

C0. Introduction

C0.1

(C0.1) Give a general description and introduction to your organization.

Waste Management is North America's leading provider of comprehensive environmental services. Since 2007, we have been working toward a set of sustainability goals to achieve by 2020, all designed to support our customers' environmental stewardship, reduce our overall impact on the environment and differentiate us from competitors. Since then, we're proud to say significant progress has been made.

We have had to be nimble to achieve our environmental goals. Importantly, the recycling market has changed around us, as has our business strategy, with impacts on the way we calculate progress by shifting our focus from a simple weight-based metric to a metric expressing tangible environmental benefit, i.e., reduction of greenhouse gases from our operations. In order to clearly communicate the environmental benefits we are creating, we are recalibrating our goals to reflect the energy use and GHG reductions achieved through waste reduction, recycling, composting and converting landfill gas into low-emissions energy and fuel. We also are targeting our goals to meet the Paris Climate Agreement targets.

ENVIRONMENTAL GOAL 1. To offset four times the GHG emissions we generate through our operations by 2038.

In 2017, the services that Waste Management provided offset the emissions of our own operations by three times. Our new goal, a jump from three times to four, will require us to decrease the emissions from our operations while increasing the emissions-reduction services we provide for ourselves and our customers. We have identified several initiatives to achieve our goals:

- To emit fewer emissions through our operations by transitioning from diesel to alternative fuel vehicles in 90 percent of our entire fleet, and using renewable fuel in over 90 percent of our vehicles. Our goal of emitting fewer emissions requires an investment in a Near Zero fleet. Over 90 percent of our fleet purchases are projected to be "NZVs" (Near Zero Vehicles), which will allow us to reduce emissions associated with our fleet 45 percent by 2038, against a 2010 baseline.
- To continue to improve energy efficiency at our facilities, reducing our own emissions throughout our systems.
- To avoid emissions by capturing methane at our landfills for use by third parties as renewable electricity and renewable fuel.
- To increase avoided emissions by recycling materials for the greatest environmental benefits.

COMMUNITY GOAL 2. To help make communities in which we live and work safe, resilient and sustainable.

Though our operations span 20 million customers in the U.S. and Canada, we are very much a local business that is an integral part of the communities we serve. We want to help make our communities, cities, towns and counties better places to work and live — today and for the future. To do so, we support events, programs and organizations that are as varied as the thousands of communities and individuals we serve.

We concentrate on initiatives that enhance our environment, promote education and improve the livability of our communities. Focus areas include:

- Projects that reduce environmental impacts, including beautification and litter control efforts
- Providing environmental education and outreach
- Supporting wildlife preservation efforts
- Supporting safe neighborhood programs
- Supporting a variety of charitable giving projects

Please note that answers in this questionnaire are supplied on behalf of Waste Management, Inc., which is a holding company; all operations are conducted by its subsidiaries. Hereafter, Waste Management, Inc., its consolidated subsidiaries and consolidated variable interest entities are referred to as "Waste Management", "WM", "the company", "we" or "us".

C0.2

(C0.2) State the start and end date of the year for which you are reporting data.

	Start date	End date	Indicate if you are providing emissions data for past reporting years	Select the number of past reporting years you will be providing emissions data for
Row 1	January 1 2018	December 31 2018	No	<Not Applicable>

C0.3

(C0.3) Select the countries/regions for which you will be supplying data.

Canada
United States of America

C0.4

(C0.4) Select the currency used for all financial information disclosed throughout your response.

USD

C0.5

(C0.5) Select the option that describes the reporting boundary for which climate-related impacts on your business are being reported. Note that this option should align with your consolidation approach to your Scope 1 and Scope 2 greenhouse gas inventory.

Operational control

C1. Governance

C1.1

(C1.1) Is there board-level oversight of climate-related issues within your organization?

Yes

C1.1a

(C1.1a) Identify the position(s) (do not include any names) of the individual(s) on the board with responsibility for climate-related issues.

Position of individual(s)	Please explain
Chief Executive Officer (CEO)	The CEO, who is also a member of our Board of Directors, is responsible for managing information on climate-related issues, making decisions about what the company will do and adapting those decisions based on climate-related information. Climate issues such as the ability to provide GHG emissions-avoiding services, the physical risks of climate change on WM facilities and services, and meeting WM's GHG reduction goals impact WM's recycling, composting, renewable energy production, fleet composition, consultancy/in-plant services and operations of our business. Carbon reduction and response to climate change are central factors in our municipal and private sector customers' decisions to employ our services and are thus a material aspect of our business.

C1.1b

(C1.1b) Provide further details on the board's oversight of climate-related issues.

Frequency with which climate-related issues are a scheduled agenda item	Governance mechanisms into which climate-related issues are integrated	Please explain
Scheduled – all meetings	<p>Reviewing and guiding strategy</p> <p>Reviewing and guiding major plans of action</p> <p>Reviewing and guiding risk management policies</p> <p>Reviewing and guiding annual budgets</p> <p>Reviewing and guiding business plans</p> <p>Setting performance objectives</p> <p>Monitoring implementation and performance of objectives</p> <p>Overseeing major capital expenditures, acquisitions and divestitures</p> <p>Monitoring and overseeing progress against goals and targets for addressing climate-related issues</p>	<p>Due to the overlapping nature of WM climate-related issues, they are discussed, in whole or in part, at each meeting through one or all of the following governance mechanisms: strategy, major plans of action, risk management policies, annual budgets, business plans, performance objectives, major capital expenditure, and progress against goals and targets for addressing climate-related issues. Specifically, reviewing and guiding strategy is scheduled into every board meeting to inform the entire board and contribute to managing information, making decisions about what the company will do, and adapting those decisions based on climate-related information. Issues discussed in the reporting year include (1) the ability to provide carbon-reduction services such as recycling, composting, low-carbon/renewable energy, and consulting/in-plant services; (2) direct GHG reductions from changes associated with our fleet, use of renewable energy, operational efficiencies, and landfill gas to energy; (3) physical risk of severe weather to our employees, facilities, and ability to provide services. Successful management of these issues relies not only upon significant investment in for example, collection of landfill gas and production of renewable natural gas and technologically advanced material recovery facilities and robotics, but also an overarching strategic plan to address the financial viability of recycling, deployment of capital in our fleet, and continued increase in the WM's development of landfill-gas-to-fuel facilities. Therefore, reviewing and guiding strategy at each board meeting is essential to meeting goals and targets.</p>

C1.2

(C1.2) Provide the highest management-level position(s) or committee(s) with responsibility for climate-related issues.

Name of the position(s) and/or committee(s)	Responsibility	Frequency of reporting to the board on climate-related issues
Chief Executive Officer (CEO)	Both assessing and managing climate-related risks and opportunities	More frequently than quarterly
Chief Financial Officer (CFO)	Both assessing and managing climate-related risks and opportunities	More frequently than quarterly

C1.2a

(C1.2a) Describe where in the organizational structure this/these position(s) and/or committees lie, what their associated responsibilities are, and how climate-related issues are monitored (do not include the names of individuals).

Responsibilities for climate-related issues have been assigned to our CEO because the CEO sets short and long-term strategy, including strategy for investment and risk/opportunity forecasts for WM's climate related services, in particular recycling, renewable energy and fuel production, fleet emissions reduction, and environmental consulting. As North America's leading post-residential recycler and a major producer of renewable energy from waste, climate related services are core to our operations. WM's CEO is responsible not only for quarterly reviews of the finances for these services and the competitive landscape, he is the public face of WM and the industry more broadly. He routinely discusses our climate-related services in investor-related media, the annual Waste Management Sustainability Forum (which is also livestreamed), and in numerous presentations to trade associations and annual conventions. He relies on the specific quarterly data from department managers (i.e., operations, recycling, renewable energy, investor relations, sales and marketing) for real-time refinement of longer-term WM investment and profitability goals and forecast. Note that changes in public understanding of the scope, impact and timing of physical changes associated with climate change are a necessary component of this analysis because perceptions of carbon-reduction urgency impact customer service requirements, services selected and the stability of pricing for recycling, waste reduction and renewable energy sales. The CEO also interacts directly with major institutional investors, who increasingly engage in specific discussions of market conditions for recycling and the profitability of renewable energy.

The CEO reports to the Board of Directors. Reporting to him on climate-related issues are the CFO, the chief Legal Officer, the EVP and Chief Operating Officers, and the Chief Customer Officer and indirectly the Senior Director for Sustainability and Policy, the VP of Recycling Operations, and the VP of Corporate Development & Innovation.

Responsibilities for climate-related issues have also been assigned to our CFO because the CFO works closely with the CEO on all financial implications of WM's climate related services, including specifically tax credits on the state and federal level, changes in costs of service, trends in pricing of services (including global commodity prices, SG&A for consulting personnel, etc.), and has responsibility for monitoring and auditing risk management performance on an operational level.

The CFO reports to the President and CEO. Reporting to her on climate-related issues are the Treasurer, the VP of Supply Chain and Chief Procurement Officer, the VP Tax, the Director of Planning & Strategy and indirectly the Senior Director of Investor Relations.

C1.3

(C1.3) Do you provide incentives for the management of climate-related issues, including the attainment of targets?

Yes

C1.3a

(C1.3a) Provide further details on the incentives provided for the management of climate-related issues (do not include the names of individuals).

Who is entitled to benefit from these incentives?

Chief Executive Officer (CEO)

Types of incentives

Monetary reward

Activity incentivized

Emissions reduction project

Comment

The WM CEO has set goals for conversion to lower GHG emissions fleet, engages with the investment community on the importance of lower GHG emissions vehicles and reducing landfill emissions, frequently does presentations on carbon reduction services like recycling, and is rewarded for his leadership on this matter.

Who is entitled to benefit from these incentives?

Management group

Types of incentives

Monetary reward

Activity incentivized

Efficiency project

Comment

Management is rewarded for execution of WM's programs and policies tied to reducing greenhouse gases from fleet vehicles by using alternative fuels and reducing fuel use and vehicle miles.

Who is entitled to benefit from these incentives?

Process operation manager

Types of incentives

Monetary reward

Activity incentivized

Efficiency project

Comment

Management is rewarded for execution of WM's logistics efficiency protocols, which reduce fuel use, vehicle miles and emissions.

Who is entitled to benefit from these incentives?

Environment/Sustainability manager

Types of incentives

Monetary reward

Activity incentivized

Efficiency project

Comment

Environmental managers are rewarded for success in achieving regulatory and internal corporate goals to reduce emissions, e.g., seek efficiency in operating gas collection systems, seek to employ "green remediation" practices, seek energy efficiencies.

Who is entitled to benefit from these incentives?

Chief Financial Officer (CFO)

Types of incentives

Monetary reward

Activity incentivized

Emissions reduction project

Comment

The WM CFO is responsible for managing the allocation of capital and the costs of operation of our climate-related services, including management of costs entity-wide in support of sustaining recycling infrastructure in times of commodity price volatility.

C2. Risks and opportunities

C2.1

(C2.1) Describe what your organization considers to be short-, medium- and long-term horizons.

	From (years)	To (years)	Comment
Short-term	0	3	This short-term time horizon is aligned with the following other business practice time horizons: (1) WM annual budget and financial reporting. (2) Analyzing risk of economic collapse of recycling programs and opportunities for improving the economics of recycling programs. (3) Risk and opportunity from increased frequency and intensity of hurricanes, floods, fires, and droughts.
Medium-term	3	10	This medium-term time horizon is aligned with the following other business practice time horizons: (1) WM five-year strategic planning process. (2) Meeting new goals for recycling and production of renewable natural gas (2025 and 2038), with an overarching goal of offsetting 4 times the GHG emissions we generate through our operations. (3) We are focused on deployment of the lower-carbon technologies we have already commercialized and identifying geographic targets for our commercial recycling and green fuel projects over a 5-year time frame. (4) Our Sustainability Services consulting group works with our customers to achieve sustainability and climate change goals along this same time horizon.
Long-term	10	30	This long-term time horizon is aligned with the following other business practice time horizons: (1) Infrastructure Investments (10 and 20 years).

C2.2

(C2.2) Select the option that best describes how your organization's processes for identifying, assessing, and managing climate-related issues are integrated into your overall risk management.

Integrated into multi-disciplinary company-wide risk identification, assessment, and management processes

C2.2a

(C2.2a) Select the options that best describe your organization's frequency and time horizon for identifying and assessing climate-related risks.

	Frequency of monitoring	How far into the future are risks considered?	Comment
Row 1	Six-monthly or more frequently	>6 years	WM goes through steps to capture the impact and sensitivity of risks based on the operational or economic driver of the risk, including current and future impact of climate change to its business operations. WM's Executive Officers, Board of Directors and Audit Committee, Government and Regulatory Affairs, Corporate Public Affairs and Disposal Operations, WM Sustainability Services, Public Sector Service group, Venturing group, and Engineering department each have specific roles in assessing risk and risk management, adapting processes and integrating them into the Company's strategy, including short- and long-term frames and customer preferences and service offerings. With regard to recycling and the carbon reductions it provides, this calibration is quarterly; with regard to broader issues (renewable fuels market, trends in organics, and industrial waste reduction consultancy), frequency is at least twice a year with more frequent review as relevant.

C2.2b

(C2.2b) Provide further details on your organization's process(es) for identifying and assessing climate-related risks.

At the corporate level, WM uses an enterprise risk management (ERM) process involving senior leaders and subject matter experts from all major divisions to assess the materiality of all risks across the enterprise. Facilitated by our Treasury & Risk Management department, a standardized risk profile created for each headline risk is submitted to the Senior Leadership Team and the Board of Directors. The risk profile includes those from climate change specifically as well as risks to our climate related services (recycling, renewable energy production, fleet deployment). Environmental service sector risks also include risks of the emergence of disruptive technology as customers seek means to meeting waste diversion goals to meet climate related GHG reduction goals. The ERM process enlists Government Affairs, Public Sector, Industrial Sales, Legal, Recycling, Engineering, Venturing and WM Sustainability Services to benchmark risks, ranking them by likelihood and severity, known controls to mitigate the risk, and metrics to be employed to monitor the risks. External stakeholders and independent organizations are consulted on an on-going basis (the identity of these groups is disclosed in WM's biennial sustainability reporting), providing the equivalent of open-source advice on risks and mitigation. The Board is informed of risks, including environmental and regulatory risks associated with climate change, in terms of likelihood of occurrence and impact. Minimal risk is under 10% likelihood, moderate is 10-51%, strong is over 52%. For climate-related risk, potential costs are between \$25M and \$100M, or up to a 1% reduction in profits and therefore a substantive financial impact of moderate magnitude.

In 2017, changes in the recycling market – one of the company's two central climate related services -- reduced the company's revenues by \$0.03 per diluted share in comparison to 2016. The additional decline in market prices for recycling commodities resulted in a decrease in revenue of \$273 million in 2018. Note the risk includes only the proportion of revenues attributable to recycling services, and the "substantive impact" noted is felt entity-wide. Recycling is among WM's investors' major concerns, arising in nearly every investor call in the past year.

C2.2c

(C2.2c) Which of the following risk types are considered in your organization's climate-related risk assessments?

