January 4, 2021. We expect to continue to pay quarterly cash dividends, and we may consider increasing our dividends if we believe it will enhance shareholder value.

We have the ability under our credit facilities to pay dividends and repurchase our common stock if we are in compliance with the financial covenants in our credit facilities. As of December 31, 2020, we were in compliance with those financial covenants.

Issuer Purchases of Equity Securities

The following table provides information relating to our purchases of shares of our common stock during the three months ended December 31, 2020:

	Total Number of Shares Purchased (a)	Average Price Paid per Share (a)	Total Number of Shares Purchased as Part of Publicly Announced Program (b)	Dollar Value of Shares that May Yet Be Purchased Under the Program (c)
October 1 – 31	-	$ -	-	$ 605,818,899
November 1 – 30	-	$ -	-	$ 605,818,899
December 1 – 31	-	$ -	-	$ 605,818,899
	-		-	

(a) In October 2017, our Board of Directors added $2.0 billion to the existing share repurchase authorization, which expired on December 31, 2020. In October 2020, our Board of Directors approved a $2.0 billion share repurchase authorization effective starting January 1, 2021 and extending through December 31, 2023. Share repurchases under the program may be made through open market purchases or privately negotiated transactions in accordance with applicable federal securities laws. While the Board of Directors has approved the program, the timing of any purchases, the prices and the number of shares of common stock to be purchased will be determined by our management, at its discretion, and will depend upon market conditions and other factors. The share repurchase program may be extended, suspended or discontinued at any time. As of December 31, 2020, there were no repurchased shares pending settlement.

(b) The total number of shares purchased as part of the publicly announced program were all purchased pursuant to the October 2017 authorization.

(c) Shares that may be purchased under the program exclude shares of common stock that may be surrendered to satisfy statutory minimum tax withholding obligations in connection with the vesting of restricted stock units and performance stock units issued to employees.

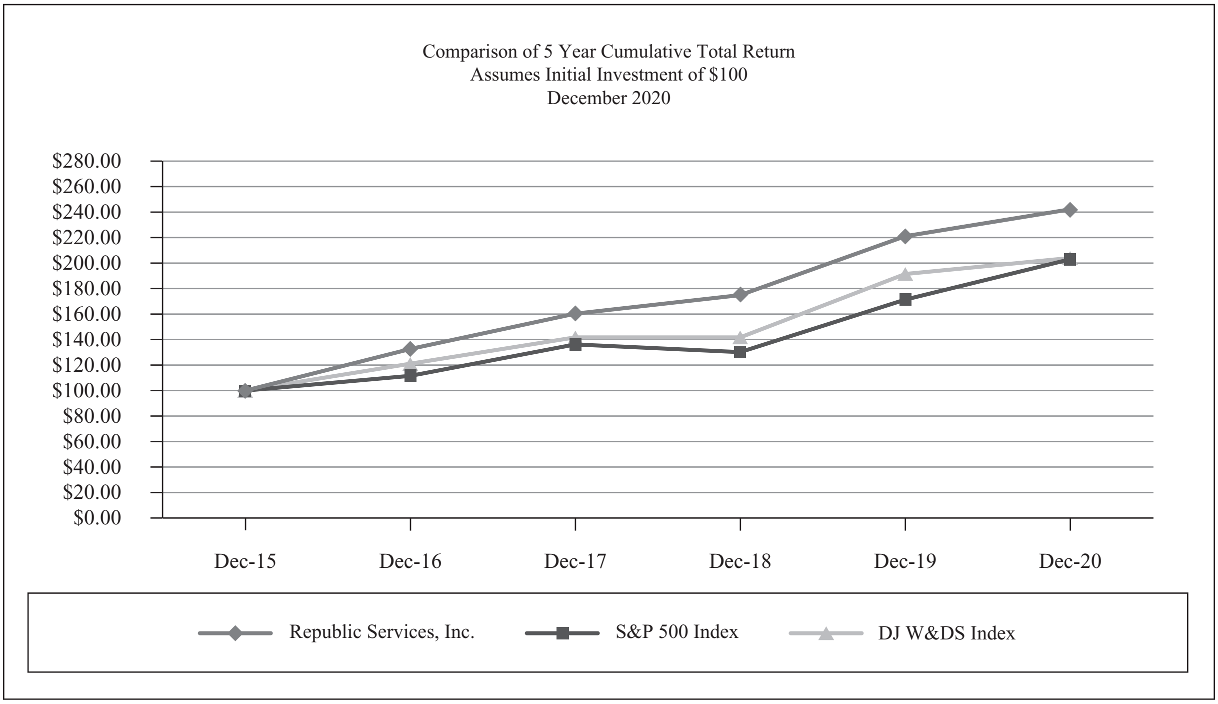
Recent Sales of Unregistered Securities

There were no sales of unregistered securities during the three months ended December 31, 2020.

Performance Graph

The following graph compares the performance of our common stock to the Standard & Poor's 500 Stock Index (S&P 500 Index) and the Dow Jones Waste & Disposal Services Index (DJ W&DS Index). The graph covers the period from December 31, 2015 to December 31, 2020 and assumes that the value of the investment in our common stock and in each index was $100 as of December 31, 2015 and that all dividends were reinvested.

The following performance graph and related information shall not be deemed "soliciting material" or to be "filed" with the SEC, nor shall such information be incorporated by reference into any future filing under the Securities Act of 1933 or the Securities Exchange Act of 1934, each as amended, except to the extent that we specifically incorporate it by reference into such filing.



	Indexed Returns for the Years Ended December 31,					
	2015	2016	2017	2018	2019	2020
Republic Services, Inc.	$ 100.00	$ 132.85	$ 160.72	$ 174.93	$ 221.47	$ 242.58
S&P 500 Index	$ 100.00	$ 111.96	$ 136.40	$ 130.42	$ 171.49	$ 203.04
DJ W&DS Index	$ 100.00	$ 121.15	$ 141.84	$ 142.00	$ 191.83	$ 204.42

ITEM 6. SELECTED FINANCIAL DATA

You should read the following Selected Financial Data in conjunction with Item 7, *Management's Discussion and Analysis of Financial Condition and Results of Operations* and Item 8, *Financial Statements and Supplementary Data*, which includes our consolidated financial statements and notes thereto as of and for the years ended December 31, 2020 and 2019, in this Form 10-K.

These historical results are not necessarily indicative of the results to be expected in the future. Amounts are in millions, except per share data.

	Years Ended December 31,				
	2020	2019	2018	2017	2016
Statements of Income Data:					
Revenue	$ 10,153.6	$ 10,299.4	$ 10,040.9	$ 10,041.5	$ 9,387.7
Operating income	$ 1,709.1	$ 1,787.2	$ 1,735.8	$ 1,668.5	$ 1,537.5
Net income	$ 969.6	$ 1,073.8	$ 1,037.6	$ 1,279.0	$ 613.2
Basic earnings per share	$ 3.03	$ 3.34	$ 3.17	$ 3.79	$ 1.79
Diluted earnings per share	$ 3.02	$ 3.33	$ 3.16	$ 3.77	$ 1.78
Cash dividends per common share	$ 1.66	$ 1.56	$ 1.44	$ 1.33	$ 1.24
Statements of Cash Flows Data:					
Cash provided by operating activities	$ 2,471.6	$ 2,352.1	$ 2,242.8	$ 1,910.7	$ 1,847.8
Purchases of property and equipment	$ 1,194.6	$ 1,207.1	$ 1,071.8	$ 989.8	$ 927.8
Proceeds from the sale of property and equipment	$ 30.1	$ 21.7	$ 31.6	$ 6.1	$ 9.8
Balance Sheet Data:					
Cash and cash equivalents	$ 38.2	$ 47.1	$ 70.5	$ 83.3	$ 67.8
Restricted cash and marketable securities	$ 149.1	$ 179.4	$ 108.1	$ 141.1	$ 90.5
Total assets	$ 23,434.0	$ 22,683.8	$ 21,617.0	$ 21,147.0	$ 20,629.6
Total debt	$ 8,934.2	$ 8,688.5	$ 8,337.5	$ 8,187.4	$ 7,658.9
Total stockholders' equity	$ 8,488.8	$ 8,120.9	$ 7,929.5	$ 7,961.1	$ 7,693.7

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

You should read the following discussion in conjunction with our audited consolidated financial statements and the notes thereto included in Item 8 of this Form 10-K. This discussion may contain forward-looking statements that anticipate results that are subject to uncertainty. We discuss in more detail various factors that could cause actual results to differ from expectations in Item 1A, Risk Factors in this Form 10-K.

For further discussion regarding our results of operations for the year ended December 31, 2019 as compared to the year ended December 31, 2018, refer to Item 7, *Management's Discussion and Analysis of Financial Condition and Results of Operations*, in our Annual Report on Form 10-K for the fiscal year ended December 31, 2019.

Recent Developments

In March 2020, the World Health Organization declared the outbreak of a new strain of coronavirus (COVID-19) a pandemic. The COVID-19 pandemic has negatively impacted the global economy, disrupted global supply chains and created significant volatility and disruption of financial markets. The full extent of the impact of the COVID-19 pandemic on our operations and financial performance will depend on future developments, including the duration and spread of the pandemic, all of which are uncertain and cannot be predicted at this time.

Both national and local government agencies have implemented steps to slow the spread of the virus, including shelter-in-place orders and the mandatory shutdown of certain businesses. During this time, we continued to provide essential services to our customers. In mid-March 2020, certain customers in our small- and large-container businesses began adjusting their service levels, which included a decrease in the frequency of pickups or a temporary pause in service. In addition, we experienced a decline in volumes disposed at certain of our landfills and transfer stations. As service levels decreased, we also experienced a decrease in certain costs of our operations which are variable in nature. This decline in service activity peaked in the first half of April and gradually recovered thereafter as local economies began to gradually reopen and customers began to resume service. Large outbreaks and resurgences of COVID-19 in various regions may result in a reinstitution of certain restrictions and further adjustments in our service levels, which would negatively impact our business.

The demand for our environmental solutions business depends on the continued demand for, and production of, oil and natural gas in certain shale basins located in the United States. During the year ended December 31, 2020, the price of crude oil and natural gas reached historic lows, resulting in a decrease in rig counts and drilling activity that led to a year-over-year decrease in revenue from our environmental solutions business. During the three months ended December 31, 2020, we recognized a $42.6 million charge as a loss on business divestitures and impairments, net in our consolidated income statement resulting from management's decision to exit certain product offerings and geographic basins in our upstream environmental solutions business. As the carrying value of the assets associated with these operations was no longer recoverable, we impaired the entire net book value of certain assets, comprised mainly of equipment, vehicles, and containers. On at least a quarterly basis, we will continue to monitor the effect of the evolving COVID-19 pandemic on our business and review our estimates for recoverability of assets.

In April 2020, we launched our Committed to Serve initiative to help our employees, customers and communities across the United States. We committed $20 million to support frontline employees and their families, as well as small business customers in the local communities where we serve. In addition to this initiative, we have experienced an increase in certain costs of doing business as a direct result of the COVID-19 pandemic, including costs for additional safety equipment and hygiene products and increased facility and equipment cleaning. These costs are intended to assist in protecting the safety of our frontline employees as we continue to provide an essential service to our customers. We also incurred incremental costs for guaranteeing certain frontline employees a minimum hourly work week regardless of service decreases. In the fourth quarter, we recognized our frontline employees for their commitment and contributions to their communities during the pandemic with a $500 award that was paid in January 2021. In 2020, we incurred costs of $68.4 million as a direct and incremental result of the COVID-19 pandemic. In addition, we incurred incremental costs associated with expanding certain aspects of our existing healthcare programs. We expect to incur similar costs throughout 2021, and potentially into future years, although we expect the annual amount of such costs to be less than those incurred in 2020.

The effects of the COVID-19 pandemic on our business are described in more detail in the *Results of Operations* discussion in this *Management's Discussion and Analysis of Financial Condition and Results of Operations.*

2021 Financial Guidance

In 2021, we will focus on driving profitable growth, making disciplined acquisition investments, maintaining an inclusive and engaging culture for our people, and advancing technology to empower our employees, increase connectivity with our customers and drive operational excellence. Our team remains focused on executing our strategy to deliver consistent earnings and free cash flow growth, and improving return on invested capital. We are committed to maintaining an efficient capital structure, preserving our investment grade credit ratings and increasing cash returned to our shareholders.

Our guidance is based on current economic conditions and does not assume any significant changes in the overall economy in 2021. Specific guidance follows:

Revenue

We expect an increase in average yield of approximately 2.5% and volume growth to be in a range of 1.5% to 2.0%.

Adjusted Diluted Earnings per Share

The following is a summary of anticipated adjusted diluted earnings per share for the year ending December 31, 2021 compared to the actual adjusted diluted earnings per share for the year ended December 31, 2020. Adjusted diluted earnings per share is not a measure determined in accordance with U.S. GAAP:

	(Anticipated) Year Ending December 31, 2021	(Actual) Year Ended December 31, 2020
Diluted earnings per share	$ 3.61 to 3.68	$ 3.02
Loss on extinguishment of debt and other related costs	-	0.23
Withdrawal costs – multiemployer pension funds	-	0.08
Restructuring charges	0.04 to 0.05	0.05
Loss on business divestitures and impairments, net	-	0.21
Bridgeton insurance recovery	-	(0.03)
Adjusted diluted earnings per share	$ 3.65 to 3.73	$ 3.56

We believe that the presentation of adjusted diluted earnings per share, which excludes loss on extinguishment of debt and other related costs, multiemployer pension fund withdrawal costs, restructuring charges, loss on business divestitures and impairments, net, and Bridgeton insurance recoveries provides an understanding of operational activities before the financial effect of certain items. We use this measure, and believe investors will find it helpful, in understanding the ongoing performance of our operations separate from items that have a disproportionate effect on our results for a particular period. We have incurred comparable charges and costs in prior periods, and similar types of adjustments can reasonably be expected to be recorded in future periods. Our definition of adjusted diluted earnings per share may not be comparable to similarly titled measures presented by other companies.

Overview

Republic is one of the largest providers of environmental services in the United States, as measured by revenue. As of December 31, 2020, we operated facilities in 41 states through 345 collection operations, 220 transfer stations, 186 active landfills, 76 recycling processing centers, 6 treatment, recovery and disposal facilities, 9 salt water disposal wells, and 7 deep injection wells. We are engaged in 75 landfill gas-to-energy and renewable energy projects and had post-closure responsibility for 128 closed landfills.

Revenue for the year ended December 31, 2020 decreased by (1.4)% to $10,153.6 million compared to $10,299.4 million for the same period in 2019. This change in revenue is due to decreased volumes of (3.1)%, fuel recovery fees of (0.7)%, and environmental solutions of (0.9)%, partially offset by increases in average yield of 2.6%, acquisitions, net of divestitures of 0.4%, recycling processing and commodity sales of 0.3%, and one additional workday as compared to 2019.

The following table summarizes our revenue, costs and expenses for the years ended December 31, 2020 and 2019 (in millions of dollars and as a percentage of revenue):

	2020		2019	
Revenue	$ 10,153.6	100.0%	$ 10,299.4	100.0%
Expenses:				
Cost of operations	6,100.5	60.1	6,298.4	61.2
Depreciation, amortization and depletion of property and equipment	1,015.9	10.0	985.8	9.6
Amortization of other intangible assets	21.2	0.2	20.4	0.2
Amortization of other assets	38.8	0.4	34.3	0.3
Accretion	82.9	0.8	81.9	0.8
Selling, general and administrative	1,053.0	10.4	1,091.9	10.6
Withdrawal costs – multiemployer pension funds	34.5	0.3	-	-
Loss (gain) on business divestitures and impairments, net	77.7	0.8	(14.7)	(0.1)
Restructuring charges	20.0	0.2	14.2	0.1
Operating income	$ 1,709.1	16.8%	$ 1,787.2	17.3%

Our pre-tax income was $1,142.7 million for the year ended December 31, 2020, compared to $1,295.8 million in 2019. Our net income attributable to Republic Services, Inc. was $967.2 million, or $3.02 per diluted share for 2020, compared to $1,073.3 million, or $3.33 per diluted share, for 2019.

During 2020 and 2019, we recorded a number of charges, other expenses and benefits that impacted our pre-tax income, net income attributable to Republic Services, Inc. (net income – Republic) and diluted earnings per share as noted in the following table (in millions, except per share data). Additionally, see our *Results of Operations* section of this *Management's Discussion and Analysis of Financial Condition and Results of Operations* for a discussion of other items that impacted our earnings during the years ended December 31, 2020 and 2019. For comparative purposes, prior year amounts have been reclassified to conform to current year presentation.

	Year Ended December 31, 2020			Year Ended December 31, 2019		
	Pre-tax Income	Net Income - Republic	Diluted Earnings per Share	Pre-tax Income	Net Income - Republic	Diluted Earnings per Share
As reported	$ 1,142.7	$ 967.2	$ 3.02	$ 1,295.8	$ 1,073.3	$ 3.33
Loss on extinguishment of debt and other related costs	99.1	73.0	0.23	-	-	-
Restructuring charges	20.0	14.8	0.05	14.2	10.4	0.04
Loss (gain) on business divestitures and impairments, net	77.7	65.5	0.21	(14.7)	(8.7)	(0.03)
Withdrawal costs - multiemployer pension funds	34.5	25.5	0.08	-	-	-
Fire-damage related costs	-	-	-	7.7	5.7	0.02
Bridgeton insurance recovery	(10.8)	(8.2)	(0.03)	(24.0)	(18.3)	(0.06)
Incremental contract startup costs - large municipal contract [(1)]	-	-	-	0.7	0.5	-
Total adjustments	220.5	170.6	0.54	(16.1)	(10.4)	(0.03)
As adjusted	$ 1,363.2	$ 1,137.8	$ 3.56	$ 1,279.7	$ 1,062.9	$ 3.30

(1) The aggregate impact to adjusted diluted earnings per share totals to less than $0.01 for the year ended December 31, 2019.

We believe that presenting adjusted pre-tax income, adjusted net income – Republic, and adjusted diluted earnings per share, which are not measures determined in accordance with U.S. GAAP, provide an understanding of operational activities before the financial impact of certain items. We use these measures, and believe investors will find them helpful, in understanding the ongoing performance of our operations separate from items that have a disproportionate impact on our results for a particular period. We have incurred comparable charges and costs in prior periods, and similar types of adjustments can reasonably be expected to be recorded in future periods. Our definitions of adjusted pre-tax income, adjusted net income – Republic, and adjusted diluted earnings per share may not be comparable to similarly titled measures presented by other companies. Further information on each of these adjustments is included below.

Loss on extinguishment of debt and other related costs. During 2020, we incurred a loss on the early extinguishment of debt and other related costs related to the early extinguishment of our $600.0 million 5.250% senior notes due November 2021 (the 2021 Notes) and our $850.0 million 3.550% senior notes due June 2022 (the 2022 Notes), and to redeem $250.0 million of the $550.0 million outstanding 4.750% senior notes due May 2023 (the 2023 Notes). We paid total cash premiums of $99.1 million and incurred non-cash charges related to the proportional share of unamortized discounts and deferred issuance costs of $2.8 million. The unamortized proportional share of certain cash flow hedges reclassified to earnings as non-cash interest expense was $1.8 million, and the proportional share of our fair value hedges (related to the 2023 Notes) that were dedesignated and recognized in earnings as a reduction to non-cash interest expense was $4.7 million. During 2019, we did not incur any losses on the early extinguishment of certain financing arrangements.

Restructuring charges. In 2019, we incurred costs related to the redesign of certain back-office software systems, which continued into 2020. In addition, in July 2020, we eliminated certain back-office support positions in response to a decline in the underlying demand for services resulting from the COVID-19 pandemic. During 2020, we incurred restructuring charges of $20.0 million which primarily related to these restructuring efforts. During 2019, we incurred restructuring charges of $14.2 million, which primarily related to the redesign of certain of our back-office software systems. We paid $15.5 million and $10.6 million during 2020 and 2019, respectively, related to these restructuring efforts.

In 2021, we expect to incur additional restructuring charges of approximately $15 million to $20 million primarily related to the redesign of certain of our back-office software systems. Substantially all of these restructuring charges will be recorded in our corporate segment.

Loss (gain) on business divestitures and impairments, net. During 2020, we recorded a net loss on business divestitures and impairments of $77.7 million which was due to business divestitures and asset impairments in certain markets, including $42.6 million resulting from management's decision to exit certain product offerings and geographic basins in our upstream environmental solutions business. During 2019, we recorded a net gain on business divestitures and impairments of $(14.7) million.

Withdrawal costs – multiemployer pension funds. During 2020, we recorded charges to earnings of $34.5 million for withdrawal events at multiemployer pension funds to which we contribute. As we obtain updated information regarding multiemployer pension funds, the factors used in deriving our estimated withdrawal liabilities will be subject to change, which may adversely impact our reserves for withdrawal costs.

Fire-damage related costs. During the three months ended December 31, 2019, certain of our owned and operated facilities in our Group 1 segment were impacted by separate fire-related events. Although our business may incur fire-related damage to our leased or owned property, plant and equipment from time to time, we specifically identify in the table above fire-damage related costs of $7.7 million incurred during 2019, due to its magnitude.

Bridgeton insurance recovery. During 2020 and 2019, we recognized insurance recoveries of $10.8 million and $24.0 million, respectively, related to our closed Bridgeton Landfill in Missouri, which we recognized as a reduction of remediation expenses in our cost of operations.

Incremental contract start-up costs – large municipal contract. Although our business regularly incurs startup costs under municipal contracts, we specifically identify in the table above the startup costs with respect to an individual municipal contract (and do not adjust for other startup costs under other contracts in 2020 or 2019). We do this because of the magnitude of the costs involved with this particular municipal contract and the unusual nature for the time period in which they were incurred. During 2019, we incurred costs of $0.7 million related to the implementation of this large municipal contract. These costs did not meet the capitalization criteria prescribed by Accounting Standards Update 2014-09, *Revenue from Contracts with Customers (Topic 606) and Other Assets and Deferred Costs-Contracts with Customers (Subtopic 340-40)*.

Results of Operations

Revenue

We generate revenue by providing environmental services to our customers, including the collection and processing of recyclable materials, collection, transfer and disposal of non-hazardous solid waste, and other environmental solutions. Our residential, small-container and large-container collection operations in some markets are based on long-term contracts with municipalities. Certain of our municipal contracts have annual price escalation clauses that are tied to changes in an underlying base index such as a consumer price index. We generally provide small-container and large-container collection services to customers under contracts with terms up to three years. Our transfer stations and landfills generate revenue from disposal or tipping fees charged to third parties. Our recycling processing centers generate revenue from tipping fees charged to third parties and the sale of recycled commodities. Our revenue from environmental solutions consists mainly of fees we charge for disposal of non-hazardous solid and liquid material and in-plant services, such as transportation and logistics. Environmental solutions waste is generated from the by-product of oil and natural gas exploration and production activity. Additionally, it is generated by the daily operations of industrial, petrochemical and refining facilities, including maintenance, plant turnarounds and capital projects. Other non-core revenue consists primarily of revenue from National Accounts, which represents the portion of revenue generated from nationwide or regional contracts in markets outside our operating areas where the associated material handling is subcontracted to local operators. Consequently, substantially all of this revenue is offset with related subcontract costs, which are recorded in cost of operations.

The following table reflects our revenue by service line for the years ended December 31, 2020 and 2019 (in millions of dollars and as a percentage of revenue):

	2020		2019	
Collection:				
Residential	$ 2,309.0	22.7%	$ 2,271.9	22.1%
Small-container	3,106.8	30.6	3,170.0	30.8
Large-container	2,148.9	21.2	2,249.6	21.8
Other	51.5	0.5	46.1	0.4
Total collection	7,616.2	75.0	7,737.6	75.1
Transfer	1,349.4		1,318.7	
Less: intercompany	(745.9)		(748.1)	
Transfer, net	603.5	5.9	570.6	5.5
Landfill	2,298.1		2,324.2	
Less: intercompany	(1,018.5)		(1,024.1)	
Landfill, net	1,279.6	12.6	1,300.1	12.6
Environmental solutions	127.7	1.3	191.7	1.9
Other:				
Recycling processing and commodity sales	297.1	2.9	273.3	2.7
Other non-core	229.5	2.3	226.1	2.2
Total other	526.6	5.2	499.4	4.9
Total revenue	$ 10,153.6	100.0%	$ 10,299.4	100.0%

The following table reflects changes in components of our revenue, as a percentage of total revenue, for the years ended December 31, 2020 and 2019:

	2020	2019
Average yield	2.6%	2.8%
Fuel recovery fees	(0.7)	-
Total price	1.9	2.8
Volume	(3.1)	(0.4)
Recycling processing and commodity sales	0.3	(0.3)
Environmental solutions	(0.9)	(0.3)
Total internal growth	(1.8)	1.8
Acquisitions / divestitures, net	0.4	0.8
Total	(1.4)%	2.6%
Core price	4.8%	4.7%

Average yield is defined as revenue growth from the change in average price per unit of service, expressed as a percentage. Core price is defined as price increases to our customers and fees, excluding fuel recovery, net of price decreases to retain customers. We also measure changes in average yield and core price as a percentage of related-business revenue, defined as total revenue excluding recycled commodities and fuel recovery fees, to determine the effectiveness of our pricing strategies. Average yield as a percentage of related-business revenue was 2.8% and 2.9% for 2020 and 2019, respectively. Core price as a percentage of related-business revenue was 5.0% for both 2020 and 2019.

During 2020, we experienced the following changes in our revenue as compared to 2019:

- Average yield increased revenue by 2.6% due to positive pricing changes in all lines of business.
- The fuel recovery fee program, which mitigates our exposure to increases in fuel prices, decreased revenue by (0.7)%, primarily due to a decrease in fuel prices compared to the same period in 2019 and a decrease in the total revenue subject to the fuel recovery fees.
- Volume decreased revenue by (3.1)% primarily due to a reduction in service levels attributable to the COVID-19 pandemic. We experienced volume declines in our small- and large-container lines of business as a result of a reduction in the frequency of pickups or a temporary pause in service for certain of our customers. In addition, we experienced declines in special waste volumes disposed at certain of our landfills and a decrease in volumes at our transfer stations. These decreases were partially offset by an increase in construction and demolition volumes in our landfill line of business along with one additional workday as compared to 2019.
- Recycling processing and commodity sales increased revenue by 0.3% primarily due to an increase in overall commodity prices as compared to 2019. The average price for recycled commodities, excluding glass and organics for 2020 was $96 per ton compared to $77 per ton for 2019.

  Changing market demand for recycled commodities causes volatility in commodity prices. At current volumes and mix of materials, we believe a $10 per ton change in the price of recycled commodities will change both annual revenue and operating income by approximately $12 million.
- Environmental solutions revenue decreased by (0.9)% primarily due to a decrease in rig counts, drilling activity, and the delay of in-plant project work as a result of lower demand for crude oil.
- Acquisitions, net of divestitures, increased revenue by 0.4% due to our continued growth strategy of acquiring privately held environmental services companies that complement our existing business platform. This was partially offset by a decrease in revenue due to the divestiture of certain non-strategic assets during the year.

Cost of Operations

Cost of operations includes labor and related benefits, which consists of salaries and wages, health and welfare benefits, incentive compensation and payroll taxes. It also includes transfer and disposal costs representing tipping fees paid to third party disposal facilities and transfer stations; maintenance and repairs relating to our vehicles, equipment and containers, including related labor and benefit costs; transportation and subcontractor costs, which include costs for independent haulers that transport our material to disposal facilities and costs for local operators who provide environmental services associated with our National Accounts in markets outside our standard operating areas; fuel, which includes the direct cost of fuel used by our vehicles, net of fuel tax credits; disposal fees and taxes, consisting of landfill taxes, host community fees and royalties; landfill operating costs, which includes financial assurance, leachate disposal, remediation charges and other landfill maintenance costs; risk management costs, which include insurance premiums and claims; cost of goods sold, which includes material costs paid to suppliers; and other, which includes expenses such as facility operating costs, equipment rent and gains or losses on sale of assets used in our operations.

The following table summarizes the major components of our cost of operations for the years ended December 31, 2020 and 2019 (in millions of dollars and as a percentage of revenue):

	2020		2019	
Labor and related benefits	$ 2,153.4	21.2%	$ 2,202.4	21.4%
Transfer and disposal costs	796.9	7.9	841.7	8.2
Maintenance and repairs	969.6	9.6	1,006.2	9.8
Transportation and subcontract costs	674.1	6.6	674.9	6.5
Fuel	271.7	2.7	347.9	3.4
Disposal fees and taxes	313.5	3.1	325.7	3.2
Landfill operating costs	258.2	2.5	244.7	2.4
Risk management	213.9	2.1	230.7	2.2
Other	460.0	4.5	440.6	4.2
Subtotal	6,111.3	60.2	6,314.8	61.3
Fire-damage related costs (1)	-	-	7.6	0.1
Bridgeton insurance recovery	(10.8)	(0.1)	(24.0)	(0.2)
Total cost of operations	$ 6,100.5	60.1%	$ 6,298.4	61.2%

(1) During the three months and year ended December 31, 2019, we incurred an additional $0.1 million of fire-damage related costs, which are reflected in other selling, general, and administrative expense.

These cost categories may change from time to time and may not be comparable to similarly titled categories presented by other companies. As such, you should take care when comparing our cost of operations by component to that of other companies and of ours for prior periods.

Our cost of operations decreased for the year ended December 31, 2020 compared to the same period in 2019 as a result of the following:

- Labor and related benefits decreased due to a decline in service levels attributable to the COVID-19 pandemic, partially offset by higher hourly and salaried wages as a result of annual merit increases, and one additional workday during 2020 as compared to 2019.

- Transfer and disposal costs decreased as a result of lower collection volumes, partially offset by an increase in third party disposal rates. During both 2020 and 2019, approximately 68% of the total solid waste volume we collected was disposed at landfill sites that we own or operate (internalization).

- Maintenance and repairs expense decreased due to a decrease in service levels attributable to the COVID-19 pandemic.

- Transportation and subcontract costs decreased slightly primarily due to a decline in demand for our environmental solutions business as well as a decrease in transfer station volumes, partially offset by increases due to acquisition-related activity along with one additional workday during 2020 as compared to 2019.

- Fuel costs decreased due to a decline in fuel prices and service levels attributable to the COVID-19 pandemic. The national average cost per gallon for diesel fuel in 2020 was $2.55 compared to $3.06 for 2019.

  At current consumption levels, we believe a twenty-cent per gallon change in the price of diesel fuel would change our fuel costs by approximately $25 million per year. Offsetting these changes in fuel expense would be changes in our fuel recovery fee charged to our customers. At current participation rates, we believe a twenty-cent per gallon change in the price of diesel fuel would change our fuel recovery fee by approximately $25 million per year.

- Disposal fees and taxes decreased due to a decrease in service levels attributable to the COVID-19 pandemic.

- Landfill operating expenses increased due to the recognition of certain favorable remediation adjustments in 2019 that did not recur in 2020.

- Risk management expenses decreased primarily due to favorable actuarial development in our auto liability and workers compensation prior year programs, coupled with a decline in exposure in our current year program.

- Other costs of operations increased during 2020 as a result of incremental costs incurred related to the COVID-19 pandemic, including costs for additional safety equipment and hygiene products, increased facility and equipment cleaning, and costs associated with our Committed to Serve initiative, partially offset by a decline in necessary facility repairs as well as decreased third party equipment rentals as a result of a decline in service levels attributable to the COVID-19 pandemic.

- During 2019, we incurred $7.6 million of fire-related damage costs in our cost of operations that resulted from damage to our leased or owned property, plant and equipment in our Group 1 segment.

- During 2020 and 2019, we recognized favorable insurance recoveries of $10.8 million and $24.0 million, respectively, related to our closed Bridgeton Landfill as a reduction of remediation expenses in our consolidated statement of income for the applicable period.

Depreciation, Amortization and Depletion of Property and Equipment

The following table summarizes depreciation, amortization and depletion of property and equipment for the years ended December 31, 2020 and 2019 (in millions of dollars and as a percentage of revenue):

	2020		2019	
Depreciation and amortization of property and equipment	$ 692.9	6.8%	$ 652.8	6.4%
Landfill depletion and amortization	323.0	3.2	333.0	3.2
Depreciation, amortization and depletion expense	$ 1,015.9	10.0%	$ 985.8	9.6%

Depreciation and amortization of property and equipment increased primarily due to additional assets acquired with our acquisitions.

Landfill depletion and amortization decreased in aggregate dollars due to lower landfill disposal volumes primarily driven by decreased special waste volumes, partially offset by an increase in our overall average depletion rate.

Amortization of Other Intangible Assets

Expenses for amortization of other intangible assets were $21.2 million and $20.4 million for the years ended December 31, 2020 and 2019, respectively, or 0.2% of revenue for both 2020 and 2019. Our other intangible assets primarily relate to customer relationships and, to a lesser extent, non-compete agreements. Amortization expense increased due to additional assets acquired with our acquisitions.

Amortization of Other Assets

Expenses for amortization of other assets were $38.8 million, or 0.4% of revenue, for the year ended December 31, 2020, compared to $34.3 million, or 0.3% of revenue, for 2019. Our other assets primarily relate to the prepayment of fees and capitalized implementation costs associated with cloud-based hosting arrangements.

Accretion Expense

Accretion expense was $82.9 million and $81.9 million, or 0.8% of revenue, for the years ended December 31, 2020 and 2019, respectively. Accretion expense has remained relatively unchanged as our asset retirement obligations remained relatively consistent period over period.

Selling, General and Administrative Expenses

Selling, general and administrative expenses include salaries, health and welfare benefits, and incentive compensation for corporate and field general management, field support functions, sales force, accounting and finance, legal, management information systems, and clerical and administrative departments. Other expenses include rent and office costs, fees for professional services provided by third parties, legal settlements, marketing, investor and community relations services, directors' and officers' insurance, general employee relocation, travel, entertainment and bank charges. Restructuring charges are excluded from selling, general and administrative expenses and are discussed separately.

The following table summarizes our selling, general and administrative expenses for the years ended December 31, 2020 and 2019 (in millions of dollars and as a percentage of revenue):

	2020		2019	
Salaries and related benefits	$ 740.5	7.3%	$ 751.9	7.3%
Provision for doubtful accounts	27.8	0.3	34.0	0.3
Other	284.7	2.8	306.0	3.0
Total selling, general and administrative expenses	$ 1,053.0	10.4%	$ 1,091.9	10.6%

These cost categories may change from time to time and may not be comparable to similarly titled categories used by other companies. As such, you should take care when comparing our selling, general and administrative expenses by cost component to those of other companies and of ours for prior periods.

The most significant items affecting our selling, general and administrative expenses during 2020 as compared to 2019 are summarized below:

- In 2020, salaries and related benefits decreased in aggregate dollars primarily due to a decrease in compensation expense related to our performance shares and continued efficiencies at our customer resource centers attributable to our investments in enhanced technology platforms. This decrease was partially offset by higher wages, benefits and other payroll related items resulting from annual merit increases.

- Provision for doubtful accounts decreased in aggregate dollars during 2020, primarily due to improved collections during the period as demonstrated by the reduction in our days sales outstanding to 38.6, or 26.4 days net of deferred revenue, as of December 31, 2020 compared to 39.8, or 27.9 days net of deferred revenue, as of December 31, 2019.

- Other selling, general and administrative expenses decreased during 2020, primarily due to a decrease in travel and advertising costs as a result of the COVID-19 pandemic. These decreases were partially offset by an increase in facility and equipment cleaning expenses attributable to the COVID-19 pandemic, professional fees, certain charitable donations associated with our Committed to Serve initiative, and acquisition deal costs.

Withdrawal Costs - Multiemployer Pension Funds

During 2020, we recorded charges to earnings of $34.5 million for withdrawal events at multiemployer pension funds to which we contribute. We paid $34.4 million during 2020 relative to these withdrawal events. As we obtain updated information regarding multiemployer pension funds, the factors used in deriving our estimated withdrawal liabilities will be subject to change, which may adversely impact our reserves for withdrawal costs.