	Relevance & inclusion	Please explain
Current regulation	Relevant, always included	Current regulations are a relevant risk and always included in WM's climate-related risk assessments because of their effects on operating costs, operational flexibility and investment in new projects. Our Government and Regulatory Affairs team monitors regulations at a company-wide level, including climate-related regulations, which feed into quarterly or biannual enterprise risk management strategy. Examples of specific risks related to current regulations include air emission limits and renewable transportation fuel standards. (i) Federal regulation of MSW Landfills: On August 29, 2016, the US EPA promulgated two new rules: New Source Performance Standards (NSPS) for new or expanded MSW Landfills (40 CFR 60 Subpart XXX) and Emission Guidelines (EG) for Existing MSW Landfills (40 CFR Subpart Cf). The NSPS XXX and EG Cf include a more stringent emissions threshold (limit) compared to the 1996 MSW Landfill rules still in effect (40 CFR 60 Subpart WWW and 40 CFR 60 Subpart Cc). The lower emissions threshold will require sites to install gas collection and control technology earlier to mitigate landfill gas emissions and will also require sites to operate the technology longer compared to the 1996 rules. WM and municipal landfill owners identified legal and technical issues with the rules that complicated state implementation. EPA committed to reconsidering certain technical aspects of the rules and planned to issue a new proposal in Spring of 2019 (still pending). (ii) At the same time, EPA is conducting a Risk Technology Review to determine whether unacceptable residual risks remain at regulated landfills, and whether revisions to the National Emission Standards for Hazardous Air Pollutants (NESHAP) for MSW Landfills are necessary. (iii) WM produces renewable natural gas (RNG) by upgrading landfill gas to pipeline quality. The fuel is used to power vehicles and qualifies for cellulosic biofuel credits under the Federal Renewable Fuel Standard (RFS). The RNG reduces GHG emissions by 90% compared to the diesel fuel it replaces. WM's multi-million-dollar projects are subject to RFS requirements, and their success depends upon a stable credit market backed by a stable regulatory program.
Emerging regulation	Relevant, always included	Emerging regulation is a relevant risk we evaluate and include in WM's climate-related risk assessments because of the potential effects on operating costs, operational flexibility and investment in new projects. Our Government and Regulatory Affairs team monitors regulations at a company-wide level, including climate-related regulations, which feed into quarterly or biannual enterprise risk management strategy. An example of a WM-specific risk related to emerging regulation and considered in our assessment is diversion of organic materials from our MSW landfill assets. California Senate Bill (SB) 1383 set statewide 2030 emission reduction target of 40% for methane. SB 1383 includes the directive for addressing landfill methane emissions via diversion of organic material from the waste stream. The Short-lived Climate Pollutants (SLCP) Reduction Strategy was developed pursuant to SB 1383 and led to the development of regulations that to reduce the level of the statewide disposal of organic waste by 50 percent of 2014 levels by 2020 and 75 percent of 2014 levels by 2025. Mandated organics diversion will increase capital and operational costs related to design/build of new infrastructure to separately manage the organics. The California Air Resources Board has established a ban of organics from MSW landfills, which will limit future opportunities to convert organics-associated methane to beneficial use at MSW landfills.

	Relevance & inclusion	Please explain
Technology	Relevant, always included	Technology is a relevant risk and always included in WM's climate-related risk assessments because it has the ability to impact our logistics capacity. WM's Executive Officers, Board of Directors and Audit Committee, Digital Group, Government and Regulatory Affairs, Corporate Public Affairs and Disposal Operations, WM Sustainability Services, Public Sector Service group, Venturing group, and Engineering department all monitor technology, including climate-related impacts and solutions, which feed into quarterly or biannual enterprise risk management strategy. One of WM's means to reduce risk by reducing GHG generation focuses on logistical means to lower our carbon footprint. The technology to most efficiently route trucks and the tools to assure maximum truck performance are continuously evaluated. Similarly, one of our central GHG reduction services is recycling, which also faces both technology constraints related to changes in the waste stream and bound feedstock quality variability. This has required investments in new processing equipment and finding automated ways to perform sorting tasks for which the available labor pool is most constrained. These technology developments include new robotics and additional optical sorting equipment, use of augmented reality tools to enhance technicians' capacity, as well as the latest innovations in screens and other equipment.
Legal	Relevant, always included	"Legal" is a relevant risk we evaluate and include in WM's climate-related risk assessments in the form of legal review, to assure compliance, consistency with contract obligations, and reporting requirements. WM's Executive Officers, Board of Directors and Audit Committee, Legal Department, Government and Regulatory Affairs, Corporate Public Affairs monitor legal risks, which feed into quarterly or biannual enterprise risk management strategy. An example of WM-specific risk related to legal review and considered in our assessment is assuring operations are meeting a municipal customer's recycling goal (which is aligned with the general GHG reduction goal) by producing the recyclable quality demanded by the contract. WM's legal team is mitigating the risk of recycling by reviewing all contracts for opportunities to improve the quality of material collected for recycling, as well as the economics of these programs given the deteriorated market conditions originally stemming from China's import policies, which are directly related to GHG emissions and climate change activities.
Market	Relevant, always included	The Market is a relevant risk we evaluate and always include in WM's climate-related risk assessments because any shifts in market demand and commodity prices have significant impacts on the on-going financial viability of our fixed assets, as well as customer preferences and procurement trends. WM's Executive Officers, Board of Directors and Audit Committee, Government and Regulatory Affairs, Corporate Public Affairs and Disposal Operations, WM Sustainability Services, Public Sector Service group, Venturing group, and Engineering department monitor climate-related market impacts and solutions, which feed into quarterly or biannual enterprise risk management strategy. Examples of WM-specific risks related to the market and considered in our assessment are WM's recycling capacity, which is capital intensive with 103 material recovery facilities (MRFs) in North America, and thousands of municipal contracts, which are fixed for often long terms. China's ban on receipt of recyclables has had dramatic impact on global markets, the geography of WM's commodity sales and prices, and our search for domestic and international outlets for these commodities. According to U.S. EPA's Waste Reduction Model, lifecycle greenhouse gas emissions are avoided when mixed recyclable material is recycled into new products instead putting this material into a landfill and using virgin material.
Reputation	Relevant, always included	Reputation is a relevant risk and always included in WM's climate-related risk assessments because WM is a full-service environmental services company, and part of our value as a service provider includes our anticipation and response to risk and threats. WM's Executive Officers, Board of Directors and Audit Committee, Government and Regulatory Affairs, Corporate Public Affairs and Disposal Operations, WM Sustainability Services, Public Sector Service group, Venturing group, and Engineering department monitor reputational risk, including climate-related reputational risk, which feeds into quarterly or biannual enterprise risk management strategy. An example of a WM-specific risk related to reputation and considered in our assessment is our ability to mitigate the impacts of China's new import policies. WM realized early the reputational risk associated with the perception of landfilling recyclables and we made a corporate decision to continue to move our material to available markets even at a cost. We worked with municipal customers to engage their support in improving commodity quality and marketability to, avoid landfilling of recyclables. Our investments in our WM's Recycle Often. Recycle Right.® training program provided municipal and private customers with tools to engage the community to reduce recycling contamination and therefore enhance the financial sustainability of recycling programs. Our ability to sustain our investment in recycling infrastructure even in the face of highly variable commodity prices is an intangible value realized in our ability to compete in the environmental service market. We have worked to educate our customers about the long-term negative impacts of eliminating recycling programs, encouraging ongoing collection – even at higher costs. Our demonstrated progress in providing GHG reducing services like recycling and production of renewable energy differentiates us, and our reputation for leadership in this area affords the opportunity to work with customers in support of the kinds of services and energy products that mitigate climate change.
Acute physical	Relevant, always included	Acute physical risk is relevant and always included in WM's climate-related risk assessments because WM incurs increased operational costs. Government and Regulatory Affairs, Corporate Public Affairs, Collection and Disposal Operations, WM Sustainability Services, Public Sector Service group, and Engineering department monitor climate-related acute physical risk, which feed into quarterly or biannual enterprise risk management strategy. Examples of WM-specific acute physical risks considered in our assessment are responding to and maintaining emergency response plans and supplies for drought-related fires and storm events at high-risk facilities, and damage to facilities; 24% of our material recovery facilities (MRFs), landfills and transfer stations are in medium to high flood areas, 53% are in high flood areas, and 11% are in extremely high flood areas; these are evenly spread across facility type. Fewer than 10% of our MRFs, landfills and transfer stations are in areas of medium to high drought severity. The unpredictability of severe weather events requires that our facilities be prepared to respond at all times, requiring significant investments in response planning, supplies and equipment. We maintain generators on site, fuel supplies, and even personal emergency supplies for onsite staff. Associated electricity outages and fuel shortages have the potential to exacerbate the initial impacts, which could reduce revenues and increase operational costs. WM updates site-specific continuity plans annually, expanding and improving these plans in response to recent, more extreme climatic events like Hurricanes Harvey and Irma. After these events, we identified some modest further adjustments in facility design and IT capabilities to mitigate this risk. We change the configuration of electrical systems, make provision for emergency fuel and upgrade our logistics capacity to maintain service in these events. We also prioritize our emergency planning by using climatological mapping. WM's emergency plans place an importance on ensuring the safety of our employees. By helping our employees, and offering extensive support, we are better able to quickly recover to also help our customers. Detailed plans with staff dedicated to our own employees have evolved over the years to play an important role in our emergency planning process.

	Relevance & inclusion	Please explain
Chronic physical	Relevant, always included	Chronic physical risk is relevant and always included in WM's climate-related risk assessments because operational costs are incurred to respond to these extremes. Government and Regulatory Affairs, Corporate Public Affairs and Disposal Operations, WM Sustainability Services, Public Sector Service group, and Engineering department monitor climate-related chronic physical risk, which feed into quarterly or biannual enterprise risk management strategy. An example of a WM-specific chronic physical risks considered in our assessment is the impact of changes in precipitation patterns on the function of MSW landfills. MSW landfills are weather exposed entities that are affected by both drought and flood conditions. Both types of weather can negatively impact integrity of the protective landfill cover which is largely comprised of soil and vegetation. Shifts in weather patterns could cause additional or exacerbate existing operational challenges. The protective soil cover prevents water infiltration. Heavy and repeat wet conditions can cause erosion which can negatively impact landfill gas and leachate collection activities. Drought conditions can also cause erosion of the soil cover. Both extreme conditions result in additional labor and materials required to maintain the protective soil cover in accordance with regulatory requirements. Sustained extreme conditions could also cause scarcity of cover soil materials.
Upstream	Relevant, always included	Upstream risks are relevant and always included in WM's climate-related risk assessments because increased costs impact procurement which can, in turn, impact greenhouse gas reduction goals. Government and Regulatory Affairs, Corporate Public Affairs and Disposal Operations, Supply Chain, WM Sustainability Services, Public Sector Service group, Venturing group, and Engineering department monitor upstream climate-related impacts, which feed into quarterly or biannual enterprise risk management strategy. An example of WM-specific upstream risk considered in our assessment is the risk of increased cost of new vehicles if tariffs impact the price of steel, which could reduce the number of lower-emission trucks we purchase. Achievement of WM's collection fleet carbon emissions goal is contingent upon efficiency/logistics improvements and conversion of the fleet from diesel to lower-emitting natural gas. WM dedicates capital to purchase 800-1000 natural gas collection vehicles each year, and capital to support the corresponding fuel infrastructure required for these trucks. Additional reductions can be attributed to our transition to Cummins-Westport's new ISL NZ engines. And, additional reductions are realized from the use of WM-generated renewable natural gas, which reduces GHG emissions by 90% versus the diesel trucks they replace. The price and availability of these vehicles (and the fueling infrastructure needed to power them) could be impacted if tariffs increase the price of steel, which may reduce the number of trucks we purchase. Note that GHG reductions from on-road fleet has been a core sustainability goal since 2007. Tariffs have been added to the cost of imported recycling equipment necessary increase our recycling operations services. Achieving our GHG emissions reduction goals is dependant on this investment.
Downstream	Relevant, always included	Downstream risks are relevant and always included in WM's climate-related risk assessments because volatile commodity prices impact revenue, WM's carbon footprint, and the carbon footprint of our customers. Government and Regulatory Affairs, Corporate Public Affairs and Disposal Operations, WM Sustainability Services, Public Sector Service group, Venturing group, and Engineering department monitor downstream climate-related impacts, which feed into quarterly or biannual enterprise risk management strategy. Examples of WM-specific downstream risks considered in our assessment are recycling commodity prices and renewable fuel pricing.. (i) Recycling commodity prices continued to be volatile in 2018 and sensitive to geopolitics. We monitor prices, trade policy, and in particular work closely with customers to sustain the infrastructure by changing contractual terms and by working with customers to mitigate the cost of recyclables too contaminated for sale (GHG reductions are realized when materials placed in recycling processing facilities can actually be reused in manufacturing). We seek to build support for the most productive (e.g., saleable) recycling by highlighting the specific carbon reductions our services provide customers. We developed a methodology for customers to evaluate the cost and the GHG reduction benefit of recycling individual commodities. This allows customers to choose how they would obtain the level of carbon reduction they could afford. We also created an "anti-contamination" campaign, called Recycle Often. Recycle Right.® with tools to educate consumers about how to enhance recycling productivity by eliminating contamination from materials that damage recycling equipment or degrade the physical value of recyclables with which the contaminants are comingled. (ii) WM is finding increased demand for renewable fuels, which reduce GHGs and in particular reduce NOx by over 90%. The Federal Renewable Fuels Standard and state incentive programs encourage investment in our facilities that produce renewable fuel from landfill gas. Similarly, our Organics Recycling Group has developed and taken to market technology to help divert food waste to a WM-designed technology that can be delivered to wastewater treatment facility digesters, substantially expanding renewable energy production and associated renewable fuel credits.

C2.2d

(C2.2d) Describe your process(es) for managing climate-related risks and opportunities.

At the company level, WM uses an enterprise risk management (ERM) process involving senior leaders and subject matter experts from all major divisions to assess the materiality of all risks across the enterprise. Facilitated by our Treasury & Risk Management department, a standardized risk profile created for each headline risk is submitted to the Senior Leadership Team (SLT) and the Board of Directors. If a headline risk or risks have trended over time, action is taken: the SLT is briefed on the risks with a scorecard for each. A headline risk with a high weighted average rating is identified as a "Priority Risk" and receives a more granular assessment, quantification of that risk, and is elevated for further discussion with the SLT and the Board of Directors.

Risks and opportunities are prioritized according to (financial) impact, likelihood (of event), outlook (of risk exposure) and confidence (in risk management). The executive team that manages our enterprise risk reporting to the Board reviews all submissions for consistency in determining scope of impacts, and comprehensiveness in determining the adequacy of current support by internal staff, the sufficiency of financial support for contractors or mitigation measures needed to manage and reduce risk, sufficiency of legal support, and the extent and sufficiency of third-party consulting support. All headline risks have a standardized scorecard which includes an overall weighted average rating, individual ratings for sub-risks, forward-looking action plans with measurable indicators and progress updates on action plans from previous assessments.

The environmental impacts, risks, and opportunities, including climate-related, associated with our carbon reduction service lines are discussed each year. WM's Corporate Venturing department briefs the Board at least annually on potentially disruptive technologies, sometimes related to customer expectations with regard to carbon reduction services. Moreover, the staff working on the ERM documentation coordinate with those drafting the risk factor description for the annual 10K to assure thoroughness in response.

The recycling industry provides an example of risk associated with changing customer preferences, and the risks associated with global policy changes. Commodity market values are 30% of 2017 levels and quality requirements are stringent, requiring more investment in improving the quality of recyclables sold. The shift to more plastic packaging combined with China's halt to imports of recyclables and the consequent impact on commodity pricing and quality expectations have impacted lifecycle greenhouse gas reduction benefits associated with recycling and meeting sustainability goals for WM and our customers. Considered a Priority Risk, recycling was analyzed and discussed by the SLT and the Board, who determined WM should be a sector leader, engage customers, and educate consumers and customers. WM created a focused campaign to engage our customers, both municipal contracts and commercial and industrial customers, by providing information necessary to maximize GHG reductions to be achieved by effective (contamination-free) recycling of the commodities providing the greatest life-cycle reductions at the lowest cost. Our Recycle Often. Recycle Right.® campaign works on-the-street to educate customers about proper recycling and has reduced inbound contamination from 24% to 19% at our recycling facilities, reducing costs and improving marketing of recyclables.

Severe storms provide an example of physical risk. Increased risk from severe storms, such as major hurricanes, flooding and fires in our service areas, impact WM facilities, employees and our ability to service customers. This headline risk resulted in discussions with SLT, impacted Area and Operations Managers. Emergency Preparedness and Contingency Response Plans were created for most at-risk business divisions, which were then used and continue to be used as templates for other business divisions to customize to their areas. Major hurricanes and fires in our service areas have subsequently demonstrated how our planning and commitment can assist our customers in rebounding rapidly from weather-related emergencies, strengthening our customer loyalty. For example, after Hurricane Sandy, a WM competitor experienced \$9 million in lost revenues. WM avoided this kind of loss and serviced the competitor's customers.

C2.3

(C2.3) Have you identified any inherent climate-related risks with the potential to have a substantive financial or strategic impact on your business?

Yes

(C2.3a) Provide details of risks identified with the potential to have a substantive financial or strategic impact on your business.

Identifier

Risk 1

Where in the value chain does the risk driver occur?

Direct operations

Risk type

Transition risk

Primary climate-related risk driver

Policy and legal: Enhanced emissions-reporting obligations

Type of financial impact

Increased operating costs (e.g., higher compliance costs, increased insurance premiums)

Company- specific description

Air pollution limits – Federal regulation of MSW Landfills: On August 29, 2016, the US EPA promulgated two new rules: New Source Performance Standards (NSPS) for MSW Landfills (40 CFR 60 Subpart XXX) and Emission Guidelines (EG) for Existing MSW Landfills (40 CFR Subpart Cf). The NSPS XXX and EG Cf include a more stringent emissions threshold (limit) compared to the 1996 MSW Landfill rules still in effect (40 CFR 60 Subpart WWW and 40 CFR 60 Subpart Cc), triggering earlier installation of control technology and requiring extended operation of control technology. The new rules also require additional surface emissions monitoring. More importantly, however, the rules failed to address overlapping requirements between the old and new rules as well as the existing National Emissions Standards for Hazardous Air Pollutants (NESHAPs) for MSW Landfills (40 CFR 63 Subpart AAAA) and Title V permit conditions which will apply simultaneously, triggering potential conflicts among requirements and confusion for state regulators and regulated entities. To further complicate matters, EPA is under court order to finalize revisions to the NESHAPs by March 2020 that may or may not align with the 2016 rule requirements. This confusion creates the potential for penalties and fines, which may negatively impact our ability to get municipal contracts, as well as our reputation with the investment community, which monitors regulatory compliance. The increased compliance costs could increase annual costs to WM by \$10M.

Time horizon

Short-term

Likelihood

Likely

Magnitude of impact

Medium-low

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

10000000

Potential financial impact figure – minimum (currency)

<Not Applicable>

Potential financial impact figure – maximum (currency)

<Not Applicable>

Explanation of financial impact figure

The 2016 Federal NSPS and EG rules require earlier installation of gas collection and control systems at some sites, and longer operation periods due to a lower emission threshold. Expanded monitoring, recordkeeping and reporting beyond the 1996 rules will add cost for each facility subject to the new rules. Surface emissions monitoring costs may double due. The 2016 rules include new recordkeeping elements (root cause and corrective action analysis for wellhead temperature and pressure exceedances) and new reporting requirements (annual liquids addition reporting and most sites will be required to modify existing Title V permits to incorporate the 2016 rule requirements, which translates to increased compliance costs potentially increasing annual costs by \$10M, as calculated by projecting increased equipment and IT systems costs. Changes to the NESHAPs rule in 2020 could potentially add to these projected costs.

Management method

WM assembled a coalition of (1) municipal and private sector landfill (LF) operators to engage U.S. EPA on the need for specific terms for making the new rules clear and consistent, to inform the public, and provide a reliable base of information on LF gas emissions to accurately project the GHG emissions reductions provided by conversion of LF gas to electricity and fuel, essential data in the event of a carbon pricing proposal that included LF gas; and (2) industry and state governments advocating for U.S. EPA to receive appropriations to correct this rule and maintain associated climate change informational sites and platforms to calculate GHG emissions from waste operations. WM foresees experiencing delays, and associated costs, in receiving updated air permits particularly as state agencies will be managing additional and unfamiliar permitting requirements. Because of omissions and conflicts between the existing and newly released regulations, all permitted parties are vulnerable to state-assessed penalties of up to \$37,500 per day. Note that the potential financial impact is \$10M/yr., not in total. The total annual costs for WM staff and legal and technical consultants is approximately \$1,000,000.

Cost of management

1000000

Comment

A coalition of the public and private sector has proven to be more effective than the private sector alone in engaging both state and federal governments in the need to reform a specific set of regulations. As a result, technical negotiations have ensued, and administrative and judicial actions have been filed, including a filing under the Regulatory Reform initiative which affords a procedural opportunity to petition for relief from paperwork inconsistency.

Identifier

Risk 2

Where in the value chain does the risk driver occur?

Direct operations

Risk type

Physical risk

Primary climate-related risk driver

Acute: Increased severity of extreme weather events such as cyclones and floods

Type of financial impact

Increased operating costs (e.g., higher compliance costs, increased insurance premiums)

Company- specific description

WM incurs increased operational costs from responding to and maintaining contingency response plans and supplies for severe storm events at its facilities due to the uncertainty of risk associated with severe weather events. Other impacts include service interruptions, risk of lost property and risk to employees. Impacts from climate change are reaching a broader swath of our business in North America. Our operations have been impacted by fires and floods in the West and by hurricanes, super storms, and tornadoes in the East, South and Midwest. WM has lost operating facilities-including buildings and fleets of trucks, and spends increasing amounts of staff time, investments in equipment, training and event management to mitigate the impacts of climate change on our employees, our customers and our operations. WM updates its contingency plans each year, including refreshing training and supplies, and communications to our customers. We have extensive plans for protecting our employees, facilities and equipment, from moving trucks to certain configurations another area to securing other equipment. We have generators, fuel and other supplies on site in those locations with a high risk of impact from wind, storm surges and flooding. Increasingly, we are planning for fires from droughts in the West and have escape and recovery plans for our employees. Electricity outages and fuel shortages have the potential to exacerbate the initial impacts, which in turn could reduce revenues and increase operational costs. The unpredictability of these events requires that we be prepared to respond at all times, requiring significant investments in response planning, supplies and equipment. WM has adjusted facility design and IT capabilities to mitigate our risk, changing the configuration of electrical systems, making provision for emergency fuel and upgrading our logistics capacity to maintain service in these events. We prioritize our emergency planning by using climatological mapping. Floods and fires in the West have required additional planning. Planning costs represent <1% annual operating cost. Increased operational cost is <0.05% annual operating cost. WM's emergency plans place an importance on ensuring the safety of our employees. By helping our employees, and offering extensive support, we are better able to quickly recover to help our customers.

Time horizon

Medium-term

Likelihood

Very likely

Magnitude of impact

Low

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

2500000

Potential financial impact figure – minimum (currency)

<Not Applicable>

Potential financial impact figure – maximum (currency)

<Not Applicable>

Explanation of financial impact figure

Financial implications from severe floods, storms and fires include repair of damaged facilities, equipment and loss of revenue from logistics interruption. Emergency plan development undertaken in response to climatic events has allowed us to improve our facility design and IT capabilities to mitigate this risk, which we estimate to be \$250,000 for each week of facility disruption, at each landfill located in the impacted area. The cost estimate assumes 10 impacted sites per year.

Management method

We manage these risks with business continuity planning, emergency response planning, innovations like use of vegetative cover for landfills to reduce repair costs, and continuing to map our facilities to identify those in water challenged areas. Actions taken: 1. Using GIS based spatial visualization program, Waste Analyzer and Visualization Explorer (WAVE), a multi-disciplinary tool that functions as a disaster management tool for our facilities in the field to anticipate potential impact of weather events and plan ahead to provide efficient services in aid of clean-up and disaster recovery. Hurricane and weather warning data layers were updated in 2018. 2. After significant events, we review and update our plans and implement any new mitigation measures that we identify 3. WM Areas identified through these processes incorporate mitigation measures like elevation of equipment, use of in-vehicle internet capability to assure efficient logistics during storm events and during the subsequent cleanup when we provide essential services. In 2018, we have dedicated landfill space to fire debris clean up in California. Our business continuity planning carefully monitors fuel prices, availability and relies on the natural hedges resulting from our development and use of a variety of fuels (petroleum, NG, CNG, electricity). For emergency response, our disaster plan now calls for prepositioning of fuel supplies in vulnerable areas.

Cost of management

100000

Comment

Identifier

Risk 3

Where in the value chain does the risk driver occur?

Direct operations

Risk type

Transition risk

Primary climate-related risk driver

Reputation: Shifts in consumer preferences

Type of financial impact

Other, please specify (Market: Reduced demand for services/supply of goods due to shift in consumer preferences)

Company- specific description

Waste Management is the largest residential recycler in North America with 9% of our revenue coming from our recycling operations. Recycling is a service differentiation that is critical to our market advantage for 50% of our annual revenues. Our customers value our recycling services for the GHG emissions reductions that we provide to them through these services. As global attention focuses on packaging in general, and more specifically on plastic, there is an increasing risk of regulation of plastic and bulky cardboard packaging. For example, Amazon has recently implemented a requirement for all mid to large size items to be "Shipped in Own Container" (SIOC) to reduce packaging and is using plastic shipping mailers for certain products. Cardboard is the largest quantity of material that WM sells, and a reduction in cardboard will have negative financial impacts on the company. In a short period of time, the global attention on the impacts to the environment has increased the risk of regulation that may cause financial damage to WM. Possible risks include: 1) Extended Producer Responsibility (EPR) where producers manage packaging at end of life 2) laws that reduce packaging in the waste stream 3) incentives for alternatives for this material 4) Taxes and fees on landfills. With the severe commodity market downturn, the threat of regulations has increased as communities look for relief from the rising cost of recycling. Several states are pushing to enact legislation that would transfer the cost and responsibility for recycling over to the manufacturing industry. The risk to our industry is significant since the need for our existing infrastructure investments would be uncertain with EPR.

Time horizon

Medium-term

Likelihood

About as likely as not

Magnitude of impact

Medium

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

300000000

Potential financial impact figure – minimum (currency)

<Not Applicable>

Potential financial impact figure – maximum (currency)

<Not Applicable>

Explanation of financial impact figure

Our risk management process has quantified the risk associated with lost recycling contracts at \$200MM. Another \$100 MM is at risk from packaging reductions, for a total of \$300 MM of at-risk revenue associated with changes to our recycling programs.

Management method

Packaging trends can change quickly, historically with little warning but large repercussions to the management of post-consumer waste. Material type manufacturing can determine if packaging is reused, recycled, composted or sent to landfill, and if that end-of-life has the greatest environmental benefit; communication of end-of-life management determines if the packaging ends up where it was intended; ease-of-use and services available to the consumer determine if the greatest environment benefit is realized. Choices made in each phase impact GHG reductions for WM and our customers. WM works with a variety of stakeholders including the packaging and CPG industries, other trade organizations and our customers to understand packaging trends, educate all parties of the risks and benefits of various types of packaging, and the importance of recycling as it reduces GHG emissions. Results so far are that challenges are better understood by all participants in the packaging value chain; material recovery facility (MRF) technologies are advancing to be able to adjust to changes in materials (optical sorter, robotics, movable screens/conveyors); manufacturers are becoming more aware of the need to use recycled content; circular economy trends are becoming part of more common dialect. The cost of management includes the design of a new MRF to handle the changing materials in the recycling stream, increased staff time, and participating in stakeholder organizations.

Cost of management

1250000

Comment

C2.4

(C2.4) Have you identified any climate-related opportunities with the potential to have a substantive financial or strategic impact on your business?

Yes

C2.4a

(C2.4a) Provide details of opportunities identified with the potential to have a substantive financial or strategic impact on your business.**Identifier**

Opp1

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Products and services

Primary climate-related opportunity driver

Development and/or expansion of low emission goods and services

Type of financial impact

Increased revenue through demand for lower emissions products and services

Company-specific description

(i) WM has invested heavily in its compressed natural gas fleet and is now using renewable natural gas fuel in this fleet, which reduces GHGs by over 90% and NOx 90%. The Federal Renewable Fuels Standard (RFS2) and state incentive programs (low carbon fuel credits) encourage investment in our facilities that produce renewable fuel from landfill gas. As of the end of 2018, WM has 4 facilities that create RNG from methane from our landfills. The fuel is placed into the natural gas pipeline, displacing the use of fossil fuel with RNG. WM expects to invest \$350 MM to build seven new RNG facilities at our landfills in the next six years. With renewable fuel incentives, the financial benefits of RNG used in our CNG trucks is important. At the same time, we reduce our emissions by over 90%. (ii) Our Organics Recycling Group has also developed, and taken to market in several states with organic management policies, technology to help municipalities substantially expand the renewable energy produced from their wastewater treatment facilities. These treatment plants, created to meet strict Clean Water Act discharge standards, can produce revenue from increased sale of renewable fuel. WM has contracts with wastewater facilities in Los Angeles, CA, Boston, MA, Elizabeth, NJ and NY, NY to use its CORE® technologies to deliver a food waste-derived bioslurry that can be used to create renewable fuel credits. The use of renewable fuel also decreases our risk associated with increasing prices of fossil fuel.

Time horizon

Medium-term

Likelihood

Virtually certain

Magnitude of impact

Medium

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

650000000

Potential financial impact figure – minimum (currency)

<Not Applicable>

Potential financial impact figure – maximum (currency)

<Not Applicable>

Explanation of financial impact figure

The financial implications of pursuing organic waste derived fuel and energy technologies may include enhanced business growth in new and established lines of business. According to US EPA's 2015 Facts and Figures (most updated report), 15.1% of waste generated is food. Six states and numerous cities require source separation of food waste for diversion from landfills: NY, CA, VT, CT, RI and MA. WM's CORE® solution can process up to 13 million tons of organics, 15.1% of the 90 M tons of waste managed/year. Assuming a fee equal to landfill disposal, CORE® is a \$650 M/year opportunity for WM. Executing our newer alternative fuel and energy activities sometimes results in additional business for WM's recycling, reuse and waste hauling businesses. The financial implications of not pursuing organic waste derived fuel and energy technologies could result in a loss of revenue of less than 5% of our \$14.5B revenue for 2018.

Strategy to realize opportunity

WM's Renewable Energy, Government Affairs, Legal, Organics and Public Sector Sales teams coordinate to sustain and increase legislative and regulatory support for renewable energy. Low-carbon and renewable energy from 130 WM landfills fuel electricity generators, with the electricity then sold to public utilities, municipal utilities or power cooperatives and is used at the landfill or delivered by pipeline to industrial customers as a direct substitute for fossil fuels in WM's fleet and industrial processes. Cost to realize opportunity comes from WM investment of \$350MM in 12 RNG fuel projects, with the cost offset by revenue gained by operating the business and benefits of other lines of business. WM creates enough energy through our waste-to-energy operations to power nearly one-half million homes; 2.4M tons of carbon dioxide equivalent is indirectly offset as a result of our renewable fuels projects. WM also has contracts with wastewater facilities in Los Angeles, Boston, Elizabeth, NJ and NY, NY to use its CORE® technology, which provides municipalities a cost-effective means to convert organic wastes into increased production of renewable energy and creates renewable fuel credits, and landfill gas to fuel facilities that provide RNG to our natural gas collection fleet. In California, WM's Organics Group is implementing organics processing facilities to support the state's plan to eliminate organics in its landfills in 2 to 3 years in line with SB32 implementation.