Loss (Gain) on Business Divestitures and Impairments, Net

We strive to have a number one or number two market position in each of the markets we serve, or have a clear path on how we will achieve a leading market position over time. Where we cannot establish a leading market position, or where operations are not generating acceptable returns, we may decide to divest certain assets and reallocate resources to other markets. Business divestitures could result in gains, losses or impairment charges that may be material to our results of operations in a given period.

During 2020, we recorded a net loss on business divestitures and impairments of $77.7 million, which was due to business divestitures and asset impairments in certain markets, including $42.6 million resulting from management’s decision to exit certain product offerings and geographic basins in our upstream environmental solutions business. During 2019, we recorded a net gain on business divestitures and impairments of $(14.7) million.

Restructuring Charges

In 2019, we incurred costs related to the redesign of certain back-office software systems, which continued into 2020. In addition, in July 2020, we eliminated certain back-office support positions in response to a decline in the underlying demand for services resulting from the COVID-19 pandemic. During 2020, we incurred restructuring charges of $20.0 million which primarily related to these restructuring efforts. During 2019, we incurred restructuring charges of $14.2 million, which primarily related to the redesign of certain of our back-office software systems. We paid $15.5 million and $10.6 million during 2020 and 2019, respectively, related to these restructuring efforts.

Interest Expense

The following table provides the components of interest expense, including accretion of debt discounts and accretion of discounts primarily associated with environmental and risk insurance liabilities assumed in acquisitions (in millions of dollars):

	2020	2019
Interest expense on debt	$ 300.1	$ 350.4
Non-cash interest	61.7	48.8
Less: capitalized interest	(6.2)	(7.2)
Total interest expense	$ 355.6	$ 392.0

Total interest expense for 2020 decreased compared to 2019 primarily due to lower interest rates on our floating and fixed rate debt. The decrease attributable to our fixed rate debt is primarily due to the issuance of $350.0 million of 0.875% senior notes and $750.0 million of 1.750% senior notes in November 2020, $650.0 million of 1.450% senior notes in August 2020, $600.0 million of 2.300% senior notes and $400.0 million of 3.050% senior notes in February 2020, as well as the issuance of $900.0 million of 2.500% senior notes in August 2019, the proceeds of which were used to repay outstanding senior notes with coupons ranging from 3.550% to 5.500%.

During 2020 and 2019, cash paid for interest, excluding net swap settlements for our fixed to floating interest rate swaps, was $325.1 million and $346.8 million, respectively.

Loss on Extinguishment of Debt

During 2020, we incurred a $101.9 million loss on the early extinguishment of debt . We paid total cash premiums during the year totaling $99.1 million and incurred non-cash charges related to the proportional share of unamortized discounts and deferred issuance costs of $2.8 million.

Income Taxes

Our provision for income taxes was $173.1 million and $222.0 million for 2020 and 2019, respectively. Our effective income tax rate was 15.2% and 17.1% for 2020 and 2019, respectively. We made income tax payments (net of refunds) of approximately $124 million and $31 million for 2020 and 2019, respectively. Income taxes paid in 2020 and 2019 reflect benefits from 100% bonus depreciation on qualified assets as well as tax credits from our continuing investments in solar energy.

During 2020, we acquired non-controlling interests in limited liability companies established to own solar energy assets that qualified for investment tax credits under Section 48 of the Internal Revenue Code. We account for these investments using the equity method of accounting and recognize our share of income or loss and other reductions in the value of our investments in loss from unconsolidated equity method investments within our consolidated statements of income. For further discussion regarding our equity method accounting, see Note 3, *Business Acquisitions, Investments and Restructuring Charges*, of the notes to our consolidated financial statements in Item 8 of this Form 10-K. Our 2020 tax provision reflects a benefit of approximately $100 million due to the tax credits related to these investments. In addition, our 2020 tax provision was reduced by $17.2 million for adjustments to our valuation allowance due to the realizability of certain state loss carryforwards. Lastly, our provision was further reduced by $8.2 million due to the realization of additional federal and state benefits as well as adjustments to deferred taxes due to the completion of our 2019 tax returns and $11.6 million from excess tax benefits related to stock compensation.

Our 2019 tax provision was reduced by $12.3 million from excess tax benefits related to stock compensation, approximately $84 million related to the tax credits from our non-controlling interests in limited liability companies established to own solar energy assets, and approximately $13 million due to the realization of tax credits and lower state rates due to changes in estimates following the completion of our 2018 tax returns.

During the three months ended December 31, 2020, we determined that it is more likely than not that we will realize a portion of our deferred tax assets related to certain state loss carryforwards. Most of these loss carryforwards are attributable to a specific subsidiary for which we have historically provided a partial valuation allowance due to the uncertainty surrounding the future utilization of these carryforwards in the tax jurisdictions where the loss carryforwards exist. The realization of these deferred tax assets depends upon the existence of sufficient taxable income in future periods. As a result of recent changes in U.S. tax law, the current macroeconomic environment and our ongoing efforts to streamline and maximize the efficiency of our tax footprint, we completed our restructuring plan which optimized our tax structure to better align with our overall operational footprint. This resulted in a reduction to our valuation allowance of $17.2 million for the year and three months ended December 31, 2020.

We have deferred tax assets related to state net operating loss carryforwards of approximately $99 million available as of December 31, 2020. These state net operating loss carryforwards expire at various times between 2021 and 2040. We believe that it is more likely than not that the benefit from some of our state net operating loss carryforwards will not be realized due to limitations on these loss carryforwards in certain states. In recognition of this risk, as of December 31, 2020, we have provided a valuation allowance of approximately $44 million.

Reportable Segments

In December 2020, our senior management began evaluating, overseeing and managing the financial performance of our operations through three operating segments. Group 1 primarily consists of geographic areas located in the western United States, and Group 2 primarily consists of geographic areas located in the southeastern and mid-western United States, and the eastern seaboard of the United States. Our environmental solutions operating segment, which provides waste management solutions for daily operations of industrial, petrochemical and refining facilities, is aggregated with Corporate entities and other as it only represents approximately 1% of our consolidated revenue. Each of our reportable segments provides integrated environmental services, including collection, transfer, recycling, and disposal services.

Summarized financial information concerning our reportable segments for the years ended December 31, 2020 and 2019 is shown in the following table (in millions of dollars and as a percentage of revenue in the case of operating margin):

	Net Revenue	Depreciation, Amortization, Depletion and Accretion Before Adjustments for Asset Retirement Obligations	Adjustments to Amortization Expense for Asset Retirement Obligations	Depreciation, Amortization, Depletion and Accretion	Loss (Gain) on Business Divestitures and Impairments, Net	Operating Income (Loss)	Operating Margin
2020:							
Group 1	$ 5,057.5	$ 522.1	$ (20.0)	$ 502.1	$ -	$ 1,343.3	26.6%
Group 2	4,791.9	506.4	(17.5)	488.9	-	966.4	20.2%
Corporate entities and other	304.2	142.8	25.0	167.8	77.7	(600.6)	-
Total	$ 10,153.6	$ 1,171.3	$ (12.5)	$ 1,158.8	$ 77.7	$ 1,709.1	16.8%
2019:							
Group 1	$ 5,001.9	$ 505.9	$ (12.2)	$ 493.7	$ -	$ 1,231.7	24.6%
Group 2	4,944.4	496.6	(21.5)	475.1	-	926.5	18.7%
Corporate entities and other	353.1	130.8	22.8	153.6	(14.7)	(371.0)	-
Total	$ 10,299.4	$ 1,133.3	$ (10.9)	$ 1,122.4	$ (14.7)	$ 1,787.2	17.4%

Financial information for the year ended December 31, 2019 reflects the transfer of our environmental solutions operating segment from Group 2 to Corporate entities and other. Corporate entities and other include legal, tax, treasury, information technology, risk management, human resources, closed landfills, environmental solutions, and other administrative functions. National Accounts revenue included in corporate entities represents the portion of revenue generated from nationwide and regional contracts in markets outside our operating areas where the associated material handling is subcontracted to local operators. Consequently, substantially all of this revenue is offset with related subcontract costs, which are recorded in cost of operations.

Significant changes in the revenue and operating margins of our reportable segments for 2020 compared to 2019 are discussed below.

Group 1

Revenue for 2020 increased 1.1% from 2019 primarily due to an increase in average yield in all lines of business and one additional workday during 2020. This increase was partially offset by volume declines in our small- and large-container collection, transfer station, and landfill lines of business.

Operating income for Group 1 increased from $1,231.7 million for 2019, or a 24.6% operating margin, to $1,343.3 million for 2020, or a 26.6% operating margin. The following cost categories impacted our operating income margin:

- Cost of operations favorably impacted operating income margin during 2020, primarily due to a decrease in labor and related benefits, maintenance and repairs expenses, disposal fees and taxes, and fuel costs as a result of decreased service levels attributable to the COVID-19 pandemic. Fuel costs further decreased due to CNG tax credits that were enacted in December 2019 and recognized during 2020.
- Landfill depletion and amortization favorably impacted operating income margin during 2020, primarily due to lower landfill disposal volumes primarily driven by decreased special waste volumes, and by favorable amortization adjustments to our asset retirement obligations during 2020 compared to the adjustments recognized in 2019. Depreciation unfavorably impacted operating margin, primarily due to additional assets acquired with our acquisitions.

Group 2

Revenue for 2020 decreased (3.1)% from 2019 due to volume declines in our collection lines of business as well as a decrease in special waste volumes in our landfill line of business. These decreases were partially offset by an increase in average yield in all lines of business, increases in construction and demolition and municipal solid waste volumes in our landfill line of business, and one additional workday during 2020.

Operating income for Group 2 increased from $926.5 million for 2019, or an 18.7% operating margin, to $966.4 million for 2020, or a 20.2% operating margin. The following cost categories impacted our operating income margin:

- Cost of operations favorably impacted operating income margin during 2020, primarily due to a decrease in labor and related benefits, transfer and disposal costs, maintenance and repairs expenses and fuel costs as a result of decreased service levels attributable to the COVID-19 pandemic. Fuel costs further decreased due to CNG tax credits that were enacted in December 2019 and recognized during 2020.
- Landfill depletion and amortization unfavorably impacted operating income margin during 2020, primarily due to an increase in our overall average depletion rate, and by decreased favorable amortization adjustments to our asset retirement obligations during 2020 compared to the adjustments recognized in 2019. Depreciation unfavorably impacted operating income margin, primarily due to additional assets acquired with our acquisitions.

Corporate Entities and Other

Operating loss in our Corporate entities and other segment increased from $371.0 million for 2019 to $600.6 million for 2020. During 2020, we recorded a net loss on business divestitures and impairments of $77.7 million which was due to business divestitures and asset impairments in certain markets, including $42.6 million resulting from management's decision to exit certain product offerings and geographic basins in our upstream environmental solutions business. During 2019, we recorded a net gain on business divestitures and impairments of $(14.7) million. Additionally, we recognized an insurance recovery of $10.8 million related to our closed Bridgeton Landfill during 2020, as compared to an insurance recovery of $24.0 million recognized in the same period in 2019. During 2020, we recognized certain direct and incremental costs attributable to the COVID-19 pandemic, including costs for additional safety equipment and hygiene products, increased facility and equipment cleaning, and costs associated with our Committed to Serve initiative.

Landfill and Environmental Matters

Our landfill costs include daily operating expenses, costs of capital for cell development, costs for final capping, closure and post-closure, and the legal and administrative costs of ongoing environmental compliance. Daily operating expenses include leachate treatment, transportation and disposal costs, methane gas and groundwater monitoring and system maintenance costs, interim cap maintenance costs, and costs associated with applying daily cover materials. We expense all indirect landfill development costs as they are incurred. We use life cycle accounting and the units-of-consumption method to recognize certain direct landfill costs related to landfill development. In life cycle accounting, certain direct costs are capitalized and charged to depletion expense based on the consumption of cubic yards of available airspace. These costs include all costs to acquire and construct a site, including excavation, natural and synthetic liners, construction of leachate collection systems, installation of methane gas collection and monitoring systems, installation of groundwater monitoring wells, and other costs associated with acquiring and developing the site. Obligations associated with final capping, closure and post-closure are capitalized and amortized on a units-of-consumption basis as airspace is consumed.

Cost and airspace estimates are developed at least annually by engineers. Our operating and accounting personnel use these estimates to adjust the rates we use to expense capitalized costs. Changes in these estimates primarily relate to changes in costs, available airspace, inflation and applicable regulations. Changes in available airspace include changes in engineering estimates, changes in design and changes due to the addition of airspace lying in expansion areas that we believe have a probable likelihood of being permitted. Changes in engineering estimates typically include modifications to the available disposal capacity of a landfill based on a refinement of the capacity calculations resulting from updated information.

Available Airspace

As of December 31, 2020 and 2019, we owned or operated 186 and 189 active solid waste landfills, respectively, with total available disposal capacity estimated to be 5.0 billion in-place cubic yards. For these landfills, the following table reflects changes in capacity and remaining capacity, as measured in cubic yards of airspace:

	Balance as of December 31, 2019	New Expansions Undertaken	Landfills Acquired, Net of Divestitures	Permits Granted / New Sites, Net of Closures	Airspace Consumed	Changes in Engineering Estimates	Balance as of December 31, 2020
Cubic yards (in millions):							
Permitted airspace	4,673.0	-	(5.1)	205.8	(76.1)	(5.1)	4,792.5
Probable expansion airspace	321.7	32.9	-	(158.2)	-	-	196.4
Total cubic yards (in millions)	4,994.7	32.9	(5.1)	47.6	(76.1)	(5.1)	4,988.9
Number of sites:							
Permitted airspace	189		(2)	(1)			186
Probable expansion airspace	12	2		(3)			11

	Balance as of December 31, 2018	New Expansions Undertaken	Landfills Acquired, Net of Divestitures	Permits Granted / New Sites, Net of Closures	Airspace Consumed	Changes in Engineering Estimates	Balance as of December 31, 2019
Cubic yards (in millions):							
Permitted airspace	4,736.8	-	-	35.0	(81.5)	(17.3)	4,673.0
Probable expansion airspace	341.2	6.7	-	(18.1)	-	(8.1)	321.7
Total cubic yards (in millions)	5,078.0	6.7	-	16.9	(81.5)	(25.4)	4,994.7
Number of sites:							
Permitted airspace	190		-	(1)			189
Probable expansion airspace	12	2		(2)			12

Total available disposal capacity represents the sum of estimated permitted airspace plus an estimate of probable expansion airspace. Engineers develop these estimates at least annually using information provided by annual aerial surveys. Before airspace included in an expansion area is determined to be probable expansion airspace and, therefore, included in our calculation of total available disposal capacity, it must meet all of our expansion criteria. See Note 2, *Summary of Significant Accounting Policies,* and Note 8, *Landfill and Environmental Costs*, of the notes to our consolidated financial statements in Item 8 of this Form 10-K for further information. Also see our *Critical Accounting Judgments and Estimates* section of this Management's Discussion and Analysis of Financial Condition and Results of Operations.

As of December 31, 2020, 11 of our landfills met all of our criteria for including their probable expansion airspace in their total available disposal capacity. At projected annual volumes, these 11 landfills have an estimated remaining average site life of 123 years, including probable expansion airspace. The average estimated remaining life of all of our landfills is 63 years. We have other expansion opportunities that are not included in our total available airspace because they do not meet all of our criteria for treatment as probable expansion airspace.

The following table reflects the estimated operating lives of our active landfill sites based on available and probable disposal capacity using current annual volumes as of December 31, 2020:

	Number of Sites without Probable Expansion Airspace	Number of Sites with Probable Expansion Airspace	Total Sites	Percent of Total
0 to 5 years	15	-	15	8.1%
6 to 10 years	15	1	16	8.6
11 to 20 years	27	2	29	15.6
21 to 40 years	49	3	52	28.0
41+ years	69	5	74	39.7
Total	175	11	186	100.0%

Final Capping, Closure and Post-Closure Costs

As of December 31, 2020, accrued final capping, closure and post-closure costs were $1,346.4 million, of which $57.5 million were current and $1,288.9 million were long-term as reflected in our consolidated balance sheets in accrued landfill and environmental costs included in Item 8 of this Form 10-K.

Remediation and Other Charges for Landfill Matters

It is reasonably possible that we will need to adjust our accrued landfill and environmental liabilities to reflect the effects of new or additional information, to the extent that such information impacts the costs, timing or duration of the required actions. Future changes in our estimates of the costs, timing or duration of the required actions could have a material adverse effect on our consolidated financial position, results of operations and cash flows.

During 2020 and 2019, we recognized insurance recoveries of $10.8 million and $24.0 million, respectively, related to our closed Bridgeton Landfill in Missouri. As such, we recorded a reduction of remediation expenses included in our cost of operations during the years ended December 31, 2020 and 2019.

For a description of our significant remediation matters, see Note 8, *Landfill and Environmental Costs,* of the notes to our consolidated financial statements in Item 8 of this Form 10-K.

Investment in Landfills

As of December 31, 2020, we expect to spend an estimated additional $9.5 billion on existing landfills, primarily related to cell construction and environmental structures, over their remaining lives. Our total expected investment, excluding non-depletable land, estimated to be $13.6 billion, or $2.72 per cubic yard, is used in determining our depletion and amortization expense based on airspace consumed using the units-of-consumption method.

The following table reflects our future expected investment as of December 31, 2020 (in millions):

	Balance as of December 31, 2020	Expected Future Investment	Total Expected Investment
Non-depletable landfill land	$ 166.3	$ -	$ 166.3
Landfill development costs	7,991.7	9,519.9	17,511.6
Construction-in-progress - landfill	303.8	-	303.8
Accumulated depletion and amortization	(4,249.5)	-	(4,249.5)
Net investment in landfill land and development costs	$ 4,212.3	$ 9,519.9	$ 13,732.2

The following table reflects our net investment in our landfills, excluding non-depletable land, and our depletion, amortization and accretion expense for the years ended December 31, 2020 and 2019:

	2020	2019
Number of landfills owned or operated	186	189
Net investment, excluding non-depletable land (in millions)	$ 4,046.0	$ 3,872.9
Total estimated available disposal capacity (in millions of cubic yards)	4,988.9	4,994.7
Net investment per cubic yard	$ 0.81	$ 0.78
Landfill depletion and amortization expense (in millions)	$ 323.0	$ 333.0
Accretion expense (in millions)	82.9	81.9
	405.9	414.9
Airspace consumed (in millions of cubic yards)	76.1	81.5
Depletion, amortization and accretion expense per cubic yard of airspace consumed	$ 5.33	$ 5.09

During 2020 and 2019, our average compaction rate was approximately 2,000 pounds per cubic yard based primarily on a three-year historical moving average.

Property and Equipment

The following tables reflect the activity in our property and equipment accounts for the years ended December 31, 2020 and 2019 (in millions of dollars):

		Gross Property and Equipment						
	Balance as of December 31, 2019	Capital Additions	Retirements	Acquisitions, Net of Divestitures	Non-Cash Additions for Asset Retirement Obligations	Adjustments for Asset Retirement Obligations	Impairments, Transfers and Other Adjustments	Balance as of December 31, 2020
Land	$ 448.3	$ 9.6	$ (1.8)	$ 13.2	$ -	$ -	$ (2.2)	$ 467.1
Non-depletable landfill land	170.5	0.3	(6.3)	(2.8)	-	-	4.6	166.3
Landfill development costs	7,474.7	2.6	(15.5)	62.3	40.6	(45.5)	472.5	7,991.7
Vehicles and equipment	7,766.0	654.4	(336.3)	3.9	-	-	31.0	8,119.0
Buildings and improvements	1,342.6	4.4	(6.1)	24.0	1.7	-	35.9	1,402.5
Construction-in-progress - landfill	366.8	406.9	-	(3.6)	-	-	(466.3)	303.8
Construction-in-progress - other	87.7	164.1	-	-	-	-	(144.4)	107.4
Total	$ 17,656.6	$ 1,242.3	$ (366.0)	$ 97.0	$ 42.3	$ (45.5)	$ (68.9)	$ 18,557.8

	Accumulated Depreciation, Amortization and Depletion						
	Balance as of December 31, 2019	Additions Charged to Expense	Retirements	Acquisitions, Net of Divestitures	Adjustments for Asset Retirement Obligations	Impairments, Transfers and Other Adjustments	Balance as of December 31, 2020
Landfill development costs	$ (3,968.6)	$ (335.6)	$ 15.5	$ 26.2	$ 13.0	$ -	$ (4,249.5)
Vehicles and equipment	(4,728.2)	(628.7)	322.7	44.4	-	36.4	(4,953.4)
Buildings and improvements	(576.3)	(65.5)	4.7	6.8	-	1.6	(628.7)
Total	$ (9,273.1)	$ (1,029.8)	$ 342.9	$ 77.4	$ 13.0	$ 38.0	$ (9,831.6)

	Gross Property and Equipment							
	Balance as of December 31, 2018	Capital Additions	Retirements	Acquisitions, Net of Divestitures	Non-Cash Additions for Asset Retirement Obligations	Adjustments for Asset Retirement Obligations	Impairments, Transfers and Other Adjustments	Balance as of December 31, 2019
Land	$ 443.6	$ 2.6	$ (1.9)	$ 3.8	$ -	$ -	$ 0.2	$ 448.3
Non-depletable landfill land	167.5	5.0	(2.1)	0.4	-	-	(0.3)	170.5
Landfill development costs	7,106.0	2.9	(0.1)	8.6	43.5	(4.9)	318.7	7,474.7
Vehicles and equipment	7,377.3	679.2	(400.2)	109.9	-	-	(0.2)	7,766.0
Buildings and improvements	1,279.8	15.1	(10.1)	1.1	1.3	-	55.4	1,342.6
Construction-in-progress - landfill	287.9	399.2	-	-	-	-	(320.3)	366.8
Construction-in-progress - other	89.9	113.6	-	-	-	-	(115.8)	87.7
Total	$ 16,752.0	$ 1,217.6	$ (414.4)	$ 123.8	$ 44.8	$ (4.9)	$ (62.3)	$ 17,656.6

	Accumulated Depreciation, Amortization and Depletion						
	Balance as of December 31, 2018	Additions Chargedto Expense	Retirements	Acquisitions, Net of Divestitures	Adjustments for Asset Retirement Obligations	Impairments, Transfers and Other Adjustments	Balance as of December 31, 2019
Landfill development costs	$ (3,635.9)	$ (343.9)	$ -	$ -	$ 11.2	$ -	$ (3,968.6)
Vehicles and equipment	(4,571.1)	(592.9)	390.7	18.2	-	26.9	(4,728.2)
Buildings and improvements	(524.9)	(62.3)	7.7	3.6	-	(0.4)	(576.3)
Total	$ (8,731.9)	$ (999.1)	$ 398.4	$ 21.8	$ 11.2	$ 26.5	$ (9,273.1)

Liquidity and Capital Resources

Cash and Cash Equivalents

The following is a summary of our cash and cash equivalents and restricted cash and marketable securities balances as of December 31:

	2020	2019
Cash and cash equivalents	$ 38.2	$ 47.1
Restricted cash and marketable securities	149.1	179.4
Less: restricted marketable securities	(73.1)	(49.1)
Cash, cash equivalents, restricted cash and restricted cash equivalents	$ 114.2	$ 177.4

Our restricted cash and marketable securities include, among other things, restricted cash and marketable securities pledged to regulatory agencies and governmental entities as financial guarantees of our performance under certain collection, landfill and transfer station contracts and permits, and relating to our final capping, closure and post-closure obligations at our landfills, restricted cash and marketable securities related to our insurance obligations, and restricted cash related to a payment for a certain maturing tax-exempt financing.

The following table summarizes our restricted cash and marketable securities as of December 31:

	2020	2019
Payment for maturing tax-exempt financing	$ -	$ 49.4
Capping, closure and post-closure obligations	31.5	30.6
Insurance	117.6	99.4
Total restricted cash and marketable securities	$ 149.1	$ 179.4

Intended Uses of Cash

We intend to use excess cash on hand and cash from operating activities to fund capital expenditures, acquisitions, dividend payments, share repurchases and debt repayments. Debt repayments may include purchases of our outstanding indebtedness in the secondary market or otherwise. We believe that our excess cash, cash from operating activities and our availability to draw on our credit facilities provide us with sufficient financial resources to meet our anticipated capital requirements and maturing obligations as they come due.

We may choose to voluntarily retire certain portions of our outstanding debt before their maturity dates using cash from operations or additional borrowings. We may also explore opportunities in the capital markets to fund redemptions should market conditions be favorable. Early extinguishment of debt will result in an impairment charge in the period in which the debt is repaid. The loss on early extinguishment of debt relates to premiums paid to effectuate the repurchase and the relative portion of unamortized note discounts and debt issue costs.

Summary of Cash Flow Activity

The major components of changes in cash flows for 2020 and 2019 are discussed in the following paragraphs. The following table summarizes our cash flow from operating activities, investing activities and financing activities for the years ended December 31, 2020 and 2019 (in millions of dollars):

	2020	2019
Net cash provided by operating activities	$ 2,471.6	$ 2,352.1
Net cash used in investing activities	$(1,922.8)	$(1,719.0)
Net cash used in financing activities	$ (612.0)	$ (589.0)

Cash Flows Provided by Operating Activities

The most significant items affecting the comparison of our operating cash flows for 2020 and 2019 are summarized below.

Changes in assets and liabilities, net of effects from business acquisitions and divestitures, decreased our cash flow from operations by $129.9 million in 2020, compared to a decrease of $213.4 million in 2019, primarily as a result of the following:

- Our accounts receivable, exclusive of the change in allowance for doubtful accounts and customer credits, decreased $13.8 million during 2020, compared to a $38.3 million increase in 2019. As of December 31, 2020, our days sales outstanding were 38.6, or 26.4 days net of deferred revenue, compared to 39.8, or 27.9 days net of deferred revenue, as of December 31, 2019.

- Our prepaid expenses and other assets decreased $6.5 million in 2020 compared to an increase of $109.7 million in 2019, primarily due to the receipt of the Bridgeton landfill settlement in the first quarter of 2020, and an increase in alternative fuel tax credit receipts during 2020 compared to 2019, partially offset by an increase of prepaid taxes due to the timing of our estimated tax payments.

- Our accounts payable decreased $46.7 million during 2020 compared to an increase of $6.4 million during 2019, due to the timing of payments.

- Cash paid for capping, closure and post-closure obligations was $19.6 million lower during 2020 compared to 2019. The decrease in cash paid for capping, closure and post-closure obligations is primarily due to the timing of capping and post-closure payments at certain of our landfill sites.

- Cash paid for remediation obligations was $14.4 million higher during 2020 compared to 2019, primarily due to $25.6 million in payments related to management and monitoring of the remediation area of our closed Bridgeton Landfill in Missouri during 2020 as compared to $16.6 million of payments during 2019.

In addition, cash paid for interest was $325.1 million and $346.8 million, excluding net swap settlements for our fixed to floating interest rate swaps, for 2020 and 2019, respectively.

We use cash flows from operations to fund capital expenditures, acquisitions, dividend payments, share repurchases and debt repayments.

Cash Flows Used in Investing Activities

The most significant items affecting the comparison of our cash flows used in investing activities for 2020 and 2019 are summarized below:

- Capital expenditures during 2020 were $1,194.6 million as compared to $1,207.1 million for 2019.

- Proceeds from sales of property and equipment during 2020 were $30.1 million as compared to $21.7 million for 2019.

- During 2020 and 2019, we used $769.5 million and $575.1 million, respectively, for acquisitions and investments, net of cash acquired. During 2020 and 2019, we received $32.9 million and $42.8 million for business divestitures, respectively.

We intend to finance capital expenditures and acquisitions through cash on hand, restricted cash held for capital expenditures, cash flows from operations, our revolving credit facilities, and tax-exempt bonds and other financings. We expect to primarily use cash and borrowings under our revolving credit facilities to pay for future business acquisitions.

Cash Flows Used in Financing Activities

The most significant items affecting the comparison of our cash flows used in financing activities for 2020 and 2019 are summarized below:

- During 2020, we issued $2,750.0 million of senior notes for cash proceeds, net of discounts and fees of $2,716.1 million. During 2019, we issued $900.0 million of senior notes for cash proceeds, net of discounts and fees of $891.1 million. Net payments of notes payable and long-term debt were $2,595.9 million during 2020, compared to net payments of $581.4 million in 2019. For a more detailed discussion, see the *Financial Condition* section of this Management's Discussion and Analysis of Financial Condition and Results of Operations.

- During 2020, we paid $99.1 million in cash premiums on the redemption of senior notes.

- During 2020, we repurchased 1.2 million shares of our stock for $98.8 million. During 2019, we repurchased 4.9 million shares of our stock for $399.4 million.

- In July 2020, our Board of Directors approved an increase in our quarterly dividend to $0.425 per share. Dividends paid were $522.5 million and $491.2 million for 2020 and 2019, respectively.

- During 2020 and 2019, cash paid for purchase price holdback releases and contingent purchase price related to acquisitions was $15.5 million and $17.2 million, respectively.

In September 2020, we entered into an agreement to extend the term of one of our landfill finance leases by 43 years, or through the end of the landfill's site life. Accordingly, we recognized an incremental finance lease obligation of $90.4 million.

Financial Condition

Debt Obligations

As of December 31, 2020, we had $168.1 million of principal debt maturing within the next 12 months, which includes certain variable rate tax-exempt financings, finance lease obligations and debentures. All of our tax-exempt financings are remarketed either quarterly or semiannually by remarketing agents to effectively maintain a variable yield. The holders of the bonds can put them back to the remarketing agents at the end of each interest period. If the remarketing agent is unable to remarket our bonds, the remarketing agent can put the bonds to us. In the event of a failed remarketing, we currently have availability under our $2.25 billion unsecured revolving credit facility to fund these bonds until they are remarketed successfully. Accordingly, we have classified these borrowings as long-term in our consolidated balance sheet as of December 31, 2020.

An extended period of economic disruption associated with the COVID-19 pandemic could further disrupt the global supply chain, negatively impact demand for our services, and disrupt financial markets. These effects could materially and adversely affect our business and financial condition, including our access to sources of liquidity. We will continue to monitor the evolving COVID-19 pandemic along with the effect on our business and access to capital markets. Refer to Part I, Item 1A – Risk Factors of this Annual Report on Form 10-K for a discussion of certain risk factors related to this pandemic.

For further discussion of the components of our overall debt, see Note 9, *Debt*, of the notes to our consolidated financial statements in Item 8 of this Form 10-K.

Credit Facilities

The 364-Day Credit Facility

In August 2020, we entered into a $1.0 billion 364-day unsecured revolving credit facility (the 364-Day Credit Facility), which matures in August 2021. At our option, borrowings under the 364-Day Credit Facility bear interest at a Base Rate, or a Eurodollar Rate, plus an applicable margin based on our Debt Ratings (all as defined in the 364-Day Credit Facility agreement).

The 364-Day Credit Facility is subject to facility fees based on applicable rates defined in the 364-Day Credit Facility agreement and the aggregate commitment, regardless of usage. Availability under our 364-Day Credit Facility totaled $1.0 billion as of December 31, 2020. The 364-Day Credit Facility can be used for working capital, capital expenditures, acquisitions, and other general corporate purposes. The 364-Day Credit Facility agreement requires us to comply with financial and other covenants, which are consistent with the financial and other covenants included in our Credit Facility. We may pay dividends and repurchase common stock if we are in compliance with these covenants.

As of December 31, 2020, we had no borrowings outstanding under our 364-Day Credit Facility.

The Credit Facility

In 2018, we entered into a $2.25 billion unsecured revolving credit facility (as amended, the Credit Facility) , which matures in June 2023. As permitted by the Credit Facility, we have the right to request two one-year extensions of the maturity date but none of the lenders are committed to participate in such extension. The Credit Facility also includes a feature that allows us to increase availability, at our option, by an aggregate amount of up to $1.0 billion through increased commitments from existing lenders or the addition of new lenders. At our option, borrowings under the Credit Facility bear interest at a Base Rate, or a Eurodollar Rate, plus an applicable margin based on our Debt Ratings (all as defined in the Credit Facility agreement).

The Credit Facility is subject to facility fees based on applicable rates defined in the Credit Facility agreement and the aggregate commitment, regardless of usage. Availability under our Credit Facility totaled $1,671.8 million and $1,696.9 million as of December 31, 2020 and 2019, respectively. The Credit Facility can be used for working capital, capital expenditures, acquisitions, letters of credit and other general corporate purposes. The Credit Facility agreement requires us to comply with financial and other covenants. We may pay dividends and repurchase common stock if we are in compliance with these covenants.

As of December 31, 2020 and 2019, we had $186.0 million and $184.4 million of borrowings outstanding under our Credit Facility, respectively. We had $376.5 million and $351.4 million of letters of credit outstanding under our Credit Facility as of December 31, 2020 and 2019, respectively.

In July 2020, we executed an amendment to the Credit Facility agreement to increase flexibility and reduce restrictions, in particular, for future acquisitions. Effective June 30, 2020, the amendment eliminated the consolidated interest coverage ratio and revised the sole remaining financial covenant, total debt to EBITDA ratio.

Uncommitted Credit Facility

We also have an Uncommitted Credit Facility, which bears interest at a LIBOR Rate or a Cost of Funds rate (both as defined in the Uncommitted Credit Facility Agreement), plus an applicable margin. We can use borrowings under the Uncommitted Credit Facility for working capital and other general corporate purposes. The agreement governing our Uncommitted Credit Facility requires us to comply with certain covenants. The Uncommitted Credit Facility may be terminated by either party at any time. As of December 31, 2020, we had no borrowings outstanding under our Uncommitted Credit Facility. As of December 31, 2019, we had $11.6 million of borrowings outstanding under our Uncommitted Credit Facility.

Financial and Other Covenants

The Credit Facility and 364-Day Credit Facility (collectively, the Credit Facilities) require us to comply with financial and other covenants. To the extent we are not in compliance with these covenants, we cannot pay dividends or repurchase common stock. Compliance with covenants also is a condition for any incremental borrowings under the Credit Facilities, and failure to meet these covenants would enable the lenders to require repayment of any outstanding loans (which would adversely affect our liquidity). In July 2020, we executed an amendment to the Credit Facility agreement to increase flexibility and reduce restrictions, in particular, for future acquisitions. Effective June 30, 2020, the amendment eliminated the consolidated interest coverage ratio and revised the sole remaining financial covenant, total debt to EBITDA ratio. The 364-Day Credit Facility and the Credit Facility, as amended, provide that our total debt to EBITDA ratio may not exceed 3.75 to 1.00 as of the last day of any fiscal quarter. In the case of an “elevated ratio period”, which may be elected by us if one or more acquisitions during a fiscal quarter involve aggregate consideration in excess of $200.0 million (the Trigger Quarter), the total debt to EBITDA ratio may not exceed 4.25 to 1.00 during the Trigger Quarter and for the three fiscal quarters thereafter. The 364-Day Credit Facility and the Credit Facility, as amended, also provide that there may not be more than two elevated ratio periods during the respective terms of the Credit Facility and 364-Day Credit Facility agreements. As of December 31, 2020, our total debt to EBITDA ratio was 3.07 compared to the 3.75 maximum allowed by the covenants. As of December 31, 2020, we were in compliance with the covenants under the Credit Facilities, and we expect to be in compliance throughout 2021.

EBITDA, which is a non-U.S. GAAP measure, is calculated as defined in our Credit Facility and 364-Day Credit Facility agreements. In this context, EBITDA is used solely to provide information regarding the extent to which we are in compliance with debt covenants and is not comparable to EBITDA used by other companies or used by us for other purposes.