Cost to realize opportunity

350000000

Comment

Identifier

Opp2

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Resilience

Primary climate-related opportunity driver

Resource substitutes/diversification

Type of financial impact

Increased revenue through new products and services related to ensuring resiliency

Company-specific description

(i) Extreme weather events do not produce "opportunities"; they produce loss and hardship. However, our services are an important means to assist the community and relieve hardship. WM facilities are equipped and WM personnel are trained to respond quickly and safely to certain damage caused by extreme weather events such as storms, floods and fires, and we do so when such services are needed. (ii) WM facilities have equipment, supplies and trained staff to secure our operations after damage from extreme weather events. They also can offer assistance to others who may not be well equipped. WM facilities offer the equipment and skills needed for early response and clean-up after extreme events, securing and preserving the health and property of the communities we serve. WM is proud to be able to offer these services, as well as support for later-phase state and federally mandated clean-ups, to help the communities we serve recover from events as quickly, safely, and cost effectively as possible. After Hurricanes Irma, Harvey and Michael in 2017 and 2018, WM determined that its emergency response planning avoided damage to WM assets and a faster response to serve the impacted communities. Lessons from storm events has informed our ongoing emergency planning for elevating electrical equipment, adding generator capacity, upgrading logistical capabilities during storm events at priority sites identified by climatological mapping. We have seen that annual, ongoing preparation and improvements have successfully mitigated our risk of losses due to uncontrollable events.

Time horizon

Medium-term

Likelihood

Very likely

Magnitude of impact

Medium-low

Are you able to provide a potential financial impact figure?

Yes, an estimated range

Potential financial impact figure (currency)

<Not Applicable>

Potential financial impact figure – minimum (currency)

5000000

Potential financial impact figure – maximum (currency)

25000000

Explanation of financial impact figure

Providing safe disposal of contaminated soil and other materials after extreme weather events can be a multi-year project. In 2018, WM was still cleaning up the Carr and Tubbs fires and hurricanes Harvey and Irma. WM was selected to help clean up the devastation from the Paradise Fire in Northern California, which is also anticipated to be a multi-year, multi-million-dollar project. Costs for emergency response planning are less than 0.05% of operating costs. Profits from one event in one year can range from \$5 million to \$25 million.

Strategy to realize opportunity

WM has support infrastructure in place to respond to extreme weather events that may potentially affect its businesses and customers. It is a phased approach that begins 7 days prior to landfall in the case of a hurricane (beyond scheduled annual preparation efforts) and focuses on protection of physical assets and employees before the severe weather event. WM's plans have established standardized lines of communication and prearranged methods of communication post-event to account for all employees, communication with customers and re-establishment of services. Each operating site has a Waste Management Continuity Plan in accordance with the Company's guidance document, which is then used to make site-specific plans. These change annually or more often based on area needs. After each event, we revise our plans with knowledge gained. In 2018, these modifications are estimated to cost less than 0.05% of operating costs; profits from one storm event in one year exceeded \$1 million. In 2018, these modifications continue to entail costs estimated at the equivalent of less than 0.05% of operating costs.

Profits from one storm event in one year exceeded \$1 million. The magnitude of the clean-up from the Paradise Fire is uncertain, but is anticipated to be more than a storm event due to the large volumes of contaminated soil and debris that must be carefully managed to protect the environment.

Cost to realize opportunity

100000

Comment

Identifier

Opp3

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Markets

Primary climate-related opportunity driver

Access to new markets

Type of financial impact

Increased revenues through access to new and emerging markets (e.g., partnerships with governments, development banks)

Company-specific description

Recent consumer response to climate change and the circular economy movement could result in more value being assigned to opportunities for reuse, recycling, use of renewable alternative fuels and renewable energy, and sustainability consulting offerings. This would enhance the revenue generation of these products and services and could give us a market advantage because of the breadth of our offerings both in variety of technology and locations, including locations not commonly provided with these opportunities. WM has launched a major educational campaign to inform consumers about the benefits, including carbon reduction benefits (i.e., displaying the CO2e reductions per ton of commodity recycling), of recycling. We are partnering with The Recycling Coalition, Keep America Beautiful, the National Waste and Recycling Association, Solid Waste Association of North America (SWANA), The Institute for Scrap Recycling Industries (ISRI), numerous associations representing consumer product manufacturers, U.S. EPA and local governments to increase recycling rates and thereby achieve carbon reductions beyond those to which WM has committed as a company. We sponsored the Coalition for Sustainable Materials Management, which authored two reports on increasing recycling and more sustainable materials management throughout the life cycle of consumer and business product use. See <http://www.michaeldbaker.com/portfolio-items/sustainable-materials-management-coalition/> The cost associated with this campaign are internalized. The potential benefits of significantly increased recycling are enormous. According to EPA, in 2015 91 million tons of recycled or composted waste provided an annual benefit of more than 182 million metric tons of carbon dioxide equivalent emissions reduced, comparable to the annual GHG emissions from more than 39 million passenger vehicles.

Time horizon

Medium-term

Likelihood

Very likely

Magnitude of impact

Medium

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

100000000

Potential financial impact figure – minimum (currency)

<Not Applicable>

Potential financial impact figure – maximum (currency)

<Not Applicable>

Explanation of financial impact figure

Customers change their behavior due to financial incentives or other policies implemented in response to climate change and the limited supply of resources. WM is investing in methods and projects to facilitate our customers' ability to act on their concerns. If our recycling revenue of \$1.6B were to grow 5% due to changing consumer behavior and increased recycling demand, revenues could increase over \$100M. Reducing contamination by the consumer when producing the recyclables we receive saves us \$125

per ton in processing costs and lost commodity sales, and it lowers our potential GHG reductions from recycling. To improve consumer recycling practices, we have implemented a public education campaign called Recycle Often. Recycle Right.® See <http://recycleoftenrecycleright.com/>.

Strategy to realize opportunity

Groups within WM compile supply chain questionnaires to understand customer trends and tailor our service offerings to market demand, which are analyzed for each of the business units offering sustainability services. Annually, our assessment of trends in customer demand, sustainability mandates and incentives are checked in comparison with interviews of representative third-party experts. Actions taken: 1. WM offers innovative renewable fuels such as Renewable Natural Gas (RNG). WM's single-stream recycling system allows consumers to put all recyclables into one bin, resulting in up to 40% increase in volumes of recyclables collected. Over the life cycle, recycling avoids emissions related to resource extraction, and single stream reduces emissions from transportation and processing. 2. Our single-stream recycling activities focused on our Recycle Often. Recycle Right.® public campaign to increase productivity from community recycling programs. 3. WM has 132 natural gas fueling facilities, 25 of which serve the public. The costs of developing new technologies to respond to customer demand, and to make it easy for the customer to respond are not sunk costs, these are investments that are fully intended and expected to generate revenue and profit for the company. If our recycling revenue were to grow 5% due to changing consumer behavior and increased recycling demand, revenues could increase over \$100M.

Cost to realize opportunity

12000000

Comment

Identifier

Opp4

Where in the value chain does the opportunity occur?

Customer

Opportunity type

Products and services

Primary climate-related opportunity driver

Development of new products or services through R&D and innovation

Type of financial impact

Better competitive position to reflect shifting consumer preferences, resulting in increased revenues

Company-specific description

Reputation is very important to WM. We have worked very hard at developing a reputation as a "green" company: a company that works hard to know our customers better, extract more value from materials, and innovate and optimize business better than any other service provider. Our reputation is a key reason we obtain opportunities to work with sustainability leaders, and to invest in innovative technologies and projects. WM has been successful in undergoing a focused transformation from being a responsible waste disposer to a full-service environmental solutions provider. Through our customized recycling and organics offerings, as well as its Sustainability Services consulting arm, WM offers our municipal, commercial and industrial customers a broad range of programmatic and consulting services. Our team of sustainability experts combines subject-matter expertise in engineering, architecture, environmental science, operations and business with WM's vast asset resources to not only design tailored sustainability programs, but also to implement and manage the programs. In addition to evolving service offerings, we continue to invest in consulting services to meeting our customers evolving needs. We are capitalizing on existing reputation and logistical assets in waste recovery and sharpening our focus on recycling and integration with consulting and project management services. This evolution has increased customer satisfaction and has enabled the company to grow its customer base as our customers' expectations for "green" services have changed.

Time horizon

Long-term

Likelihood

Likely

Magnitude of impact

Medium

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

14900000

Potential financial impact figure – minimum (currency)

<Not Applicable>

Potential financial impact figure – maximum (currency)

<Not Applicable>

Explanation of financial impact figure

Increasing public desire to address climate change and its recognition that sustainable practices such as recycling and renewable energy are means to do so have enhanced WM's reputation for service innovation and its competitive position with customers with sustainability goals. We are able to demonstrate that in 2018 we processed 15.2M tons of recyclables, used renewable energy equivalent to 2.6M tons of coal, and preserved 25,000 acres of land in certified wildlife habitat. Therefore, the financial implications of not capitalizing on innovations driven by sustainability practices due to climate change and its positive implication to WM's business would likely result in a loss of revenue of approximately 10% of our \$14.9B revenue for 2018.

Strategy to realize opportunity

We enhance our reputation by disclosing our capabilities and achievement in recycling and renewable energy generation in sustainability reports, using the Waste Management Phoenix Open, widely-televised and the most-attended PGA TOUR golf tournament, to show how major public venues, stadiums and arenas can increase recycling, approach zero waste, and employ other renewable energy sources into venue operations and in ongoing communications that convey WM's sustainability goals and progress. This reinforces, externally and throughout our workforce, our commitment to recycling and renewable energy generation. In 2018, WM processed 15.2M tons of recyclables, used renewable energy equivalent to 2.6M tons of coal, and preserved 25,000 acres of land in certified wildlife habitat. The costs of transformation from a disposal-based company to a materials management company have required investment in processing infrastructure to meet our customers processing expectations. These investments are fully intended and expected to generate revenue and profit for the company, now and for many years into the future. For example, the cost of the innovations we bring to "greening" events like the Phoenix Open is being offset by marketing and sales opportunities. In 2018, the cost thus remains zero.

Cost to realize opportunity

0

Comment

C2.5

(C2.5) Describe where and how the identified risks and opportunities have impacted your business.

	Impact	Description
Products and services	Impacted	(i) Extreme weather events do not produce "opportunities"; they produce loss and hardship. However, our services can be an important means to assist the community and relieve hardship. WM facilities exhibit resilience by having equipment, supplies and trained staff to secure its own interests after damage from extreme weather events, and can offer assistance to others who may not be so well equipped. WM facilities offer the equipment and skills needed for the early response and clean-up of extreme events such as floods, wildfires and high winds that are key to securing and preserving the health and property of the communities we serve. WM is proud to be able to offer these services, as well as support for later phase state and federally mandated clean-ups, to help the communities we serve recover from events as quickly, safely, and cost effectively as possible. (ii) Reputation: An erroneous perception by the public or WM customers that WM is somehow responsible for the global shifts occurring in the recycling industry today is clearly a reputational risk. WM has used its market connections to ship more material to domestic markets, and to a wider range of customers across the globe and committed to processing recyclables for sale to end markets, even when the cost exceeds the value. Our total tons of recyclable commodities sold is now increasing. We have worked with municipal customers to engage their support in improving commodity quality/saleability and avoided landfilling recyclables. Our Recycle Often. Recycle Right.® program provides tools to engage the community to reduce recycling contamination and enhance the financial sustainability of recycling programs. Our ability to sustain our investment in recycling infrastructure even in the face of highly variable commodity prices is an intangible value realized in our ability to compete in the environmental service market. We have worked to educate our customers about the long-term negative impacts of eliminating recycling programs, encourages ongoing collection – even at higher costs. (iii) Policy: Mandated organics diversion in some locations has resulted in increased capital and operational costs related to design/build of new infrastructure to separately manage the organics, for example California SB 1382 and the Short-lived Climate Pollutants Reduction Strategy. Magnitude of impacts are low.
Supply chain and/or value chain	Impacted	(i) Recycling commodity prices have been volatile in 2017 and 2018 and sensitive to geopolitics. We monitor prices, trade policy, and in particular work closely with customers to sustain the infrastructure by changing contractual terms and by working with customers to mitigate the negative impacts when recyclables are too contaminated for sale. These risks impact our supply chain because higher commodity prices may inhibit manufacturers' purchase of recycled material to use in manufacturing their own products, which is the very definition of recycling. Similarly, it impacts our value chain because landfill diversion and GHG reduction goals are only realized if materials placed in recycling processing facilities are actually reused in manufacturing, (ii)WM's Organics Recycling Group has developed and taken to market in several cities technology to help municipalities substantially expand the renewable energy produced from their existing wastewater treatment facilities. These treatment plants, created to meet strict Clean Water Act discharge standards, can produce revenue from increased sale of renewable fuel. WM has contracts in Los Angeles, CA, Boston, MA, Elizabeth, NJ and NY, NY to use its CORE® technologies to deliver a food waste-derived bioslurry that can be used to create renewable fuel credits. Magnitude of impacts are low.
Adaptation and mitigation activities	Impacted for some suppliers, facilities, or product lines	WM incurs increased operational costs from responding to and maintaining contingency response plans and supplies for severe storm events at most of its facilities due to the uncertainty of risk associated with severe storm events. Facilities located in coastal areas engage in hurricane preparedness; facilities near bodies of water and in low lying areas engage in flood preparedness, inland facilities engage in tornado/severe thunderstorm preparedness and areas of drought engage in wildfire preparedness. WM's Business Divisions located in coastal areas are particularly impacted– WM Florida, WM South Atlantic, and WM Gulf Coast, as well as WM Pacific Northwest, WM Northern California and WM Southern California. WM has expanded its emergency plan in response to recent, more extreme climatic events like Hurricanes Harvey and Irma and the Paradise Fire, which has allowed us to make modest adjustments in facility design and IT capabilities to mitigate this risk. We are changing the configuration of electrical systems, making provision for emergency fuel and upgrading our logistics capacity to maintain service in these events. We are also prioritizing our emergency planning by using climatological mapping. Magnitude of impacts are low.
Investment in R&D	Impacted for some suppliers, facilities, or product lines	Customers change their behavior based on a driver, such as financial incentives or other policies implemented in response to climate change and the limited supply of resources, so WM is investing in methods and projects to facilitate our customers' ability to act on their concerns. For example, WM's Organics Recycling Group has developed and taken to market in several cities technology to help municipalities substantially expand the renewable energy produced from their existing wastewater treatment facilities. These technologies deliver a food waste-derived bioslurry that can be used to create renewable fuel credits. WM has partnered with over 30 innovators, and managed investments in firms evaluating innovative treatment technologies across North America and Europe. We have prioritized our investments to focus on continued funding of those projects most likely to succeed at commercial scale. WM's Venturing Department manages a portfolio of investments in innovate waste reduction and treatment technologies. Magnitude of impacts are low.
Operations	Impacted	Contamination of the recycling stream requires our material recovery facility operations to increase time and labor to sort, increasing costs. Plastic bags, lights, hoses, ropes, etc. that get caught in the machinery requires a complete shut-down to clean up. If our recycling revenue of \$1.6B were to grow 5% due to changing consumer behavior and increased recycling demand, revenues could increase over \$100M annually. In addition, reducing contamination by the consumer saves us \$125 per ton in processing costs and lost commodity sales, and it lowers our potential GHG reductions from recycling. WM is finding increased demand for renewable fuels, which reduce GHGs and in particular reduce NOx 90%, and impacts investment in landfill gas projects at WM landfills. The Federal Renewable Fuels Standard and state incentive programs encourage investment in our facilities that produce renewable fuel from landfill gas. Magnitude of impacts are medium.
Other, please specify	Please select	

C2.6

(C2.6) Describe where and how the identified risks and opportunities have been factored into your financial planning process.