Failure to comply with the financial and other covenants under the Credit Facilities, as well as the occurrence of certain material adverse events, would constitute defaults and would allow the lenders under the Credit Facilities to accelerate the maturity of all indebtedness under the Credit Facilities agreements. This could have an adverse effect on the availability of financial assurances. In addition, maturity acceleration on the Credit Facilities constitutes an event of default under our other debt instruments, including our senior notes, and, therefore, our senior notes would also be subject to acceleration of maturity. If such acceleration were to occur, we would not have sufficient liquidity available to repay the indebtedness. We would likely have to seek an amendment under the Credit Facilities for relief from the financial covenant or repay the debt with proceeds from the issuance of new debt or equity, or asset sales, if necessary. We may be unable to amend the Credit Facilities or raise sufficient capital to repay such obligations in the event the maturity is accelerated.

Senior Notes and Debentures

As of December 31, 2020, we had $7,437.0 million of unsecured senior notes and debentures outstanding with maturities ranging from 2021 to 2050. As of December 31, 2019, we had $7,257.0 million of unsecured senior notes and debentures outstanding with maturities ranging from 2020 to 2041.

In November 2020, we issued $350.0 million of 0.875% senior notes due 2025 (the 0.875% Notes) and $750.0 million of 1.750% senior notes due 2032 (the 1.750% Notes). We used the net proceeds from the 0.875% Notes and 1.750% Notes to redeem all $850.0 million of the outstanding 3.550% senior notes due June 2022 and $250.0 million of the $550.0 million outstanding 4.750% senior notes due May 2023.

In August 2020, we issued $650.0 million of 1.450% senior notes due 2031 (the 1.450% Notes). We used the net proceeds to redeem all $600.0 million of the outstanding 5.250% senior notes due November 2021 plus a make-whole premium of $34.0 million. The remaining proceeds were used for general corporate purposes.

In February 2020, we issued $600.0 million of 2.300% senior notes due 2030 (the 2.300% Notes) and $400.0 million of 3.050% senior notes due 2050 (the 3.050% Notes). We used the net proceeds from the 2.300% Notes and 3.050% Notes to repay $850.0 million of 5.000% senior notes that matured in March 2020. The remaining proceeds were used to repay amounts outstanding under our unsecured credit facilities as well as for general corporate purposes.

Our senior notes are general senior unsecured obligations. Interest is payable semi-annually.

Derivative Instruments and Hedging Relationships

Our ability to obtain financing through the capital markets is a key component of our financial strategy. Historically, we have managed risk associated with executing this strategy, particularly as it relates to fluctuations in interest rates, by using a combination of fixed and floating rate debt. From time to time, we also have entered into interest rate swap and lock agreements to manage risk associated with interest rates, either to effectively convert specific fixed rate debt to a floating rate (fair value hedges), or to lock interest rates in anticipation of future debt issuances (cash flow hedges).

Additionally, we amended certain interest rate lock agreements, extending the mandatory maturity date and dedesignated them as cash flow hedges (the Extended Interest Rate Locks). In addition, we entered into offsetting interest rate swaps to offset future exposures to fair value fluctuations of the Extended Interest Rate Locks.

For a description of our derivative contracts and hedge accounting, see Note 9, *Debt*, to our audited consolidated financial statements included in Part II, Item 8 of this Annual Report on Form 10-K.

Tax-Exempt Financings

As of December 31, 2020, we had $1,104.7 million of certain variable rate tax-exempt financings outstanding with maturities ranging from 2021 to 2050. As of December 31, 2019, we had $1,116.2 million of certain variable rate tax-exempt financings outstanding with maturities ranging from 2020 to 2049. During the year ended December 31, 2020, we issued $60.0 million of new tax-exempt financings. During the year ended December 31, 2019, we refinanced $35.0 million and issued $30.0 million of tax-exempt financings.

Finance Leases

We had finance lease liabilities of $206.5 million and $119.3 million as of December 31, 2020 and 2019, respectively, with maturities ranging from 2021 to 2063 and 2020 to 2049, respectively.

In September 2020, we entered into an agreement to extend the term of one of our landfill finance leases by 43 years, or through the end of the landfill's site life. Accordingly, we recognized an incremental finance lease obligation of $90.4 million.

Contractual Obligations

The following table summarizes our estimated contractual obligations as of December 31, 2020 (in millions):

Year Ending December 31,	Operating Leases	Maturities of Notes Payable, Finance Leases and Other Long-Term Debt	Scheduled Interest Payment Obligations	Final Capping, Closure and Post-Closure	Remediation	Unconditional Purchase Commitments	Total
2021	$ 41.5	$ 168.1	$ 267.7	$ 57.5	$ 57.0	$ 163.6	$ 755.4
2022	37.9	6.4	265.0	61.1	64.7	97.0	532.1
2023	35.6	659.4	251.0	76.0	67.8	61.0	1,150.8
2024	30.9	924.9	224.6	75.6	59.8	53.4	1,369.2
2025	29.4	854.6	203.5	82.2	41.0	29.4	1,240.1
Thereafter	105.8	6,441.2	1,694.7	6,348.8	352.4	252.9	15,195.8
Total	$ 281.1	$ 9,054.6	$ 2,906.5	$ 6,701.2	$ 642.7	$ 657.3	$ 20,243.4

Scheduled interest payment obligations in the above table were calculated using stated coupon rates for fixed rate debt and interest rates applicable as of December 31, 2020 for variable rate debt. The effect of our outstanding interest rate swaps on the interest payments of our 4.750% fixed rate senior notes due in May 2023 is also included based on the floating rates in effect as of December 31, 2020.

The estimated remaining final capping, closure and post-closure and remediation expenditures presented above are not inflated or discounted and reflect the estimated future payments for liabilities incurred and recorded as of December 31, 2020 and for liabilities yet to be incurred over the remaining life of our landfills.

Unconditional purchase commitments consist primarily of (1) disposal related agreements that include fixed or minimum royalty payments, host agreements and take-or-pay and put-or-pay agreements and (2) other obligations including committed capital expenditures and consulting service agreements.

Financial Assurance

We must provide financial assurance to governmental agencies and a variety of other entities under applicable environmental regulations relating to our landfill operations for capping, closure and post-closure costs, and related to our performance under certain collection, landfill and transfer station contracts. We satisfy these financial assurance requirements by providing surety bonds, letters of credit, or insurance policies (Financial

Assurance Instruments), or trust deposits, which are included in restricted cash and marketable securities and other assets in our consolidated balance sheets. The amount of the financial assurance requirements for capping, closure and post-closure costs is determined by applicable state environmental regulations. The financial assurance requirements for capping, closure and post-closure costs may be associated with a portion of the landfill or the entire landfill. Generally, states require a third-party engineering specialist to determine the estimated capping, closure and post-closure costs that are used to determine the required amount of financial assurance for a landfill. The amount of financial assurance required can, and generally will, differ from the obligation determined and recorded under U.S. GAAP. The amount of the financial assurance requirements related to contract performance varies by contract. Additionally, we must provide financial assurance for our insurance program and collateral for certain performance obligations. We do not expect a material increase in financial assurance requirements during 2021, although the mix of Financial Assurance Instruments may change.

These Financial Assurance Instruments are issued in the normal course of business and are not classified as indebtedness. Because we currently have no liability for the Financial Assurance Instruments, they are not reflected in our consolidated balance sheets; however, we record capping, closure and post-closure liabilities and insurance liabilities as they are incurred.

Off-Balance Sheet Arrangements

We have no off-balance sheet debt or similar obligations, other than short-term operating leases and financial assurances, which are not classified as debt. We have no transactions or obligations with related parties that are not disclosed, consolidated into or reflected in our reported financial position or results of operations. We have not guaranteed any third-party debt.

Contingencies

For a description of our commitments and contingencies, see Note 8, *Landfill and Environmental Costs*, Note 11, *Income Taxes,* and Note 19, *Commitments and Contingencies*, of the notes to our consolidated financial statements in Item 8 of this Form 10-K.

Critical Accounting Judgments and Estimates

Our consolidated financial statements have been prepared in accordance with U.S. GAAP and necessarily include certain estimates and judgments made by management. The following is a list of accounting policies that we believe are the most critical in understanding our consolidated financial position, results of operations and cash flows and that may require management to make subjective or complex judgments about matters that are inherently uncertain. Such critical accounting policies, estimates and judgments are applicable to all of our operating segments.

We have noted examples of the residual accounting and business risks inherent in the accounting for these areas. Residual accounting and business risks are defined as the inherent risks that we face after the application of our policies and processes that are generally outside of our control or ability to forecast.

Landfill Accounting

Landfill operating costs are treated as period expenses and are not discussed further in this section.

Our landfill assets and liabilities fall into the following two categories, each of which requires accounting judgments and estimates:

- Landfill development costs that are capitalized as an asset.

- Landfill retirement obligations relating to our capping, closure and post-closure liabilities that result in a corresponding landfill retirement asset.

We use life-cycle accounting and the units-of-consumption method to recognize landfill development costs over the life of the site. In life-cycle accounting, all current and future capitalized costs to acquire and construct a site are calculated, and charged to expense based on the consumption of cubic yards of available airspace. Obligations associated with final capping, closure and post-closure are also capitalized, and amortized on a units-of-consumption basis as airspace is consumed. Cost and airspace estimates are developed at least annually by engineers.

Landfill Development Costs

Site permits. To develop, construct and operate a landfill, we must obtain permits from various regulatory agencies at the local, state and federal levels. The permitting process requires an initial site study to determine whether the location is feasible for landfill operations. The initial studies are reviewed by our environmental management group and then submitted to the regulatory agencies for approval. During the development stage we capitalize certain costs that we incur after site selection but before the receipt of all required permits if we believe that it is probable that the site will be permitted.

Residual risks:

- Changes in legislative or regulatory requirements may cause changes to the landfill site permitting process. These changes could make it more difficult and costly to obtain and maintain a landfill permit.

- Studies performed could be inaccurate, which could result in the denial or revocation of a permit and changes to accounting assumptions. Conditions could exist that were not identified in the study, which may make the location not feasible for a landfill and could result in the denial of a permit. Denial or revocation of a permit could impair the recorded value of the landfill asset.

- Actions by neighboring parties, private citizen groups or others to oppose our efforts to obtain, maintain or expand permits could result in denial, revocation or suspension of a permit, which could adversely impact the economic viability of the landfill and could impair the recorded value of the landfill. As a result of opposition to our obtaining a permit, improved technical information as a project progresses, or changes in the anticipated economics associated with a project, we may decide to reduce the scope of, or abandon, a project, which could result in an asset impairment.

Technical landfill design. Upon receipt of initial regulatory approval, technical landfill designs are prepared. The technical designs, which include the detailed specifications to develop and construct all components of the landfill including the types and quantities of materials that will be required, are reviewed by our environmental management group. The technical designs are submitted to the regulatory agencies for approval. Upon approval of the technical designs, the regulatory agencies issue permits to develop and operate the landfill.

Residual risks:

- Changes in legislative or regulatory requirements may require changes in the landfill technical designs. These changes could make it more difficult and costly to meet new design standards.

- Technical design requirements, as approved, may need modifications at some future point in time.

- Technical designs could be inaccurate and could result in increased construction costs, difficulty in obtaining a permit or the use of rates to recognize the amortization of landfill development costs and asset retirement obligations that are not appropriate.

Permitted and probable landfill disposal capacity. Included in the technical designs are factors that determine the ultimate disposal capacity of the landfill. These factors include the area over which the landfill will be developed, such as the depth of excavation, the height of the landfill elevation and the angle of the side-slope construction. The disposal capacity of the landfill is calculated in cubic yards. This measurement of volume is then converted to a disposal capacity expressed in tons based on a site-specific expected density to be achieved over the remaining operating life of the landfill.

Residual risks:

- Estimates of future disposal capacity may change as a result of changes in legislative or regulatory design requirements.
- The density of waste may vary due to variations in operating conditions, including waste compaction practices, site design, climate and the nature of the waste.
- Capacity is defined in cubic yards but waste received is measured in tons. The number of tons per cubic yard varies by type of waste and our rate of compaction.

Development costs. The types of costs that are detailed in the technical design specifications generally include excavation, natural and synthetic liners, construction of leachate collection systems, installation of methane gas collection systems and monitoring probes, installation of groundwater monitoring wells, construction of leachate management facilities and other costs associated with the development of the site. We review the adequacy of our cost estimates on an annual basis by comparing estimated costs with third-party bids or contractual arrangements, reviewing the changes in year-over-year cost estimates for reasonableness, and comparing our resulting development cost per acre with prior period costs. These development costs, together with any costs incurred to acquire, design and permit the landfill, including capitalized interest, are recorded to the landfill asset on the balance sheet as incurred.

Residual risk:

- Actual future costs of construction materials and third-party labor could differ from the costs we have estimated because of the level of demand and the availability of the required materials and labor. Technical designs could be altered due to unexpected operating conditions, regulatory changes or legislative changes.

Landfill development asset amortization. To match the expense related to the landfill asset with the revenue generated by the landfill operations, we amortize the landfill development asset over its operating life on a per-ton basis as waste is accepted at the landfill. The landfill asset is fully amortized at the end of a landfill's operating life. The per-ton rate is calculated by dividing the sum of the landfill development asset net book value plus estimated future development costs (as described above) for the landfill, by the landfill's estimated remaining disposal capacity. The expected future development costs are not inflated or discounted, but rather expressed in nominal dollars. This rate is applied to each ton accepted at the landfill to arrive at amortization expense for the period.

Amortization rates are influenced by the original cost basis of the landfill, including acquisition costs, which in turn is determined by geographic location and market values. We secure significant landfill assets through business acquisitions and value them at the time of acquisition based on fair value. Amortization rates are also influenced by site-specific engineering and cost factors.

Residual risk:

- Changes in our future development cost estimates or our disposal capacity will normally result in a change in our amortization rates and will impact amortization expense prospectively. An unexpected significant increase in estimated costs or reduction in disposal capacity could affect the ongoing economic viability of the landfill and result in asset impairment.

On at least an annual basis, we update the estimates of future development costs and remaining disposal capacity for each landfill. These costs and disposal capacity estimates are reviewed and approved by senior operations management annually. Changes in cost estimates and disposal capacity are reflected prospectively in the landfill amortization rates that are updated annually. See our *Results of Operations* section in this Management's Discussion and Analysis of Financial Condition and Results of Operations for discussion on changes to our landfill depletion and amortization.

Landfill Asset Retirement Obligations

We have two types of retirement obligations related to landfills: (1) capping and (2) closure and post-closure.

Obligations associated with final capping activities that occur during the operating life of the landfill are recognized on a units-of-consumption basis as airspace is consumed within each discrete capping event. Obligations related to closure and post-closure activities that occur after the landfill has ceased operations are recognized on a units-of-consumption basis as airspace is consumed throughout the entire life of the landfill. Landfill retirement obligations are capitalized as the related liabilities are recognized and amortized using the units-of-consumption method over the airspace consumed within the capping event or the airspace consumed within the entire landfill, depending on the nature of the obligation. All obligations are initially measured at estimated fair value. Fair value is calculated on a present value basis using an inflation rate and our credit-adjusted, risk-free rate in effect at the time the liabilities were incurred. Future costs for final capping, closure and post-closure are developed at least annually by engineers, and are inflated to future value using estimated future payment dates and inflation rate projections.

Landfill capping. As individual areas within each landfill reach capacity, we must cap and close the areas in accordance with the landfill site permit. These requirements are detailed in the technical design of the landfill site process previously described.

Closure and post-closure. Closure costs are costs incurred after a landfill stops receiving waste, but prior to being certified as closed. After the entire landfill has reached capacity and is certified closed, we must continue to maintain and monitor the site for a post-closure period, which generally extends for 30 years. Costs associated with closure and post-closure requirements generally include maintenance of the site, the monitoring of methane gas collection systems and groundwater systems, and other activities that occur after the site has ceased accepting waste. Costs associated with post-closure monitoring generally include groundwater sampling, analysis and statistical reports, third-party labor associated with gas system operations and maintenance, transportation and disposal of leachate, and erosion control costs related to the final cap.

Landfill retirement obligation liabilities and assets. Estimates of the total future costs required to cap, close and monitor each landfill as specified by the landfill permit are updated annually. The estimates include inflation, the specific timing of future cash outflows, and the anticipated waste flow into the capping events. Our cost estimates are inflated to the period of performance using an estimate of inflation, which is updated annually and is based upon the ten year average consumer price index (1.7% in 2020 and 2019).

The present value of the remaining capping costs for specific capping events and the remaining closure and post-closure costs for each landfill are recorded as incurred on a per-ton basis. These liabilities are incurred as disposal capacity is consumed at the landfill.

Capping, closure and post-closure liabilities are recorded in layers and discounted using our credit-adjusted risk-free rate in effect at the time the obligation is incurred (3.4% and 4.3% in 2020 and 2019).

Retirement obligations are increased each year to reflect the passage of time by accreting the balance at the weighted average credit-adjusted risk-free rate that was used to calculate each layer of the recorded liabilities. This accretion is charged to operating expenses. Actual cash expenditures reduce the asset retirement obligation liabilities as they are made.

Corresponding retirement obligation assets are recorded for the same value as the additions to the capping, closure and post-closure liabilities. The retirement obligation assets are amortized to expense on a per-ton basis as disposal capacity is consumed. The per-ton rate is calculated by dividing the sum of each of the recorded retirement obligation asset's net book value and expected future additions to the retirement obligation asset by the remaining disposal capacity. A per-ton rate is determined for each separate capping event based on the disposal capacity relating to that event. Closure and post-closure per-ton rates are based on the total disposal capacity of the landfill.

Residual risks:

- Changes in legislative or regulatory requirements, including changes in capping, closure activities or post-closure monitoring activities, types and quantities of materials used, or term of post-closure care, could cause changes in our cost estimates.

- Changes in the landfill retirement obligation due to changes in the anticipated waste flow, changes in airspace compaction estimates or changes in the timing of expenditures for closed landfills and fully incurred but unpaid capping events are recorded in results of operations prospectively. This could result in unanticipated increases or decreases in expense.

- Actual timing of disposal capacity utilization could differ from projected timing, causing differences in timing of when amortization and accretion expense is recognized for capping, closure and post-closure liabilities.

- Changes in inflation rates could impact our actual future costs and our total liabilities.

- Changes in our capital structure or market conditions could result in changes to the credit-adjusted risk-free rate used to discount the liabilities, which could cause changes in future recorded liabilities, assets and expense.

- Amortization rates could change in the future based on the evaluation of new facts and circumstances relating to landfill capping design, post-closure monitoring requirements, or the inflation or discount rate.

On an annual basis, we update our estimates of future capping, closure and post-closure costs and of future disposal capacity for each landfill. Revisions in estimates of our costs or timing of expenditures are recognized immediately as increases or decreases to the capping, closure and post-closure liabilities and the corresponding retirement obligation assets. Changes in the assets result in changes to the amortization rates which are applied prospectively, except for fully incurred capping events and closed landfills, where the changes are recorded immediately in results of operations since the associated disposal capacity has already been consumed. See our *Results of Operations* section in this Management's Discussion and Analysis of Financial Condition and Results of Operations for discussion on changes to our landfill depletion and amortization.

Permitted and probable disposal capacity. Disposal capacity is determined by the specifications detailed in the landfill permit. We classify this disposal capacity as permitted. We also include probable expansion disposal capacity in our remaining disposal capacity estimates, thus including additional disposal capacity being sought through means of a permit expansion. Probable expansion disposal capacity has not yet received final approval from the applicable regulatory agencies, but we have determined that certain critical criteria have been met and that the successful completion of the expansion is probable. We have developed six criteria that must be met before an expansion area is designated as probable expansion airspace. We believe that satisfying all of these criteria demonstrates a high likelihood that expansion airspace that is incorporated in our landfill costing will be permitted. However, because some of these criteria are judgmental, they may exclude expansion airspace that will eventually be permitted or include expansion airspace that will not be permitted. In either of these scenarios, our amortization, depletion and accretion expense could change significantly. Our internal criteria to classify disposal capacity as probable expansion airspace are as follows:

- We own the land associated with the expansion airspace or control it pursuant to an option agreement;
- We are committed to supporting the expansion project financially and with appropriate resources;
- There are no identified fatal flaws or impediments associated with the project, including political impediments;
- Progress is being made on the project;
- The expansion is attainable within a reasonable time frame; and
- We believe it is likely we will receive the expansion permit.

After successfully meeting these criteria, the disposal capacity that will result from the planned expansion is included in our remaining disposal capacity estimates. Additionally, for purposes of calculating landfill amortization and capping, closure and post-closure rates, we include the incremental costs to develop, construct, close and monitor the related probable expansion disposal capacity.

Residual risk:

- We may be unsuccessful in obtaining permits for probable expansion disposal capacity because of the failure to obtain the final local, state or federal permits or due to other unknown reasons. If we are unsuccessful in obtaining permits for probable expansion disposal capacity, or the disposal capacity for which we obtain approvals is less than what was estimated, both our estimated total costs and disposal capacity will be reduced, which generally increases the rates we charge for landfill amortization and capping, closure and post-closure accruals. An unexpected decrease in disposal capacity could also cause an asset impairment.

Environmental Liabilities

We are subject to an array of laws and regulations relating to the protection of the environment, and we remediate sites in the ordinary course of our business. Under current laws and regulations, we may be responsible for environmental remediation at sites that we either own or operate, including sites that we have acquired, or sites where we have (or a company that we have acquired has) delivered waste. Our environmental remediation liabilities primarily include costs associated with remediating groundwater, surface water and soil contamination, as well as controlling and containing methane gas migration and the related legal costs. To estimate our ultimate liability at these sites, we evaluate several factors, including the nature and extent of contamination at each identified site, the required remediation methods, timing of expenditures, the apportionment of responsibility among the potentially responsible parties and the financial viability of those parties. We accrue for costs associated with environmental remediation obligations when such costs are probable and reasonably estimable in accordance with accounting for loss contingencies. We periodically review the status of all environmental matters and update our estimates of the likelihood of and future expenditures for remediation as necessary. Changes in the liabilities resulting from these reviews are recognized currently in earnings in the period in which the adjustment is known. Adjustments to estimates are reasonably possible in the near term and may result in changes to recorded amounts. With the exception of those obligations assumed in certain business combinations, environmental obligations are recorded on an undiscounted basis. Environmental obligations assumed in certain business combinations are initially estimated on a discounted basis, and accreted to full value over time through charges to interest expense. Adjustments arising from changes in amounts and timing of estimated costs and settlements may result in increases or decreases in these obligations and are calculated on a discounted basis as they were initially estimated on a discounted basis. These adjustments are charged to operating income when they are known. We perform a comprehensive review of our environmental obligations annually and also review changes in facts and circumstances associated with these obligations at least quarterly. See our *Results of*

Operations section in this Management's Discussion and Analysis of Financial Condition and Results of Operations for discussion on our remediation adjustments. We have not reduced the liabilities we have recorded for recoveries from other potentially responsible parties or insurance companies.

Residual risks:

- We cannot determine with precision the ultimate amounts of our environmental remediation liabilities. Our estimates of these liabilities require assumptions about uncertain future events. Thus, our estimates could change substantially as additional information becomes available regarding the nature or extent of contamination, the required remediation methods, timing of expenditures, the final apportionment of responsibility among the potentially responsible parties identified, the financial viability of those parties, and the actions of governmental agencies or private parties with interests in the matter. The actual environmental costs may exceed our current and future accruals for these costs, and any adjustments could be material.

- Actual amounts could differ from the estimated liabilities as a result of changes in estimated future litigation costs to pursue the matter to ultimate resolution.

- An unanticipated environmental liability that arises could result in a material charge to our consolidated statements of income.

Insurance Reserves and Related Costs

Our insurance policies for workers' compensation, commercial general liability, commercial auto liability and environmental liability are high deductible, or retention programs. The deductibles, or retentions, range from $3 million to $10 million. The employee-related health benefits are also subject to a high deductible insurance policy. Accruals for deductibles or retentions are based on claims filed and actuarial estimates of claims development and claims incurred but not reported.

Residual risks:

- Incident rates, including frequency and severity, and other actuarial assumptions could change causing our current and future actuarially determined obligations to change, which would be reflected in our consolidated statements of income in the period in which such adjustment is known.

- Recorded reserves may not be adequate to cover the future payment of claims. Adjustments, if any, to estimates recorded resulting from ultimate claim payments would be reflected in the consolidated statements of income in the periods in which such adjustments are known.

- The settlement costs to discharge our obligations, including legal and health care costs, could increase or decrease causing current estimates of our insurance reserves to change.

New Accounting Standards

For a description of new accounting standards that may affect us, see Note 2, *Summary of Significant Accounting Policies*, of the notes to our consolidated financial statements in Item 8 of this Form 10-K.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Interest Rate Risk

Our major market risk exposure of our financial instruments is changing interest rates in the United States and fluctuations in LIBOR. We intend to manage interest rate risk through the use of a combination of fixed and floating rate debt. The carrying value of our variable rate debt approximates fair value because interest rates are variable and, accordingly, approximates current market rates for instruments with similar risk and maturities. The fair value of our debt is determined as of the balance sheet date and is subject to change.

The table below provides information about certain of our market-sensitive financial instruments and constitutes a forward-looking statement.

	Expected Maturity Date							
	2021	2022	2023	2024	2025	Thereafter	Total	Fair Value as of December 31, 2020
Fixed rate debt:								
Amount outstanding (in millions)	$ 41.1	$ 6.4	$ 329.2	$ 904.2	$ 854.6	$ 5,621.9	$ 7,757.4	$ 8,708.4
Variable rate debt:								
Amount outstanding (in millions)	$ 127.0	$ -	$ 330.2	$ 20.7	$ -	$ 819.3	$ 1,297.2	$ 1,290.7

The fixed and variable rate debt amounts above exclude the remaining non-cash discounts, premiums and adjustments to fair value totaling $120.4 million.

During the second half of 2013, we entered into various interest rate swap agreements relative to our 4.750% fixed rate senior notes due in May 2023. The goal was to reduce overall borrowing costs and rebalance our debt portfolio's ratio of fixed to floating interest rates. These swap agreements, which were designated as fair value hedges, have a total notional value of $300.0 million as of December 31, 2020. Contemporaneously with our $250.0 million redemption of the 4.750% Notes, we dedesignated the proportional share of these swap agreements as fair value hedges. Our interest rate swap contracts have been authorized pursuant to our policies and procedures. We do not use financial instruments for trading purposes and are not a party to any leveraged derivatives.

We have historically entered into multiple swap agreements designated as cash flow hedges to manage exposure to fluctuations in interest rates in anticipation of planned future issuances of senior notes. Upon the expected issuance of senior notes, we terminate the interest rate locks and settle with our counterparties. These transactions were accounted for as cash flow hedges. All of our cash flow hedges settled on or before December 31, 2020, thus there is no related asset or liability as of December 31, 2020. As of December 31, 2019 our interest rate lock agreements had an aggregate notional value of $575.0 million with fixed interest rates ranging from 1.330% to 3.000%.

As of December 31, 2020, we had $1,297.2 million of floating rate debt and $300.0 million of floating interest rate swap contracts. If interest rates increased or decreased by 100 basis points on our variable rate debt, annualized interest expense and net cash payments for interest would increase or decrease by approximately $16 million. This analysis does not reflect the effect that interest rates would have on other items, such as new borrowings and the impact on the economy. See Note 9, *Debt,* of the notes to our consolidated financial statements in Item 8 of this Form 10-K for further information regarding how we manage interest rate risk.

Fuel Price Risk

Fuel costs represent a significant operating expense. When economically practical, we may enter into new fuel hedges, renew contracts, or engage in other strategies to mitigate market risk. As of December 31, 2020, we had no fuel hedges in place. While we charge fuel recovery fees to a majority of our customers, we are unable to charge such fees to all customers.

At current consumption levels, we believe a twenty-cent per gallon change in the price of diesel fuel would change our fuel costs by approximately $25 million per year. Offsetting these changes in fuel expense would be changes in our fuel recovery fee charged to our customers. At current participation rates, we believe a twenty-cent per gallon change in the price of diesel fuel would change our fuel recovery fee by approximately $25 million per year.

Our operations also require the use of certain petrochemical-based products (such as liners at our landfills) whose costs may vary with the price of petrochemicals. An increase in the price of petrochemicals could increase the cost of those products, which would increase our operating and capital costs. We also are susceptible to increases in fuel recovery fees from our vendors.

Our fuel costs were $271.7 million in 2020, or 2.7% of revenue, compared to $347.9 million in 2019, or 3.4% of revenue.

Commodities Price Risk

We market recovered materials such as old corrugated containers and old newsprint from our recycling processing centers. Changes in market supply and demand for recycled commodities causes volatility in commodity prices. In prior periods, we have entered into derivative instruments such as swaps and costless collars designated as cash flow hedges to manage our exposure to changes in prices of these commodities. As of December 31, 2020, we had no recycling commodity hedges in place.

At current volumes and mix of materials, we believe a $10 per ton change in the price of recycled commodities would change both annual revenue and operating income by approximately $12 million.

Revenue from recycling processing and commodity sales during the years ended December 31, 2020 and 2019 was $297.1 million and $273.3 million, respectively.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and the Board of Directors of Republic Services, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Republic Services, Inc. (the Company) as of December 31, 2020 and 2019, the related consolidated statements of income, comprehensive income, stockholders' equity and cash flows for each of the three years in the period ended December 31, 2020, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2020 and 2019, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2020, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2020, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) and our report dated February 22, 2021, expressed an unqualified opinion thereon.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's consolidated financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current period audit of the financial statements that were communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

	Landfill Development Asset Amortization
Description of the Matter	At December 31, 2020, the net book value of the Company's landfill development assets totaled $3,742.2 million, and the associated landfill development asset amortization expense for 2020 was $323.0 million. Significant assumptions used in calculating the amortization expense include estimated future development costs

associated with the land, permitting, cell construction and environmental structures of the landfill in relation to airspace consumed to date and total estimated available airspace. These assumptions have a significant effect on the total landfill amortization expense. As discussed in Note 2 to the consolidated financial statements, costs and airspace estimates are developed at least annually, or more often if significant facts change.

How We Addressed the Matter in Our Audit

Auditing landfill development asset amortization expense is complex due to the highly judgmental nature of the assumptions used in the calculation of the expense and required the involvement of specialists to assist us with evaluating estimated future development costs and certain assumptions to project total estimated available airspace.

We tested controls that address the risks of material misstatement relating to the measurement and valuation of landfill development asset amortization expense. For example, we tested controls over the estimation of future landfill development costs and management's review of the assumptions to project total estimated available airspace.

To test the landfill development asset amortization expense, our audit procedures included, among others, assessing methodologies and testing the significant assumptions discussed above related to the underlying cost and airspace data used by the Company. We compared the significant assumptions used by management to historical trends and, when available, to comparable size landfills accepting the same type of waste. We also tested the completeness and accuracy of the historical data utilized in the development of the amortization expense. Regarding available airspace, we evaluated the Company's estimation of the landfill disposal capacity through a comparison of airspace to historical estimates and annual aerial surveys. We involved EY engineering specialists to assist us with evaluating estimated future development costs and certain assumptions to project total estimated available airspace.

Landfill Final Capping, Closure and Post-Closure Costs

Description of the Matter

At December 31, 2020, the carrying value of the Company's landfill final capping, closure and post-closure costs totaled $1,346.4 million. As discussed in Notes 2 and 8 to the consolidated financial statements, asset retirement obligations for final capping, closure and post-closure are measured at their estimated fair value. Management updates the assumptions used to estimate asset retirement obligations at least annually, or more often if significant facts change. These assumptions include estimated future costs associated with the final capping, closure and post closure activities at each landfill, airspace consumed to date, estimated available airspace, projected annual tonnage volume, projected timing of capping, closure and post closure activities and estimated inflation and discount rates. These assumptions have a significant effect on the estimated asset retirement obligation.

How We Addressed the Matter in Our Audit

Auditing the landfill asset retirement obligation is complex due to the highly judgmental nature of the assumptions used in the measurement process and required the involvement of specialists to assist us with evaluating the costs estimated for the capping, closure and post closure activities and certain assumptions to project total estimated available airspace.

We tested controls that address the risks of material misstatement relating to the completeness, measurement and valuation of the asset retirement obligation. For example, we tested controls over management's development of the landfill asset retirement obligation models to estimate the future liability and management's review of data inputs and projections.

To test the landfill asset retirement obligation, our audit procedures included, among others, assessing methodologies used by the Company, testing the completeness of activities included in the estimate (e.g., gas monitoring and leachate management) and testing the significant assumptions discussed above, as well as the underlying costs and other estimates used by the Company in its development of these assumptions. We compared the significant assumptions used by management to historical trends and, when available, to comparable size landfills accepting the same type of waste. We also tested the completeness and accuracy of the historical data utilized in preparing the estimate. We involved EY engineering specialists to assist us with evaluating the costs estimated for the capping, closure and post closure activities and the reasons for significant changes in assumptions from historical trends and determined whether the change from the historical trend was appropriate and identified timely. EY engineering specialists were also involved in evaluating certain assumptions to project total estimated available airspace.

Environmental Liabilities

Description of the Matter	At December 31, 2020, environmental remediation liabilities totaled $462.8 million. As discussed in Note 2 to the consolidated financial statements, the Company performs a review of their environmental obligations annually and when it identifies changes in facts and circumstances associated with these obligations. The Company considers several factors to estimate the ultimate liability at these sites, including, but not limited to, the nature and extent of contamination, the required remediation methods, timing of expenditures, and apportionment of responsibility among the potentially responsible parties and the financial viability of those parties. The Company accrues for costs associated with environmental remediation obligations when such costs are probable and reasonably estimable. Significant assumptions used in estimating environmental remediation liabilities include costs associated with remediating groundwater, surface water and soil contamination, as well as controlling and containing methane gas migration and the related legal costs. These assumptions have a significant effect on the estimated liability.
How We Addressed the Matter in Our Audit	Auditing environmental remediation liabilities is complex and required the involvement of specialists due to the highly judgmental nature of the assumptions used in the estimate.

We tested controls that address the risks of material misstatement relating to the valuation and completeness of the environmental liabilities. For example, we tested controls over the identification of new matters and management's review of the significant assumptions used in determining the estimated remediation liabilities.

To test the environmental liabilities, our audit procedures included, among others, assessing methodologies used by the Company and testing the significant assumptions discussed above, as well as the underlying costs and other estimates used by the Company in its development of these assumptions. We compared the significant assumptions used by management to historical trends and, when available, to notifications or decisions from regulatory agencies specifying remedial plans of action required and to agreements or correspondence regarding the apportionment of responsibility among the potentially responsible parties. We also tested the completeness and accuracy of the historical data utilized in the development of the environmental liability. We also involved EY engineering specialists to assist us with evaluating the completeness of the Company's environmental matters and assumptions used in estimating remediation liabilities for certain sites.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2002.
Phoenix, Arizona
February 22, 2021

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and Board of Directors of Republic Services, Inc.

Opinion on Internal Control over Financial Reporting

We have audited Republic Services, Inc.'s internal control over financial reporting as of December 31, 2020, based on criteria established in Internal Control – Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) (the COSO criteria). In our opinion, Republic Services, Inc. (the Company) maintained, in all material respects, effective internal control over financial reporting as of December 31, 2020, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of Republic Services, Inc. as of December 31, 2020 and 2019, the related consolidated statements of income, comprehensive income, stockholders' equity and cash flows for each of the three years in the period ended December 31, 2020, and the related notes and our report dated February 22, 2021, expressed an unqualified opinion thereon.