	Relevance	Description
Revenues	Impacted	Risks that relate to revenues include Risk 1, Risk 2 and Risk 3. Opportunities related to revenues include Opportunity 1, Opportunity 2, and Opportunity 3. The aggregate magnitude of the impacts is low. Impacts to revenue include: (1) Increasing public desire to address climate change and recognition that sustainable practices such as recycling and renewable energy are a means to do so have enhanced WM's reputation for service innovation and its competitive position with customers with sustainability goals. (2) Processing of recyclables, renewable energy used and sold. (3) Financial implications of not capitalizing on innovations driven by sustainability practices due to climate change and its positive implication to WM's business. (4) Changing consumer behavior that leads to increased recycling demand and services provided. (5) Savings from consumers reducing contamination and decreased processing costs, and increased revenue from capturing lost commodity sales. (6) Increased costs from an inability to change consumer behavior and increased contamination.
Operating costs	Impacted	Risks that relate to operating costs include Risk 1, Risk 2 and Risk 3. Opportunities related to operating costs include Opportunity 1, Opportunity 2, and Opportunity 3. The aggregate magnitude of the impacts is low. Impacts to operating costs include (1) Costs associated with Emergency Plan development, maintenance and implementation. (2) Repair of damaged facilities and equipment; (3) Loss of revenue from logistics interruption. (4) Cost of increased labor. (5) Revenue from emergency services provided. (6) Recycling commodity prices and contamination costs. (7) Costs to provide and maintain educational materials and training around proper recycling. (8) Costs associated with customers and stakeholders. (9) Increased recordkeeping of field monitoring results. (10) Analyzing viability of creating digital forms for landfill technicians to use on tablets while conducting surface methane monitoring to document real time results and corrective measures. (11) Testing new landfill gas collector designs for functionality and reliability to improve existing gas collection/drive earlier gas collection. (12) Increasing compliance costs, staff time and consultants. (13) Permitted parties are vulnerable to state-assessed penalties from omissions and conflicts between the existing and newly released regulations.
Capital expenditures / capital allocation	Impacted	Risks that relate to capital expenditures/capital allocation include Risk 1 and Risk 3. Opportunities related to capital expenditures/capital allocation include Opportunity 1 and Opportunity 3. The aggregate magnitude of the impacts is low. Impacts to capital expenditures/capital allocation include: (1) Evaluating allocation of capital among carbon-reducing investment opportunities like continued transition to natural gas vehicles and development of additional landfill-gas-to-fuel facilities, which both lower the company's carbon footprint and have the benefit of eligibility for renewable fuel credits. (2) Investment in the skills and knowledge needed (human capital) to respond to customer requests for low-carbon products and services. (3) Maintaining varying partnerships supporting recycling and renewable energy (social capital), such as ReFed, the Business Council for Social Responsibility, the Coalition for Renewable Natural Gas, the Green Sports Alliance, the National Waste & Recycling Association, The Recycling Partnership, Sustainable Brands, Keep America Beautiful, AMERIPEN, the US Green Building council and the Wildlife Habitat Council.
Acquisitions and divestments	Impacted	Risks that relate to acquisitions and divestments include Risk 1 and Risk 3. Opportunities related to acquisitions and divestments include Opportunity 1 and Opportunity 3. The aggregate magnitude of the impacts is low. Impacts to acquisitions and divestments include: (1) Regulatory impacts on new or removed assets and operations as part of acquisitions and divestments. (2) Expansion and contraction of customer base for services.
Access to capital	Not impacted	We have evaluated the impact of access to capital and determined it is not an identified risk because WM funds its own investments based on policy requirements combined with returns on capital. Each year we allocate our capital based on a combination of these factors.
Assets	Impacted	Risks that relate to assets include Risk 1 and Risk 3. Opportunities related to assets include Opportunity 1 and Opportunity 3. The aggregate magnitude of the impacts is medium. Impacts to assets include: (1) Cost of the more expensive new near-zero trucks to replace diesel. (2) Fuel costs. (3) Costs to build new landfill gas projects and filling stations. (4) Organics Recycling Group's CORE® unit technology to help divert food waste and expand the renewable energy produced from wastewater treatment facilities partners. (5) Asset repair/replacement costs and insurance. (6) Advanced technology for materials recycling facilities (MRFs).
Liabilities	Not impacted	We evaluate the impact of climate-related risks and opportunities, in particular Risk 1 and Risk 3 and Opportunity 1 and Opportunity 3, and we do not expect the impact of any known casualty, property, environmental or other contingency to have a material impact on our liabilities/ability to pay off debt.
Other	Please select	

C3. Business Strategy

C3.1

(C3.1) Are climate-related issues integrated into your business strategy?

Yes

C3.1a

(C3.1a) Does your organization use climate-related scenario analysis to inform your business strategy?

Yes, quantitative

C3.1c

(C3.1c) Explain how climate-related issues are integrated into your business objectives and strategy.

Our sustainability goals related to climate change affect 100% of our business strategy because our customer base of communities and industries are making contracting choices with attention to opportunities for recycling, GHG reductions, support for renewable energy, access to sustainability consulting services, and long-term liability protection by assuring their materials will not have adverse impacts on the environment over the long term. For the past decade, all aspects of our operations and services touch on short- and long-term climate-related issues as determined by our senior leadership team in response to customer demand and evolving regulatory requirements.

ii. In our 2018 Sustainability Report, we stated as our environmental goal that WM will offset four times the GHG emissions we generate through our operations by 2038. Our new goal will require us to decrease emissions from our operations while increasing emissions-reduction services we provide for ourselves and our customers. We intend to emit fewer emissions through our operations by (1) continuing to transition from diesel to alternative fuel vehicles in 90% of our entire fleet, (2) using renewable fuel in over 90% of our vehicles, (3) investing in a Near Zero fleet, which allows us to reduce emissions associated with our fleet 45% by 2038, and (4) continuing to improve energy efficiency at our facilities. We also intend to reduce our customers' emissions and our own emissions by capturing methane at our landfills for use by third parties as renewable electricity and renewable fuel and by recycling materials for the greatest environmental benefit.

i. and iii. WM has invested over \$2.2 billion in its commitment to a lower carbon collection fleet and renewable fuel, the most substantial business decision made. WM's fleet operations and landfills offer lower carbon opportunities, and our senior leadership team developed a business strategy to invest in a low carbon fleet, fueling infrastructure, and infrastructure at our landfills to develop low carbon fuel from landfill biogas. WM worked with its primary engine manufacturers in the development of a new "Near Zero" carbon emissions engine that is now the only natural gas (NG) truck engine that WM is purchasing. WM allocates significant capital and invests in infrastructure to process biogas from our landfills into renewable natural gas (RNG) that we use in our trucks, reducing the emissions from our collection trucks by over 90% from diesel fuel. Over the next five years, our fleet of NG trucks operating on RNG is planned to grow to over 60% of our overall collection fleet. WM has four facilities producing RNG from our landfills for our fleet, reducing emission from our landfills and from our fleet operations. These initiatives are consistent with the medium- and long-term time horizons referenced in C2.1.

Recycling and organics management services are another carbon reduction and business opportunity that applies across our business enterprise and continues to be recognized by our senior leadership team as a priority for improvement, consistent with the short-term time horizon referenced in C2.1. WM maintains 147 recycling and organics processing facilities and recycled 15.2 million tons of recyclables in 2018. Our recycling services reduced GHG emission by 30 million metric tons. As a result of China's efforts to reduce its carbon emissions by eliminating imports of recyclables, WM has adapted its strategy to enable long-term stability for recycling services by developing stronger domestic markets for paper and plastics, and a broad range of markets for paper across the globe, ensuring resiliency in our recycling services. WM is working with stakeholders across North America to improve the quality of recyclables collected, and to focus on collecting those materials that are recycled into new products that reduce carbon emissions. In 2018, WM spent \$12 million on public education programs to teach our customer how to recycle correctly. We are also working with stakeholders to support a circular economy, identifying ways to remove materials from the waste stream for reuse and recycling beyond traditional means.

Management of food waste is another key area of focus for WM. WM has made a commitment to working with regulators and other stakeholders to support food reduction activities, which reduce carbon by 6 to 7 times that of end-of-life management. Our forty-four compost facilities organics support end of life programs as well as our centralized organics recycling systems (CORe®) that process urban food into a bioslurry for delivery into local waste water treatment facilities, creating renewable energy. Four of these facilities are located in large urban areas with organics policies place for food waste reduction and recovery.

WM provides an essential emergency sanitation service assisting our customers and communities after extreme weather-related events like hurricanes and wildfires, which were particularly prevalent in our service area in 2018 as well as 2017. These events highlighted the disruption to our business continuity that severe weather events can create and are consistent with the short-term time horizon referenced in C2.1. WM has well-developed continuity plans in place that prioritize geographic areas of risk of disasters using FEMA maps. During the severe weather events of the last few years, WM's disaster preparedness plans were executed as planned and proven effective, as our local teams were able to ensure the safety of our employees, our disposal facilities and other "Key Facilities", as well as our collection equipment (including fueling). This allowed us to begin to take care of our customers within 24 hours of the event. After each event, we re-evaluate our emergency plans company-wide to improve our readiness for future climate related events. These weather events offer significant risk to our operations and warrant ongoing modifications to ensure that we are improving and adapting to changes in events or regulatory requirements. These ongoing adaptations to WM Sustainability Services (WMSS) consulting, recycling, renewable energy production and carbon sequestration in landfills are all carbon-reducing services, and our ability to provide verifiable metrics on carbon reduction to our customers will be a competitive advantage. We monitor customer advocacy and goals based upon the Paris Agreement for market trends affecting our renewable energy portfolio, recognizing that our multinational customers are shaping their procurement strategies on factors beyond U.S.-driven climate policy. WMSS provides consulting services to help our customers achieve sustainability and climate change goals through our "zero waste" services for large events, plus a full range of recycling, waste reduction, renewable energy, water conservation and environmental education services.

C3.1d

(C3.1d) Provide details of your organization’s use of climate-related scenario analysis.

Climate-related scenarios	Details
2DS	<p>Selected scenarios were chosen because they are publicly available, peer-reviewed, issued by an independent body, supported by publicly available data sets, updated, and link to mapping tools or visualizers. We used the IEA’s WEO World Energy Outlook (WEO) 2DS scenario analysis again for this reporting year, analyzing emissions reductions and energy flows mainly related to transport fuels, from 2025 to 2060. For 2019 reporting, WM continued to use the time horizons embedded in the publicly available scenarios. The IEA’s WEO World Energy Outlook (WEO) 2DS scenario uses time horizons of 2025, 2035, 2040 and 2060. We used the 2025, 2038 and 2040 time horizons because they are close to our current set of greenhouse gas reduction goals and fit within our short-, medium- and long-term climate strategies. Since the 2DS model sets the target of cutting CO2 emissions by almost 60% by 2050, followed by continued decline after 2050 until carbon neutrality is reached, we included the 2060 time horizon in our analysis. Although it is a challenge to incorporate that planning so far into the future, the data obtained from the models is valuable. In 2019 reporting, material recycling facilities (MRFs) were primarily considered in the scenario analysis. In the future we plan to consider transfer stations, hauling facilities and landfills. Results of the scenario analysis: Use of transitional scenario analyses like IEA’s WEO World Energy Outlook (WEO) 2DS scenario shows us that in 2040, oil used in heavy-duty trucks is slightly lower than it was in 2025, but after 2040 its use appears to steeply decline. Natural gas steadily declines to less than half what it is today. Biofuels decrease initially and steady increase from 2035 to 2040 and beyond. Electricity increases slowly until 2040 and then quickly after 2040. Hydrogen slowly but steadily increases. To date, these results have been reported in our CDP response only, and as they align with WM’s existing strategy around renewable fuel they have not changed or significantly impacted the strategy. Over the next year, WM will use the results of the 2DS analysis to continue to establish a business case for using renewable natural gas in our trucks, generating renewable gas at our landfills for sale, using off-road electric vehicles at our landfills and following the progress of electric vehicle technology.</p>
Other, please specify (WRI Aqueduct Water Risk Atlas)	<p>Selected scenarios were chosen because they are publicly available, peer-reviewed, issued by an independent body, supported by publicly available data sets, updated, and link to mapping tools or visualizers. For 2019 reporting, WM again chose to use the time horizons embedded in the publicly available scenarios. The WRI Aqueduct Water Risk Atlas looks at current, 2020, 2030 and 2040 time horizons. We used the current, 2030 and 2040 scenarios because they are close to our current set of greenhouse gas reduction goals and fit within our medium- and long-term climate strategies. We specifically looked at flood, drought, groundwater stress, regulatory and reputational risks, media coverage, and projected change in water stress at 100% of our material recovery facilities (MRFs), landfills and transfer stations (hereafter referred to as Facilities). Ninety-four percent of these WM Facilities are currently in locations with medium to high public awareness around water issues, which could carry higher reputational risks if water is not sustainably managed. Fewer than 1% are in areas of concern regarding uncertainty in regulatory change or conflicts with the public regarding water issues. 24% of WM Facilities are in medium to high flood areas, 53% are in high flood areas, and 11% are in extremely high flood areas; these are evenly spread across facility type. Fewer than 10% of WM Facilities are in areas of medium to high drought severity. In a business as usual scenario, 47% of WM Facilities are located in areas projected to experience near normal water stress in 2030, decreasing to 33% in 2040. Ten percent of these may experience up to 1.4 times increase in water stress in 2030, 22% in 2040. In 2030, two landfills and eight transfer stations may experience twice the water stress. In 2040, five landfills, four transfer stations and one MRF may experience twice the water stress. This year we only evaluated threatened amphibians in landfill locations because they have by far the largest footprint. 86% of WM landfills are in areas where 0 to 5% of amphibian species are classified by IUCN as threatened. Less than 1% of WM landfills are in areas where 35 to 100% of amphibian species are classified as threatened. To date, results of the scenario analysis have been reported in CDP only; however, in the last 20 years WM has been directly impacted by severe weather and previously reported publicly related risks and opportunities via CDP and the WM sustainability report. Our operations located in the path of recent hurricanes and wildfires are intimately aware of the risks, with Contingency Response Plans (Plans) in place. Scenario analyses of the physical impact of climate change on all locations where WM has a facility of any kind has resulted in taking a closer look potential future impacts. For example, our use of the WRI Aqueduct tool for 2018 reporting showed that over half of WM MRFs were in high or extremely high flood areas. WM realized that we should expand our scenario analysis to include more facilities and look to the longer-term future to consider locations that might be similarly impacted in 2030 and 2040, and begin to adapt existing plans for these locations. Our 2019 analysis shows that 88% of WM Facilities are currently in medium-high to extremely high flood areas. We are considering multiple scenarios where WM operations are impacted to varying degrees and put plans in place to utilize the closest operations that would be out of the severe weather path. Another example is plotting WM locations into scenario analysis that shows areas of high drought severity and high likelihood of wildfires to try to predict where we may need to be prepared in the future. Specific departments responsible for analysis and implementation of these changes will meet to discuss them, and the results.</p>

C4. Targets and performance

C4.1

(C4.1) Did you have an emissions target that was active in the reporting year?