As indicated in the accompanying Report of Management on Republic Services, Inc's Internal Control over Financial Reporting, management's assessment of and conclusion on the effectiveness of internal control over financial reporting did not include the internal controls of Randy's Sanitation, LLC, Randy's Rentals, LLC, Gallegos Sanitation, Inc. and related entities, and Eagle Waste & Recycling, Inc. and related entities, which are included in the 2020 consolidated financial statements of the Company and constituted less than 1% of total and net assets as of December 31, 2020 and less than 1% of revenues and net income for the year then ended. Our audit of internal control over financial reporting of the Company also did not include an evaluation of the internal control over financial reporting of Randy's Sanitation, LLC, Randy's Rentals, LLC, Gallegos Sanitation, Inc. and related entities, and Eagle Waste & Recycling, Inc. and related entities.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting included in the accompanying Report of Management on Republic Services, Inc.'s Internal Control over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects.

Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ Ernst & Young LLP

Phoenix, Arizona
February 22, 2021

REPUBLIC SERVICES, INC.
CONSOLIDATED BALANCE SHEETS
(in millions, except per share data)

	December 31, 2020	December 31, 2019
ASSETS		
Current assets:		
Cash and cash equivalents	$ 38.2	$ 47.1
Accounts receivable, less allowance for doubtful accounts and other of $34.7 and $34.0, respectively	1,091.3	1,125.9
Prepaid expenses and other current assets	392.3	433.0
Total current assets	1,521.8	1,606.0
Restricted cash and marketable securities	149.1	179.4
Property and equipment, net	8,726.2	8,383.5
Goodwill	12,046.4	11,633.4
Other intangible assets, net	173.1	133.9
Other assets	817.4	747.6
Total assets	$ 23,434.0	$ 22,683.8
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 779.0	$ 777.9
Notes payable and current maturities of long-term debt	168.1	929.9
Deferred revenue	345.6	336.0
Accrued landfill and environmental costs, current portion	114.5	132.6
Accrued interest	54.6	74.0
Other accrued liabilities	820.2	814.2
Total current liabilities	2,282.0	3,064.6
Long-term debt, net of current maturities	8,766.1	7,758.6
Accrued landfill and environmental costs, net of current portion	1,694.7	1,703.2
Deferred income taxes and other long-term tax liabilities, net	1,238.8	1,180.6
Insurance reserves, net of current portion	281.8	276.5
Other long-term liabilities	681.8	579.4
Commitments and contingencies		
Stockholders' equity:		
Preferred stock, par value $0.01 per share; 50 shares authorized; none issued	-	-
Common stock, par value $0.01 per share; 750 shares authorized; 318.8 and 353.3 issued including shares held in treasury, respectively	3.2	3.5
Additional paid-in capital	2,741.4	4,994.8
Retained earnings	5,751.8	5,317.3
Treasury stock, at cost; — and 34.5 shares, respectively	(0.1)	(2,199.6)
Accumulated other comprehensive income, net of tax	(12.4)	2.2
Total Republic Services, Inc. stockholders' equity	8,483.9	8,118.2
Non-controlling interests in consolidated subsidiary	4.9	2.7
Total stockholders' equity	8,488.8	8,120.9
Total liabilities and stockholders' equity	$ 23,434.0	$ 22,683.8

The accompanying notes are an integral part of these financial statements.

REPUBLIC SERVICES, INC.
CONSOLIDATED STATEMENTS OF INCOME
(in millions, except per share data)

	Years Ended December 31,		
	2020	2019	2018
Revenue	$ 10,153.6	$ 10,299.4	$ 10,040.9
Expenses:			
Cost of operations	6,100.5	6,298.4	6,150.0
Depreciation, amortization and depletion	1,075.9	1,040.5	1,033.4
Accretion	82.9	81.9	80.7
Selling, general and administrative	1,053.0	1,091.9	1,059.5
Withdrawal costs – multiemployer pension funds	34.5	-	-
Loss (gain) on business divestitures and impairments, net	77.7	(14.7)	(44.9)
Restructuring charges	20.0	14.2	26.4
Operating income	1,709.1	1,787.2	1,735.8
Interest expense	(355.6)	(392.0)	(383.8)
Loss from unconsolidated equity method investments	(118.2)	(112.2)	(35.8)
Loss on extinguishment of debt	(101.9)	-	(0.3)
Interest income	5.2	6.4	1.6
Other income, net	4.1	6.4	3.4
Income before income taxes	1,142.7	1,295.8	1,320.9
Provision for income taxes	173.1	222.0	283.3
Net income	969.6	1,073.8	1,037.6
Net income attributable to non-controlling interests in consolidated subsidiary	(2.4)	(0.5)	(0.7)
Net income attributable to Republic Services, Inc.	$ 967.2	$ 1,073.3	$ 1,036.9
Basic earnings per share attributable to Republic Services, Inc. stockholders:			
Basic earnings per share	$ 3.03	$ 3.34	$ 3.17
Weighted average common shares outstanding	319.3	321.1	326.9
Diluted earnings per share attributable to Republic Services, Inc. stockholders:			
Diluted earnings per share	$ 3.02	$ 3.33	$ 3.16
Weighted average common and common equivalent shares outstanding	319.8	322.0	328.4
Cash dividends per common share	$ 1.66	$ 1.56	$ 1.44

The accompanying notes are an integral part of these financial statements.

REPUBLIC SERVICES, INC.
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(in millions)

	Years Ended December 31,		
	2020	2019	2018
Net income	$ 969.6	$ 1,073.8	$ 1,037.6
Other comprehensive income (loss), net of tax			
Hedging activity:			
Settlements	-	-	4.0
Realized loss (gain) reclassified into earnings	5.8	1.0	(3.8)
Unrealized (loss) gains	(22.5)	(30.2)	14.5
Pension activity:			
Change in funded status of pension plan obligations	2.1	(2.5)	(6.5)
Other comprehensive income (loss), net of tax	(14.6)	(31.7)	8.2
Comprehensive income	955.0	1,042.1	1,045.8
Comprehensive income attributable to non-controlling interests	(2.4)	(0.5)	(0.7)
Comprehensive income attributable to Republic Services, Inc.	$ 952.6	$ 1,041.6	$ 1,045.1

The accompanying notes are an integral part of these financial statements.

REPUBLIC SERVICES, INC.
CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(in millions)

	Republic Services, Inc. Stockholders' Equity								
	Common Stock		Additional Paid-In	Retained	Treasury Stock		Accumulated Other Comprehensive Income (Loss),	Non-controlling Interests In Consolidated	
	Shares	Amount	Capital	Earnings	Shares	Amount	Net of Tax	Subsidiary	Total
Balance as of December 31, 2017	350.1	$ 3.5	$ 4,839.6	$ 4,152.5	(18.4)	$ (1,059.4)	$ 22.6	$ 2.3	$ 7,961.1
Adoption of accounting standard, net of tax	-	-	-	33.4	-	-	-	-	$ 33.4
Net income	-	-	-	1,036.9	-	-	-	0.7	1,037.6
Change in the value of derivative instruments, net of tax of $5.4	-	-	-	-	-	-	14.7	-	14.7
Employee benefit plan liability adjustments, net of tax of $2.3	-	-	-	-	-	-	(6.5)	-	(6.5)
Cash dividends declared	-	-	-	(468.4)	-	-	-	-	(468.4)
Issuances of common stock	1.8	-	43.3	-	(0.3)	(20.1)	-	-	23.2
Stock-based compensation	-	-	42.0	(3.9)	-	-	-	-	38.1
Purchase of common stock for treasury	-	-	-	-	(10.7)	(703.1)	-	-	(703.1)
Distributions paid	-	-	-	-	-	-	-	(0.6)	(0.6)
Balance as of December 31, 2018	351.9	3.5	4,924.9	4,750.5	(29.4)	(1,782.6)	30.8	2.4	7,929.5
Adoption of accounting standard, net of tax	-	-	-	(3.1)	-	-	3.1	-	-
Net income	-	-	-	1,073.3	-	-	-	0.5	1,073.8
Change in the value of derivative instruments, net of tax of $10.4	-	-	-	-	-	-	(29.2)	-	(29.2)
Employee benefit plan liability adjustments, net of tax of $0.9	-	-	-	-	-	-	(2.5)	-	(2.5)
Cash dividends declared	-	-	-	(499.4)	-	-	-	-	(499.4)
Issuances of common stock	1.4	-	26.9	-	(0.2)	(17.6)	-	-	9.3
Stock-based compensation	-	-	43.0	(4.0)	-	-	-	-	39.0
Purchase of common stock for treasury	-	-	-	-	(4.9)	(399.4)	-	-	(399.4)
Distributions paid	-	-	-	-	-	-	-	(0.2)	(0.2)
Balance as of December 31, 2019	353.3	3.5	4,994.8	5,317.3	(34.5)	(2,199.6)	2.2	2.7	8,120.9
Net income	-	-	-	967.2	-	-	-	2.4	969.6
Change in the value of derivative instruments, net of tax of $(5.9)	-	-	-	-	-	-	(16.7)	-	(16.7)
Employee benefit plan liability adjustments, net of tax of $0.8	-	-	-	-	-	-	2.1	-	2.1
Cash dividends declared	-	-	-	(528.8)	-	-	-	-	(528.8)
Issuances of common stock	1.3	-	21.6	-	(0.1)	(17.7)	-	-	3.9
Stock-based compensation	-	-	40.7	(3.9)	-	-	-	-	36.8
Purchase of common stock for treasury	-	-	-	-	(1.2)	(98.8)	-	-	(98.8)
Shares returned to unissued status	(35.8)	(0.3)	(2,315.7)	-	35.8	2,316.0	-	-	-
Distributions paid	-	-	-	-	-	-	-	(0.2)	(0.2)
Balance as of December 31, 2020	318.8	$ 3.2	$ 2,741.4	$ 5,751.8	-	$ (0.1)	$ (12.4)	$ 4.9	$ 8,488.8

The accompanying notes are an integral part of these financial statements.

REPUBLIC SERVICES, INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(in millions)

	Years Ended December 31,		
	2020	2019	2018
Cash provided by operating activities:			
Net income	$ 969.6	$ 1,073.8	$ 1,037.6
Adjustments to reconcile net income to cash provided by operating activities:			
Depreciation, amortization, depletion and accretion	1,158.8	1,122.4	1,114.1
Non-cash interest expense	61.7	48.8	41.2
Stock-based compensation	37.3	39.5	39.0
Deferred tax provision	60.8	166.1	152.1
Provision for doubtful accounts, net of adjustments	27.8	34.0	34.8
Loss on extinguishment of debt	101.9	-	0.3
Loss (gain) on disposition of assets and asset impairments, net	75.5	(13.8)	(58.9)
Environmental adjustments	5.1	(11.9)	5.0
Loss from unconsolidated equity method investments	118.2	112.2	35.8
Other non-cash items	(3.8)	(5.6)	0.6
Change in assets and liabilities, net of effects from business acquisitions and divestitures:			
Accounts receivable	13.8	(38.3)	(29.6)
Prepaid expenses and other assets	6.5	(109.7)	(152.5)
Accounts payable	(46.7)	6.4	85.9
Capping, closure and post-closure expenditures	(58.6)	(78.2)	(71.9)
Remediation expenditures	(63.5)	(49.1)	(48.8)
Other liabilities	18.6	55.5	27.0
(Payments) proceeds from retirement of certain hedging relationships	(11.4)	-	31.1
Cash provided by operating activities	2,471.6	2,352.1	2,242.8
Cash used in investing activities:			
Purchases of property and equipment	(1,194.6)	(1,207.1)	(1,071.8)
Proceeds from sales of property and equipment	30.1	21.7	31.6
Cash used in acquisitions and investments, net of cash and restricted cash acquired	(769.5)	(575.1)	(277.3)
Cash received from business divestitures	32.9	42.8	89.2
Purchases of restricted marketable securities	(32.9)	(14.7)	(38.2)
Sales of restricted marketable securities	11.2	13.5	37.7
Other	-	(0.1)	(0.3)
Cash used in investing activities	(1,922.8)	(1,719.0)	(1,229.1)
Cash used in financing activities:			
Proceeds from notes payable and long-term debt, net of fees	2,625.5	4,746.5	4,347.6
Proceeds from issuance of senior notes, net of discount and fees	2,716.1	891.1	781.8
Payments of notes payable and long-term debt and senior notes	(5,221.4)	(5,327.9)	(5,000.7)
Premiums paid on extinguishment of debt	(99.1)	-	-
Issuances of common stock, net	3.9	9.3	23.2
Purchases of common stock for treasury	(98.8)	(399.4)	(736.9)
Cash dividends paid	(522.5)	(491.2)	(461.8)
Distributions paid to non-controlling interests in consolidated subsidiary	(0.2)	(0.2)	(0.6)
Contingent consideration payments	(15.5)	(17.2)	(12.1)
Cash used in financing activities	(612.0)	(589.0)	(1,059.5)
(Decrease) increase in cash, cash equivalents, restricted cash and restricted cash equivalents	(63.2)	44.1	(45.8)
Cash, cash equivalents, restricted cash and restricted cash equivalents at beginning of year	177.4	133.3	179.1
Cash, cash equivalents, restricted cash and restricted cash equivalents at end of year	$ 114.2	$ 177.4	$ 133.3

The accompanying notes are an integral part of these financial statements.

REPUBLIC SERVICES, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. BASIS OF PRESENTATION

Republic Services, Inc., a Delaware corporation, and its consolidated subsidiaries (also referred to collectively as Republic, the Company, we, us, or our), is one of the largest providers of environmental services in the United States, as measured by revenue. We manage and evaluate our operations through three operating segments, Group 1, Group 2, and environmental solutions.

The consolidated financial statements include the accounts of Republic Services, Inc. and its wholly owned and majority owned subsidiaries in accordance with accounting principles generally accepted in the United States of America (U.S. GAAP). We account for investments in entities in which we do not have a controlling financial interest under the equity method of accounting or, for investments that do not meet the criteria to be accounted for under the equity method, we reflect these investments at their fair value when it is readily determinable. If fair value is not readily determinable, we use an alternative measurement approach. All material intercompany accounts and transactions have been eliminated in consolidation.

For comparative purposes, certain prior year amounts have been reclassified to conform to the current year presentation. All dollar amounts in tabular presentations are in millions, except per share amounts and unless otherwise noted.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Management's Estimates and Assumptions

In preparing our financial statements, we make numerous estimates and assumptions that affect the amounts reported in these financial statements and accompanying notes. We must make these estimates and assumptions because certain information we use is dependent on future events, cannot be calculated with a high degree of precision from data available or simply cannot be readily calculated based on generally accepted methodologies. In preparing our financial statements, the more critical and subjective areas that deal with the greatest amount of uncertainty relate to our accounting for our long-lived assets, including recoverability, landfill development costs, and final capping, closure and post-closure costs; our valuation allowances for accounts receivable and deferred tax assets; our liabilities for potential litigation, claims and assessments; our liabilities for environmental remediation, multiemployer pension plans, employee benefit plans, deferred taxes, uncertain tax positions, and insurance reserves; and our estimates of the fair values of assets acquired and liabilities assumed in any acquisition. Each of these items is discussed in more detail elsewhere in these Notes to Consolidated Financial Statements. Our actual results may differ significantly from our estimates.

In March 2020, the World Health Organization declared the outbreak of a new strain of coronavirus (COVID-19) a pandemic. The COVID-19 pandemic has negatively impacted the global economy, disrupted global supply chains and created significant volatility and disruption of financial markets. The full extent of the impact of the COVID-19 pandemic on our operations and financial performance will depend on future developments, including the duration and spread of the pandemic, all of which are uncertain and cannot be predicted at this time.

Both national and local government agencies have implemented steps to slow the spread of the virus, including shelter-in-place orders and the mandatory shutdown of certain businesses. During this time, we continued to provide essential services to our customers. In mid-March 2020, certain customers in our small- and large-container businesses began adjusting their service levels, which included a decrease in the frequency of pickups or a temporary pause in service. In addition, we experienced a decline in volumes disposed at certain of our landfills and transfer stations. As service levels decreased, we also experienced a decrease in certain costs of our operations which are variable in nature. This decline in service activity peaked in the first half of April and gradually improved thereafter as local economies began to gradually reopen and customers began to resume service. Large outbreaks and resurgences of COVID-19 in various regions may result in a reinstitution of certain restrictions and further adjustments in our service levels, which would negatively impact our business.

The demand for our environmental solutions business depends on the continued demand for, and production of, oil and natural gas in certain shale basins located in the United States. During the year ended December 31, 2020, the price of crude oil and natural gas reached historic lows, resulting in a decrease in rig counts and drilling activity that led to a year-over-year decrease in revenue from our environmental solutions business. During the three months ended December 31, 2020, we recognized a $42.6 million charge as a loss on business divestitures and impairments, net in our consolidated income statement resulting from management's decision to exit certain product offerings and geographic basins in our upstream environmental solutions business. As the carrying value of the assets associated with these operations was no longer recoverable, we impaired the entire net book value of certain assets, comprised mainly of equipment, vehicles, and containers. On at least a quarterly basis, we will continue to monitor the effect of the evolving COVID-19 pandemic on our business and review our estimates for recoverability of assets.

In April 2020, we launched our Committed to Serve initiative to help our employees, customers and communities across the United States. We committed $20 million to support frontline employees and their families, as well as small business customers in the local communities where we serve. In addition to this initiative, we have experienced an increase in certain costs of doing business as a direct result of the COVID-19 pandemic, including costs for additional safety equipment and hygiene products and increased facility and equipment cleaning. These costs are intended to assist in protecting the safety of our frontline employees as we continue to provide an essential service to our customers. We also incurred incremental costs for guaranteeing certain frontline employees a minimum hourly work week regardless of service decreases. In the fourth quarter, we recognized our frontline employees for their commitment and contributions to their communities during the pandemic with a $500 award that was paid in January 2021. In addition, we incurred incremental costs associated with expanding certain aspects of our existing healthcare programs. We expect to incur similar costs throughout 2021, and potentially into future years, although we expect the amount of such costs annually to be less than those incurred in 2020.

Cash and Cash Equivalents

We consider liquid investments with a maturity at the date of acquisition of three months or less to be cash equivalents.

We may have net book credit balances in our primary disbursement accounts at the end of a reporting period. We classify such credit balances as accounts payable in our consolidated balance sheets as checks presented for payment to these accounts are not payable by our banks under overdraft arrangements, and, therefore, do not represent short-term borrowings. As of December 31, 2020 and 2019, there were net book credit balances of $32.7 million and $50.6 million, respectively, in our primary disbursement accounts that were classified as accounts payable on our consolidated balance sheets.

Concentration of Credit Risk

Financial instruments that potentially subject us to concentrations of credit risk consist of cash and cash equivalents, trade accounts receivable and derivative instruments. We place our cash and cash equivalents with high quality financial institutions. Such balances may be in excess of FDIC insured limits. To manage the related credit exposure, we continually monitor the credit worthiness of the financial institutions where we have deposits. Concentrations of credit risk with respect to trade accounts receivable are limited due to the wide variety of customers and markets in which we provide services, as well as the dispersion of our operations across many geographic areas. We provide services to small-container, large-container, municipal and residential, and other environmental solutions customers in the United States. We perform ongoing credit evaluations of our customers, but generally do not require collateral to support customer receivables. We establish an allowance for doubtful accounts based on various factors including the credit risk of specific customers, age of receivables outstanding, historical trends, economic conditions and other information.

Accounts Receivable, Net

Accounts receivable represent receivables from customers for environmental services, including collection and processing of recyclable materials, collection, transfer, and disposal of solid waste, and other environmental solutions. Our receivables are recorded when billed or when the related revenue is earned and represent claims against third parties that will be settled in cash. The carrying value of our receivables, net of the allowance for doubtful accounts and customer credits, represents their estimated net realizable value.

We establish an allowance for doubtful accounts based on various factors including the age of receivables outstanding, historical trends, economic conditions and other information. We also review outstanding balances on an account-specific basis based on the credit risk of the customer. We determined that all of our accounts receivable share similar risk characteristics. We monitor our credit exposure on an ongoing basis and assess whether assets in the pool continue to display similar risk characteristics. We perform ongoing credit evaluations of our customers, but generally do not require collateral to support customer receivables.

The following table reflects the activity in our allowance for doubtful accounts for the years ended December 31:

	2020	2019	2018
Balance at beginning of year	$ 34.0	$ 34.3	$ 38.9
Additions charged to expense	27.8	34.0	34.8
Accounts written-off	(27.1)	(34.3)	(39.4)
Balance at end of year	$ 34.7	$ 34.0	$ 34.3

Restricted Cash and Marketable Securities

As of December 31, 2020, we had $149.1 million of restricted cash and marketable securities of which $117.6 million supports our insurance programs for workers' compensation, commercial general liability, and commercial auto liability. Additionally, we obtain funds through the issuance of tax-exempt bonds for the purpose of financing qualifying expenditures at our landfills, transfer stations, collection and recycling processing centers. The funds are deposited directly into trust accounts by the bonding authorities at the time of issuance. As the use of these funds is contractually restricted, and we do not have the ability to use these funds for general operating purposes, they are classified as restricted cash and marketable securities in our consolidated balance sheets.

In the normal course of business, we may be required to provide financial assurance to governmental agencies and a variety of other entities in connection with municipal residential collection contracts, closure or post-closure of landfills, environmental remediation, environmental permits, and business licenses and permits as a financial guarantee of our performance. At several of our landfills, we satisfy financial assurance requirements by depositing cash into restricted trust funds or escrow accounts.

Property and Equipment

We record property and equipment at cost. Expenditures for major additions and improvements to facilities are capitalized, while maintenance and repairs are charged to expense as incurred. When property is retired or otherwise disposed, the related cost and accumulated depreciation are removed from the accounts and any resulting gain or loss is reflected in the consolidated statements of income.

We revise the estimated useful lives of property and equipment acquired through business acquisitions to conform with our policies. We depreciate assets over their estimated useful lives using the straight-line method. We assume no salvage value for our depreciable property and equipment. The estimated useful lives of our property and equipment are as follows:

Buildings and improvements	7 - 40 years
Vehicles	5 - 20 years
Landfill equipment	5 - 7 years
Other equipment	3 - 25 years
Furniture and fixtures	10 years

Landfill development costs also are included in property and equipment. Landfill development costs include direct costs incurred to obtain landfill permits and direct costs incurred to acquire, construct and develop sites, as well as final capping, closure and post-closure assets. These costs are amortized or depleted based on consumed airspace. All indirect landfill development costs are expensed as incurred. For additional information, see Note 8, *Landfill and Environmental Costs*.

Capitalized Interest

We capitalize interest on all landfill cell construction and other construction or development projects. Interest is capitalized on qualified assets while they undergo activities to ready them for their intended use. Capitalization of interest ceases once an asset is placed into service or if construction activity is suspended for more than a brief period of time. Our interest capitalization rate is based on our weighted average cost of indebtedness. Interest capitalized was $6.2 million, $7.2 million and $6.8 million for the years ended December 31, 2020, 2019, and 2018, respectively.

Fair Value of Financial Instruments

Our financial instruments include cash and cash equivalents, restricted cash and marketable securities, interest rate hedges and other derivatives, long-term debt, and assets in our defined benefit pension plan. Accounting standards include disclosure requirements around fair values used for certain financial instruments and establish a fair value hierarchy. The hierarchy prioritizes valuation inputs into three levels based on the extent to which inputs used in measuring fair value are observable in the market. Each fair value measurement is reported in one of three levels:

- Level 1 – inputs are based upon unadjusted quoted prices for identical instruments traded in active markets.

- Level 2 – inputs are based upon quoted prices for similar instruments in active markets, quoted prices for identical or similar instruments in markets that are not active, and model-based valuation techniques for which all significant assumptions are observable in the market or can be corroborated by observable market data for substantially the full term of the assets or liabilities.

- Level 3 – inputs are generally unobservable and typically reflect management's estimates of assumptions that market participants would use in pricing the asset or liability. The fair values are therefore determined using model-based techniques that include option pricing models, discounted cash flow models, and similar techniques.

See Note 12, *Employee Benefit Plans,* and Note 18, *Financial Instruments,* for fair value disclosures related to our defined benefit pension plan investments and financial instruments, respectively.

Investments Other Than Derivatives

Investments other than derivatives primarily include money market funds, common stock, mutual funds, real estate investment trusts, U.S. government and agency securities, municipal and corporate bonds, and foreign government bonds. In general, and where applicable, we use quoted prices in active markets for identical assets or liabilities to determine fair value. This pricing methodology applies to our Level 1 investments, such as money market funds, common stock and certain mutual funds. If quoted prices in active markets for identical assets or liabilities are not available to determine fair value, then we use quoted prices for similar assets and liabilities or inputs other than the quoted prices that are observable either directly or indirectly. These investments are included in Level 2 and consist primarily of corporate bonds, foreign government bonds, real estate investment trusts and certain agency securities.

Derivative Financial Instruments

We use derivative financial instruments to manage our risk associated with changing interest rates by creating offsetting market exposures. We use interest rate swap agreements designated as fair value hedges to manage risk associated with fluctuations in interest rates. In prior periods, we entered into multiple agreements designated as cash flow hedges to lock interest rates in anticipation of future debt issuance.

All derivatives are measured at fair value and recognized in the balance sheet as assets or liabilities, as appropriate. For derivative instruments designated as fair value hedges, to the extent they are effective, they are included as an adjustment to long-term debt in our consolidated balance sheets. Changes in fair value of the ineffective portions are recognized currently in earnings. For derivatives designated as cash flow hedges, changes in fair value of the effective portions of derivative instruments are reported in stockholders' equity as components of other comprehensive income until the forecasted transaction occurs or is not probable of occurring. When the forecasted transaction occurs or is not probable of occurring, the realized net gain or loss is then recognized in the consolidated statements of income. Changes in fair value of the ineffective portions are recognized currently in earnings.

The fair values of our derivative instruments are determined using standard valuation models with assumptions about prices and other relevant information based on those observed in the underlying markets (Level 2 in the fair value hierarchy). The estimated fair values of derivatives used to hedge risks fluctuate over time and should be viewed in relation to the underlying hedged transactions.

Landfill and Environmental Costs

Life Cycle Accounting

We use life-cycle accounting and the units-of-consumption method to recognize certain landfill costs over the life of the site. In life cycle accounting, all current and future capitalized costs to acquire and construct a site are calculated, and charged to expense based on the consumption of cubic yards of available airspace.

Costs and airspace estimates are developed at least annually by engineers. We use these estimates to adjust the rates we use to deplete capitalized costs. Changes in these estimates primarily relate to changes in available airspace, inflation and applicable regulations. Changes in available airspace include, but are not limited to, changes due to the addition of airspace attributable to probable expansion areas, airspace consumed and changes in engineering estimates.

Probable Expansion Airspace

We classify landfill disposal capacity as either permitted (having received the final permit from the applicable regulatory agency) or as probable expansion airspace. Before airspace included in an expansion area is determined to be probable expansion airspace and, therefore, is included in our calculation of total available disposal capacity, all of the following criteria must be met:

- We own the land associated with the expansion airspace or control it pursuant to an option agreement;
- We are committed to supporting the expansion project financially and with appropriate resources;
- There are no identified fatal flaws or impediments associated with the project, including political impediments;
- Progress is being made on the project;
- The expansion is attainable within a reasonable time frame; and
- We believe it is likely the expansion permit will be received.

Upon meeting our expansion criteria, the rates used at each applicable landfill to expense costs to acquire, construct, cap, close and maintain a site during the post-closure period are adjusted to include both the probable expansion airspace and the additional costs to be capitalized or accrued associated with that expansion airspace.

We have identified three steps that landfills generally follow to obtain expansion permits. These steps are as follows:

- Obtaining approval from local authorities;
- Submitting a permit application to state authorities; and
- Obtaining permit approval from state authorities.

We continually monitor our progress toward obtaining permits for each of our sites with probable airspace. If we determine that a landfill expansion area no longer meets our criteria, the probable expansion airspace is removed from the landfill's total available capacity and the rates used at the landfill to deplete costs to acquire, construct, cap, close and maintain a site during the post-closure period are adjusted accordingly. In addition, any amounts capitalized for the probable expansion airspace are charged to expense in the period in which it is determined that the criteria are no longer met.

Capitalized Landfill Costs

Capitalized landfill costs include expenditures for land, permitting, cell construction and environmental structures. Capitalized permitting and cell construction costs are limited to direct costs relating to these activities, including legal, engineering and construction costs associated with excavation, natural and synthetic liners, construction of leachate collection systems, installation of methane gas collection and monitoring systems, installation of groundwater monitoring wells and other costs associated with the development of the site. Interest is capitalized on landfill construction projects while the assets are undergoing activities to ready them for their intended use. Capitalized landfill costs also include final capping, closure and post-closure assets and are depleted as airspace is consumed using the units-of-consumption method.

Costs related to acquiring land, excluding the estimated residual value of unpermitted, non-buffer land, and costs related to permitting and cell construction are depleted as airspace is consumed using the units-of-consumption method.

Capitalized landfill costs also may include an allocation of purchase price paid for landfills. For landfills purchased as part of a group of assets, the purchase price assigned to the landfill is determined based on the estimated fair value of the landfill. If the landfill meets our expansion criteria, the purchase price is further allocated between permitted airspace and expansion airspace based on the respective ratios to total available airspace. Landfill purchase price is amortized using the units-of-consumption method over the total available airspace, including probable expansion airspace, where appropriate.

Final Capping, Closure and Post-Closure Costs

Final capping

We have future obligations for final capping, closure and post-closure costs with respect to the landfills we own or operate as set forth in applicable landfill permits. The permit requirements are based on the Subtitle C and Subtitle D regulations of the Resource Conservation and Recovery Act, as implemented and applied on a state-by-state basis. We define final capping as activities required to permanently cover a portion of a landfill that has been completely filled with waste. Final capping typically includes installing flexible membrane and geosynthetic clay liners, drainage and compact soil layers, and topsoil, and is constructed over an area of the landfill where total airspace capacity has been consumed and waste disposal operations have ceased. These final capping activities occur in phases as needed throughout the operating life of a landfill as specific areas are filled to capacity and the final elevation for that specific area is reached in accordance with the provisions of the operating permit. We consider final capping events to be discrete activities that are recognized as asset retirement obligations separately from other closure and post-closure obligations. As a result, we use a separate rate per ton for recognizing the principal amount of the liability and related asset associated with each capping event. We amortize the asset recorded pursuant to this approach as waste volume related to the capacity covered by the capping event is placed into the landfill based on the consumption of cubic yards of available airspace.

Closure and post-closure

Closure and post-closure activities occur after the entire landfill ceases to accept waste and closes. These activities involve methane gas control, leachate management and groundwater monitoring, surface water monitoring and control, and other operational and maintenance activities that occur after the site ceases to accept waste. Obligations associated with monitoring and controlling methane gas migration and emissions are set forth in applicable landfill permits and these requirements are based on the provisions of the Clean Air Act. The post-closure period generally runs for 30 years after final site closure for municipal solid waste landfills and a shorter period for construction and demolition landfills and inert landfills. We recognize asset retirement obligations and the related amortization expense for closure and post-closure (excluding obligations for final capping) using the units-of-consumption method over the total remaining capacity of the landfill, including probable expansion airspace, where appropriate.

Estimated future expenditures

Estimates of future expenditures for final capping, closure and post-closure are developed at least annually by engineers. Management reviews these estimates and our operating and accounting personnel use them to adjust the rates used to capitalize and amortize these costs. These estimates involve projections of costs that will be incurred during the remaining life of the landfill for final capping activities, after the landfill ceases operations and during the legally required post-closure monitoring period. As of December 31, 2020, we had 128 closed landfills.

Fair value measurements

In general, we engage third parties to perform most of our final capping, closure and post-closure activities. Accordingly, the fair value of these activities is based on quoted and actual prices paid for similar work. We also perform some of our final capping, closure and post-closure activities using internal resources. Where we expect internal resources to be used to fulfill an asset retirement obligation, we add a profit margin to the estimated cost of such services to better reflect their fair value. If we perform these services internally, the added profit margin is recognized as a component of operating income in the period the obligation is settled.

Our estimates of costs to discharge asset retirement obligations for landfills are developed in today's dollars. These costs are inflated each year to reflect a normal escalation of prices up to the year they are expected to be paid. We used a 1.7% inflation rate for the years ended December 31, 2020, 2019, and 2018, which is based on the ten-year historical moving average increase of the U.S. Consumer Price Index, and is the rate used by the largest environmental services industry participants. These estimated costs are then discounted to their present values using a credit-adjusted, risk-free interest rate.

Changes in assets retirement obligations

A liability for an asset retirement obligation is recognized in the period in which it is incurred and is initially measured at fair value. The offset to the liability is capitalized as part of the carrying amount of the related long-lived asset. Changes in the liabilities due to revisions to estimated future cash flows are recognized by increasing or decreasing the liabilities with the offsets adjusting the carrying amounts of the related long-lived assets, and may also require immediate adjustments to amortization expense in the consolidated statements of income. Upward revisions in the amount of undiscounted estimated cash flows used to record a liability are discounted using the credit-adjusted, risk-free interest rate in effect at the time of the change. Downward revisions in the amount of undiscounted estimated cash flows used to record a liability are discounted using the credit-adjusted, risk-free rate that existed when the original liability was recognized.

Changes in asset retirement obligations due to the passage of time are measured by recognizing accretion expense in a manner that results in a constant effective interest rate being applied to the average carrying amount of the liability. The effective interest rate used to calculate accretion expense is our credit-adjusted, risk-free interest rate in effect at the time the liabilities were recorded.

We review our calculations with respect to landfill asset retirement obligations at least annually. If there is a significant change in the facts and circumstances related to a landfill during the year, we will review our calculations for the landfill as soon as practical after the change has occurred.

Landfill operating expenses

Costs associated with daily maintenance activities and environmental compliance during the operating life of the landfill are expensed as incurred. These costs include, among other things, leachate treatment and disposal, methane gas and groundwater monitoring and systems maintenance, interim cap maintenance, costs associated with the application of daily cover materials, and the legal and administrative costs of ongoing environmental compliance.

Environmental Liabilities

We are subject to an array of laws and regulations relating to the protection of the environment, and we remediate sites in the ordinary course of our business. Under current laws and regulations, we may be responsible for environmental remediation at sites that we either own or operate, including sites that we have acquired, or sites where we have (or a company that we have acquired has) delivered waste. Our environmental remediation liabilities primarily include costs associated with remediating groundwater, surface water and soil contamination, as well as controlling and containing methane gas migration and the related legal costs. To estimate our ultimate liability at these sites, we evaluate several factors, including the nature and extent of contamination at each identified site, the required remediation methods, timing of expenditures, the apportionment of responsibility among the potentially responsible parties and the financial viability of those parties. We accrue for costs associated with environmental remediation obligations when such costs are probable and reasonably estimable in accordance with accounting for loss contingencies. We periodically review the status of all environmental matters and update our estimates of the likelihood of and future expenditures for remediation as necessary. Changes in the liabilities resulting from these reviews are recognized currently in earnings in the period in which the adjustment is known. Adjustments to estimates are reasonably possible in the near term and may result in changes to recorded amounts. With the exception of those obligations assumed in certain business combinations, environmental obligations are recorded on an undiscounted basis. Adjustments arising from changes in amounts and timing of estimated costs and settlements may result in increases or decreases in these obligations and are calculated on a discounted basis as they were initially estimated on a discounted basis. These adjustments are charged to operating income when they are known. We perform a comprehensive review of our environmental obligations annually and also review changes in facts and circumstances associated with these obligations at least quarterly. We have not reduced the liabilities we have recorded for recoveries from other potentially responsible parties or insurance companies.

Business Combinations

We acquire businesses in the environmental services industry as part of our growth strategy. Businesses are included in the consolidated financial statements from the date of acquisition.

We recognize, separately from goodwill, the identifiable assets acquired and liabilities assumed at their estimated acquisition-date fair values. We measure and recognize goodwill as of the acquisition date as the excess of: (1) the aggregate of the fair value of consideration transferred, the fair value of any non-controlling interest in the acquiree (if any) and the acquisition date fair value of our previously held equity interest in the acquiree (if any), over (2) the fair value of assets acquired and liabilities assumed. If information about facts and circumstances existing as of the acquisition date is incomplete by the end of the reporting period in which a business combination occurs, we report provisional amounts for the items for which the accounting is incomplete. The measurement or allocation period ends once we receive the information we are seeking; however, this period will generally not exceed one year from the acquisition date. Any material adjustments recognized during the measurement period will be reflected retrospectively in the consolidated financial statements of the subsequent period. We recognize third-party transaction related costs as expense currently in the period in which they are incurred.

Goodwill and Other Intangible Assets

During the eleven months ended November 30, 2020, we managed and evaluated our operations through two field groups: Group 1 and Group 2. In December 2020, we began evaluating our operations through three reporting units, referred to as Group 1, Group 2, and environmental solutions, and determined that no goodwill was allocable to the environmental solutions reporting unit.

We evaluate goodwill for impairment annually as of October 1st, or when an indicator of impairment exists. We compare the fair value of our reporting units to their carrying value, including goodwill. We assign assets and liabilities from our corporate entities to our three reporting units to the extent that such assets or liabilities relate to the cash flows of the reporting unit and would be included in determining the reporting unit's fair value. We recognize an impairment charge for the amount by which the carrying value exceeds a reporting unit's fair value, not to exceed the total amount of recorded goodwill, as applicable. To determine a reporting unit's fair value, we primarily use discounted future cash flows and operating results based on a comparative multiple of earnings or revenues.

Significant estimates used in our fair value calculation using discounted future cash flows include: (1) estimates of future revenue and expense growth by reporting unit, which we estimate to be approximately 3% annually; (2) future estimated effective tax rates, which we estimate to be 27%; (3) future estimated capital expenditures and future required investments in working capital; (4) estimated discount rates, which we estimate to range between 6% and 8%; and (5) the future terminal value of the reporting unit, which is based on its ability to exist into perpetuity. Significant estimates used in the fair value calculation utilizing market value multiples include: (a) estimated future growth potential of the reporting unit; (b) estimated multiples of revenue or earnings a willing buyer is likely to pay; and (c) the estimated control premium a willing buyer is likely to pay.

In addition, we evaluate a reporting unit for impairment if events or circumstances change between annual tests, indicating a possible impairment. Examples of such events or circumstances include: (1) a significant adverse change in legal factors or in the business climate; (2) an adverse action or assessment by a regulator; (3) a more likely than not expectation that a reporting unit or a significant portion thereof will be sold; (4) continued or sustained losses at a reporting unit; (5) a significant decline in our market capitalization as compared to our book value; or (6) we conclude that we may not recover a significant asset group within the reporting unit.

In preparing our annual test for impairment as of October 1, 2020, we determined that our indicated fair value of total invested capital exceeded our total market capitalization for Group 1 and Group 2 reporting units. We believe one of the primary reconciling differences between the indicated fair value of total invested capital and our total market capitalization is due to a control premium. We believe the control premium represents the value a market participant could extract as savings or synergies by obtaining control.

As of October 1, 2020, we determined that the indicated fair value of our Group 1 and Group 2 reporting units exceeded their carrying value by approximately 150% on average and, therefore, we noted no indicators of impairment at our reporting units. As no goodwill was allocated to the environmental solutions reporting unit, we did not test for goodwill impairment in December 2020.

Our reporting units are comprised of several vertically integrated businesses. When an individual business within an integrated reporting unit is divested, goodwill is allocated to that business based on its fair value relative to the fair value of its reporting unit.

Other intangible assets include values assigned to customer relationships, non-compete agreements and trade names and are amortized generally on a straight-line basis over periods ranging from 1 to 16 years.

Asset Impairments

We continually consider whether events or changes in circumstances have occurred that may warrant revision of the estimated useful lives of our long-lived assets (other than goodwill) or whether the remaining balances of those assets should be evaluated for possible impairment. Long-lived assets include, for example, capitalized landfill costs, other property and equipment, and identifiable intangible assets.

Events or changes in circumstances that may indicate that an asset may be impaired include the following:

- A significant decrease in the market price of an asset or asset group;
- A significant adverse change in the extent or manner in which an asset or asset group is being used or in its physical condition;
- A significant adverse change in legal factors or in the business climate that could affect the value of an asset or asset group, including an adverse action or assessment by a regulator;
- An accumulation of costs significantly in excess of the amount originally expected for the acquisition or construction of a long-lived asset;
- A current period operating or cash flow loss combined with a history of operating or cash flow losses or a projection or forecast that demonstrates continuing losses associated with the use of a long-lived asset or asset group;
- A current expectation that, more likely than not, a long-lived asset or asset group will be sold or otherwise disposed of significantly before the end of its previously estimated useful life; or
- An impairment of goodwill at a reporting unit.

There are certain indicators listed above that require judgment and understanding of the environmental services industry when applied to landfill development or expansion. For example, a regulator may initially deny a landfill expansion permit application though the expansion permit is ultimately granted. In addition, management may periodically divert waste from one landfill to another to conserve remaining permitted landfill airspace. Therefore, certain events could occur in the ordinary course of business and not necessarily be considered indicators of impairment due to the unique nature of the environmental services industry.

If indicators of impairment exist, the asset or asset group is reviewed to determine whether its recoverability is impaired. We assess the recoverability of the asset or asset group by comparing its carrying value to an estimate (or estimates) of its undiscounted future cash flows over its remaining life. If the estimated undiscounted cash flows are not sufficient to recover the carrying value of the asset or asset group, we measure an impairment loss as the amount by which the carrying amount of the asset exceeds its fair value. The loss is recorded in the consolidated statements of income in the period in which such impairment is identified. Estimating future cash flows requires significant judgment, and our projections of future cash flows and remaining useful lives may vary materially from actual results.

Insurance Reserves

Our insurance programs for workers' compensation, commercial general and auto liability, environmental and remediation liability, and employee-related health care benefits are subject to high deductible insurance policies. Accruals for insurance reserves are based on claims filed and estimates of claims incurred but not reported. We consider our past claims experience, including both frequency and settlement amount of claims, in determining these estimates. It is possible that recorded reserves may not be adequate to fund the future payment of claims. Adjustments, if any, to estimates recorded resulting from ultimate claim payments will be reflected in the consolidated statements of income in the periods in which such adjustments are known. In general, our insurance reserves are recorded on an undiscounted basis; however, the insurance liabilities we assumed in business combinations are recorded at estimated fair value, and therefore have been discounted to present value based on our estimate of the timing of the related cash flows.

Costs Associated with Exit Activities

We record costs associated with exit activities such as employee termination benefits that represent a one-time benefit when management approves and commits to a plan of termination, and communicates the termination arrangement to the employees, or over the future service period, if any. Other costs associated with exit activities may include contract termination costs, including facility and employee relocation costs.

Contingent Liabilities

We are subject to various legal proceedings, claims and regulatory matters, the outcomes of which are subject to significant uncertainty. In general, we determine whether to disclose or accrue for loss contingencies based on an assessment of whether the risk of loss is remote, reasonably possible or probable, and whether it can be reasonably estimated. We assess our potential liability relating to litigation and regulatory matters based on information available to us. Management develops its assessment based on an analysis of possible outcomes under various strategies. We accrue for loss contingencies when such amounts are probable and reasonably estimable. If a contingent liability is only reasonably possible, we disclose the potential range of the loss, if estimable. Contingent liabilities recorded in purchase accounting are recorded at their fair values. These fair values may be different from the values we would have otherwise recorded, had the contingent liability not been assumed as part of an acquisition of a business.

Accumulated Other Comprehensive Income

Accumulated other comprehensive income is a component of stockholders' equity and includes the effective portion of the net changes in fair value of our cash flow hedges, amortization of our interest rate locks, and certain adjustments to liabilities associated with our employee defined benefit pension plan liabilities, net of tax.

Revenue Recognition

We generally provide services under contracts with municipalities or individual customers. Municipal and small-container contracts are generally long-term and often have renewal options. Advance billings are recorded as deferred revenue, and revenue is recognized over the period services are provided.

We recognize revenue when control is transferred to the customer, generally at the time we provide a service. Revenue is measured as the amount of consideration we expect to receive in exchange for providing a service. We make certain payments to our customers, including payments to our municipal customers or commodity rebates to customers in our recycling business, which reduce the amount of revenue we recognize.

Income Taxes

We account for income taxes under the asset and liability method, which requires the recognition of deferred tax assets and liabilities for the expected future tax consequences of events that have been included in the financial statements. Under this method, we record deferred income taxes to reflect the effects of temporary differences between the carrying amounts of assets and liabilities and their tax bases using enacted tax rates that we expect to be in effect when the taxes are actually paid or recovered. The effect of a change in tax rates on deferred tax assets and liabilities is recognized in income in the period that includes the enactment date.

We record net deferred tax assets to the extent we believe these assets will more likely than not be realized. In making these determinations, we consider all available positive and negative evidence, including scheduled reversals of deferred tax liabilities, tax planning strategies, projected future taxable income and recent financial operating results. The weight given to the positive and negative evidence is commensurate with the extent such evidence can be objectively verified. If we determine that we would be able to realize a deferred income tax asset in the future in excess of its net recorded amount, we would make an adjustment to the valuation allowance, which would reduce the provision for income taxes.

We record uncertain tax positions in accordance with ASC 740. A tax benefit from an uncertain tax position may be recognized when it is more likely than not that the position will be sustained upon examination, including resolution of any related appeals or litigation processes, based on the technical merits. Income tax positions must meet a more-likely-than-not recognition threshold at the effective date to be recognized.

We recognize interest and penalties related to uncertain tax positions in the provision for income taxes in the accompanying consolidated statements of income. Accrued interest and penalties are included in other accrued liabilities, deferred income taxes and other long-term tax liabilities in the consolidated balance sheets.

We use the flow-through method to account for investment tax credits earned on eligible development expenditures. Under this method, the investment tax credits are recognized as a reduction to income tax expense in the year they are earned.

Defined Benefit Pension Plan

We currently have one qualified defined benefit pension plan, the BFI Retirement Plan (the Plan). The Plan covers certain current and former employees of Allied in the United States, including some employees subject to collective bargaining agreements. The Plan's benefit formula is based on a percentage of compensation as defined in the Plan document. However, the benefits of all current Plan participants are frozen.

Our pension contributions are made in accordance with funding standards established by the Employee Retirement Income Security Act of 1974 and the Internal Revenue Code, as amended by the Pension Protection Act of 2006. The Plan's assets have been invested as determined by our Employee Benefits Committee. The Employee Benefits Committee reviews and adjusts the Plan's asset allocation as deemed necessary.

The benefit obligation and associated income or expense related to the Plan are determined using annually established assumptions for discount rates, expected rates of return and mortality rates. We determine the discount rate based on a model that matches the timing and amount of expected benefit payments to maturities of high quality bonds priced as of the pension plan measurement date. When that timing does not correspond to a published high-quality bond rate, our model uses an expected yield curve to determine an appropriate current discount rate. The yields on the bonds are used to derive a discount rate for the liability. In developing our expected rate of return assumption, we evaluate long-term expected and historical actual returns on the Plan assets, giving consideration to the asset mix and the anticipated duration of our Plan obligations. The average rate of compensation increase reflects our expectations of average pay increases over the period benefits are earned. Our assumptions are reviewed annually and adjusted as deemed necessary.

Equity-Based Compensation Plans

Compensation expense associated with our restricted share units is recognized ratably over the vesting period, or to the employee's retirement eligible date, if earlier. The fair value of restricted share units is based on the closing market price on the date of the grant.

Compensation expense associated with our performance shares that vest based on future performance targets is measured using the fair value of our common stock at the grant date for the stock-settled, equity classified awards, and the fair value of our common stock at the end of each reporting period for the cash-settled, liability classified awards. Compensation expense is recognized ratably over the performance period based on our estimated achievement of the established performance criteria.

Compensation expense is only recognized for those awards that we expect to vest, which we estimate based on an assessment of the probability that the performance criteria will be achieved.

Income tax related cash flows resulting from equity-based payments are reported as a component of operating activities.

Share Repurchases

Share repurchases under our share repurchase authorization may be made through open market purchases or privately negotiated transactions at the current market prices. From time-to-time, we return treasury shares acquired through share repurchases to the status of authorized but unissued. Our accounting policy is to deduct the par value from common stock and to reflect any excess of cost over par value as a deduction from additional paid-in capital.

Leases

We lease property and equipment in the ordinary course of business under various lease agreements. The most significant lease obligations are for real property and equipment specific to our industry, including property operated as a landfill or transfer station and operating equipment. Our leases have varying terms. Some may include renewal or purchase options, escalation clauses, restrictions, penalties or other obligations that we consider in determining minimum lease payments. Our lease terms include options to renew the lease when it is reasonably certain that we will exercise the option.

Certain leases require payments that are variable in nature based on volume measurements, e.g. a fixed rate per ton at our landfills. In addition, certain rental payments are adjusted annually based on changes in an underlying base index such as a consumer price index. Variable lease payments are recognized in our consolidated statements of income in the period incurred. Our lease agreements do not contain any material residual value guarantees or material restrictive covenants. We generally account for lease components separately from non-lease components.

Leases are classified as either operating leases or finance leases, as appropriate. Leases with an initial term of 12 months or less are not recorded on our consolidated balance sheet.

Operating Leases

Many of our leases are operating leases. Operating lease classification generally can be attributed to either (1) relatively low fixed minimum lease payments (including, for example, real property lease payments that are not fixed and vary based on the volume of material we receive or process), or (2) minimum lease terms that are shorter than the asset's economic useful life. We expect that, in the ordinary course of business, our operating leases will be renewed, replaced by other leases, or replaced with capital expenditures. We recognize rent expense for these leases on a straight-line basis over the lease term.

We recognize a right-of-use liability and right-of-use asset for leases classified as operating leases in our consolidated balance sheet upon lease commencement. The right-of-use liability represents the present value of the remaining lease payments. An implicit rate is often not readily available for these leases. As such, we use our incremental borrowing rate at the commencement date to determine the present value of the lease payments. Our incremental borrowing rate represents the rate of interest that we would have to pay to borrow on a collateralized basis over a similar term in a similar economic environment. In addition, we recognize a corresponding right-of-use asset, which represents our right to use an underlying asset for the lease term. The right-of-use asset is adjusted for certain favorable or unfavorable leases recognized through acquisition, prepaid or accrued rent, asset impairments and lease incentives, including but not limited to cash incentives, rent abatement or leasehold improvements paid by the lessor.

Finance Leases

We capitalize assets acquired under finance leases at lease commencement and amortize them to depreciation expense over the lesser of the useful life of the asset or the lease term on either a straight-line or a units-of-consumption basis, depending on the asset leased. We record the present value of the related lease payments as a debt obligation. Our finance lease liabilities relate primarily to real property, including certain long-term landfill operating agreements that require minimum lease payments with offsetting finance lease assets recorded as part of the landfill development costs.

Related Party Transactions

It is our policy that transactions with related parties must be on terms that, on the whole, are no less favorable than those that would be available from unaffiliated parties.

New Accounting Pronouncements

Accounting Standards Adopted

Effective January 1, 2020, we adopted the following accounting standard updates (ASUs) as issued by the Financial Accounting Standards Board (FASB):

ASU		Effective Date
ASU 2016-13	Credit Losses (Topic 326)	January 1, 2020
ASU 2018-13	Disclosure Framework – Changes to the Disclosure Requirements for Fair Value Measurement (Topic 820)	January 1, 2020

Credit Losses

Effective January 1, 2020, we adopted ASU 2016-13, *Credit Losses Topic 326* (ASU 2016-13 or the new credit losses standard) using the modified retrospective approach. The comparative periods have not been restated and continue to be reported under the accounting standard in effect for those periods. The new credit losses standard amends the impairment model to use a methodology that reflects expected credit losses and requires consideration of a broader range of reasonable and supportable information to inform credit loss estimates. Our adoption of ASU 2016-13 did not have a material impact on our consolidated financial statements for the year ended December 31, 2020, and we did not recognize a cumulative effect adjustment to retained earnings as of January 1, 2020.

To assist in quantifying the impact on our consolidated financial statements and supplementing our existing disclosures, we identified financial assets measured at an amortized cost basis in our consolidated balance sheet and evaluated the collectability considerations based on an expected credit loss assessment. We are exposed to credit losses primarily through customer receivables generated from the processing and sale of certain recyclable materials as well as the collection, transfer and disposal of non-hazardous solid waste, and other environmental solutions we provide our customers.

For additional details, refer to our accounting policy related to Accounts Receivable, Net above.

Fair Value Measurement

Effective January 1, 2020, we adopted the FASB's ASU 2018-13, *Fair Value Measurement (Topic 820) Disclosure Framework—Changes to the Disclosure Requirements for Fair Value Measurement* (ASU 2018-13). ASU 2018-13 intends to increase the consistency and comparability of fair value measurements used in financial reporting through eliminating, modifying, and adding certain disclosure requirements within Topic 820. The adoption of ASU 2018-13 did not have a material impact on our consolidated financial statements for the year ended December 31, 2020.

Accounting Standards Issued but not yet Adopted as of December 31, 2020

Changes to the Disclosure Requirements for Defined Benefit Plans

In August 2018, the FASB issued ASU 2018-14, *Compensation—Retirement Benefits—Defined Benefit Plans—General (Subtopic 715-20) Disclosure Framework—Changes to the Disclosure Requirements for Defined Benefit Plans* (ASU 2018-14). ASU 2018-14 removes disclosures that are no longer considered cost beneficial, clarifies the specific requirements of disclosures, and adds disclosure requirements identified as relevant. ASU 2018-14 is effective for public business entities for fiscal years beginning after December 15, 2020, including interim periods within that fiscal year. As such, Republic adopted the standard beginning January 1, 2021. Our adoption of this guidance did not have a material impact on our consolidated financial statements.

Simplifying the Accounting for Income Taxes

In December 2019, the FASB issued ASU 2019-12, *Income Taxes (Topic 740): Simplifying the Accounting for Income Taxes* (ASU 2019-12). ASU 2019-12 attempts to simplify aspects of accounting for franchise taxes and enacted changes in tax laws or rates, and clarifies the accounting for transactions that result in a step-up in the tax basis of goodwill. ASU 2019-12 is effective for public business entities for fiscal years beginning after December 15, 2020, including interim periods within that fiscal year. As such, Republic adopted the standard beginning January 1, 2021. Our adoption of this guidance did not have a material impact on our consolidated financial statements.

Reference Rate Reform

In March 2020, the FASB issued ASU 2020-04, Reference Rate Reform (Topic 848): *Facilitation of the Effects of Reference Rate Reform on Financial Reporting* (ASU 2020-04). ASU 2020-04 provides optional guidance for a limited period of time to ease the potential burden in accounting for (or recognizing the effects of) reference rate reform on financial reporting. The amendments in ASU 2020-04 provide optional expedients and exceptions for applying generally accepted accounting principles to contracts, hedging relationships, and other transactions affected by reference rate reform if certain criteria are met. ASU 2020-04 is effective for all entities as of March 12, 2020 through December 31, 2022. We are currently assessing the effect this guidance may have on our consolidated financial statements.

3. BUSINESS ACQUISITIONS, INVESTMENTS AND RESTRUCTURING CHARGES

We acquired various environmental services businesses during the years ended December 31, 2020 and 2019. The purchase price paid for these business acquisitions and the allocations of the purchase price follows:

	2020	2019
Purchase price:		
Cash used in acquisitions, net of cash acquired	$ 598.8	$ 430.0
Contingent consideration	-	2.5
Holdbacks	14.1	15.8
Fair value, future minimum lease payments	0.3	5.8
Fair value of operations surrendered	-	9.5
Total	$ 613.2	$ 463.6
Allocated as follows:		
Accounts receivable	$ 14.9	$ 19.5
Property and equipment	124.3	154.5
Operating right-of-use lease assets	0.2	18.1
Other assets	1.1	1.9
Inventory	1.5	1.0
Accounts payable	(3.8)	(7.2)
Environmental remediation liabilities	(1.7)	(1.9)
Closure and post-closure liabilities	(0.8)	(0.3)
Operating right-of-use lease liabilities	(0.2)	(18.4)
Other liabilities	(13.4)	(3.4)
Fair value of tangible assets acquired and liabilities assumed	122.1	163.8
Excess purchase price to be allocated	$ 491.1	$ 299.8
Excess purchase price to be allocated as follows:		
Other intangible assets	$ 60.7	$ 47.2
Goodwill	430.4	252.6
Total allocated	$ 491.1	$ 299.8

The purchase price allocations are preliminary and are based on information existing at the acquisition dates. Accordingly, the purchase price allocations are subject to change. Substantially all of the goodwill and intangible assets recorded for acquisitions in 2020 and 2019 was deductible for tax purposes.

These acquisitions are not material to the Company's results of operations, individually or in the aggregate. As a result, no pro forma financial information is provided.

Investments

In 2020 and 2019, we acquired non-controlling equity interests in certain limited liability companies that qualified for investment tax credits under Section 48 of the Internal Revenue Code. In exchange for our non-controlling interests, we made capital contributions of approximately $143 million and $129 million, which were recorded to other long-term assets in our December 31, 2020 and 2019 consolidated balance sheets, respectively. During 2020 and 2019, we reduced the carrying value of these investments by $118.2 million and $112.2 million, respectively, as a result of tax credits allocated to us, cash distributions, and our share of income and loss pursuant to the terms of the limited liability company agreements. Additionally, our 2020 and 2019 tax provisions reflect a benefit of approximately $100 million and $84 million, respectively, due to the tax credits related to these investments. For further discussion of the income tax benefits, see Note 11, *Income Taxes*.

Restructuring Charges

In 2019, we incurred costs related to the redesign of certain back-office software systems, which continued into 2020. In addition, in July 2020, we eliminated certain back-office support positions in response to a decline in the underlying demand for services resulting from the COVID-19 pandemic. During 2020, we incurred restructuring charges of $20.0 million which primarily related to these restructuring efforts. During 2019, we incurred restructuring charges of $14.2 million, which primarily related to the redesign of certain of our back-office software systems. We paid $15.5 million and $10.6 million during 2020 and 2019, respectively, related to these restructuring efforts.

In 2021, we expect to incur additional restructuring charges of approximately $15 million to $20 million primarily related to the redesign of certain of our back-office software systems. Substantially all of these restructuring charges will be recorded in our corporate entities and other segment.

4. PROPERTY AND EQUIPMENT, NET

A summary of property and equipment, net as of December 31 follows:

	2020	2019
Land	$ 467.1	$ 448.3
Non-depletable landfill land	166.3	170.5
Landfill development costs	7,991.7	7,474.7
Vehicles and equipment	8,119.0	7,766.0
Buildings and improvements	1,402.5	1,342.6
Construction-in-progress – landfill	303.8	366.8
Construction-in-progress – other	107.4	87.7
	$ 18,557.8	$ 17,656.6
Less: accumulated depreciation, depletion and amortization		
Landfill development costs	$ (4,249.5)	$ (3,968.6)
Vehicles and equipment	(4,953.4)	(4,728.2)
Buildings and improvements	(628.7)	(576.3)
	(9,831.6)	(9,273.1)
Property and equipment, net	$ 8,726.2	$ 8,383.5

Depreciation, amortization and depletion of property and equipment was $1,015.9 million, $985.8 million and $977.0 million for the years ended December 31, 2020, 2019 and 2018, respectively.

5. GOODWILL AND OTHER INTANGIBLE ASSETS, NET

Goodwill

A summary of the activity and balances in goodwill accounts by reporting segment follows:

	Balance as of December 31, 2019	Acquisitions	Divestitures	Adjustments to Acquisitions	Balance as of December 31, 2020
Group 1	$ 6,235.6	$ 171.7	$ -	$ (2.4)	$ 6,404.9
Group 2	5,397.8	258.7	(19.0)	4.0	5,641.5
Corporate entities and other	-	-	-	-	-
Total	$ 11,633.4	$ 430.4	$ (19.0)	$ 1.6	$ 12,046.4

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	Balance as of December 31, 2018	Acquisitions	Divestitures	Adjustments to Acquisitions	Balance as of December 31, 2019
Group 1	$ 6,150.6	$ 86.3	$ -	$ (1.3)	$ 6,235.6
Group 2	5,249.5	166.3	(17.9)	(0.1)	5,397.8
Corporate entities and other	-	-	-	-	-
Total	$ 11,400.1	$ 252.6	$ (17.9)	$ (1.4)	$ 11,633.4

Adjustments to acquisitions during the years ended December 31, 2020 and 2019 primarily related to working capital and fixed assets.

Goodwill by reporting segment as of December 31, 2019 and 2018 reflects the transfer of all environmental solutions assets from Group 2 to Corporate entities and other.

Other Intangible Assets, Net

Other intangible assets, net, include values assigned to customer relationships, non-compete agreements and trade names, and are amortized over periods ranging from 1 to 16 years. A summary of the activity and balances by intangible asset type follows:

	Gross Intangible Assets				Accumulated Amortization				Other Intangible Assets, Net
	Balance as of December 31, 2019	Acquisitions	Adjustments and Other	Balance as of December 31, 2020	Balance as of December 31, 2019	Additions Charged to Expense	Adjustments and Other	Balance as of December 31, 2020	as of December 31, 2020
Customer relationships	$ 733.8	$ 54.4	$ (0.1)	$ 788.1	$ (623.0)	$ (16.6)	$ 0.1	$ (639.5)	$ 148.6
Non-compete agreements	45.3	6.3	(0.2)	51.4	(35.3)	(3.9)	0.1	(39.1)	12.3
Other intangible assets	58.2	-	(0.7)	57.5	(45.1)	(0.6)	0.4	(45.3)	12.2
Total	$ 837.3	$ 60.7	$ (1.0)	$ 897.0	$ (703.4)	$ (21.1)	$ 0.6	$ (723.9)	$ 173.1

	Gross Intangible Assets				Accumulated Amortization				Other Intangible Assets, Net
	Balance as of December 31, 2018	Acquisitions	Adjustments and Other	Balance as of December 31, 2019	Balance as of December 31, 2018	Additions Charged to Expense	Adjustments and Other	Balance as of December 31, 2019	as of December 31, 2019
Customer relationships	$ 692.4	$ 41.4	$ -	$ 733.8	$ (607.2)	$ (16.0)	$ 0.2	$ (623.0)	$ 110.8
Non-compete agreements	37.0	7.4	0.9	45.3	(31.5)	(3.8)	-	(35.3)	10.0
Other intangible assets	64.3	-	(6.1)	58.2	(48.5)	(0.8)	4.2	(45.1)	13.1
Total	$ 793.7	$ 48.8	$ (5.2)	$ 837.3	$ (687.2)	$ (20.6)	$ 4.4	$ (703.4)	$ 133.9

Based on the amortizable intangible assets recorded in the consolidated balance sheet as of December 31, 2020, amortization expense for each of the next five years is estimated as follows:

2021	$ 26.7
2022	$ 25.4
2023	$ 23.9
2024	$ 21.7
2025	$ 19.5

6. OTHER ASSETS

Prepaid Expenses and Other Current Assets

A summary of prepaid expenses and other current assets as of December 31 follows:

	2020	2019
Income tax receivable	$ 170.7	$ 156.7
Prepaid expenses	77.7	75.5
Inventories	59.1	56.8
Reinsurance receivable	34.1	31.9
Other non-trade receivables	32.2	88.1
Prepaid fees for cloud-based hosting arrangements, current	11.8	12.4
Interest rate swap locks	-	3.6
Other current assets	6.7	8.0
Total	$ 392.3	$ 433.0

Other Assets

A summary of other assets as of December 31 follows:

	2020	2019
Operating right-of-use lease asset	$ 218.8	$ 243.6
Investments	145.4	87.8
Deferred compensation plan	131.8	118.0
Reinsurance receivable	84.8	78.9
Deferred contract costs and sales commissions	82.3	83.1
Other derivative assets	63.8	2.9
Prepaid fees and capitalized implementation costs for cloud-based hosting arrangements	29.5	32.0
Amounts recoverable for capping, closure and post-closure obligations	18.5	31.8
Interest rate swaps	10.0	10.7
Deferred financing costs	2.7	3.0
Other	29.8	55.8
Total	$ 817.4	$ 747.6

7. OTHER LIABILITIES

Other Accrued Liabilities

A summary of other accrued liabilities as of December 31 follows:

	2020	2019
Accrued payroll and benefits	$ 221.1	$ 207.7
Insurance reserves, current portion	167.5	162.0
Accrued dividends	135.5	129.2
Accrued fees and taxes	132.3	140.8
Ceded insurance reserves, current portion	34.1	31.6
Operating right-of-use lease liabilities, current	33.5	51.5
Accrued professional fees and legal settlement reserves	7.2	11.8
Interest rate swap locks	-	14.9
Other	89.0	64.7
Total	$ 820.2	$ 814.2

Other Long-Term Liabilities

A summary of other long-term liabilities as of December 31 follows:

	2020	2019
Operating right-of-use lease liabilities	$ 206.6	$ 212.5
Deferred compensation plan liability	126.6	116.1
Other derivative liabilities	103.0	22.2
Ceded insurance reserves	84.8	80.6
Contingent purchase price and acquisition holdbacks	67.3	71.2
Withdrawal liability – multiemployer pension funds	22.3	12.0
Legal settlement reserves	20.2	10.0
Pension and other post-retirement liabilities	5.5	6.2
Interest rate swap locks	-	0.8
Other	45.5	47.8
Total	$ 681.8	$ 579.4

Insurance Reserves

Our liabilities for unpaid and incurred but not reported claims as of December 31, 2020 and 2019 (which include claims for workers' compensation, commercial general and auto liability, and employee-related health care benefits) were $449.3 million and $438.5 million, respectively, under our risk management program and are included in other accrued liabilities and insurance reserves, net of current portion, in our consolidated balance sheets. While the ultimate amount of claims incurred depends on future developments, we believe the recorded reserves are adequate to cover the future payment of claims; however, it is possible that these recorded reserves may not be adequate to cover the future payment of claims. Adjustments, if any, to estimates recorded resulting from ultimate claim payments will be reflected in our consolidated statements of income in the periods in which such adjustments are known.

The following table summarizes the activity in our insurance reserves for the years ended December 31:

	2020	2019	2018
Balance at beginning of year	$ 438.5	$ 423.7	$ 420.2
Additions charged to expense	466.1	468.5	452.4
Payments	(482.6)	(479.3)	(461.4)
Accretion expense	0.5	0.7	0.9
Premium written for third party risk assumed	36.5	35.5	31.6
Reclassified to ceded insurance reserves	(9.7)	(10.6)	(20.0)
Balance at end of year	449.3	438.5	423.7
Less: current portion	(167.5)	(162.0)	(152.9)
Long-term portion	$ 281.8	$ 276.5	$ 270.8

8. LANDFILL AND ENVIRONMENTAL COSTS

As of December 31, 2020, we owned or operated 186 active landfills with total available disposal capacity estimated to be 5.0 billion in-place cubic yards. Additionally, we have post-closure responsibility for 128 closed landfills.

Accrued Landfill and Environmental Costs

A summary of our accrued landfill and environmental liabilities as of December 31 follows:

	2020	2019
Landfill final capping, closure and post-closure liabilities	$ 1,346.4	$ 1,335.6
Environmental remediation	462.8	500.2
Total accrued landfill and environmental costs	1,809.2	1,835.8
Less: current portion	(114.5)	(132.6)
Long-term portion	$ 1,694.7	$ 1,703.2

Final Capping, Closure and Post-Closure Costs

The following table summarizes the activity in our asset retirement obligation liabilities, which includes liabilities for final capping, closure and post-closure, for the years ended December 31:

	2020	2019	2018
Asset retirement obligation liabilities, beginning of year	$ 1,335.6	$ 1,292.0	$ 1,257.7
Non-cash additions	42.3	44.9	43.9
Acquisitions, net of divestitures and other adjustments	(10.9)	0.2	(0.7)
Asset retirement obligation adjustments	(44.9)	(5.2)	(17.7)
Payments	(58.6)	(78.2)	(71.9)
Accretion expense	82.9	81.9	80.7
Asset retirement obligation liabilities, end of year	1,346.4	1,335.6	1,292.0
Less: current portion	(57.5)	(75.8)	(76.7)
Long-term portion	$ 1,288.9	$ 1,259.8	$ 1,215.3

We review our landfill asset retirement obligations at least annually. As a result, we reduced amortization expense by $12.5 million, $10.9 million and $13.2 million for December 31, 2020, 2019 and 2018, respectively, primarily related to changes in estimates and assumptions concerning the anticipated waste flow, cost and timing of future final capping, closure and post-closure activities.
The expected future payments for final capping, closure and post-closure as of December 31, 2020 follows:

2021	$ 57.5
2022	61.1
2023	76.0
2024	75.6
2025	82.2
Thereafter	6,348.8
	$ 6,701.2

The estimated remaining final capping, closure and post-closure expenditures presented above are not inflated and not discounted and reflect the total estimated future payments for liabilities which include those incurred and recorded as of December 31, 2020 as well as liabilities yet to be incurred over the remaining life of our landfills.

Environmental Remediation Liabilities

We accrue for remediation costs when they become probable and can be reasonably estimated. There can sometimes be a range of reasonable estimates of the costs associated with remediation of a site. In these cases, we use the amount within the range that constitutes our best estimate. If no amount within the range appears to be a better estimate than any other, we use the amount that is at the low end of such range. It is reasonably possible that we will need to adjust the liabilities recorded for remediation to reflect the effects of new or additional information, to the extent such information impacts the costs, timing or duration of the required actions. If we used the reasonably possible high ends of our ranges, our aggregate potential remediation liability as of December 31, 2020 would be approximately $356 million higher than the amounts recorded. Future changes in our estimates of the cost, timing or duration of the required actions could have a material adverse effect on our consolidated financial position, results of operations and cash flows.

The following table summarizes the activity in our environmental remediation liabilities for the years ended December 31:

	2020	2019	2018
Environmental remediation liabilities, beginning of year	$ 500.2	$ 540.2	$ 564.0
Net additions charged to expense	5.1	(12.5)	5.0
Payments	(63.5)	(49.1)	(48.8)
Accretion expense (non-cash interest expense)	18.6	19.0	20.2
Acquisitions, net of divestitures and other adjustments	2.4	2.6	(0.2)
Environmental remediation liabilities, end of year	462.8	500.2	540.2
Less: current portion	(57.0)	(56.8)	(53.9)
Long-term portion	$ 405.8	$ 443.4	$ 486.3

The expected undiscounted future payments for remediation costs as of December 31, 2020 follows:

2021	$	57.0
2022		64.7
2023		67.8
2024		59.8
2025		41.0
Thereafter		352.4
	$	642.7

The following is a discussion of certain of our significant remediation matters:

Bridgeton Landfill. During the year ended December 31, 2020, we paid $25.6 million related to management and monitoring of the remediation area for our closed Bridgeton Landfill in Missouri. We continue to work with state and federal regulatory agencies on our remediation efforts. From time to time, this may require us to modify our future operating timeline and procedures, which could result in changes to our expected liability. As of December 31, 2020, the remediation liability recorded for this site is $118.9 million, of which approximately $18 million is expected to be paid during 2021. We believe the remaining reasonably possible high end of our range would be approximately $140 million higher than the amount recorded as of December 31, 2020.

During 2020 and 2019, we recognized insurance recoveries of $10.8 million and $24.0 million, respectively, related to our closed Bridgeton Landfill in Missouri. As such, we recorded a reduction of remediation expenses included in our cost of operations during the years ended December 31, 2020 and 2019.