Absolute target

C4.1a

(C4.1a) Provide details of your absolute emissions target(s) and progress made against those targets.

Target reference number

Abs 1

Scope

Scope 1

% emissions in Scope

9

Targeted % reduction from base year

45

Base year

2010

Start year

2017

Base year emissions covered by target (metric tons CO2e)

1880932

Target year

2038

Is this a science-based target?

Yes, we consider this a science-based target, but this target has not been approved as science-based by the Science-Based Targets initiative

% of target achieved

66

Target status

Underway

Please explain

This goal is based on a 2.1% year-over-year reduction of emissions between the base year and the target year from our fleet, in line with climate science. In 2018 we mis-calculated % of target achieved; it has been corrected and updated here. To achieve this target, WM continues to transition to alternative fuels and implement other fleet efficiency measures. WM has invested over \$1B in natural gas transportation and innovation in the last two decades, and we operate the largest private fleet of heavy-duty natural gas trucks in the nation. For every diesel truck we replace with natural gas we reduce our use of diesel fuel by an average of 8,000 gallons per year along with a reduction of 14 metric tons of greenhouse gas emissions per year (the equivalent of a 15 percent emissions reduction per truck). Our vehicles powered by compressed natural gas (CNG) emit nearly zero particulate emissions, cut greenhouse gas emissions by 15 percent, and are quieter than diesel trucks. We innovate in collection logistics to reduce emissions by eliminating trips all together: Our Single Stream recycling facilities collect commingled source-separated recyclables in one truck for processing in facilities operated to minimize the potential for air releases. Our At Your Door Special Collection provides a one trip option for collecting special household waste items such as home cleaners, garden chemicals, electronics, paint products and universal materials. Technologies like our Efficiency Management and Planning (EMAP) on-board computing system and Service Delivery Optimization (SDO) initiative helps us streamline routes for our fleet, cutting the amount of fuel we need and lowering our carbon footprint. As a result, our customers will also enjoy a reduction in their supply chain transportation emissions.

Target reference number

Abs 2

Scope

Scope 1+2 (location-based) +3 (downstream)

% emissions in Scope

100

Targeted % reduction from base year

42

Base year

2011

Start year

2017

Base year emissions covered by target (metric tons CO2e)

13006771

Target year

2028

Is this a science-based target?

Yes, we consider this a science-based target, but this target has not been approved as science-based by the Science-Based Targets initiative

% of target achieved

51

Target status

Underway

Please explain

This goal is based on a 2.1% year-over-year reduction of lifecycle emissions between the base year and the target year, in line with climate science. Material management choices have a direct impact on greenhouse gas emissions generated. For example, according to the EPA's Waste Reduction Model, three times the lifecycle emissions are generated when mixed recyclable material is put in a landfill instead of being recycled. In the base year, 25,750,786 MTCO₂e lifecycle emissions would have been generated if the material management choice had been decomposition in landfill instead of recycling, generating electricity or creating compost from organics. WM is the largest residential recycler in North America, regularly investing in programs such as our "Recycle Often. Recycle Right.®" campaign to encourage our residential, commercial and municipal customers to recycle and decrease contamination, and engaged broadly with stakeholders on means to increase the productivity and sustainable economics of recycling. Achieving this goal also requires that we work with designers and the manufacturing industry to avoid raw material processing, reduce the degree of material processing, and include recycled materials in their products. We do this by utilizing our materials recovery facility infrastructure to teach designers and manufacturers about the recycling process and through our Sustainability Services consulting group. By the end of 2018, WM operated 44 organics processing plants and 103 material recovery facilities; we managed 15.2 million tons of recyclables WM's recycling activities result in a wide variety of GHG reductions that otherwise very likely would not occur. WM explicitly advocates that GHG reductions become the focus of federal, state and local government and private sector recycling goals, replacing current weight-based goals with science-based emissions reductions goals. These communications make the physical benefits of recycling tangible, and show consumers how they can play an important role in combatting climate change.

Target reference number

Abs 3

Scope

Scope 1+2 (location-based)

% emissions in Scope

100

Targeted % reduction from base year

75

Base year

2011

Start year

2018

Base year emissions covered by target (metric tons CO₂e)

13006771

Target year

2038

Is this a science-based target?

Yes, we consider this a science-based target, but this target has not been approved as science-based by the Science-Based Targets initiative

% of target achieved

29

Target status

Underway

Please explain

This goal is based on a 2.1% year-over-year reduction of lifecycle emissions between the base year and the target year, in line with climate science. Material management choices have a direct impact on greenhouse gas emissions generated. For example, according to the EPA's Waste Reduction Model, three times the lifecycle emissions are generated when mixed recyclable material is put in a landfill instead of being recycled. In the base year, 25,750,786 MTCO₂e lifecycle emissions would have been generated

if the material management choice had been decomposition in landfill instead of recycling, generating electricity or creating compost from organics. WM is the largest residential recycler in North America, regularly investing in programs such as our "Recycle Often. Recycle Right.®" campaign to encourage our residential, commercial and municipal customers to recycle and decrease contamination, and engaged broadly with stakeholders on means to increase the productivity and sustainable economics of recycling. Achieving this goal also requires that we work with designers and the manufacturing industry to avoid raw material processing, reduce the degree of material processing, and include recycled materials in their products. We do this by utilizing our materials recovery facility infrastructure to teach designers and manufacturers about the recycling process and through our Sustainability Services consulting group. By the end of 2018, WM operated 44 organics processing plants and 99 recycling facilities; we managed 15.2 million tons of recyclables WM's recycling activities result in a wide variety of GHG reductions that otherwise very likely would not occur. WM explicitly advocates that GHG reductions become the focus of federal, state and local government and private sector recycling goals, replacing current weight-based goals with science-based emissions reductions goals.

C4.2

(C4.2) Provide details of other key climate-related targets not already reported in question C4.1/a/b.

Target

Other, please specify (WM will offset four times the GHG emissions we generate through our operations by 2038.)

KPI – Metric numerator

MTCO_{2e} generated through our operations

KPI – Metric denominator (intensity targets only)

MTOC_{2e} avoided through services provided

Base year

2016

Start year

2018

Target year

2038

KPI in baseline year

3

KPI in target year

4

% achieved in reporting year

0

Target Status

New

Please explain

WM currently offsets 3 times the GHG emissions we generate in our operations through reductions like those described in Abs 1, Abs 2 and Abs 3 from C4.1a and other services that reduce our customers' GHG emissions. 100% of WM's business is covered by the goal, as well as 100% of our scope 1, 2 and 3 (downstream) emissions.

Part of emissions target

Abs 1, Abs 2, Abs 3

Is this target part of an overarching initiative?

Other, please specify (WM will offset four times the GHG emissions we generate through our operations by 2038.)

C4.3

(C4.3) Did you have emissions reduction initiatives that were active within the reporting year? Note that this can include those in the planning and/or implementation phases.

Yes

C4.3a

(C4.3a) Identify the total number of initiatives at each stage of development, and for those in the implementation stages, the estimated CO2e savings.

	Number of initiatives	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	2	0
To be implemented*	0	0
Implementation commenced*	0	0
Implemented*	6	35539057
Not to be implemented	0	0

C4.3b

(C4.3b) Provide details on the initiatives implemented in the reporting year in the table below.

Initiative type

Low-carbon energy purchase

Description of initiative

Biogas

Estimated annual CO2e savings (metric tonnes CO2e)

52101

Scope

Scope 1

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

242000000

Investment required (unit currency – as specified in C0.4)

945000000

Payback period

4 - 10 years

Estimated lifetime of the initiative

16-20 years

Comment

WM will emit fewer emissions through our operations by transitioning from diesel to alternative fuel vehicles in 90 percent of our entire fleet. We will use renewable fuel in over 90 percent of our vehicles. Our goal of emitting fewer emissions requires an investment in a Near Zero fleet running on Renewable Natural Gas. Over 90 percent of our fleet purchases are "NZVs" (Near Zero Vehicles). Estimated annual CO2e savings is based on anticipated emissions savings in 2038 and averaged out over 20 years.

Initiative type

Low-carbon energy installation

Description of initiative

Other, please specify (solar PV/wind on closed landfills)

Estimated annual CO2e savings (metric tonnes CO2e)

1565043

Scope

Scope 3

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

0

Investment required (unit currency – as specified in C0.4)

0

Payback period

No payback

Estimated lifetime of the initiative

16-20 years

Comment

Initiative type

Energy efficiency: Processes

Description of initiative

Waste recovery

Estimated annual CO2e savings (metric tonnes CO2e)

31323081

Scope

Scope 3

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

0

Investment required (unit currency – as specified in C0.4)

12000000

Payback period

4 - 10 years

Estimated lifetime of the initiative

16-20 years

Comment

The potential benefits of significantly increased recycling and keeping organic waste out of the landfill are enormous. According to EPA, 87 million tons of recycled or composted waste provided an annual benefit of more than 168 million metric tons of carbon dioxide equivalent emissions reduced, comparable to the annual greenhouse gas emissions from more than 33 million passenger vehicles. WM's recycling activities result in a wide variety of greenhouse gas reductions (scopes 1, 2 and 3) that otherwise very likely would not occur.

Initiative type

Process emissions reductions

Description of initiative

Behavioral change

Estimated annual CO2e savings (metric tonnes CO2e)

395822

Scope

Scope 3

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

8750000

Investment required (unit currency – as specified in C0.4)

84000000

Payback period

4 - 10 years

Estimated lifetime of the initiative

11-15 years

Comment

Public education and outreach is ongoing. For example, our "Recycle Often. Recycle Right" public campaign to increase productivity from community recycling programs relies on educating communities, schools, companies, non-profits, governments, and CEOs. The potential benefits of increased recycling are enormous, but requires that consumers actually recycle the materials properly and without contamination that increases the cost to recycle. As contamination decreases, annual monetary savings will increase

Initiative type

Low-carbon energy installation

Description of initiative

Biogas

Estimated annual CO2e savings (metric tonnes CO2e)

1300000

Scope

Scope 1

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

4600000

Investment required (unit currency – as specified in C0.4)

700000000

Payback period

4 - 10 years

Estimated lifetime of the initiative

>30 years

Comment

At our landfill gas-to-energy (LFGTE) facilities, we capture methane from waste decomposition and use it beneficially as an alternative to fossil fuel to power homes and provide fuel for industrial uses and commercial vehicles, including our own. This significantly reduces greenhouse gas emissions compared with diesel fuel. This initiative directly supports WM's goal to emit fewer emissions through our operations by using RNG in over 90 percent of our vehicles by 2038. One hundred percent of the investment in our LFGTE facilities is reported here, although it also decreases our customers' greenhouse gas emissions, as described in the scope 3 low-carbon energy installation initiative.

Initiative type

Low-carbon energy installation

Description of initiative

Biogas

Estimated annual CO2e savings (metric tonnes CO2e)

904000

Scope

Scope 3

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

0

Investment required (unit currency – as specified in C0.4)

0

Payback period

No payback

Estimated lifetime of the initiative

>30 years

Comment

At our landfill gas-to-energy (LFGTE) facilities, we capture methane from waste decomposition and use it beneficially as an alternative to fossil fuel to power homes and provide fuel for industrial uses and commercial vehicles, decreasing WM and our customers' greenhouse gas emissions. Investment for this initiative is captured in the scope 1 low-carbon energy installation initiative; therefore, the investment, monetary savings and payback period reported for this scope 3 initiative is zero.

C4.3c

(C4.3c) What methods do you use to drive investment in emissions reduction activities?

Method	Comment
Internal finance mechanisms	Our CEO has set, and has communicated to our Board, aggressive sustainability goals with ambitious emissions reduction benefits. Moreover, there are many emissions reduction activities available to a highly diversified company like WM. Therefore, those opportunities presented to WM from outside or inside the company that have the best potential to deliver high degrees of emission reduction at low cost or to deliver emission reductions combined with a positive return are given priority for implementation. Our goal setting and disclosure of progress on production of renewable energy, recycling and fuel efficiency are important factors in our investment strategy. Our nationwide campaign, Recycle Often. Recycle Right.®, continues to expand each year, leveraging partnerships and community engagement to increase recycling quality and productivity. We will continue to grow our natural gas fleet, and to expand our capacity to produce renewable natural gas from landfill gas and other biogas projects. Our Organics Recycling Group has developed and taken to market technology to help divert foodwaste to a WM designed technology that creates a bioslurry that can be delivered to wastewater treatment facility digestors, substantially expanding the renewable energy produced from their wastewater treatment facilities, producing revenue from increased sale of renewable fuel. WM has contracts in Los Angeles, CA, Boston, MA, Elizabeth, NJ and NY, NY.

C4.5

(C4.5) Do you classify any of your existing goods and/or services as low-carbon products or do they enable a third party to avoid GHG emissions?

Yes

C4.5a

(C4.5a) Provide details of your products and/or services that you classify as low-carbon products or that enable a third party to avoid GHG emissions.

Level of aggregation

Company-wide

Description of product/Group of products

Increasing the volume of recyclable materials (which includes organic materials) we share GHG benefits among all the parties involved in the process. Direct emissions are avoided from harvesting, processing and delivering virgin material, and a decrease in methane emissions results from avoiding anaerobic decomposition of this material in the landfill. In addition, direct emissions are avoided using renewable natural gas from landfills in our trucks and other operations. Indirect emissions are avoided from the additional processing associated with virgin material and supply chain emissions are avoided by parties using the recycled materials and energy generated from organic materials. Consulting with our customers also allows for avoidance of scope 3 emissions in the following ways: using recyclable and/or recycled content materials in their product manufacturing; procurement analysis to decrease supply chain emissions; aligning procurement with waste management decisions to have the highest environmental impact.

Are these low-carbon product(s) or do they enable avoided emissions?

Low-carbon product and avoided emissions

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify (EPA WAsTe Reduction Model)

% revenue from low carbon product(s) in the reporting year

9

Comment

C5. Emissions methodology

C5.1

(C5.1) Provide your base year and base year emissions (Scopes 1 and 2).

Scope 1

Base year start

January 1 2009

Base year end

December 31 2009

Base year emissions (metric tons CO2e)

20505750

Comment

Scope 2 (location-based)

Base year start

January 1 2009

Base year end

December 31 2009

Base year emissions (metric tons CO2e)

137207

Comment

Scope 2 (market-based)

Base year start

January 1 2009

Base year end

December 31 2009

Base year emissions (metric tons CO2e)

137207

Comment

The location-based result has been used as a proxy since a market-based figure cannot be calculated.

C5.2

(C5.2) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate Scope 1 and Scope 2 emissions.

IPCC Guidelines for National Greenhouse Gas Inventories, 2006

The Climate Registry: General Reporting Protocol

The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)

US EPA Mandatory Greenhouse Gas Reporting Rule

C6. Emissions data

C6.1

(C6.1) What were your organization's gross global Scope 1 emissions in metric tons CO2e?

Reporting year

Gross global Scope 1 emissions (metric tons CO2e)

16272144

Start date

January 1 2018

End date

December 31 2018

Comment

C6.2

(C6.2) Describe your organization's approach to reporting Scope 2 emissions.

Row 1

Scope 2, location-based

We are reporting a Scope 2, location-based figure

Scope 2, market-based

We have no operations where we are able to access electricity supplier emission factors or residual emissions factors and are unable to report a Scope 2, market-based figure

Comment

Because there is no confirmed residual mix for the US, our calculations default to the location-based emission factors, and thus the same quantity as the Scope 2 location-based calculation. EPA is working on a residual mix and Green-e calculates a residual mix, but it was not recommended because it is not a reliable account for the entire scope of US renewable energy.

C6.3

(C6.3) What were your organization's gross global Scope 2 emissions in metric tons CO2e?

Reporting year

Scope 2, location-based

246091

Scope 2, market-based (if applicable)

<Not Applicable>

Start date

January 1 2018

End date

December 31 2018

Comment

C6.4

(C6.4) Are there any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure?

No

C6.5

(C6.5) Account for your organization's Scope 3 emissions, disclosing and explaining any exclusions.

Purchased goods and services

Evaluation status

Relevant, calculated

Metric tonnes CO2e

428822.58

Emissions calculation methodology

Actual spend on furniture, fixtures and office equipment from 10-K filing and Bagster production: GHG Protocol Scope 3 Evaluator tool

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Explanation

Bagster is an individual line of business. Emissions from the purchase of the 540,569 Bagsters produced by third party vendors have been included in the total Purchased Good and Services and account for 3,210.34 MtCO2e of the total 428,822.58 MtCO2e. This is an overall decrease from 2017 emissions of 470,255.43 MtCO2e.

Capital goods

Evaluation status

Relevant, calculated

Metric tonnes CO2e

8348930.68

Emissions calculation methodology

Actual spend on land, vehicles, large machinery and equipment, and buildings from 10-K filings: GHG Protocol Scope 3 Evaluator tool.

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Explanation

No explanation necessary.

Fuel-and-energy-related activities (not included in Scope 1 or 2)

Evaluation status

Relevant, calculated

Metric tonnes CO2e

2158203

Emissions calculation methodology

WM uses fuel generated and eGRID emissions factors to calculate emissions from fuel and energy related activities.

Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

Explanation

Conversion of landfill gas into renewable natural gas to generate power off-site.

Upstream transportation and distribution

Evaluation status

Relevant, calculated

Metric tonnes CO2e

1497.69

Emissions calculation methodology

Actual spend on Bagster transportation: GHG Protocol Scope 3 Evaluator tool

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Explanation

Bagster is an individual line of business with reported emissions that include ocean and rail freight and tax.

Waste generated in operations

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

Explanation

Since we are an environmental solutions provider, waste generated through our operations are managed by WM. Therefore, emissions generated from these services are Scope 1 and Scope 2 and reported in those sections. There is a very small number of WM employees who work as service consultants in non-WM facilities; Scope 3 emissions from their activities are reported by those non-WM facilities.

Business travel

Evaluation status

Relevant, calculated

Metric tonnes CO2e

19693.15

Emissions calculation methodology

World Resources Institute (2015). GHG protocol tool for mobile combustions. Version 2.6.

Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

Explanation

WM's business travel data include air and vehicle miles, which totaled 19,693.15 MtCO2e. Prior to 2015, WM submitted vehicle travel under employee commuting. Combining it with air business travel has resulted in an increase in MtCO2e the past few years. WM's GHG emissions from air business travel decreased in 2018 from 2017. Emissions from air travel were 5,887.67 metric tonnes CO2e compared to 7,093.77 metric tonnes CO2e in 2017. Emissions from vehicle travel were 13,805.48 MtCO2e, a slight decrease from the 13,451.59 MtCO2e in 2017.

Employee commuting

Evaluation status

Relevant, calculated

Metric tonnes CO2e

215287.8

Emissions calculation methodology

World Resources Institute (2015). GHG protocol tool for mobile combustions. Version 2.6.

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

2015 was the first year WM reported emissions from employee commutes. Less than 1% of WM employees telecommute, while the other 99% travel a typical daily commute. In 2018, WM employee commuting resulted in 215,287.80 MtCO2e. The calculation is based on the accounting for the total employee count of 43,700. This is an increase from 2017 when employee commuting resulting in 208,276.23 MtCO2e, based on the total employee count of 42,300. This is also an increase from 2016 when WM employee commuting resulted in 202,971.56 MtCO2e based on the total employee count of 41,200. In 2015, WM reported 4,694.79 MtCO2e as the emissions from employee commuting because in the GHG Protocol template spreadsheet, selecting "Passenger Car - Fuel Unknown" as the general vehicle type resulted in calculations of CH4 and N2O emissions only; CO2 emissions were not calculated. When corrected to "Passenger Car - Gasoline - Year 2005-Present," the emissions are 198,015.51 MtCO2e. In addition, the 2007 IPCC Fourth Assessment Report GWP was used to be consistent with our scope 1 reporting.

Upstream leased assets

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

Explanation

All emissions from WM's leased sites are included in Scope 1 and 2 reporting.

Downstream transportation and distribution

Evaluation status

Relevant, calculated

Metric tonnes CO2e

362.8

Emissions calculation methodology

Actual spend on Bagster transportation, FedEx spend and UPS spend: GHG Protocol Scope 3 Evaluator tool.

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

Bagster is an individual line of business with emissions that include domestic shipping and tax. FedEx and UPS provide transport emissions data.

Processing of sold products

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

Explanation

WM does not process any sold, intermediate products.

Use of sold products

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

Explanation

WM does not produce or sell products used by customers. Unlike other companies where products are produced and/or sold, WM conducts its business by offering hauling, recycling and consulting services to consumers.

End of life treatment of sold products

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

Explanation

WM does not produce or sell products used by customers. Unlike other companies where products are produced and/or sold, WM conducts its business by offering hauling, recycling and consulting services to consumers. End of life treatment is done for companies who are availing our services.

Downstream leased assets

Evaluation status

Relevant, calculated

Metric tonnes CO2e

2408.73

Emissions calculation methodology

Using the "Office", "Storage" and "Other" building averages from the Commercial Building Energy Consumption Survey (Table C13, released May 2016), WM calculated electricity consumption from leased sites based on square footage, and average consumption per square foot.

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Explanation

Total 2018 energy usage is estimated to be 5,409,747.80 kWh. WM's GHG from Downstream Leased Assets total 2,408.73 MtCO2e in 2018, which is an increase from 1,933.60 MtCO2e for 2017.

Franchises

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

Explanation

WM does not have franchised operations.

Investments

Evaluation status

Relevant, calculated

Metric tonnes CO2e

30227.73

Emissions calculation methodology

The average-data method for calculating emissions from equity investments: $\sum((\text{investee company total revenue (\$)} \times \text{emission factor for investee's sector (kg CO}_2\text{e/\$ revenue)}) \times \text{share of equity (\%)})$

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Explanation

In 2018, WM identified 14 equity investments that fell within the established boundaries (>1% and <50% equity share). Of those 14, 10 were determine to have revenue in 2018 which factored into the scope 3 emissions from investments. Investments with >50% equity share are accounted for in Scope 1 emissions and investments with <1% equity share are considered negligible.

Other (upstream)

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

Explanation

WM has no other relevant upstream activity to report.

Other (downstream)

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

Explanation

WM has no other relevant downstream activity to report.

C6.7

(C6.7) Are carbon dioxide emissions from biologically sequestered carbon relevant to your organization?

Yes

C6.7a

(C6.7a) Provide the emissions from biologically sequestered carbon relevant to your organization in metric tons CO2.

Row 1

Emissions from biologically sequestered carbon (metric tons CO2)

62946

Comment

C6.10

(C6.10) Describe your gross global combined Scope 1 and 2 emissions for the reporting year in metric tons CO2e per unit currency total revenue and provide any additional intensity metrics that are appropriate to your business operations.

Intensity figure

0.001107566

Metric numerator (Gross global combined Scope 1 and 2 emissions)

16518235

Metric denominator

unit total revenue

Metric denominator: Unit total

1491400000

Scope 2 figure used

Location-based

% change from previous year

0.68

Direction of change

Increased

Reason for change

GHG emissions per dollar of total revenue increased between 2017 and 2018 because GHG emissions (numerator) had a 3.66% increase while revenue had a 2.88% increase. WM also implemented emission reduction activities: i.) WM's diesel fleet vehicle count increased by 54 vehicles, while CNG fleet increased by 1,053 vehicles, leading to a significant increase in renewable natural gas consumption. CNG fuel generates fewer GHG emissions than diesel. ii.) Change in methane collection efficiency at some WM landfills is related to change in type of cover (daily, intermediate and final) and change in surface area of each type of cover at sites with gas collection and capture systems. More final cover surface area will increase collection efficiency and decrease methane emissions. In some cases, fluctuation is due to installation of gas systems or significant expansion of gas systems; iii.) Overall emissions from landfill increased because WM added landfill capacity, generating more landfill gas in 2018 compared to 2017. Methane destruction efficiencies were improved slightly, so less methane passed through and was emitted from the stacks in 2018 compared to 2017; WM recovered, and combusted and converted more methane in our engines and turbines in 2018; iv.) Internal reporting methodologies have also changed and become more accurate; vi) Emissions from purchased electricity and natural gas used in facilities increased because sites were added to our portfolio through acquisition.

C7. Emissions breakdowns

C7.1

(C7.1) Does your organization break down its Scope 1 emissions by greenhouse gas type?

Yes

C7.1a

(C7.1a) Break down your total gross global Scope 1 emissions by greenhouse gas type and provide the source of each used greenhouse warming potential (GWP).

Greenhouse gas	Scope 1 emissions (metric tons of CO2e)	GWP Reference
CO2	1664092	IPCC Fourth Assessment Report (AR4 - 50 year)
CH4	14546615	IPCC Fourth Assessment Report (AR4 - 50 year)
N2O	13391	IPCC Fourth Assessment Report (AR4 - 50 year)
HFCs	48047	IPCC Fourth Assessment Report (AR4 - 50 year)

C7.2

(C7.2) Break down your total gross global Scope 1 emissions by country/region.

Country/Region	Scope 1 emissions (metric tons CO2e)
United States of America	15457119
Canada	815025

C7.3

(C7.3) Indicate which gross global Scope 1 emissions breakdowns you are able to provide.

By business division

C7.3a

(C7.3a) Break down your total gross global Scope 1 emissions by business division.

Business division	Scope 1 emissions (metric ton CO2e)
Corporate Office	3345
Inactive or Closed Sites	1002145
WM of Ark Tenn Alabama Kentucky	803052
WM of Florida	793660
WM of Four Corners	1070898
WM of Greater Mid Atlantic	247029
WM of Gulf Coast	1004405
WM of Illinois Missouri Valley	1179129
WM of Michigan Ohio Indiana	1728054
WM of New England	518598
WM of Northern California	457490
WM of Pacific Northwest BC	417046
WM of South Atlantic	682334
WM of Southern California	555052
WM of Texas Oklahoma	2714199
WM of Wisconsin Minnesota	837728
WM of WPA MD WV VA	1780527
WM SBS	211
WM of Eastern Canada	354079
WM of Western Canada	98248
Venturing and New Products	95
Energy and Environmental Services	972
WM Renewable Energy	23849

C7.5

(C7.5) Break down your total gross global Scope 2 emissions by country/region.

Country/Region	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)	Purchased and consumed electricity, heat, steam or cooling (MWh)	Purchased and consumed low-carbon electricity, heat, steam or cooling accounted in market-based approach (MWh)
United States of America	233765	233765	554561	122
Canada	12326	12326	29241	0

C7.6

(C7.6) Indicate which gross global Scope 2 emissions breakdowns you are able to provide.

By business division

C7.6a

(C7.6a) Break down your total gross global Scope 2 emissions by business division.

Business division	Scope 2, location-based emissions (metric tons CO2e)	Scope 2, market-based emissions (metric tons CO2e)
Corporate Office	4697	0
Inactive or Closed Sites	4265	0
WM of Ark Tenn Alabama Kentucky	8527	0
WM of Florida	17965	0
WM of Four Corners	14050	0
WM of Greater Mid Atlantic	21386	0
WM of Gulf Coast	12659	0
WM of Illinois Missouri Valley	23748	0
WM of Michigan Ohio Indiana	25531	0
WM of New England	6852	0
WM of Northern California	4317	0
WM of Pacific Northwest BC	8323	0
WM of South Atlantic	6793	0
WM of Southern California	7447	0
WM of Texas Oklahoma	15027	0
WM of Wisconsin Minnesota	21314	0
WM of WPA MD WV VA	20588	0
WM SBS	391	0
WM of Eastern Canada	398	0
WM of Western Canada	3373	0
Venturing and New Products	487	0
Energy and Environmental Services	383	0
WM Renewable Energy	17571	0

C7.9

(C7.9) How do your gross global emissions (Scope 1 and 2 combined) for the reporting year compare to those of the previous reporting year?

Increased

(C7.9a) Identify the reasons for any change in your gross global emissions (Scope 1 and 2 combined) and for each of them specify how your emissions compare to the previous year.

	Change in emissions (metric tons CO2e)	Direction of change	Emissions value (percentage)	Please explain calculation
Change in renewable energy consumption	30236	Decreased	54.2	WM produces renewable natural gas (RNG), used in WM's fleet, from methane at five WM landfills. The RNG displaces diesel fuel use. WM's gross RNG emissions from 2018 and 2017 was 62,946 MtCO2 and 36,319 MtCO2e, respectively. WM's gross RNG consumption for 2018 and 2017 was 14,632,753 gallons and 9,047,033 gallons, respectively. If this volume of fuel used was diesel instead of RNG, the equivalent emissions for 2018 and 2017 would be 148,961 MtCO2e and 92,099 MtCO2, respectively. Comparing the RNG emissions against the diesel emissions from the equivalent volume of fuel indicates a decrease of 86,015 MtCO2e in 2018 and a decrease of 55,780 MtCO2e in 2017, or a 54.2% decrease from 2017 to 2018 from change in renewable fuel consumption, according to the formula in the explanation of terms: $(55,780 \text{ MtCO}_2 - 86,015 \text{ MtCO}_2e) / 55,780 \text{ MtCO}_2e = -54.2\%$.
Other emissions reduction activities	56800	Decreased	5.9	WM's gross diesel emissions for this reporting year are 902,161 MtCO2e. WM's gross diesel emissions for the previous reporting year was 958,961 MtCO2e. This means that the total change in emissions is -56,800 MtCO2e, equal to a 5.92% decrease, according to the formula in the explanation of terms: $(-56,800 / 958,961) * 100 = -5.92\%$. The change is attributed to the emissions reduction activity of switching WM fleet vehicles to run on renewable natural gas.
Divestment		<Not Applicable>		
Acquisitions	903131	Increased	6.6	WM's gross landfill emissions for this reporting year are 14,536,271 MtCO2e. WM's gross landfill emissions for the previous reporting year were 13,633,140 MtCO2e. This means that the total change in emissions is 903,131 MtCO2e, equal to a 6.6% increase, according to the formula in the explanation of terms: $(903,131 / 13,633,140) * 100 = 6.6\%$. The change from 13,633,140 to 14,536,271 MtCO2e is attributed to the acquisition of four construction and demolition landfills. At the time of this report, historical records were unavailable to determine a complete understanding of inert materials received and therefore we conservatively assumed the historical materials included organic content, resulting in significantly higher methane value estimates. Over the course of the next year we hope to gain a better understanding of actual materials and adjust these emissions.
Mergers		<Not Applicable>		
Change in output	4571.77	Increased	6.5	Emissions from gasoline, liquified natural gas (LNG), compressed natural gas (CNG), jet fuel, methanol, off-road diesel, propane, acetylene, used oil, kerosene, refrigerants and fuel oil #2 are all considered de minimis. WM's gross emissions from de minimis sources for this reporting year are 1,282,494 MTCO2e. WM's gross emissions from de minimis sources for the previous year are 1,030,709 MTCO2e. This means that the total change in emissions is 251,785 MtCO2e, equal to a 1.11% increase, according to the formula in the explanation of terms: $(251,785 / 1,030,709) * 100 = 24.426\%$. This change is attributed to a change in output, specifically organic growth. When these totals are combined, it results in a 33.829% increase in emissions due to change in output.
Change in methodology	35953	Increased	81.5	WM uses a Utility Bill Management (UBM) system to collect invoices and report natural gas usage. Each year we review our UBM system processes to improve on data collection and transparency, and our most recent review discovered the following. (1) Prior to 2018 reporting, the UBM system was grouping mobile emissions from compressed natural gas (389,988 MtCO2e in 2017) with stationary emissions from natural gas used for heating in our facilities. This has been corrected (to 44,137 MTCO2e in 2017) and our explanation of emissions changes here is based on corrected figures. (2) A small number of facilities were added to the UBM system in the last year. WM's gross landfill emissions from natural gas for this reporting year are 80,090 MtCO2e. WM's gross landfill emissions from natural gas for the previous reporting year are 44,137 MTCO2e. The total change in natural gas utility emissions is 35,953 MtCO2e, equal to a 81.5% increase, according to the formula in the explanation of terms: $(35,953 / 44,137) * 100 = 81.5\%$. The change from 44,137 to 80,090 MtCO2e is attributed to adding sites previously not reporting through the UBM system.
Change in boundary		<Not Applicable>		
Change in physical operating conditions		<Not Applicable>		
Unidentified		<Not Applicable>		
Other		<Not Applicable>		

C7.9b

(C7.9b) Are your emissions performance calculations in C7.9 and C7.9a based on a location-based Scope 2 emissions figure or a market-based Scope 2 emissions figure?