West Lake Landfill Superfund Site. Our subsidiary Bridgeton Landfill, LLC is one of several currently designated Potentially Responsible Parties for the West Lake Landfill Superfund site (West Lake) in Missouri. On September 27, 2018, the U.S. Environmental Protection Agency (EPA) issued a Record of Decision Amendment for West Lake that includes a total undiscounted cost estimate of $229 million over a four to five-year design and construction timeline. On March 11, 2019, the EPA issued special notice letters under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) to Bridgeton Landfill, LLC and the other currently designated Potentially Responsible Parties to initiate negotiations to implement the remedy. At this time we are neither able to predict the final design of that remedy, nor estimate how much of the future response costs of the site our subsidiary may agree or be required to pay. During any subsequent administrative proceedings or litigation, our subsidiary will vigorously contest liability for the costs of remediating radiologically-impacted materials generated on behalf of the federal government during the Manhattan Project and delivered to the site by an Atomic Energy Commission licensee and its subcontractor. Currently, we believe we are adequately reserved for our expected remediation liability. However, subsequent events related to remedy design, divisibility, or allocation may require us to modify our expected remediation liability.

9. DEBT

The carrying value of our credit facilities, finance leases and long-term debt as of December 31, 2020 and 2019 is listed in the following table, and is adjusted for the fair value of interest rate swaps, unamortized discounts, deferred issuance costs and the unamortized portion of adjustments to fair value recorded in purchase accounting. Original issue discounts and adjustments to fair value recorded in purchase accounting are amortized to interest expense over the term of the applicable instrument using the effective interest method.

		December 31, 2020			December 31, 2019		
Maturity	Interest Rate	Principal	Adjustments	Carrying Value	Principal	Adjustments	Carrying Value
Credit facilities:							
Uncommitted Credit Facility	Variable	$ -	$ -	$ -	$ 11.6	$ -	$ 11.6
$1.0 billion - August 2021	Variable	-	-	-	-	-	-
$2.25 billion - June 2023	Variable	186.0	-	186.0	184.4	-	184.4
Senior notes:							
March 2020	5.000	-	-	-	850.0	(0.1)	849.9
November 2021	5.250	-	-	-	600.0	(0.8)	599.2
June 2022	3.550	-	-	-	850.0	(2.6)	847.4
May 2023	4.750	300.0	4.8	304.8	550.0	2.6	552.6
August 2024	2.500	900.0	(6.6)	893.4	900.0	(8.3)	891.7
March 2025	3.200	500.0	(3.0)	497.0	500.0	(3.6)	496.4
November 2025	0.875	350.0	(3.3)	346.7	-	-	-
July 2026	2.900	500.0	(3.3)	496.7	500.0	(3.9)	496.1
November 2027	3.375	650.0	(4.5)	645.5	650.0	(5.2)	644.8
May 2028	3.950	800.0	(14.2)	785.8	800.0	(15.7)	784.3
March 2030	2.300	600.0	(6.5)	593.5	-	-	-
February 2031	1.450	650.0	(8.6)	641.4	-	-	-
February 2032	1.750	750.0	(7.1)	742.9	-	-	-
March 2035	6.086	181.9	(13.4)	168.5	181.9	(13.9)	168.0
March 2040	6.200	399.9	(3.6)	396.3	399.9	(3.7)	396.2
May 2041	5.700	385.7	(5.1)	380.6	385.7	(5.3)	380.4
March 2050	3.050	400.0	(7.3)	392.7	-	-	-
Debentures:							
May 2021	9.250	35.3	(0.1)	35.2	35.3	(0.4)	34.9
September 2035	7.400	148.1	(32.1)	116.0	148.1	(33.0)	115.1
Tax-exempt:							
2021 - 2050	0.220 - 0.300	1,111.2	(6.5)	1,104.7	1,122.4	(6.2)	1,116.2
Finance leases:							
2021 - 2063	1.917 - 12.203	206.5	-	206.5	119.3	-	119.3
Total Debt		$ 9,054.6	$ (120.4)	8,934.2	$ 8,788.6	$ (100.1)	8,688.5
Less: current portion				(168.1)			(929.9)
Long-term portion				$ 8,766.1			$ 7,758.6

Loss on Extinguishment of Debt and Other Related Costs

During the year ended December 31, 2020, we incurred a loss on the early extinguishment of debt and other related costs. We paid cash premiums during the year totaling $99.1 million and incurred non-cash charges related to the proportional share of unamortized discounts and deferred issuance costs of $2.8 million. The unamortized proportional share of certain cash flow hedges reclassified to earnings as non-cash interest expense was $1.8 million and the proportional share of our fair value hedges that were dedesignated and immediately recognized in earnings as a reduction to non-cash interest expense was $4.7 million.

Future Maturities of Debt

Aggregate principal maturities of notes payable, finance leases and other long-term debt as of December 31, 2020 follow:

2021	$ 168.1
2022	6.4
2023	659.4
2024	924.9
2025	854.6
Thereafter	6,441.2
	$ 9,054.6

Credit Facilities

The 364-Day Credit Facility

In August 2020, we entered into a $1.0 billion 364-day unsecured revolving credit facility (the 364-Day Credit Facility), which matures in August 2021. At our option, borrowings under the 364-Day Credit Facility bear interest at a Base Rate, or a Eurodollar Rate, plus an applicable margin based on our Debt Ratings (all as defined in the 364-Day Credit Facility agreement).

The 364-Day Credit Facility is subject to facility fees based on applicable rates defined in the 364-Day Credit Facility agreement and the aggregate commitment, regardless of usage. Availability under our 364-Day Credit Facility totaled $1.0 billion as of December 31, 2020. The 364-Day Credit Facility can be used for working capital, capital expenditures, acquisitions, and other general corporate purposes. The 364-Day Credit Facility agreement requires us to comply with financial and other covenants, which are consistent with the financial and other covenants included in our Credit Facility. We may pay dividends and repurchase common stock if we are in compliance with these covenants.

As of December 31, 2020, we had no borrowings outstanding under our 364-Day Credit Facility.

The Credit Facility

In 2018, we entered into a $2.25 billion unsecured revolving credit facility (as amended, the Credit Facility), which matures in June 2023. As permitted by the Credit Facility, we have the right to request two one-year extensions of the maturity date but none of the lenders are committed to participate in such extension. The Credit Facility also includes a feature that allows us to increase availability, at our option, by an aggregate amount of up to $1.0 billion through increased commitments from existing lenders or the addition of new lenders. At our option, borrowings under the Credit Facility bear interest at a Base Rate, or a Eurodollar Rate, plus an applicable margin based on our Debt Ratings (all as defined in the Credit Facility agreement).

The Credit Facility is subject to facility fees based on applicable rates defined in the Credit Facility agreement and the aggregate commitment, regardless of usage. Availability under our Credit Facility totaled $1,671.8 million and $1,696.9 million as of December 31, 2020 and 2019, respectively. The Credit Facility can be used for working capital, capital expenditures, acquisitions, letters of credit and other general corporate purposes. The Credit Facility agreement requires us to comply with financial and other covenants. We may pay dividends and repurchase common stock if we are in compliance with these covenants.

As of December 31, 2020 and 2019, we had $186.0 million and $184.4 million of borrowings outstanding under our Credit Facility, respectively. We had $376.5 million and $351.4 million of letters of credit outstanding under our Credit Facility as of December 31, 2020 and 2019, respectively.

In July 2020, we executed an amendment to the Credit Facility agreement to increase flexibility and reduce restrictions, in particular, for future acquisitions. Effective June 30, 2020, the amendment eliminated the consolidated interest coverage ratio and revised the sole remaining financial covenant, total debt to EBITDA ratio.

Uncommitted Credit Facility

We also have an Uncommitted Credit Facility, which bears interest at a LIBOR Rate or a Cost of Funds rate (both as defined in the Uncommitted Credit Facility Agreement), plus an applicable margin. We can use borrowings under the Uncommitted Credit Facility for working capital and other general corporate purposes. The agreement governing our Uncommitted Credit Facility requires us to comply with certain covenants. The Uncommitted Credit Facility may be terminated by either party at any time. As of December 31, 2020, we had no borrowings outstanding under our Uncommitted Credit Facility. As of December 31, 2019, we had $11.6 million of borrowings outstanding under our Uncommitted Credit Facility.

Senior Notes and Debentures

In November 2020, we issued $350.0 million of 0.875% senior notes due 2025 (the 0.875% Notes) and $750.0 million of 1.750% senior notes due 2032 (the 1.750% Notes). We used the net proceeds from the 0.875% Notes and 1.750% Notes to redeem all $850.0 million of the outstanding 3.550% senior notes due June 2022 and $250.0 million of the $550.0 million outstanding 4.750% senior notes due May 2023.

In August 2020, we issued $650.0 million of 1.450% senior notes due 2031 (the 1.450% Notes). We used the net proceeds to redeem all $600.0 million of the outstanding 5.250% senior notes due November 2021 plus a make-whole premium of $34.0 million. The remaining proceeds were used for general corporate purposes.

In February 2020, we issued $600.0 million of 2.300% senior notes due 2030 (the 2.300% Notes) and $400.0 million of 3.050% senior notes due 2050 (the 3.050% Notes). We used the net proceeds from the 2.300% Notes and 3.050% Notes to repay $850.0 million of 5.000% senior notes that matured in March 2020. The remaining proceeds were used to repay amounts outstanding under our unsecured credit facilities as well as for general corporate purposes.

Our senior notes are general senior unsecured obligations. Interest is payable semi-annually.

Interest Rate Swap and Lock Agreements

Our ability to obtain financing through the capital markets is a key component of our financial strategy. Historically, we have managed risk associated with executing this strategy, particularly as it relates to fluctuations in interest rates, by using a combination of fixed and floating rate debt. From time to time, we also have entered into interest rate swap and lock agreements to manage risks associated with interest rates, either to effectively convert specific fixed rate debt to a floating rate (fair value hedges), or to lock interest rates in anticipation of future debt issuances (cash flow hedges).

Fair Value Hedges

During the second half of 2013, we entered into various interest rate swap agreements relative to our 4.750% fixed rate senior notes due in May 2023 (the 4.750% Notes). The goal was to reduce overall borrowing costs and rebalance our debt portfolio's ratio of fixed to floating interest rates. As of December 31, 2020, these swap agreements have a total notional value of $300.0 million and mature in May 2023. We pay interest at floating rates based on changes in LIBOR and receive interest at a fixed rate of 4.750%. In 2013, these transactions were designated as fair value hedges because the swaps hedge against the changes in fair value of the 4.750% Notes resulting from changes in interest rates.

Contemporaneously with our $250.0 million redemption of the 4.750% Notes, we dedesignated the proportional share of these swap agreements as fair value hedges and recognized $4.7 million in earnings immediately as a reduction to non-cash interest expense. There was no ineffectiveness recognized in the dedesignation of these fair value hedges. Following the dedesignation, the fair value of these free standing derivatives was determined using standard valuation models with assumptions about interest rates being based on those observed in underlying markets (Level 2 in the fair value hierarchy). As of December 31, 2020, these free standing derivatives are reflected at their fair value of $8.3 million and are included in other assets in our consolidated balance sheets. For the year ended December 31, 2020, we recognized a loss of $0.1 million directly in earnings as an adjustment to non-cash interest expense attributable to the change in fair value of the free standing derivatives.

As of December 31, 2020 and 2019, the interest rate swap agreements that were designated as fair value hedges are reflected at their fair value of $10.0 million and $10.7 million, respectively, and are included in other assets in our consolidated balance sheets. To the extent they are effective, the remaining hedged portion of these interest rate swap agreements is included as an adjustment to long-term debt in our consolidated balance sheets.

We recognized net interest income of $5.7 million, $1.0 million and $1.9 million, respectively, during 2020, 2019 and 2018 related to net swap settlements for these interest rate swap agreements, which is included as an offset to interest expense in our consolidated statements of income.

For the years ended December 31, 2020 and 2019, we recognized losses of $5.7 million and $7.5 million, respectively, and during the year ended December 31, 2018 we recognized a gain of $5.0 million on the change in fair value of the hedged senior notes attributable to changes in the benchmark interest rate. For the years ended December 31, 2020 and 2019, we recognized offsetting gains of $7.6 million and $8.1 million, respectively. For the year ended December 31, 2018, we recognized an offsetting loss of $5.4 million on the related interest rate swaps attributable to changes in the benchmark interest rate. The difference of these fair value changes for the year ended December 31, 2018 was recorded directly in earnings as other income, net. In accordance with our adoption of ASU 2017-12, the difference of these fair value changes for the years ended December 31, 2020 and 2019 was recorded directly in earnings as an adjustment to interest expense in our consolidated statements of income.

For further detail regarding the effect of our fair value hedging on interest expense, see Note 18, *Financial Instruments*, of the notes to our consolidated financial statements in Item 8 of this Form 10-K.

Cash Flow Hedges

We have historically entered into multiple swap agreements designated as cash flow hedges to manage exposure to fluctuations in interest rates in anticipation of planned future issuances of senior notes. Upon the expected issuance of senior notes, we terminate the interest rate locks and settle with our counterparties. These transactions were accounted for as cash flow hedges. All of our cash flow hedges settled before December 31, 2020, thus there was no related asset or liability as of December 31, 2020. As of December 31, 2019 our interest rate lock agreements had an aggregate notional value of $575.0 million with fixed interest rates ranging from 1.330% to 3.000%.

The fair value of our interest rate locks was determined using standard valuation models with assumptions about interest rates being based on those observed in underlying markets (Level 2 in the fair value hierarchy). The aggregate fair values of the outstanding interest rate locks as of December 31, 2019 were assets of $3.6 million, which were recorded in prepaid expenses and other current assets in our consolidated balance sheet and liabilities of $15.7 million, which were recorded in other accrued liabilities and other long-term liabilities in our consolidated balance sheet.

Total unrealized (loss) gain recognized in other comprehensive income for interest rate locks were $(22.5) million, $(30.2) million and $16.2 million, net of tax, for the years ended December 31, 2020, 2019, and 2018, respectively.

As of December 31, 2020 and 2019, our previously terminated interest rate locks were recorded as components of accumulated other comprehensive loss of $30.4 million and $4.7 million, respectively, net of tax. The effective portion of the interest rate locks is amortized as an adjustment to interest expense over the life of the issued debt using the effective interest method. Over the next 12 months, we expect to amortize approximately $4.6 million, net of tax, from accumulated other comprehensive loss to interest expense as a yield adjustment of our senior notes.

For further detail regarding the effect of our cash flow hedging on interest expense, see Note 18, *Financial Instruments*, of the notes to our consolidated financial statements in Item 8 of this Form 10-K.

Derivative Contracts

Contemporaneously with the issuance of our 2.300% Notes in February 2020, we amended interest rate lock agreements with a notional value of $550.0 million, extending the mandatory maturity date from 2020 to 2030 and dedesignated them as cash flow hedges (the 2020 Extended Interest Rate Locks). Contemporaneously with the issuance of our 2.500% Notes in August 2019 we amended interest rate lock agreements with a notional value of $375.0 million, extending the mandatory maturity date from 2019 to 2024 and dedesignated them as cash flow hedges (collectively with the 2020 Extended Interest Rate Locks referred to as the Extended Interest Rate Locks). There was no ineffectiveness recognized in the termination of these cash flow hedges. In addition, we entered into an offsetting interest rate swaps to offset future exposures to fair value fluctuations of the Extended Interest Rate Locks (the Offsetting Interest Rate Swaps). The fair value of these free standing derivatives was determined using standard valuation models with assumptions about interest rates being based on those observed in underlying markets (Level 2 in the fair value hierarchy).

As of December 31, 2020 and 2019, the fair values of the Extended Interest Rate Swaps were liabilities of $103.0 million and $22.2 million, respectively, which were included in other long-term liabilities in our consolidated balance sheet, and the fair values of the Offsetting Interest Rate Swaps were assets of $55.5 million and $2.9 million, respectively, which were included in other assets in our consolidated balance sheet. For the years ended December 31, 2020 and 2019, we recognized losses of $55.6 million and $3.4 million, respectively, on the change in fair value of the Extended Interest Rate Swaps, with offsetting gains of $52.9 million and $2.9 million, respectively, on the Offsetting Interest Rate Swaps. The changes in fair value were recorded directly in earnings as an adjustment to interest expense in our consolidated statements of income.

Tax-Exempt Financings

As of December 31, 2020, we had $1,104.7 million of certain variable rate tax-exempt financings outstanding with maturities ranging from 2021 to 2050. As of December 31, 2019, we had $1,116.2 million of certain variable rate tax-exempt financings outstanding with maturities ranging from 2020 to 2049. During the year ended December 31, 2020, we issued $60.0 million of new tax-exempt financings. During the year ended December 31, 2019, we refinanced $35.0 million and issued $30.0 million of tax-exempt financings.

All of our tax-exempt financings are remarketed either quarterly or semi-annually by remarketing agents to effectively maintain a variable yield. The holders of the bonds can put them back to the remarketing agents at the end of each interest period. If the remarketing agent is unable to remarket our bonds, the remarketing agent can put the bonds to us. In the event of a failed remarketing, we currently have availability under our $2.25 billion unsecured revolving credit facility to fund these bonds until they are remarketed successfully. Accordingly, we have classified these borrowings as long-term in our consolidated balance sheet as of December 31, 2020.

Finance Leases

We had finance lease liabilities of $206.5 million and $119.3 million as of December 31, 2020 and 2019, respectively, with maturities ranging from 2021 to 2063 and 2020 to 2049, respectively.

In September 2020, we entered into an agreement to extend the term of one of our landfill finance leases by 43 years, or through the end of the landfill's site life. Accordingly, we recognized an incremental finance lease obligation of $90.4 million.

Interest Paid

Interest paid, excluding net swap settlements for our fair value hedges, was $325.1 million, $346.8 million, and $351.0 million for the years ended December 31, 2020, 2019 and 2018, respectively.

10. LEASES

A summary of the lease classification on our consolidated balance sheet as of December 31, 2020 and 2019 follows:

		2020	2019
Assets			
Operating right-of-use lease assets	Other assets	$ 218.8	$ 243.6
Finance lease assets	Property and equipment, net	227.7	134.8
Total lease assets		$ 446.5	$ 378.4
Liabilities			
Current			
Operating	Other accrued liabilities	$ 33.5	$ 51.5
Finance	Notes payable and current maturities of long-term debt	5.8	8.9
Long-term			
Operating	Other long-term liabilities	206.6	212.5
Finance	Long-term debt, net of current maturities	200.7	110.4
Total lease liabilities		$ 446.6	$ 383.3

A summary of the lease cost reflected in our consolidated statements of income for the years ended December 31 follow:

		2020	2019
Operating lease cost			
Fixed lease cost	Cost of operations	$ 44.0	$ 41.6
Short-term lease cost	Cost of operations	23.4	37.0
Variable lease cost	Cost of operations	18.6	17.8
Finance lease cost			
Amortization of leased assets	Depreciation amortization, and depletion	7.6	5.5
Interest on lease liabilities	Interest expense	8.2	7.5
Variable lease cost	Interest expense	14.0	5.6
Total lease cost		$ 115.8	$ 115.0

During the years ended December 31, 2020 and 2019, we recognized changes in our operating right-of-use lease liabilities and assets, resulting from the recognition of non-cash lease expense of $34.1 million and $36.3 million, respectively.

As of December 31, 2020, maturities for operating and finance lease liabilities were as follows:

	Operating Leases	Finance Leases	Total
2021	$ 41.5	$ 15.2	$ 56.7
2022	37.9	14.8	52.7
2023	35.6	37.3	72.9
2024	30.9	10.8	41.7
2025	29.4	10.9	40.3
Thereafter	105.8	299.1	404.9
Total lease payments	281.1	388.1	669.2
Less: interest	(41.0)	(181.6)	(222.6)
Present value of lease liabilities	$ 240.1	$ 206.5	$ 446.6

A summary of the weighted-average remaining lease term and weighted-average discount rate as of December 31, 2020 and 2019 follows:

	2020	2019
Weighted-average remaining lease term (years)		
Operating leases	8.4	9.2
Finance leases	30.4	14.3
Weighted-average discount rate		
Operating leases	3.8%	3.9%
Finance leases	4.3%	6.7%

Supplemental cash flow and other non-cash information for the years ended December 31 follow:

	2020	2019
Cash paid for amounts included in the measurement of lease liabilities		
Operating cash flows from operating leases	$ 86.9	$ 97.3
Operating cash flows from finance leases	$ 22.2	$ 13.1
Financing cash flows from finance leases	$ 8.1	$ 6.3
Leased assets obtained in exchange for new finance lease liabilities	$ 108.0	$ 15.9
Leased assets obtained in exchange for new operating lease liabilities	$ 24.8	$ 47.6

11. INCOME TAXES

The components of the provision for income taxes for the years ended December 31 follow:

	2020	2019	2018
Current:			
Federal	$ 71.7	$ 46.1	$ 128.9
State	43.6	40.5	46.9
Deferred:			
Federal	65.4	151.8	121.5
State	12.6	18.9	30.6
State deferred benefit - change in valuation allowance	(17.2)	(4.6)	(4.5)
Uncertain tax positions and interest, and other	(3.0)	(30.7)	(40.1)
Provision for income taxes	$ 173.1	$ 222.0	$ 283.3

The reconciliations of the statutory federal income tax rate to our effective tax rate for the years ended December 31 follow:

	2020	2019	2018
Federal statutory rate	21.0%	21.0%	21.0%
State income taxes, net of federal benefit	4.5	4.2	4.5
Change in valuation allowance	(1.5)	(0.4)	(0.3)
Non-deductible expenses	1.7	1.7	1.9
Uncertain tax position taxes and interest	0.1	(0.3)	(0.5)
Investment tax credits	(8.8)	(6.5)	(3.8)
Change in U.S. Tax Law	-	-	-
Other, net	(1.8)	(2.6)	(1.3)
Effective income tax rate	15.2%	17.1%	21.5%

During 2020, we acquired non-controlling interests in limited liability companies established to own solar energy assets that qualified for investment tax credits under Section 48 of the Internal Revenue Code. We account for these investments using the equity method of accounting and recognize our share of income or loss and other reductions in the value of our investment in loss from unconsolidated equity method investments within our consolidated statements of income. For further discussion regarding our equity method accounting, see Note 3, *Business Acquisitions, Investments and Restructuring Charges*. Our 2020 tax provision reflects a benefit of approximately $100 million due to the tax credits related to these investments. In addition, our 2020 tax provision was reduced by $17.2 million for adjustments to our valuation allowance due to the realizability of certain state loss carryforwards. Lastly, our provision was further reduced by $8.2 million due to the realization of additional federal and state benefits as well as adjustments to deferred taxes due to the completion of our 2019 tax returns and $11.6 million due from excess tax benefits related to stock compensation.

Our 2019 tax provision was reduced by $12.3 million from excess tax benefits related to stock compensation, approximately $84 million related to the tax credits from our non-controlling interests in limited liability companies established to own solar energy assets, and approximately $13 million due to the realization of tax credits and lower state rates due to changes in estimates following the completion of our 2018 tax returns.

Our 2018 tax provision was reduced by $12.1 million from excess tax benefits related to stock compensation, approximately $50 million related to the tax credits from our non-controlling interests in limited liability companies established to own solar energy assets, and approximately $6 million due to the realization of tax credits and lower state rates due to changes in estimates following the completion of our 2017 tax returns.

We made income tax payments (net of refunds) of approximately $124 million, $31 million and $210 million for 2020, 2019, and 2018, respectively. Income taxes paid in 2020, 2019, and 2018 reflect benefits from 100% bonus depreciation on qualified assets as well as tax credits from our continuing investments in solar energy.

The components of the net deferred income tax asset and liability as of December 31 follow:

	2020	2019
Deferred tax liabilities relating to:		
Differences between book and tax basis of property and equipment	$ (1,010.7)	$ (938.7)
Difference between book and tax basis of intangible assets	(464.6)	(464.5)
Operating right-of-use lease assets	(60.9)	(67.2)
Basis difference due to redemption of partnership interests	(85.3)	(84.2)
Total liabilities	$ (1,621.5)	$ (1,554.6)
Deferred tax assets relating to:		
Environmental reserves	$ 224.6	$ 241.2
Accruals not currently deductible	84.5	78.0
Net operating loss carryforwards	111.8	127.2
Difference between book and tax basis of other assets	21.7	18.6
Operating right-of-use lease liabilities	61.1	67.4
Other	13.3	12.8
Total assets	517.0	545.2
Valuation allowance	(43.8)	(67.6)
Net deferred tax asset	473.2	477.6
Net deferred tax liabilities	$ (1,148.3)	$ (1,077.0)

Changes in the deferred tax valuation allowance for the years ended December 31 follow:

	2020	2019	2018
Valuation allowance, beginning of year	$ 67.6	$ 73.5	$ 72.4
Additions charged to provision for income taxes	2.2	0.1	0.9
Deferred tax assets realized or written-off	(28.3)	(6.0)	(5.9)
Current year acquisitions	-	-	6.1
Other, net	2.3	-	-
Valuation allowance, end of year	$ 43.8	$ 67.6	$ 73.5

We have deferred tax assets related to state net operating loss carryforwards. We provide a partial valuation allowance due to uncertainty surrounding the future utilization of these carryforwards in the taxing jurisdictions where the loss carryforwards exist. When determining the need for a valuation allowance, we consider all positive and negative evidence, including recent financial results, scheduled reversals of deferred tax liabilities, projected future taxable income and tax planning strategies. The weight given to the positive and negative evidence is commensurate with the extent such evidence can be objectively verified. We adjust the valuation allowance in the period management determines it is more likely than not that deferred tax assets will or will not be realized.

Substantially all of our valuation allowance is associated with state loss carryforwards. The realization of our deferred tax asset for state loss carryforwards ultimately depends upon the existence of sufficient taxable income in the appropriate state taxing jurisdictions in future periods. We continue to regularly monitor both positive and negative evidence in determining the ongoing need for a valuation allowance.

During the three months ended December 31, 2020, we determined that it is more likely than not that we will realize a portion of our deferred tax assets related to certain state loss carryforwards. Most of these loss carryforwards are attributable to a specific subsidiary for which we have historically provided a partial valuation allowance due to the uncertainty surrounding the future utilization of these carryforwards in the tax jurisdictions where the loss carryforwards exist. The realization of these deferred tax assets depends upon the existence of sufficient taxable income in future periods. As a result of recent changes in U.S. tax law, the current macroeconomic environment and our ongoing efforts to streamline and maximize the efficiency of our tax footprint, we completed our restructuring plan which optimized our tax structure to better align with our overall operational footprint. This resulted in a reduction to our valuation allowance of $17.2 million for the year and three months ended December 31, 2020.

We have deferred tax assets related to state net operating loss carryforwards with an estimated tax effect of approximately $99 million available as of December 31, 2020. These state net operating loss carryforwards expire at various times between 2021 and 2040. We believe that it is more likely than not that the benefit from some of our state net operating loss carryforwards will not be realized due to limitations on these loss carryforwards in certain states. In recognition of this risk, as of December 31, 2020, we have provided a valuation allowance of approximately $44 million.

We are subject to income tax in the United States, as well as income tax in multiple state jurisdictions. Our compliance with income tax rules and regulations is periodically audited by tax authorities. These authorities may challenge the positions taken in our tax filings. Thus, to provide for certain potential tax exposures, we maintain liabilities for uncertain tax positions for our estimate of the final outcome of the examinations. Our federal statute of limitations is closed for all years prior to 2015. We are currently under examination by the Internal Revenue Service (IRS) for tax years 2015 through 2017 and recently received an informal notification from the IRS of their intent to expand their examination to include our 2018 tax year.

In addition, we are currently under state examination or administrative review in various jurisdictions for tax years 2012 to 2019.
The following table summarizes the activity in our gross unrecognized tax benefits for the years ended December 31:

	2020	2019	2018
Balance at beginning of year	$ 100.7	$ 104.9	$ 39.3
Additions for tax positions of prior years	0.4	0.9	75.0
Reductions for tax positions of prior years	-	-	(2.3)
Reductions for tax positions resulting from lapse of statute of limitations	-	(0.2)	(5.1)
Settlements	-	(4.9)	(2.0)
Balance at end of year	$ 101.1	$ 100.7	$ 104.9

During 2019 and 2018, we resolved tax matters in various states which reduced our gross unrecognized tax benefits by $5.1 million and $9.5 million, respectively.

Included in our gross unrecognized tax benefits as of December 31, 2020, 2019, and 2018 are $93.3 million, $93.0 million and $96.3 million, respectively, of unrecognized tax benefits (net of the federal benefit on state matters) that, if recognized, would affect our effective income tax rate in future periods. However, we are unable to estimate the resolution of these matters over the next 12 months.

We recognize interest and penalties as incurred within the provision for income taxes in our consolidated statements of income. Related to the unrecognized tax benefits previously noted, we recorded interest expense of $0.8 million during 2020 and, in total as of December 31, 2020, have recognized a liability for penalties of $0.3 million and interest of $12.6 million.

During 2019, we recorded interest expense of approximately $4 million and, in total as of December 31, 2019, had recognized a liability for penalties of $0.3 million and interest of $11.6 million. During 2018, we accrued interest of approximately $2 million and, in total as of December 31, 2018, had recognized a liability for penalties of $0.5 million and interest of $11.7 million.

During 2018, we accrued additional uncertain tax liabilities of approximately $63 million resulting from the filing of our 2017 tax returns and prior year amended tax returns that reflected uncertain tax positions. These additional liabilities for uncertain tax positions had no impact on our effective tax rate.

We believe the recorded liabilities for uncertain tax positions are adequate. However, a significant assessment against us in excess of the liabilities recorded could have a material adverse effect on our consolidated financial position, results of operations and cash flows.

12. EMPLOYEE BENEFIT PLANS

Stock-Based Compensation

In February 2007, our Board of Directors approved the 2007 Stock Incentive Plan (the 2007 Plan), and in May 2007 our shareholders ratified the 2007 Plan. In March 2011, our Board of Directors approved the Amended and Restated 2007 Stock Incentive Plan (the Amended and Restated 2007 SIP), and in May 2011 our shareholders ratified the Amended and Restated 2007 SIP. In March 2013, our Board of Directors approved the Republic Services, Inc. Amended and Restated 2007 Stock Incentive Plan (the Republic Amended and Restated 2007 SIP), and in May 2013 our shareholders ratified the Republic Amended and Restated 2007 SIP (the 2007 Plan, the Amended and Restated 2007 SIP, and the Republic Amended and Restated 2007 SIP are collectively referred to in this Form 10-K as the Amended and Restated 2007 Stock Incentive Plan). We currently have 12.8 million shares of common stock reserved for future grants under the Amended and Restated 2007 Stock Incentive Plan; however, no further awards will be granted under the Amended and Restated 2007 Stock Incentive Plan after December 31, 2020.

In December 2008, our Board of Directors amended and restated the Republic Services, Inc. 2006 Incentive Stock Plan (formerly known as the Allied Waste Industries, Inc. 2006 Incentive Stock Plan) (the 2006 Plan). Allied's shareholders approved the 2006 Plan in May 2006. The 2006 Plan was amended and restated in December 2008 to reflect Republic as the new sponsor of the 2006 Plan, to reflect that any references to shares of common stock are to shares of common stock of Republic, and to adjust outstanding awards and the number of shares available under the 2006 Plan to reflect the Allied acquisition. The 2006 Plan, as amended and restated, provided for the grant of non-qualified stock options, incentive stock options, shares of restricted stock, shares of phantom stock, stock bonuses, restricted stock units, stock appreciation rights, performance awards, dividend equivalents, cash awards, or other stock-based awards. Awards granted under the 2006 Plan prior to December 5, 2008 became fully vested and non-forfeitable upon the closing of the Allied acquisition. No further awards will be made under the 2006 Plan.

In October 2020, our Board of Directors amended and restated the Republic Services, Inc. Executive Incentive Plan (the 2021 Plan) to remove references to the performance-based compensation exception that was previously permitted but is no longer applicable under Section 162(m) of the Code. The purposes of the Plan are to promote the success of the Company; to provide designated Executive Officers with an opportunity to receive incentive compensation dependent upon that success; and to attract, retain and motivate such individuals.

Restricted Stock Units

The following table summarizes restricted stock unit (RSU) activity for the years ended December 31, 2020, 2019 and 2018:

	Number of RSUs (in thousands)	Weighted-Average Grant Date Fair Value per Share	Weighted-Average Remaining Contractual Term (years)	Aggregate Intrinsic Value (in millions)
Unissued as of December 31, 2017	1,775.9	$ 45.48		
Granted	467.4	$ 64.32		
Vested and issued	(565.0)	$ 41.50		
Forfeited	(85.7)	$ 54.84		
Unissued as of December 31, 2018	1,592.6	$ 51.88		
Granted	392.8	$ 75.11		
Vested and issued	(409.8)	$ 50.40		
Forfeited	(76.1)	$ 65.37		
Unissued as of December 31, 2019	1,499.5	$ 57.63		
Granted	314.9	$ 95.75		
Vested and issued	(538.2)	$ 50.63		
Forfeited	(64.1)	$ 79.77		
Unissued as of December 31, 2020	1,212.1	$ 69.47	0.8	$ 116.7
Vested and unissued as of December 31, 2020	372.8	$ 51.84		

During the years ended December 31, 2020, 2019 and 2018, we awarded our non-employee directors 29,331, 35,376 and 36,855 RSUs, respectively, which vested upon issuance.

During the years ended December 31, 2020, 2019 and 2018, we awarded 258,661, 328,142 and 395,495 RSUs, respectively, to executives and employees that vest in four equal annual installments beginning on the anniversary date of the original grant or cliff vest after four years.

During the years ended December 31, 2020, 2019 and 2018, we granted an additional 26,907, 29,273 and 35,071 RSUs, respectively, as dividend equivalents.

The RSUs do not carry any voting or dividend rights, except the right to receive additional RSUs in lieu of dividends.

Compensation Expense

The fair value of RSUs is based on the closing market price on the date of the grant. The compensation expense related to RSUs is amortized ratably over the vesting period, or to the employee's retirement eligible date, if earlier.

During December 31, 2020, 2019 and 2018, compensation expense related to RSUs totaled $26.2 million, $24.8 million and $24.4 million, respectively. As of December 31, 2020, total unrecognized compensation expense related to outstanding RSUs was $36.3 million, which will be recognized over a weighted average period of 2.4 years.

Performance Shares

The following table summarizes performance stock unit (PSU) activity for the years ended December 31, 2020, 2019 and 2018:

	Number of PSUs (in thousands)	Weighted Average Grant Date Fair Value per Share
Unissued as of December 31, 2017	798.7	$ 50.52
Granted	374.9	$ 62.26
Vested and issued	(150.7)	$ 39.05
Forfeited	(23.2)	$ 59.76
Unissued as of December 31, 2018	999.7	$ 55.77
Granted	356.1	$ 71.22
Vested and issued	(407.3)	$ 47.11
Forfeited	(29.3)	$ 67.77
Unissued as of December 31, 2019	919.2	$ 65.92
Granted	247.0	$ 98.01
Vested and issued	(285.0)	$ 61.22
Forfeited	(27.6)	$ 88.29
Unissued as of December 31, 2020	853.6	$ 76.14

During the years ended December 31, 2020, 2019 and 2018, we awarded 127,278, 166,179 and 168,627 performance shares (PSUs) to our executive officers, respectively. These awards are performance-based as the number of shares ultimately earned depends on performance against pre-determined targets for return on invested capital (ROIC), cash flow value creation (CFVC), and total shareholder return relative to the S&P 500 index (RTSR). The PSUs are payable 50% in shares of common stock and 50% in cash after the end of a three-year performance period, when our financial performance for the entire performance period is reported, typically in February of the succeeding year. At the end of the performance period, the number of PSUs awarded can range from 0% to 150% of the targeted amount, depending on the performance against the pre-determined targets.

During the years ended December 31, 2020, 2019 and 2018, we awarded 102,994, 172,341, and 187,036 PSUs to our employees other than our executive officers, respectively. The PSUs are payable 100% in shares of common stock after the end of a three-year performance period, when our financial performance for the entire performance period is reported, typically in February of the succeeding year. At the end of the performance period, the number of PSUs awarded can range from 0% to 150% of the targeted amount, depending on the performance against the pre-determined targets.

During the years ended December 31, 2020, 2019 and 2018, we granted an additional 16,760, 17,612, and 19,204 PSUs, respectively, as dividend equivalents.

The PSUs do not carry any voting or dividend rights, except the right to accumulate additional PSUs in lieu of dividends.

Compensation Expense

For the stock-settled portion of the award that vests based on future ROIC and CFVC performance, compensation expense is measured using the fair value of our common stock at the grant date. For the cash-settled portion of the award that vests based on future ROIC and CFVC performance, compensation expense is recorded based on the fair value of our common stock at the end of each reporting period. Compensation expense is recognized ratably over the performance period based on our estimated achievement of the established performance criteria. Compensation expense is only recognized for the portion of the award that we expect to vest, which we estimate based on an assessment of the probability that the performance criteria will be achieved.

For the stock-settled portion of the award that vests based on RTSR, the grant date fair value is based on a Monte Carlo valuation and compensation expense is recognized on a straight-line basis over the vesting period. For the cash-settled portion of the award that vests based on RTSR, compensation expense also incorporates the fair value of our PSUs at the end of each reporting period. Compensation expense is recognized for the RTSR portion of the award whether or not the market conditions are achieved.

During December 31, 2020, 2019 and 2018, compensation expense related to PSUs totaled $17.2 million, $22.5 million, and $20.3 million, respectively. As of December 31, 2020, total unrecognized compensation expense related to outstanding PSUs was $16.9 million, which will be recognized over a weighted average period of 0.9 years.

Defined Benefit Pension Plan

We currently have one qualified defined benefit pension plan, the BFI Retirement Plan (the Plan). The Plan covers certain employees in the United States, including some employees subject to collective bargaining agreements.

The Plan benefits are frozen. Interest credits continue to be earned by participants in the Plan, and participants whose collective bargaining agreements provide for additional benefit accruals under the Plan continue to receive those credits in accordance with the terms of their bargaining agreements. The Plan was converted from a traditional defined benefit plan to a cash balance plan in 1993.

Prior to the conversion to the cash balance design, benefits payable as a single life annuity under the Plan were based on the participant's highest five years of earnings out of the last ten years of service. Upon conversion to the cash balance plan, the existing accrued benefits were converted to a lump-sum value using the actuarial assumptions in effect at the time. Participants' cash balance accounts are increased until retirement by certain benefit and interest credits under the terms of their bargaining agreements. Participants may elect early retirement with the attainment of age 55 and completion of ten years of credited service at reduced benefits. Participants with 35 years of service may retire at age 62 without any reduction in benefits.

Our pension contributions are made in accordance with funding standards established by the Employee Retirement Income Security Act of 1974 and the Internal Revenue Code, as amended by the Pension Protection Act enacted in 2006 (the PPA). No contributions were made in 2020 or 2019.

We must separately recognize the overfunded or underfunded status of the Plan as an asset or liability. The funded status represents the difference between the projected benefit obligation (PBO) and the fair value of the Plan assets. The PBO is equal to the accumulated benefit obligation (ABO) as the Plan is frozen, and the present value of liabilities is not affected by future salary increases. We use a measurement date that coincides with our year end of December 31.

The following table presents the ABO and reconciliations of the changes in the PBO, the Plan assets and the accounting funded status of our defined benefit pension plan for the years ended December 31:

	Defined Benefit Pension Plan	
	2020	2019
Accumulated benefit obligation	$ 219.2	$ 218.0
Change in projected benefit obligation:		
Projected benefit obligation at beginning of year	$ 218.0	$ 220.7
Interest cost	6.4	8.9
Actuarial (gain) loss	11.3	19.0
Benefits paid	(16.5)	(30.6)
Projected benefit obligation at end of year	$ 219.2	$ 218.0
Change in plan assets:		
Fair value of plan assets at beginning of year	$ 226.6	$ 230.1
Actual return on plan assets	24.5	29.0
Estimated expenses	(2.1)	(1.9)
Benefits paid	(16.5)	(30.6)
Fair value of plan assets at end of year	$ 232.5	$ 226.6
Over funded status	$ 13.3	$ 8.6
Amounts recognized in the statement of financial position consist of:		
Noncurrent assets	$ 13.3	$ 8.6
Net amount recognized	$ 13.3	$ 8.6
Weighted average assumptions used to determine benefit obligations:		
Discount rate	2.24%	3.06%
Rate of compensation increase	N/A	N/A

The amounts included in accumulated other comprehensive income on the consolidated balance sheets that have not yet been recognized as components of net periodic benefit cost as of December 31, 2020 and 2019 were $23.7 million and $20.8 million, respectively.

The components of the net periodic benefit cost for the years ended December 31 are summarized below:

	2020	2019	2018
Components of net periodic benefit cost:			
Interest cost	$ 6.4	$ 8.9	$ 8.2
Expected return on plan assets	(8.0)	(9.7)	(11.3)
Recognized net actuarial (gain)	(0.1)	(0.1)	(1.1)
Amortization of prior service cost	0.1	0.1	0.1
Net periodic benefit (income)	$ (1.6)	$ (0.8)	$ (4.1)
Weighted average assumptions used to determine net periodic benefit cost:			
Discount rate	2.24%	4.21%	3.55%
Expected return on plan assets	3.45%	5.20%	5.35%
Rate of compensation increase	N/A	N/A	N/A

We determine the discount rate used in the measurement of our obligations based on a model that matches the timing and amount of expected benefit payments to maturities of high quality bonds priced as of the Plan measurement date. When that timing does not correspond to a published high-quality bond rate, our model uses an expected yield curve to determine an appropriate current discount rate. The yields on the bonds are used to derive a discount rate for the liability. The term of our obligation, based on the expected retirement dates of our workforce, is approximately seven years.

In developing our expected rate of return assumption, we have evaluated the actual historical performance and long-term return projections of the Plan assets, which give consideration to the asset mix and the anticipated timing of the Plan outflows. We employ a total return investment approach whereby a mix of equity and fixed income investments are used to maximize the long-term return of Plan assets for what we consider a prudent level of risk. The intent of this strategy is to minimize Plan expenses by outperforming Plan liabilities over the long run. Risk tolerance is established through careful consideration of Plan liabilities, Plan funded status and our financial condition. The investment portfolio contains a diversified blend of equity and fixed income investments. Furthermore, equity investments are diversified across U.S. and non-U.S. stocks as well as growth, value, and small and large capitalizations. Derivatives may be used to gain market exposure in an efficient and timely manner; however, derivatives may not be used to leverage the portfolio beyond the market value of the underlying investments. Investment risk is measured and monitored on an ongoing basis through annual liability measurements, periodic asset and liability studies, and quarterly investment portfolio reviews.

The following table summarizes our target asset allocation as of December 31, 2020 and the actual asset allocation as of December 31, 2020 and 2019 for our Plan:

	December 31, 2020 Target Asset Allocation	December 31, 2020 Actual Asset Allocation	December 31, 2019 Actual Asset Allocation
Debt securities	82%	81%	83%
Equity securities	18	19	17
Total	100%	100%	100%

Asset allocations are reviewed and rebalanced periodically based on funded status. For 2021, the investment strategy for Plan assets is to maintain a broadly diversified portfolio designed to achieve our target of an average long-term rate of return of 3.45%. While we believe we can achieve a long-term average return of 3.45%, we cannot be certain that the portfolio will perform to our expectations. Assets are strategically allocated among debt and equity portfolios to achieve a diversification level that reduces fluctuations in investment returns. Asset allocation target ranges and strategies are reviewed periodically with the assistance of an independent external consulting firm.

The Plan assets are measured at fair value. The following table summarizes, by level, within the fair value hierarchy, the investments of the Plan at fair value as of December 31, 2020 and 2019:

		Fair Value Measurements Using		
	Total as of December 31, 2020	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Money market accounts	$ 4.8	$ 4.8	$ -	$ -
Mutual funds	227.7	-	227.7	-
Total assets	$ 232.5	$ 4.8	$ 227.7	$ -

		Fair Value Measurements Using		
	Total as of December 31, 2019	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Money market accounts	$ 11.3	$ 11.3	$ -	$ -
Mutual funds	215.3	-	215.3	-
Total assets	$ 226.6	$ 11.3	$ 215.3	$ -

Estimated future benefit payments for the next ten years under the Plan follow:

2021	$ 19.9
2022	$ 19.5
2023	$ 17.9
2024	$ 17.2
2025	$ 16.5
2026 through 2030	$ 66.8

Collective Bargaining Agreements

As of December 31, 2020, approximately 24% of our workforce was covered by collective bargaining agreements (CBAs), and approximately 7% of our workforce was covered by CBAs that will expire during 2021.

Multiemployer Pension Plans

We participate in multiemployer pension plans that generally provide retirement benefits to participants of contributing employers. We do not administer these plans. In general, these plans are managed by a board of trustees with the unions appointing certain trustees and other contributing employers of the plan appointing certain members. We generally are not represented on the board of trustees.

Based on the information available to us, we believe that some of the multiemployer plans to which we contribute are either critical or endangered as those terms are defined in the Pension Protection Act (PPA). The PPA requires underfunded pension plans to improve their funding ratios within prescribed intervals based on the level of their underfunding. Until the plan trustees develop the funding improvement plans or rehabilitation plans as required by the PPA, we cannot determine the amount of any additional contribution or other financial obligations that we may be subject to, if any. Accordingly, we cannot presently determine the effect that the PPA may have on our consolidated financial position, results of operations or cash flows.

Furthermore, under current law regarding multiemployer benefit plans, a plan's termination, our voluntary withdrawal (which we consider from time to time), or the mass withdrawal from any under-funded multiemployer pension plan would require us to make payments to the plan for our proportionate share of the multiemployer plan's unfunded vested liabilities. During the course of operating our business, we may incur withdrawal events regarding certain of the multiemployer pension plans in which we participate. We accrue for such events when losses become probable and reasonably estimable.

In June 2020, we entered into an agreement with a certain multiemployer pension fund through which we transitioned from one plan into another plan managed by the same fund, thus creating a withdrawal event from the original plan. As a result of the withdrawal event, we recognized $31.6 million of withdrawal costs, which we paid in July 2020.

Republic's participation in individually significant multiemployer pension plans for the year ended December 31, 2020 is outlined in the table below. Only with respect to multiemployer pension plans, we considered contributions in excess of $2.0 million in any period disclosed to be individually significant. The most recent PPA zone status available in 2020 and 2019 is for the plans' year ended September 30, or December 31, 2019 and 2018, respectively. The status is based on information that Republic received from the plans and is certified by the plans' actuary. Among other factors, plans in the critical red zone are generally less than 65% funded, plans in the endangered yellow zone are less than 80% funded, and plans in the safe green zone are at least 80% funded. Plans in the critical and declining zone are classified as critical and projected to be insolvent in the current year or any of the 14 following plan years. The last column lists the expiration dates of the CBAs to which the plans are subject.

		Pension Protection Act Zone Status		Funding Improvement or Rehabilitation Plan Status Pending /	Republic Contributions to Plan				Expiration Dates
Legal Plan Name	EIN	2019	2018	Implemented	2020	2019	2018	Surcharge Imposed	of CBAs
Western Conference of Teamsters Pension Plan	91-6145047	Safe	Safe	No	$ 49.4	$ 45.1	$ 44.3	No	Various dates through 9/30/25
Local No. 731 I.B. of T. Pension Fund	36-6513567	Safe	Safe	No	8.8	9.3	9.7	No	Various dates through 1/31/24
New England Teamsters & Trucking Industry Pension	04-6372430	Critical and Declining	Critical and Declining	Implemented	2.8	3.5	3.2	No	06/30/25
Midwest Operating Engineers Pension Fund	36-6140097	Safe	Endangered	Implemented	2.6	2.4	2.1	No	Various dates through 11/30/23
Individually significant plans					63.6	60.3	59.3		
All other plans	N/A	N/A	N/A	N/A	9.6	11.8	10.1	N/A	
Total					$ 73.2	$ 72.1	$ 69.4		

We are listed in the Form 5500 for Local No. 731, I.B. of T. Pension Fund as providing more than 5% of the total contributions. At the date these financial statements were issued, Forms 5500 were not available for the plan years ended in 2020.

The COVID-19 pandemic has created significant volatility and disruption of financial markets, which has negatively impacted companies across the globe. We will continue to monitor the Pension Protection Act zone status of the multiemployer pension plans in which we participate, noting that the current economic environment may impact certain contributing employers' ability to fulfill their obligations under the plans. We believe the largest risk is attributable to plans in the critical red zone. In the event other contributing employers default on their obligations under the plans, we could be required to adjust our estimates for these matters, which could have a material and adverse effect on our consolidated financial position, results of operations and cash flows.

Defined Contribution Plan

We maintain the Republic Services 401(k) Plan (the 401(k) Plan), which is a defined contribution plan covering all eligible employees. Under the 401(k) Plan, participants may direct us to defer a portion of their compensation to the 401(k) Plan, subject to Internal Revenue Code limitations. We provide for an employer matching contribution equal to 100% of the first 3% of eligible compensation and 50% of the next 2% of eligible compensation contributed by each employee, which is funded in cash. All contributions vest immediately.

Total expense recorded for matching 401(k) contributions in 2020, 2019 and 2018 was $59.3 million, $55.7 million and $51.7 million, respectively.

Deferred Compensation Plan

We provide eligible Republic employees, officers and directors with the opportunity to voluntarily defer base salary, bonus payments, long-term incentive awards and other compensation, as applicable, on a pre-tax basis through the Republic Services, Inc. Deferred Compensation Plan (the DCP). The DCP is a nonqualified deferred compensation plan that conforms to Section 409A of the Internal Revenue Code. Eligible participants can defer up to 80% of base salary and up to 100% of bonus, long-term compensation and directors' fees. Under the DCP, some participants also are eligible for matching contributions. The matching contribution under the DCP is equal to the lesser of 2% of the participant's compensation over established 401(k) limits or 50% of the amount the participant has deferred. The DCP participants have no ownership or security interest in any of the amounts deferred or the measurement funds under the DCP. The right of each participant in the DCP is solely that of a general, unsecured creditor of Republic with respect to his or her own interest under the DCP. Deferred amounts may be subject to forfeiture and are deemed invested among investment funds offered under the DCP, as directed by each participant. Payments of deferred amounts are payable following separation from service or at a date or dates elected by the participant when the deferral is elected. Payments of deferred amounts are made in either a lump sum or in annual installments over a period not exceeding 15 years.

Republic invested in corporate-owned life insurance policies to satisfy future obligations under the DCP. These corporate-owned life insurance policies are held in a Rabbi Trust and are recorded at the amount that can be realized under insurance contracts at the balance sheet date, which is the cash surrender value adjusted for other charges or other amounts due that are probable at settlement. The aggregate cash surrender value of these life insurance policies was $131.8 million and $118.0 million as of December 31, 2020 and 2019, respectively, and is classified in other assets in our consolidated balance sheets. The DCP liability was $126.6 million and $116.1 million as of December 31, 2020 and 2019, respectively, and is classified in other long-term liabilities in our consolidated balance sheets.

Employee Stock Purchase Plan

Republic employees are eligible to participate in an employee stock purchase plan. The plan allows participants to purchase our common stock for 95% of its quoted market price on the last day of each calendar quarter. For the years ended December 31, 2020, 2019 and 2018, issuances under this plan totaled 116,865 shares, 107,522 shares and 117,153 shares, respectively. As of December 31, 2020, shares reserved for issuance to employees under this plan totaled 2.7 million and Republic held employee contributions of $2.4 million for the purchase of common stock.

13. SHARE REPURCHASES AND DIVIDENDS

Share Repurchases

Share repurchase activity during the years ended December 31, 2020 and 2019 follows (in millions except per share amounts):

	2020	2019
Number of shares repurchased	1.2	4.9
Amount paid	$ 98.8	$ 399.4
Weighted average cost per share	$ 85.06	$ 82.13

As of December 31, 2020 and 2019, there were no repurchased shares pending settlement.

In October 2017, our Board of Directors added $2.0 billion to the existing share repurchase authorization, which continued through December 31, 2020. In October 2020, our Board of Directors approved a $2.0 billion share repurchase authorization effective starting January 1, 2021 and extending through December 31, 2023. Share repurchases under the current program may be made through open market purchases or privately negotiated transactions in accordance with applicable federal securities laws. While the Board of Directors has approved the program, the timing of any purchases, the prices and the number of shares of common stock to be purchased will be determined by our management, at its discretion, and will depend upon market conditions and other factors. The share repurchase program may be extended, suspended or discontinued at any time. As of December 31, 2020, the remaining authorized purchase capacity under our October 2020 repurchase program was $2.0 billion. On a quarterly basis, our Board of Directors reviews the intrinsic value of our stock and the parameters around which we repurchase our shares.

In December 2020, our board of directors changed the status of 35,789,806 treasury shares to authorized and unissued. In doing so, the number of our issued shares was reduced by the stated amount. Our accounting policy is to deduct the par value from common stock and to reflect the excess of cost over par value as a deduction from additional paid-in capital. The reduction in issued shares resulted in a change of $2,316.0 million in treasury stock which was reclassified as $0.3 million in common stock, and $2,315.7 million in additional paid-in capital. There was no effect on our total stockholders' equity position as a result of the change.

Dividends

In October 2020, our Board of Directors approved a quarterly dividend of $0.425 per share. Aggregate cash dividends declared were $528.8 million, $499.4 million and $468.4 million for the years ended December 31, 2020, 2019 and 2018, respectively. As of December 31, 2020, we recorded a quarterly dividend payable of $135.5 million to shareholders of record at the close of business on January 4, 2021.

14. EARNINGS PER SHARE

Basic earnings per share is computed by dividing net income attributable to Republic Services, Inc. by the weighted average number of common shares (including vested but unissued RSUs and PSUs) outstanding during the period. Diluted earnings per share is based on the combined weighted average number of common shares and common share equivalents outstanding, which include, where appropriate, the assumed exercise of employee stock options, unvested RSUs and unvested PSUs at the expected attainment levels. We use the treasury stock method in computing diluted earnings per share.

Earnings per share for the years ended December 31, 2020, 2019, and 2018 are calculated as follows (in thousands, except per share amounts):

	2020	2019	2018
Basic earnings per share:			
Net income attributable to Republic Services, Inc.	$ 967,237	$ 1,073,286	$ 1,036,898
Weighted average common shares outstanding	319,282	321,058	326,897
Basic earnings per share	$ 3.03	$ 3.34	$ 3.17
Diluted earnings per share:			
Net income attributable to Republic Services, Inc.	$ 967,237	$ 1,073,286	$ 1,036,898
Weighted average common shares outstanding	319,282	321,058	326,897
Effect of dilutive securities:			
Options to purchase common stock	52	247	745
Unvested RSU awards	175	254	250
Unvested PSU awards	327	431	491
Weighted average common and common equivalent shares outstanding	319,836	321,990	328,383
Diluted earnings per share	$ 3.02	$ 3.33	$ 3.16

During the year ended December 31, 2020, there were less than 0.1 million antidilutive securities outstanding. During the years ended December 31, 2019 and 2018, there were no antidilutive securities outstanding, respectively.

15. SEGMENT REPORTING

In December 2020, our senior management began evaluating, overseeing and managing the financial performance of our operations through three operating segments. Group 1 primarily consists of geographic areas located in the western United States, and Group 2 primarily consists of geographic areas located in the southeastern and mid-western United States, and the eastern seaboard of the United States. Our environmental solutions operating segment, which provides environmental solutions for daily operations of industrial, petrochemical and refining facilities, is aggregated with Corporate entities and other as it only represents approximately 1% of our consolidated revenue. Each of our operating segments provides integrated environmental services, including collection, transfer, recycling, and disposal.

Summarized financial information concerning our reportable segments for the years ended December 31, 2020, 2019 and 2018 follows:

	Gross Revenue	Intercompany Revenue	Net Revenue	Depreciation, Amortization, Depletion and Accretion	Operating Income (Loss)	Capital Expenditures	Total Assets
2020:							
Group 1	$ 6,059.3	$ (1,001.8)	$ 5,057.5	$ 502.1	$ 1,343.3	$ 546.6	$ 11,760.3
Group 2	5,626.4	(834.5)	4,791.9	488.9	966.4	465.8	9,255.9
Corporate entities and other	346.0	(41.8)	304.2	167.8	(600.6)	182.2	2,417.8
Total	$ 12,031.7	$ (1,878.1)	$ 10,153.6	$ 1,158.8	$ 1,709.1	$ 1,194.6	$ 23,434.0
2019:							
Group 1	$ 6,012.5	$ (1,010.6)	$ 5,001.9	$ 493.7	$ 1,231.7	$ 551.3	$ 11,389.1
Group 2	5,782.6	(838.2)	4,944.4	475.1	926.5	490.9	8,947.7
Corporate entities and other	397.9	(44.8)	353.1	153.6	(371.0)	164.9	2,347.0
Total	$ 12,193.0	$ (1,893.6)	$ 10,299.4	$ 1,122.4	$ 1,787.2	$ 1,207.1	$ 22,683.8
2018:							
Group 1	$ 5,794.1	$ (982.6)	$ 4,811.5	$ 484.1	$ 1,157.5	$ 515.8	$ 10,994.9
Group 2	5,704.6	(825.9)	4,878.7	469.3	900.0	421.3	8,674.0
Corporate entities and other	399.7	(49.0)	350.7	160.7	(321.7)	134.7	1,948.1
Total	$ 11,898.4	$ (1,857.5)	$ 10,040.9	$ 1,114.1	$ 1,735.8	$ 1,071.8	$ 21,617.0

Financial information for the years ended December 31, 2019 and 2018 reflects the transfer of our environmental solutions operating segment from Group 2 to Corporate entities and other.

Intercompany revenue reflects transactions within and between segments that generally are made on a basis intended to reflect the market value of such services. Capital expenditures for Corporate entities and other primarily include vehicle inventory acquired but not yet assigned to operating locations and facilities. Corporate functions include legal, tax, treasury, information technology, risk management, human resources, closed landfills, environmental solutions, and other administrative functions.

16. REVENUE

Our operations primarily consist of providing environmental services. The following table disaggregates our revenue by service line for the years ended December 31 (in millions of dollars and as a percentage of revenue):

	2020		2019		2018	
Collection:						
Residential	$ 2,309.0	22.7%	$ 2,271.9	22.1%	$ 2,236.5	22.3%
Small-container	3,106.8	30.6	3,170.0	30.8	3,059.1	30.5
Large-container	2,148.9	21.2	2,249.6	21.8	2,184.7	21.8
Other	51.5	0.5	46.1	0.4	43.8	0.4
Total collection	7,616.2	75.0	7,737.6	75.1	7,524.1	75.0
Transfer	1,349.4		1,318.7		1,244.9	
Less: intercompany	(745.9)		(748.1)		(713.8)	
Transfer, net	603.5	5.9	570.6	5.5	531.1	5.3
Landfill	2,298.1		2,324.2		2,291.7	
Less: intercompany	(1,018.5)		(1,024.1)		(1,020.8)	
Landfill, net	1,279.6	12.6	1,300.1	12.6	1,270.9	12.6
Environmental solutions	127.7	1.3	191.7	1.9	194.7	1.9
Other:						
Recycling processing and commodity sales	297.1	2.9	273.3	2.7	297.8	3.0
Other non-core	229.5	2.3	226.1	2.2	222.3	2.2
Total other	526.6	5.2	499.4	4.9	520.1	5.2
Total revenue	$ 10,153.6	100.0%	$ 10,299.4	100.0%	$ 10,040.9	100.0%

Other non-core revenue consists primarily of revenue from National Accounts, which represents the portion of revenue generated from nationwide or regional contracts in markets outside our operating areas where the associated material handling is subcontracted to local operators. Consequently, substantially all of this revenue is offset with related subcontract costs, which are recorded in cost of operations.

The factors that impact the timing and amount of revenue recognized for each service line may vary based on the nature of the service performed. Generally, we recognize revenue at the time we perform a service. In the event that we bill for services in advance of performance, we recognize deferred revenue for the amount billed and subsequently recognize revenue at the time the service is provided. Depending upon the nature of the contract, we may also generate revenue through the collection of fuel recovery fees and environmental fees which are designed to recover our internal costs of providing services to our customers.
See Note 15, *Segment Reporting*, for additional information regarding revenue by reportable segment.

Revenue by Service Line

Collection Services

Our collection business involves the collection of material for transport to transfer stations, or directly to landfills or recycling processing centers. Our collection services business includes both recurring and temporary customer relationships. Our standard contract duration is three years, although some of our exclusive franchises are for significantly longer periods. The fees received for collection services are based primarily on the market, collection frequency, type of service, type and volume or weight of the material collected, the distance to the disposal facility and the cost of disposal.

In general, small-container and residential collection fees are billed monthly or quarterly in advance. Substantially all of the deferred revenue recognized as of December 31, 2019 was recognized as revenue during the year ended December 31, 2020 when the service was performed. Our large-container customers are typically billed on a monthly basis based on the nature of the services provided during the period.

Revenue recognized under these agreements is variable in nature based on the number of residential homes or businesses serviced during the period, the frequency of collection and the volume of material collected. In addition, certain of our contracts have annual price escalation clauses that are tied to changes in an underlying base index such as a consumer price index which are unknown at contract inception.

Transfer Services

Revenue at our transfer stations is primarily generated by charging tipping or disposal fees. The fees received for transfer services are based primarily on the market, type and volume or weight of the material accepted, the distance to the disposal facility and the cost of disposal. In general, fees are billed and revenue is recognized at the time the service is performed. Revenue recognized under these agreements is variable in nature based on the volume and nature of the material accepted at the transfer station.

Landfill Services

Revenue at our landfills is primarily generated by charging tipping fees to third parties based on the volume disposed and the nature of the waste. In general, fees are variable in nature and revenue is recognized at the time the waste is disposed at the facility.

Environmental Solutions

Environmental solutions waste is generated from the by-products of oil and natural gas exploration and production activity. Additionally, it is generated by the daily operations of industrial, petrochemical and refining facilities, including maintenance, plant turnarounds and capital projects. Environmental solutions revenue is primarily generated through the disposal of non-hazardous solid and liquid material and in-plant services, such as transportation and logistics. Activity for this service line varies across market areas that are tied to the natural resource basins in which the drilling activity occurs and reflects the regulatory environment, pricing and disposal alternatives available in any given market. Revenue recognized under these agreements is variable in nature and primarily based on the volume of waste accepted or processed during the period.

Recycling Processing and Commodity Sales

Our recycling processing centers generate revenue through the processing and sale of old corrugated cardboard (OCC), old newsprint (ONP), aluminum, glass and other materials at market prices. In certain instances, we issue recycling rebates to our municipal or large-container customers, which can be based on the price we receive upon the final sale of recycled commodities, a fixed contractual rate or other measures. We also receive rebates when we dispose of recycled commodities at third-party facilities. The fees received are based primarily on the market, type and volume or weight of the materials sold. In general, fees are billed and revenue is recognized at the time title is transferred. Revenue recognized under these agreements is variable in nature based on the volume and type of materials sold. In addition, the amount of revenue recognized is based on commodity prices at the time of sale, which are unknown at contract inception.

Revenue Recognition

Our service obligations of a long-term nature, e.g., certain collection service contracts, are satisfied over time, and we recognize revenue based on the value provided to the customer during the period. The amount billed to the customer is based on variable elements such as the number of residential homes or businesses for which collection services are provided, the volume of material collected, transported and disposed, and the nature of the material accepted. We do not disclose the value of unsatisfied performance obligations for these contracts as our right to consideration corresponds directly to the value provided to the customer for services completed to date and all future variable consideration is allocated to wholly unsatisfied performance obligations.

Additionally, certain elements of our long-term customer contracts are unknown upon entering into the contract, including the amount that will be billed in accordance with annual price escalation clauses, our fuel recovery fee program and commodity prices. The amount to be billed is often tied to changes in an underlying base index such as a consumer price index or a fuel or commodity index, and revenue can be recognized once the index is established for the period.

Deferred Contract Costs

We incur certain upfront payments to acquire customer contracts which are recognized as other assets in our consolidated balance sheet, and we amortize the asset over the respective contract life. In addition, we recognize sales commissions that represent an incremental cost of the contract as other assets in our consolidated balance sheet, and we amortize the asset over the average life of the customer relationship. As of December 31, 2020 and 2019, we recognized $82.3 million and $83.1 million, respectively, of deferred contract costs and capitalized sales commissions. During the years ended December 31, 2020 and 2019, we amortized $12.2 million and $11.8 million, respectively, of capitalized sales commissions to selling, general and administrative expenses, and $6.5 million and $6.2 million, respectively, of other deferred contract costs as a reduction of revenue.

17. CHANGES IN ACCUMULATED OTHER COMPREHENSIVE INCOME (LOSS) BY COMPONENT

A summary of changes in accumulated other comprehensive income, net of tax, by component, for the years ended December 31, 2020, 2019 and 2018 follows:

	Cash Flow Hedges	Defined Benefit Pension Plan	Total
Balance as of December 31, 2017	$ 1.4	$ 21.2	$ 22.6
Other comprehensive income (loss) before reclassifications	18.5	(6.5)	12.0
Amounts reclassified from accumulated other comprehensive income	(3.8)	-	(3.8)
Net current-period other comprehensive income	14.7	(6.5)	8.2
Balance as of December 31, 2018	16.1	14.7	30.8
Other comprehensive loss before reclassifications	(30.2)	(2.5)	(32.7)
Amounts reclassified from accumulated other comprehensive income	1.0	-	1.0
Net current period other comprehensive income (loss)	(29.2)	(2.5)	(31.7)
Adoption of accounting standard	(0.6)	3.7	3.1
Balance as of December 31, 2019	(13.7)	15.9	2.2
Other comprehensive loss before reclassifications	(22.5)	2.1	(20.4)
Amounts reclassified from accumulated other comprehensive loss	5.8	-	5.8
Net current period other comprehensive loss	(16.7)	2.1	(14.6)
Balance as of December 31, 2020	$ (30.4)	$ 18.0	$ (12.4)

A summary of reclassifications out of accumulated other comprehensive income (loss) for the years ended December 31, 2020, 2019 and 2018 follows:

Details about Accumulated Other Comprehensive (Loss) Income Components	Amount Reclassified from Accumulated Other Comprehensive (Loss) Income 2020	2019	2018	Affected Line Item in the Statement Where Net Income is Presented
(Loss) gain on cash flow hedges:				
Recycling commodity hedges	$ -	$ -	$ 1.1	Revenue
Fuel hedges	-	-	4.3	Cost of operations
Terminated interest rate locks	(7.9)	(1.4)	(0.3)	Interest expense
Total before tax	(7.9)	(1.4)	5.1	
Tax expense	2.1	0.4	(1.3)	
Total (loss) gain reclassified into earnings, net of tax	$ (5.8)	$ (1.0)	$ 3.8	

18. FINANCIAL INSTRUMENTS

The effect of our derivative instruments in fair value and cash flow hedging relationships on the consolidated statements of income for the years ended December 31, 2020, 2019 and 2018 follows (in millions):

	Classification and Amount of Gain (Loss) Recognized in Income on Fair Value and Cash Flow Hedging Relationships		
	2020	2019	2018
	Interest Expense	Interest Expense	Interest Expense
Total amounts of expense line items presented in the consolidated statements of income in which the effects of fair value or cash flow hedges are recorded	$ (355.6)	$ (392.0)	$ (383.8)
The effects of fair value and cash flow hedging relationships in Subtopic 815-20:			
Gain (loss) on fair value hedging relationships:			
Interest rate swaps:			
Net swap settlements	$ 5.7	$ 1.0	$ 1.9
Net periodic earnings[1]	$ 2.0	$ 0.6	$ (0.4)
Effect of dedesignation	$ 4.7	$ -	$ -
Gain (loss) on cash flow hedging relationships:			
Interest rate swap locks:			
Amount of loss reclassified from accumulated other comprehensive (loss) income into income, net of tax	$ (5.8)	$ (1.0)	$ (0.2)
The effects of derivative instruments not in Subtopic 815-20:			
Loss on free-standing derivative instruments:			
Interest rate swaps:			
Loss on change in fair value of free-standing derivative instruments	$ (0.1)	$ -	$ -
Interest rate contract:			
Net (loss) on change in fair value of free-standing derivative instruments	$ (2.7)	$ (0.5)	$ -

(1) During 2018 (prior to adoption of ASU 2017-12), all net periodic earnings for fair value hedges were recorded to other income, net. To align the effect of the hedging relationship with the activity of the hedged item, beginning January 1, 2019, all net periodic earnings on fair value hedges are presented within interest expense in our consolidated statements of income.

Fair Value Measurements

In measuring fair values of assets and liabilities, we use valuation techniques that maximize the use of observable inputs (Level 1) and minimize the use of unobservable inputs (Level 3). We also use market data or assumptions that we believe market participants would use in pricing an asset or liability, including assumptions about risk when appropriate.

The carrying value for certain of our financial instruments, including cash, accounts receivable, accounts payable and certain other accrued liabilities, approximates fair value because of their short-term nature.

As of December 31, 2020 and 2019, our assets and liabilities that are measured at fair value on a recurring basis include the following:

	December 31, 2020				
		Fair Value			
	Carrying Amount	Total	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:					
Money market mutual funds	$ 32.3	$ 32.3	$ 32.3	$ -	$ -
Bonds - restricted cash and marketable securities and other assets	73.8	73.8	-	73.8	-
Interest rate swaps - other assets	10.0	10.0	-	10.0	-
Other derivative assets - other assets	63.8	63.8	-	63.8	-
Total assets	$ 179.9	$ 179.9	$ 32.3	$ 147.6	$ -
Liabilities:					
Other derivative liabilities - other long-term liabilities	$ 103.0	$ 103.0	$ -	$ 103.0	$ -
Contingent consideration - other accrued liabilities and other long-term liabilities	70.6	70.6	-	-	70.6
Total liabilities	$ 173.6	$ 173.6	$ -	$ 103.0	$ 70.6

	December 31, 2019				
		Fair Value			
	Carrying Amount	Total	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:					
Money market mutual funds	$ 43.0	$ 43.0	$ 43.0	$ -	$ -
Bonds - restricted cash and marketable securities and other assets	51.6	51.6	-	51.6	-
Interest rate swaps - other assets	10.7	10.7	-	10.7	-
Interest rate locks - prepaid expenses and other current assets	3.6	3.6	-	3.6	-
Other derivative assets - other assets	2.9	2.9	-	2.9	-
Total assets	$ 111.8	$ 111.8	$ 43.0	$ 68.8	$ -
Liabilities:					
Interest rate locks - other accrued liabilities and other long-term liabilities	$ 15.7	$ 15.7	$ -	$ 15.7	$ -
Other derivative liabilities - other long-term liabilities	22.2	22.2	-	22.2	-
Contingent consideration - other accrued liabilities and other long-term liabilities	72.0	72.0	-	-	72.0
Total liabilities	$ 109.9	$ 109.9	$ -	$ 37.9	$ 72.0

Total Debt

As of December 31, 2020 and 2019, the carrying value of our total debt was $8.9 billion and $8.7 billion, respectively, and the fair value of our total debt was $10.0 billion and $9.4 billion, respectively. The estimated fair value of our fixed rate senior notes and debentures is based on quoted market prices. The fair value of our remaining notes payable, tax-exempt financings and borrowings under our credit facilities approximates the carrying value because the interest rates are variable. The fair value estimates are based on Level 2 inputs of the fair value hierarchy as of December 31, 2020 and 2019. See Note 9, *Debt*, for further information related to our debt.

Contingent Consideration

In April 2015, we entered into a waste management contract with the County of Sonoma, California to operate the county's waste management facilities. As of December 31, 2020, the Sonoma contingent consideration represents the fair value of $64.2 million payable to the County of Sonoma based on the achievement of future annual tonnage targets through the expected remaining capacity of the landfill. The potential undiscounted amount of all future contingent payments that we could be required to make under the waste management contract is estimated to be between approximately $80 million and $100 million. During 2020, the activity in the contingent consideration liability included accretion, which was offset by concession payments made in the ordinary course of business. There were no changes to the estimate of fair value.

19. COMMITMENTS AND CONTINGENCIES

Legal Proceedings

We are subject to extensive and evolving laws and regulations and have implemented safeguards to respond to regulatory requirements. In the normal course of our business, we become involved in legal proceedings. Some may result in fines, penalties or judgments against us, or settlements, which may impact earnings and cash flows for a particular period. Although we cannot predict the ultimate outcome of any legal matter with certainty, we do not believe the outcome of any of our pending legal proceedings will have a material adverse impact on our consolidated financial position, results of operations or cash flows.

As used herein, the term *legal proceedings* refers to litigation and similar claims against us and our subsidiaries, excluding: (1) ordinary course accidents, general commercial liability and workers' compensation claims, which are covered by insurance programs, subject to customary deductibles, and which, together with insured employee health care costs, are discussed in Note 7, *Other Liabilities*; and (2) environmental remediation liabilities, which are discussed in Note 8, *Landfill and Environmental Costs.*

We accrue for legal proceedings when losses become probable and reasonably estimable. We have recorded an aggregate accrual of approximately $27 million relating to our outstanding legal proceedings as of December 31, 2020. As of the end of each applicable reporting period, we review each of our legal proceedings and, where it is probable that a liability has been incurred, we accrue for all probable and reasonably estimable losses. Where we can reasonably estimate a range of losses we may incur regarding such a matter, we record an accrual for the amount within the range that constitutes our best estimate. If we can reasonably estimate a range but no amount within the range appears to be a better estimate than any other, we use the amount that is the low end of such range. If we had used the high ends of such ranges, our aggregate potential liability would be approximately $10 million higher than the amount recorded as of December 31, 2020.

Unconditional Purchase Commitments

Royalties

We have entered into agreements to pay royalties to prior landowners or host communities, based on, among other things, revenue received and waste tonnage disposed at specified landfills. These royalties are generally payable quarterly and amounts incurred, but not paid, are accrued in our consolidated balance sheets. Royalties are accrued as revenue is received or tonnage is disposed of, as applicable, in the landfills.

Disposal Agreements

We have several agreements that require us to dispose of a minimum number of tons at third-party disposal facilities. Under these put-or-pay agreements, we must pay for agreed-upon minimum volumes regardless of the actual number of tons placed at the facilities.

Our unconditional purchase commitments have varying expiration dates, with some extending through the remaining life of the respective landfill. Future minimum payments under unconditional purchase commitments, consisting primarily of (1) disposal related agreements, which include fixed or minimum royalty payments, host agreements, and take-or-pay and put-or-pay agreements, and (2) other obligations including committed capital expenditures and consulting service agreements as of December 31, 2020 are as follows:

2021	$ 163.6
2022	97.0
2023	61.0
2024	53.4
2025	29.4
Thereafter	252.9
	$ 657.3

Cash and Cash Equivalents and Restricted Cash and Marketable Securities

Restricted cash and restricted cash equivalents are included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amounts shown on the statements of cash flows. Beginning-of-period and end-of-period cash, cash equivalents, restricted cash and restricted cash equivalents as presented in the statements of cash flows are reconciled as follows:

	December 31, 2020	December 31, 2019	December 31, 2018
Cash and cash equivalents	$ 38.2	$ 47.1	$ 70.5
Restricted cash and marketable securities	149.1	179.4	108.1
Less: restricted marketable securities	(73.1)	(49.1)	(45.3)
Cash, cash equivalents, restricted cash and restricted cash equivalents	$ 114.2	$ 177.4	$ 133.3

Our restricted cash and marketable securities include, among other things, restricted cash and marketable securities pledged to regulatory agencies and governmental entities as financial guarantees of our performance under certain collection, landfill and transfer station contracts and permits, and relating to our final capping, closure and post-closure obligations at our landfills, restricted cash and marketable securities related to our insurance obligations, and restricted cash related to a payment for a certain maturing tax-exempt financing.

The following table summarizes our restricted cash and marketable securities as of December 31:

	2020	2019
Payment for maturing tax-exempt financing	$ -	$ 49.4
Capping, closure and post-closure obligations	31.5	30.6
Insurance	117.6	99.4
Total restricted cash and marketable securities	$ 149.1	$ 179.4

We must provide financial assurance to governmental agencies and a variety of other entities under applicable environmental regulations relating to our landfill operations for capping, closure and post-closure costs, and our performance under certain collection, landfill and transfer station contracts. We satisfy our financial assurance requirements by providing surety bonds, letters of credit, insurance policies or trust deposits. The amount of the financial assurance requirements for capping, closure and post-closure costs is determined by applicable state environmental regulations, which vary by state. The financial assurance requirements for capping, closure and post-closure costs can either be for costs associated with a portion of the landfill or the entire landfill. Generally, states will require a third-party engineering specialist to determine the estimated capping, closure and post-closure costs that are used to determine the required amount of financial assurance for a landfill. The amount of financial assurance required can, and generally will, differ from the obligation determined and recorded under U.S. GAAP. The amount of the financial assurance requirements related to contract performance varies by contract. Additionally, we are required to provide financial assurance for our insurance program and collateral for certain performance obligations.

We had the following financial instruments and collateral in place to secure our financial assurances as of December 31:

	2020	2019
Letters of credit	$ 474.2	$ 449.7
Surety bonds	$ 3,580.7	$ 3,460.8

We had $376.5 million and $351.4 million of letters of credit outstanding under our Credit Facility as of December 31, 2020 and 2019, respectively. Surety bonds subject to expiration will expire on various dates through 2026.

These financial instruments are issued in the normal course of business and are not classified as debt. Because we currently have no liability for this financial assurance, it is not reflected in our consolidated balance sheets. However, we have recorded capping, closure and post-closure obligations and insurance reserves as they are incurred.

We own a 19.9% interest in a company that, among other activities, issues financial surety bonds to secure capping, closure and post-closure obligations for companies operating in the environmental services industry. We account for this investment using an alternative measurement approach. There have been no identified events or changes in circumstances that may have a significant adverse effect on the recoverability of this investment. This investee company and the parent company of the investee had written surety bonds for us relating primarily to our landfill operations for capping, closure and post-closure, of which $1,371.1 million were outstanding as of December 31, 2020. Our reimbursement obligations under these bonds are secured by an indemnity agreement with the investee and a surety bond.

Off-Balance Sheet Arrangements

We have no off-balance sheet debt or similar obligations, other than short-term operating leases and financial assurances, which are not classified as debt. We have no transactions or obligations with related parties that are not disclosed, consolidated into or reflected in our reported financial position or results of operations. We have not guaranteed any third-party debt.

Guarantees

We enter into contracts in the normal course of business that include indemnification clauses. Indemnifications relating to known liabilities are recorded in the consolidated financial statements based on our best estimate of required future payments. Certain of these indemnifications relate to contingent events or occurrences, such as the imposition of additional taxes due to a change in the tax law or adverse interpretation of the tax law, and indemnifications made in divestiture agreements where we indemnify the buyer for liabilities that relate to our activities prior to the divestiture and that may become known in the future. We do not believe that these contingent obligations will have a material effect on our consolidated financial position, results of operations or cash flows.

We have entered into agreements with property owners to guarantee the value of property that is adjacent to certain of our landfills. These agreements have varying terms. We do not believe that these contingent obligations will have a material effect on our consolidated financial position, results of operations or cash flows.

Other Matters

Our business activities are conducted in the context of a developing and changing statutory and regulatory framework. Governmental regulation of the environmental services industry requires us to obtain and retain numerous governmental permits to conduct various aspects of our operations. These permits are subject to revocation, modification or denial. The costs and other capital expenditures that may be required to obtain or retain the applicable permits or comply with applicable regulations could be significant. Any revocation, modification or denial of permits could have a material adverse effect on us.

20. SELECTED QUARTERLY FINANCIAL DATA (unaudited)

The following table summarizes our unaudited consolidated quarterly results of operations as reported for December 31, 2020 and 2019:

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
2020:				
Revenue [(1)]	$ 2,553.9	$ 2,454.4	$ 2,572.1	$ 2,573.3
Operating income [(1)]	$ 433.0	$ 395.2	$ 447.9	$ 432.7
Net income	$ 246.8	$ 226.3	$ 260.2	$ 236.3
Net income attributable to Republic Services, Inc. [(1)]	$ 246.3	$ 225.5	$ 260.0	$ 235.5
Diluted earnings per common share [(1)]	$ 0.77	$ 0.71	$ 0.81	$ 0.74
2019:				
Revenue [(1)]	$ 2,470.6	$ 2,605.3	$ 2,646.9	$ 2,576.7
Operating income	$ 422.8	$ 437.4	$ 467.8	$ 459.2
Net income	$ 234.9	$ 250.9	$ 298.0	$ 290.0
Net income attributable to Republic Services, Inc.	$ 234.2	$ 251.5	$ 298.3	$ 289.3
Diluted earnings per common share	$ 0.72	$ 0.78	$ 0.93	$ 0.90

(1) Line items in these rows do not total to amounts reported in the consolidated financial statements due to rounding.

During the first quarter of 2020 and the fourth quarter of 2019, we recorded a reduction to remediation expense of $10.8 million and $24.0 million, respectively, related to insurance recoveries at our closed Bridgeton Landfill. Additionally, during the fourth quarter of 2020, we recognized a $42.6 million charge as a loss on business divestitures and impairments, net in our consolidated income statement resulting from management's decision to exit certain product offerings and geographic basins in our upstream environmental solutions business.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

None.

ITEM 9A. CONTROLS AND PROCEDURES

REPORT OF MANAGEMENT ON REPUBLIC SERVICES, INC.'S INTERNAL CONTROL OVER FINANCIAL REPORTING

We, as members of management of Republic Services, Inc., are responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Exchange Act Rule 13a-15(f). Internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. Internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect transactions and dispositions of our assets; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that our receipts and expenditures are being made only in accordance with authorizations of our management and directors; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of our assets that could have a material effect on the financial statements.

Because of its inherent limitations, our internal control systems and procedures may not prevent or detect misstatements. An internal control system, no matter how well conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, have been detected. Also, projections of any evaluation of effectiveness to future periods are subject to the risks that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies and procedures may deteriorate.

We, under the supervision of and with the participation of our management, including the Chief Executive Officer, Chief Financial Officer and Chief Accounting Officer, assessed the effectiveness of our internal control over financial reporting as of December 31, 2020, based on criteria for effective internal control over financial reporting described in Internal Control — Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on this assessment, we concluded that we maintained effective internal control over financial reporting as of December 31, 2020, based on the specified criteria.

Our internal control over financial reporting has been audited by Ernst & Young LLP, an independent registered public accounting firm, as stated in their attestation report which is included herein.

Disclosure Controls and Procedures

We carried out an evaluation, under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, of the effectiveness of our disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e), and 15d-15(e)) as of the end of the period covered by this Annual Report. Based upon that evaluation, our Chief Executive Officer and Chief Financial Officer concluded that our disclosure controls and procedures were effective as of the end of the period covered by this Annual Report.

Changes in Internal Control Over Financial Reporting

Based on an evaluation, under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, there has been no change in our internal control over financial reporting during the quarter ended December 31, 2020 identified in connection with that evaluation, that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

In December 2020, we acquired all of the issued and outstanding equity interests of Randy’s Sanitation, LLC and Randy’s Rentals, LLC. Additionally, we acquired certain assets and assumed certain liabilities from Gallegos Sanitation, Inc. and related entities as well as Eagle Waste & Recycling, Inc. and related entities. As permitted by the SEC Staff interpretive guidance for newly acquired businesses, management’s assessment of our internal control over financial reporting as of December 31, 2020 did not include an assessment of internal control over financial reporting as it relates to these acquisitions. We will continue the process of implementing internal controls over financial reporting for these acquired businesses. As of December 31, 2020, these businesses contributed less than 1% of revenue to our audited consolidated financial statements for the year ended December 31, 2020.

ITEM 9B. OTHER INFORMATION

None.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

Information required by this item is incorporated by reference to the material appearing under the headings Proposal 1 – Election of Directors, Biographical Information Regarding Directors/Nominees, Board of Directors and Corporate Governance Matters, Delinquent Section 16(a) Reports, and Executive Officers in the Proxy Statement for the 2021 Annual Meeting of Shareholders.

ITEM 11. EXECUTIVE COMPENSATION

Information required by this item is incorporated by reference to the material appearing under the headings Executive Compensation and Director Compensation in the Proxy Statement for the 2021 Annual Meeting of Shareholders.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

Information required by this item is incorporated by reference to the material appearing under the headings Security Ownership of Five Percent Shareholders and Security Ownership of the Board of Directors and Management in the Proxy Statement for the 2021 Annual Meeting of Shareholders.

The following table sets forth certain information regarding equity compensation plans as of December 31, 2020 (number of securities in millions):

Plan Category	Number of Securities to be Issued Upon Exercise of Outstanding Options and Rights [b]	Weighted Average Exercise Price of Outstanding Options and Rights [c]	Number of Securities Remaining Available for Future Issuance Under Equity Compensation Plans (excluding securities reflected in the first column) [d]
Equity compensation plans approved by security holders [a]	1.8	$ 91.49	31.1
Equity compensation plans not approved by security holders	-	-	-
Total	1.8	$ 91.49	31.1

(a) Includes our 2006 Plan, Amended and Restated 2007 Stock Incentive Plan and our 2018 Employee Stock Purchase Plan (ESPP).

(b) Includes zero stock options as all were exercised within 2020, 1.2 million shares underlying restricted stock units, 0.6 million shares underlying performance shares, and less than 0.1 million shares underlying purchase rights that accrue under the ESPP.

(c) Excludes restricted stock units and performance shares as these awards do not have exercise prices.

(d) The shares remaining available for future issuances include 12.8 million shares under our 2021 Stock Incentive Plan and 2.7 million shares under our ESPP. No further awards will be granted under the Amended and Restated 2007 Stock Incentive Plan after December 31, 2020.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

Information required by this item is incorporated by reference to the material appearing under the headings Board of Directors and Corporate Governance Matters and Certain Relationships and Related Party Transactions in the Proxy Statement for the 2021 Annual Meeting of Shareholders.

ITEM 14. PRINCIPAL ACCOUNTING FEES AND SERVICES

Information required by this item is incorporated by reference to the material appearing under the heading Audit and Related Fees in the Proxy Statement for the 2021 Annual Meeting of Shareholders.

PART IV

ITEM 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULES

(a) The following documents are filed as part of this report:

1. Financial Statements

Our consolidated financial statements are set forth under Item 8 of this Form 10-K.

2. Financial Statement Schedules

All schedules are omitted as the required information is not applicable or the information is presented in the consolidated financial statements and notes thereto in Item 8 of this Form 10-K.

3. Exhibits

The following exhibits are filed herewith or are incorporated by reference to exhibits previously filed with the SEC, as indicated in the description of each, File No. 1-14267 in the case of Republic and File No. 1-14705 and No. 0-19285 in the case of Allied, and File No. 1-06805 in the case of Browning-Ferris Industries, Inc..

Exhibit Number	Description
3.1	Amended and Restated Certificate of Incorporation (incorporated by reference to Exhibit 3.1 of the Company's Quarterly Report on Form 10-Q for the period ended June 30, 1998).
3.2	Certificate of Amendment of Amended and Restated Certificate of Incorporation of Republic Services, Inc. (incorporated by reference to Exhibit 4.2 of the Company's Registration Statement on Form S-8, Registration No. 333-81801, filed with the Commission on June 29, 1999).
3.3	Amended and Restated Bylaws of Republic Services, Inc. (incorporated by reference to Exhibit 3.3 of the Company's Current Report on Form 8-K dated May 6, 2016).
4.1	Republic Services, Inc. Common Stock Certificate (incorporated by reference to Exhibit 4.4 of the Company's Registration Statement on Form S-8, Registration No. 333-81801, filed with the Commission on June 29, 1999).
4.2	Indenture, dated as of August 15, 2001 between Republic Services, Inc. and The Bank of New York, as trustee, including the form of notes (incorporated by reference to Exhibit 4.1 of the Company's Current Report on Form 8-K filed August 16, 2001).
4.3	Second Supplemental Indenture, dated as of March 21, 2005, to the Indenture dated as of August 15, 2001, by and between Republic Services, Inc. and The Bank of New York, as trustee, including the form of 6.086% Note due March 15, 2035 (incorporated by reference to Exhibit 4.1 of the Company's Quarterly Report on Form 10-Q for the quarter ended March 31, 2005).

Exhibit Number	Description
4.4	Indenture, dated as of September 8, 2009, by and between Republic Services, Inc. and The Bank of New York Mellon Trust Company, N.A., as trustee (incorporated by reference to Exhibit 4.1 of the Company's Current Report on Form 8-K dated September 9, 2009).
4.5	Third Supplemental Indenture, dated as of May 9, 2011, to the Indenture dated as of September 8, 2009, by and among Republic Services, Inc., the guarantors named therein and The Bank of New York Mellon Trust Company, N.A., as trustee, including the form of 4.750% Notes due 2023 (incorporated by reference to Exhibit 4.2 of the Company's Current Report on Form 8-K dated May 9, 2011).
4.6	Fourth Supplemental Indenture, dated as of May 9, 2011, to the Indenture dated as of September 8, 2009, by and among Republic Services, Inc., the guarantors named therein and The Bank of New York Mellon Trust Company, N.A., as trustee, including the form of 5.700% Notes due 2041 (incorporated by reference to Exhibit 4.3 of the Company's Current Report on Form 8-K dated May 9, 2011).
4.7	Indenture, dated as of November 25, 2009, by and between Republic Services, Inc. and U.S. Bank National Association, as trustee (incorporated by reference to Exhibit 4.1 of the Company's Current Report on Form 8-K dated November 25, 2009).
4.8	Third Supplemental Indenture, dated as of March 4, 2010, to the Indenture dated as of November 25, 2009, by and among Republic Services, Inc., the guarantors named therein and U.S. Bank National Association, as trustee, including the form of 6.20% Notes due 2040 (incorporated by reference to Exhibit 4.2 of the Company's Current Report on Form 8-K dated March 4, 2010).
4.9	Indenture, dated as of May 21, 2012, by and between Republic Services, Inc. and Wells Fargo Bank, National Association, as trustee (incorporated by reference to Exhibit 4.1 of the Company's Current Report on Form 8-K dated May 21, 2012).
4.10	Restated Indenture, dated as of September 1, 1991, by and between Browning-Ferris Industries, Inc. and First City, Texas-Houston, National Association, as trustee (incorporated by reference to Exhibit 4.22 of Allied's Registration Statement on Form S-4/A (No. 333-61744)).
4.11	First Supplemental Indenture, dated as of July 30, 1999, to the Restated Indenture dated as of September 1, 1991, by and among Allied Waste Industries, Inc., Allied Waste North America, Inc., Browning-Ferris Industries, Inc. and Chase Bank of Texas, National Association, as trustee (incorporated by reference to Exhibit 4.23 of Allied's Registration Statement on Form S-4/A (No. 333-61744)).
4.12	First [sic] Supplemental Indenture, dated as of December 31, 2004, to the Restated Indenture dated as of September 1, 1991, by and among Browning-Ferris Industries, Inc., BBCO, Inc. and JP Morgan Chase Bank, National Association as trustee (incorporated by reference to Exhibit 4.33 of Allied's Annual Report on Form 10-K for the year ended December 31, 2004).
4.13	Third Supplemental Indenture, dated as of December 5, 2008, to the Restated Indenture dated as of September 1, 1991, by and among Allied Waste Industries, Inc., Allied Waste North America, Inc., Browning-Ferris Industries, LLC (successor to Browning-Ferris Industries, Inc.), BBCO, Inc., Republic Services, Inc., the guarantors party thereto and The Bank of New York Mellon Trust Company, N.A., as trustee (incorporated by reference to Exhibit 4.1 of the Company's Current Report on Form 8-K dated December 10, 2008).
4.14	Fourth Supplemental Indenture, dated as of March 11, 2015, to the Indenture, dated as of November 25, 2009, between Republic Services, Inc. and U.S. Bank National Association, as trustee, including the form of 3.20% Notes due 2025 (incorporated by reference to Exhibit 4.1 of the Company's Current Report on Form 8-K dated March 11, 2015).

Exhibit Number	Description
4.15	Fifth Supplemental Indenture, dated as of July 5, 2016, to the Indenture, dated as of November 25, 2009, between Republic Services, Inc. and U.S. Bank National Association, as trustee, including the form of 2.900% Notes due 2026 (incorporated by reference to Exhibit 4.1 of the Company's Current Report on Form 8-K dated July 5, 2016).
4.16	Sixth Supplemental Indenture, dated as of November 16, 2017, between Republic Services, Inc. and U.S. Bank National Association, as trustee, including the form of 3.375% Notes due 2027 (incorporated by reference to Exhibit 4.1 of the Company's Current Report on Form 8-K dated November 15, 2017).
4.17	Form of Browning-Ferris Industries, Inc. 7.4% Debentures due 2035 (incorporated by reference to Exhibit 4 of Browning-Ferris Industries, Inc.'s Current Report on Form 8-K dated September 15, 1995).
4.18	Credit Agreement, dated as of June 8, 2018, by and among Republic Services, Inc., as Borrower, Bank of America, N.A., as Administrative Agent, Swing Line Lender and L/C Issuer, and the other lenders party thereto (incorporated by reference to Exhibit 4.1 of the Company's Current Report on Form 8-K dated June 11, 2018).
4.19	Amendment No.1, dated as of May 18, 2020, to Credit Agreement, dated as of June 8, 2018, by and among Republic Services, Inc., as Borrower, Bank of America, N.A., as Administrative Agent, Swing Line Lender and L/C Issuer, and the other lenders party thereto (incorporated by reference to Exhibit 4.1 of the Company's Current Report on Form 8-K dated May 21, 2020).
4.20	Amendment No. 2, dated as of July 14, 2020, to Credit Agreement, dated as of June 8, 2018, as amended, by and among Republic Services, Inc., as Borrower, Bank of America, N.A., as Administrative Agent, Swing Line Lender and L/C Issuer, and the other lenders party thereto (incorporated by reference to Exhibit 4.1 of the Company's Current Report on Form 8-K dated July 17, 2020).
4.21	Amendment No. 3, dated as of August 25, 2020, to Credit Agreement, dated as of June 8, 2018, as amended, by and among Republic Services, Inc., as Borrower, Bank of America, N.A., as Administrative Agent, Swing Line Lender and L/C Issuer, and the other lenders party thereto (incorporated by reference to Exhibit 4.2 of the Company's Current Report on Form 8-K dated August 27, 2020).
4.22	Credit Agreement, dated as of August 25, 2020, by and among Republic Services, Inc., as Borrower, Bank of America, N.A., as Administrative Agent, and the other lenders party thereto (incorporated by reference to Exhibit 4.1 of the Company's Current Report on Form 8-K dated August 27, 2020).
4.23	Seventh Supplemental Indenture, dated as of May 14, 2018, between Republic Services, Inc. and U.S. Bank National Association, as trustee, including the form of 3.950% Notes due 2028 (incorporated by reference to Exhibit 4.1 of the Company's Current Report on Form 8-K dated May 3, 2018).
4.24	Limited consent (2018 Credit Agreement), dated as of August 21, 2019, by and among Republic Services, Inc., as Borrower, Bank of America, N.A., as Administrative Agent, Swing Line Lender and an L/C Issuer, and the lenders party thereto (incorporated by reference to Exhibit 4.1 of the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2019).
4.25	Description of Securities Registered Under Section 12 of the Securities Exchange Act of 1934 (incorporated by reference to Exhibit 4.23 of the Company's Annual Report on Form 10-K for the year ended December 31, 2019).

Exhibit Number	Description
4.26	Eighth Supplemental Indenture, dated as of August 7, 2019, between Republic Services, Inc. and U.S. Bank National Association, as trustee, including the form of 2.500% Notes due 2024 (incorporated by reference to Exhibit 4.1 of the Company's Current Report on Form 8-K dated August 1, 2019).
4.27	Ninth Supplemental Indenture, dated as of February 27, 2020, between Republic Services, Inc. and U.S. Bank National Association, as trustee, including the form of 2.300% Notes due 2030 and the form of 3.050% Notes due 2050 (incorporated by reference to Exhibit 4.1 of the Company's Current Report on Form 8-K dated February 21, 2020).
4.28	Tenth Supplemental Indenture, dated as of August 20, 2020, between Republic Services, Inc. and U.S. Bank National Association, as trustee, including the form of 1.450% Notes due 2031 (incorporated by reference to Exhibit 4.1 of the Company's Current Report on Form 8-K dated August 13, 2020).
4.29	Eleventh Supplemental Indenture, dated as of November 24, 2020, between Republic Services, Inc. and U.S. Bank National Association, as trustee, including the form of 0.875% Notes due 2025 and the form of 1.750% Notes due 2032 (incorporated by reference to Exhibit 4.1 of the Company's Current Report on Form 8-K dated November 12, 2020).
10.1+	Republic Services, Inc. Amended and Restated 2007 Stock Incentive Plan effective May 12, 2011 (incorporated by reference to Appendix A of the Company's Proxy Statement on Schedule 14A filed on April 1, 2011).
10.2+	Republic Services, Inc. Executive Incentive Plan, as amended and restated effective October 26, 2020 (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2020).
10.3+	Form of Employee Restricted Stock Unit Agreement under the Republic Services, Inc. Amended and Restated 2007 Stock Incentive Plan (for awards on or after December 27, 2011) (incorporated by reference to Exhibit 10.1 of the Company's Current Report on Form 8-K dated December 27, 2011).
10.4+	Form of Non-Employee Director Restricted Stock Unit Agreement (annual vesting) under the Republic Services, Inc. Amended and Restated 2007 Stock Incentive Plan (for awards on or after December 27, 2011) (incorporated by reference to Exhibit 10.2 of the Company's Current Report on Form 8-K dated December 27, 2011).
10.5+	Form of Non-Employee Director Restricted Stock Unit Agreement (3 year vesting) under the Republic Services, Inc. Amended and Restated 2007 Stock Incentive Plan (for awards on or after December 27, 2011) (incorporated by reference to Exhibit 10.3 of the Company's Current Report on Form 8-K dated December 27, 2011).
10.6+	Republic Services, Inc. Deferred Compensation Plan, as amended and restated effective January 1, 2010 (incorporated by reference to Exhibit 4.4 of the Company's Registration Statement on Form S-8, Registration No. 333-170174, filed with the SEC on October 27, 2010).
10.7+	Amendment No. 1 to Republic Services, Inc. Deferred Compensation Plan, effective January 6, 2011 (incorporated by reference to Exhibit 10.17 of the Company's Annual Report on Form 10-K for the year ended December 31, 2010).
10.8+	Republic Services, Inc. Amended and Restated Executive Incentive Plan, effective February 4, 2014 (incorporated by reference to Appendix A of the Company's Proxy Statement on Schedule 14A filed on March 26, 2014).
10.9+	Employment Agreement, effective as of October 29, 2013, by and between Republic Services, Inc. and Donald W. Slager (incorporated by reference to Exhibit 10.1 of the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2013).

Exhibit Number	Description
10.10+	Amended and Restated Employment Agreement, effective December 8, 2008, by and between Jeffrey A. Hughes and Republic Services, Inc. (incorporated by reference to Exhibit 10.61 of the Company's Annual Report on Form 10-K for the year ended December 31, 2012).
10.11+	Republic Services, Inc. Executive Separation Policy, as amended as of March 29, 2012 (incorporated by reference to Exhibit 10.2 of the Company's Quarterly Report on Form 10-Q for the quarter ended March 31, 2012).
10.12+	Amendment No. 2 to Republic Services, Inc. Deferred Compensation Plan, effective February 7, 2012 (incorporated by reference to Exhibit 10.3 of the Company's Quarterly Report on Form 10-Q for the quarter ended March 31, 2012).
10.13+	Republic Services, Inc. Amended and Restated 2007 Stock Incentive Plan effective May 9, 2013 (incorporated by reference to Exhibit 10.1 of the Company's Quarterly Report on Form 10-Q for the quarter ended June 30, 2013).
10.14+	Amendment No. 3 to Republic Services, Inc. Deferred Compensation Plan, effective October 29, 2013 (incorporated by reference to Exhibit 10.3 of the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2013).
10.15+	Offer Letter, dated August 22, 2014, by and between Charles F. Serianni and Republic Services, Inc. (incorporated by reference to Exhibit 10.1 of the Company's Current Report on Form 8-K dated August 25, 2014).
10.16+	Clawback Policy, dated October 29, 2014 (incorporated by reference to Exhibit 10.1 of the Company's Current Report on Form 8-K dated October 30, 2014).
10.17+	First Amendment to the Employment Agreement, dated December 23, 2014, by and between Donald W. Slager and Republic Services, Inc. (incorporated by reference to Exhibit 10.1 of the Company's Current Report on Form 8-K dated December 24, 2014).
10.18+	Form of Performance Share Agreement, adopted January 7, 2015 (incorporated by reference to Exhibit 10.1 of the Company's Current Report on Form 8-K dated January 9, 2015).
10.19+	Form of Employee Restricted Stock Unit Agreement - Senior Executive, adopted January 7, 2015 (incorporated by reference to Exhibit 10.2 of the Company's Current Report on Form 8-K dated January 9, 2015).
10.20+	Amendment No. 4 to Republic Services, Inc. Deferred Compensation Plan, effective January 1, 2015 (incorporated by reference to Exhibit 10.53 of the Company's Annual Report on Form 10-K for the year ended December 31, 2014).
10.21+	Offer Letter, dated July 25, 2016, by and between Catharine D. Ellingsen and Republic Services, Inc. (incorporated by reference to Exhibit 10.37 of the Company's Annual Report on Form 10-K dated February 16, 2017).
10.22+	Non-Competition, Non-Solicitation, Confidentiality and Arbitration Agreement, effective June 13, 2016, by and between Catharine D. Ellingsen and Republic Services, Inc. (incorporated by reference to Exhibit 10.38 of the Company's Annual Report on Form 10-K dated February 16, 2017).
10.23+	Republic Services, Inc. 2018 Employee Stock Purchase Plan (incorporated by reference to Annex A of the Company's Proxy Statement on Schedule 14A filed on March 29, 2018).
10.24+	Offer Letter, dated April 29, 2019, by and between Jon Vander Ark and Republic Services, Inc. (incorporated by reference to Exhibit 10.1 of the Company's Quarterly Report on Form 10-Q for the quarter ended June 30, 2019).

Exhibit Number	Description
10.25+	Non-Competition, Non-Solicitation, Confidentiality and Arbitration Agreement, effective May 1, 2019, by and between Jon Vander Ark and Republic Services, Inc. (incorporated by reference to Exhibit 10.2 of the Company's Quarterly Report on Form 10-Q for the quarter ended June 30, 2019).
10.26+	Offer Letter, dated April 29, 2019, by and between Timothy Stuart and Republic Services, Inc. (incorporated by reference to Exhibit 10.3 of the Company's Quarterly Report on Form 10-Q for the quarter ended June 30, 2019).
10.27+	Non-Competition, Non-Solicitation, Confidentiality and Arbitration Agreement, effective May 1, 2019, by and between Timothy Stuart and Republic Services, Inc. (incorporated by reference to Exhibit 10.4 of the Company's Quarterly Report on Form 10-Q for the quarter ended June 30, 2019).
10.28+	Offer letter, dated May 29, 2020, by and between Brian DelGhiaccio and Republic Services, Inc. (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended June 30, 2020).
10.29+	Non-Competition, Non-Solicitation, and Confidentiality Agreement, effective June 1, 2020, by and between Brian DelGhiaccio and Republic Services, Inc. (incorporated by reference to Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q for the quarter ended June 30, 2020).
10.30+*	Republic Services, Inc. 2021 Stock Incentive Plan.
10.31+*	Form of Performance Share Agreement (Executive Officer) under the Republic Services, Inc. 2021 Stock Incentive Plan.
10.32+*	Form of Performance Share Agreement (Other Executive) under the Republic Services, Inc. 2021 Stock Incentive Plan.
10.33+*	Form of Performance Share Agreement (Non-Executive Officer EVP) under the Republic Services, Inc. 2021 Stock Incentive Plan.
10.34+*	Form of Employee Restricted Stock Unit Agreement (Senior Executive) under the Republic Services, Inc. 2021 Stock Incentive Plan.
10.35+*	Form of Employee Restricted Stock Unit Agreement (Senior Executive, Cliff Vesting) under the Republic Services, Inc. 2021 Stock Incentive Plan.
10.36+*	Form of Employee Restricted Stock Unit Agreement (Other Employees) under the Republic Services, Inc. 2021 Stock Incentive Plan.
21.1*	Subsidiaries of the Company.
23.1*	Consent of Ernst & Young LLP.
31.1*	Rule 13a-14(a)/15d-14(a) Certification of Chief Executive Officer.
31.2*	Rule 13a-14(a)/15d-14(a) Certification of Chief Financial Officer.
32.1**	Section 1350 Certification of Chief Executive Officer.
32.2**	Section 1350 Certification of Chief Financial Officer.
101.INS*	XBRL Instance Document. - the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.
101.SCH*	XBRL Taxonomy Extension Schema Document.
101.CAL*	XBRL Taxonomy Extension Calculation Linkbase Document.
101.LAB*	XBRL Taxonomy Extension Labels Linkbase Document.
101.PRE*	XBRL Taxonomy Extension Presentation Linkbase Document.

Exhibit Number	Description
101.DEF*	XBRL Taxonomy Extension Definition Linkbase Document.
104*	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101).

* Filed herewith.
** This exhibit is being furnished rather than filed, and shall not be deemed incorporated by reference into any filing, in accordance with Item 601 of Regulation S-K.
+ Indicates a management or compensatory plan or arrangement.

Pursuant to Item 601(b)(4)(iii)(A) of Regulation S-K, the Company has not filed as exhibits to this Form 10-K certain long-term debt instruments under which the total amount of securities authorized does not exceed 10% of the total assets of the Company and its subsidiaries on a consolidated basis. The Company hereby agrees to furnish a copy of any such instrument to the SEC upon request.

ITEM 16. FORM 10-K SUMMARY

None.

Signatures

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

Date: February 22, 2021

REPUBLIC SERVICES, INC.

By: /s/ DONALD W. SLAGER

Donald W. Slager
Chief Executive Officer
(Principal Executive Officer)

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the Registrant and in the capacities and on the dates indicated.

Signature	Title	Date
/s/ DONALD W. SLAGER Donald W. Slager	Chief Executive Officer and Director (Principal Executive Officer)	February 22, 2021
/s/ BRIAN DELGHIACCIO Brian DelGhiaccio	Executive Vice President, Chief Financial Officer (Principal Financial Officer)	February 22, 2021
/s/ BRIAN A. GOEBEL Brian A. Goebel	Vice President and Chief Accounting Officer (Principal Accounting Officer)	February 22, 2021
/s/ MANUEL KADRE Manuel Kadre	Chairman of the Board of Directors	February 22, 2021
/s/ TOMAGO COLLINS Tomago Collins	Director	February 22, 2021
/s/ MICHAEL A. DUFFY Michael A. Duffy	Director	February 22, 2021
/s/ THOMAS W. HANDLEY Thomas W. Handley	Director	February 22, 2021
/s/ JENNIFER M. KIRK Jennifer M. Kirk	Director	February 22, 2021
/s/ MICHAEL LARSON Michael Larson	Director	February 22, 2021
/s/ KIM S. PEGULA Kim S. Pegula	Director	February 22, 2021
/s/ JAMES P. SNEE James P. Snee	Director	February 22, 2021

Signature	Title	Date
/s/ SANDRA M. VOLPE Sandra M. Volpe	Director	February 22, 2021
/s/ KATHARINE B. WEYMOUTH Katharine B. Weymouth	Director	February 22, 2021

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