Location-based

C8. Energy

C8.1

(C8.1) What percentage of your total operational spend in the reporting year was on energy?

More than 5% but less than or equal to 10%

C8.2

(C8.2) Select which energy-related activities your organization has undertaken.

	Indicate whether your organization undertakes this energy-related activity
Consumption of fuel (excluding feedstocks)	Yes
Consumption of purchased or acquired electricity	Yes
Consumption of purchased or acquired heat	No
Consumption of purchased or acquired steam	No
Consumption of purchased or acquired cooling	No
Generation of electricity, heat, steam, or cooling	No

C8.2a

(C8.2a) Report your organization's energy consumption totals (excluding feedstocks) in MWh.

	Heating value	MWh from renewable sources	MWh from non-renewable sources	Total MWh
Consumption of fuel (excluding feedstock)	Unable to confirm heating value	467328	7033506	7500833
Consumption of purchased or acquired electricity	<Not Applicable>	104014	479788	583802
Consumption of purchased or acquired heat	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired steam	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired cooling	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of self-generated non-fuel renewable energy	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Total energy consumption	<Not Applicable>	571342	7513294	8084635

C8.2b

(C8.2b) Select the applications of your organization's consumption of fuel.

	Indicate whether your organization undertakes this fuel application
Consumption of fuel for the generation of electricity	No
Consumption of fuel for the generation of heat	Yes
Consumption of fuel for the generation of steam	No
Consumption of fuel for the generation of cooling	No
Consumption of fuel for co-generation or tri-generation	No

C8.2c

(C8.2c) State how much fuel in MWh your organization has consumed (excluding feedstocks) by fuel type.

Fuels (excluding feedstocks)

Diesel

Heating value

Unable to confirm heating value

Total fuel MWh consumed by the organization

3566401

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

<Not Applicable>

Comment

Fuels (excluding feedstocks)

Motor Gasoline

Heating value

Unable to confirm heating value

Total fuel MWh consumed by the organization

36326

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

<Not Applicable>

Comment

Fuels (excluding feedstocks)

Jet Kerosene

Heating value

Unable to confirm heating value

Total fuel MWh consumed by the organization

6656

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

<Not Applicable>

Comment

Fuels (excluding feedstocks)

Fuel Oil Number 2

Heating value

Unable to confirm heating value

Total fuel MWh consumed by the organization

3181

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

<Not Applicable>

Comment

Fuels (excluding feedstocks)

Natural Gas

Heating value

Unable to confirm heating value

Total fuel MWh consumed by the organization

395599

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

<Not Applicable>

Comment

Fuels (excluding feedstocks)

Compressed Natural Gas (CNG)

Heating value

Unable to confirm heating value

Total fuel MWh consumed by the organization

1775284

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

<Not Applicable>

Comment

Fuels (excluding feedstocks)

Liquefied Natural Gas (LNG)

Heating value

Unable to confirm heating value

Total fuel MWh consumed by the organization

133789

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

<Not Applicable>

Comment

Fuels (excluding feedstocks)

Landfill Gas

Heating value

Unable to confirm heating value

Total fuel MWh consumed by the organization

467328

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

<Not Applicable>

Comment

401,320 MWh from renewable landfill CNG and 66,008 MWh from renewable landfill LNG

Fuels (excluding feedstocks)

Acetylene

Heating value

Unable to confirm heating value

Total fuel MWh consumed by the organization

362

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

<Not Applicable>

Comment

Fuels (excluding feedstocks)

Propane Liquid

Heating value

Unable to confirm heating value

Total fuel MWh consumed by the organization

49671

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

<Not Applicable>

Comment

Fuels (excluding feedstocks)

Other, please specify (Methanol)

Heating value

Unable to confirm heating value

Total fuel MWh consumed by the organization

598

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

<Not Applicable>

Comment

Fuels (excluding feedstocks)

Kerosene

Heating value

Unable to confirm heating value

Total fuel MWh consumed by the organization

12362

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

<Not Applicable>

Comment

Fuels (excluding feedstocks)

Other, please specify (Used Oil)

Heating value

Unable to confirm heating value

Total fuel MWh consumed by the organization

30680

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

<Not Applicable>

Comment

Fuels (excluding feedstocks)

Diesel

Heating value

Unable to confirm heating value

Total fuel MWh consumed by the organization

1022598

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

<Not Applicable>

Comment

Off-road diesel

Fuels (excluding feedstocks)

Please select

Heating value

Please select

Total fuel MWh consumed by the organization

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

<Not Applicable>

Comment

C8.2d

(C8.2d) List the average emission factors of the fuels reported in C8.2c.

Acetylene

Emission factor

0.2425

Unit

lb CO2 per 1000 cubic ft3

Emission factor source

The Climate Registry (TCR) 2018 default emission factors. <https://www.theclimateregistry.org/wp-content/uploads/2018/06/The-Climate-Registry-2018-Default-Emission-Factor-Document.pdf>

Comment

The actual EF is 0.11 kg CO2 / scf but CDP does not offer that Unit option. 0.11 kg = 0.2425 lbs so the emissions factor is 0.2425 lbs CO2 / scf.

Compressed Natural Gas (CNG)

Emission factor

7.03

Unit

kg CO2 per gallon

Emission factor source

2019 SmartWay Truck Carrier Partner Tool: Technical Documentation, U.S. Version 2.0.18 (Data Year 2018), EPA-420-B-19-003, January 2019: <https://nepis.epa.gov/Exe/ZyPDF.cgi/P100VXGP.PDF?Dockey=P100VXGP.PDF>

Comment

Diesel

Emission factor

10.18

Unit

kg CO2 per gallon

Emission factor source

2019 SmartWay Truck Carrier Partner Tool: Technical Documentation, U.S. Version 2.0.18 (Data Year 2018), EPA-420-B-19-003, January 2019: <https://nepis.epa.gov/Exe/ZyPDF.cgi/P100VXGP.PDF?Dockey=P100VXGP.PDF>

Comment

This applies to on-road and off-road diesel emissions.

Fuel Oil Number 2

Emission factor

10.18

Unit

kg CO2 per gallon

Emission factor source

https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf

Comment

Jet Kerosene

Emission factor

72.22

Unit

kg CO2 per million Btu

Emission factor source

https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf

Comment

Kerosene

Emission factor

75.2

Unit

kg CO2 per million Btu

Emission factor source

https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf; EPA GHG Reporting Rules (40 CFR 98, Subpart C, Table C-1)

Comment

Landfill Gas

Emission factor

0.00004

Unit

kg CO2e per GJ

Emission factor source

Internal carbon intensity measurements at our production facilities.

Comment

There are two emissions factors for LFG because it's used to generate Renewable Compressed Natural Gas and Renewable Liquefied Natural Gas. The RCNG emissions factor is 43.97 g CO2e/MJ, or 0.00004397 kg CO2e/GJ. The RLNG emissions factor is 10.71 gCO2e/MJ, or 0.00001071 kg CO2e/GJ.

Liquefied Natural Gas (LNG)

Emission factor

4.394

Unit

kg CO2 per gallon

Emission factor source

2019 SmartWay Truck Carrier Partner Tool: Technical Documentation, U.S. Version 2.0.18 (Data Year 2018), EPA-420-B-19-003, January 2019: <https://nepis.epa.gov/Exe/ZyPDF.cgi/P100VXGP.PDF?Dockey=P100VXGP.PDF>

Comment

Motor Gasoline

Emission factor

8.887

Unit

kg CO2 per gallon

Emission factor source

2019 SmartWay Truck Carrier Partner Tool: Technical Documentation, U.S. Version 2.0.18 (Data Year 2018), EPA-420-B-19-003, January 2019: <https://nepis.epa.gov/Exe/ZyPDF.cgi/P100VXGP.PDF?Dockey=P100VXGP.PDF>

Comment

Natural Gas

Emission factor

56100

Unit

metric tons CO2 per GJ

Emission factor source

World Resources Institute and World Business Council on Sustainable Development, The Greenhouse Gas (GHG) Protocol https://ghgprotocol.org/sites/default/files/Emission_Factors_from_Cross_Sector_Tools_March_2017.xlsx

Comment

The EF is listed as 56,100 kg / TJ, which converts to 56,100 metric tons / GJ

Propane Liquid

Emission factor

61.46

Unit

kg CO2 per million Btu

Emission factor source

https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf

Comment

Other

Emission factor

4.1

Unit

lb CO2 per million Btu

Emission factor source

The Climate Registry (TCR) 2018 default emission factors. <https://www.theclimateregistry.org/wp-content/uploads/2018/06/The-Climate-Registry-2018-Default-Emission-Factor-Document.pdf>

Comment

There is only one 'Other' section so we are including the emissions factor information here for: Other: Used Oil Emissions Factor: 74.0 Unit: kg CO2 per million Btu Emission Factor Source: EPA GHG Reporting Rules (40 CFR 98, Subpart C, Table C-1).

C8.2f

(C8.2f) Provide details on the electricity, heat, steam and/or cooling amounts that were accounted for at a low-carbon emission factor in the market-based Scope 2 figure reported in C6.3.

Basis for applying a low-carbon emission factor

Grid mix of renewable electricity

Low-carbon technology type

Solar PV
Wind
Hydropower
Biomass (including biogas)
Other low-carbon technology, please specify (Geothermal)

Region of consumption of low-carbon electricity, heat, steam or cooling

North America

MWh consumed associated with low-carbon electricity, heat, steam or cooling

103892

Emission factor (in units of metric tons CO2e per MWh)

0.4555

Comment

Emissions factor listed is eGrid US Average of 1,004.2 lb of CO2e/MWh converted to .4555 MTCO2e/MWh.

Basis for applying a low-carbon emission factor

Energy attribute certificates, Renewable Energy Certificates (RECs)

Low-carbon technology type

Other low-carbon technology, please specify (Not specified)

Region of consumption of low-carbon electricity, heat, steam or cooling

North America

MWh consumed associated with low-carbon electricity, heat, steam or cooling

122

Emission factor (in units of metric tons CO2e per MWh)

0

Comment

WM completed a Green-e REC purchase from Liberty Power that started for a location toward the end of 2018. This is just the 2018 portion of the agreement.

C9. Additional metrics

C9.1

(C9.1) Provide any additional climate-related metrics relevant to your business.

Description

Waste

Metric value

4444.96

Metric numerator

Tons of waste generated annually

Metric denominator (intensity metric only)

% change from previous year

1.7

Direction of change

Increased

Please explain

Waste generated internally by WM includes industry-typical waste streams from administrative offices, construction and demolition activities, building and process operations and maintenance of vehicles, mobile heavy equipment and stationary heavy equipment. Less than 1% of the waste managed by WM is generated by WM operations. WM Sustainability Services consultants audited every type of WM facility to calculate waste per full time employee (FTE) per facility type, which is then used to calculate total waste generated internally. Our methodology was updated in 2019, resulting in an increase in estimated materials recycled at some facilities. After revising our 2017 estimated waste generation to 4,369.29 tons, our value of 4,444.96 tons is a 1.7% increase from 2017. For more details please see 2018 Sustainability Report (<https://sustainability.wm.com/downloads/report.php>) p. 185.

Description

Waste

Metric value

3267.25

Metric numerator

Tons landfilled

Metric denominator (intensity metric only)**% change from previous year**

2.54

Direction of change

Increased

Please explain

Our methodology was updated in 2019, resulting in an increase in estimated materials recycled at some facilities. After revising our 2017 estimated waste sent to landfill to 3,184.42 tons, our value of 3,267.25 tons is a 2.54% increase from 2017. Overall, 73.5% of our total waste generated was sent to landfill. For more details please see 2018 Sustainability Report (<https://sustainability.wm.com/downloads/report.php>) p. 185.

Description

Waste

Metric value

1177.71

Metric numerator

Tons recycled

Metric denominator (intensity metric only)**% change from previous year**

0.61

Direction of change

Decreased

Please explain

Our methodology was updated in 2019, resulting in an increase in estimated materials recycled at some facilities. After revising our 2017 estimated tons recycled to 1,184.87 tons, our value of 1,177.71 tons is a 0.61% decrease from 2017. Overall, 26.5% of our total waste generated was recycled. For more details please see 2018 Sustainability Report (<https://sustainability.wm.com/downloads/report.php>) p. 185.

Description

Waste

Metric value

0

Metric numerator

tons incinerated

Metric denominator (intensity metric only)

% change from previous year

0

Direction of change

No change

Please explain

During 2018, 0 tons were sent to Waste to Energy facilities. For more details please see 2018 Sustainability Report (<https://sustainability.wm.com/downloads/report.php>) p. 185.

Description

Waste

Metric value

209.11

Metric numerator

pounds of total waste generated annually

Metric denominator (intensity metric only)

per employee

% change from previous year

0

Direction of change

No change

Please explain

Our internal waste generation metric is normalized by comparing the estimated waste generated annually on a per-employee basis. For 2018, the total waste generation of 209.11 pounds per employee is relatively unchanged from our 2017 total waste generated per employee of 210.10.

C10. Verification

C10.1

(C10.1) Indicate the verification/assurance status that applies to your reported emissions.

	Verification/assurance status
Scope 1	Third-party verification or assurance process in place
Scope 2 (location-based or market-based)	Third-party verification or assurance process in place
Scope 3	Third-party verification or assurance process in place

C10.1a

(C10.1a) Provide further details of the verification/assurance undertaken for your Scope 1 and/or Scope 2 emissions and attach the relevant statements.

Scope

Scope 1

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

Limited assurance

Attach the statement

WM RY2018 Greenhouse Gas Verification Assurance Statement.pdf

Page/ section reference

Pages 1 - 3

Relevant standard

ISO14064-3

Proportion of reported emissions verified (%)

100

Scope

Scope 2 location-based

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

Limited assurance

Attach the statement

WM RY2018 Greenhouse Gas Verification Assurance Statement.pdf

Page/ section reference

Pages 1 - 3

Relevant standard

ISO14064-3

Proportion of reported emissions verified (%)

100

C10.1b

(C10.1b) Provide further details of the verification/assurance undertaken for your Scope 3 emissions and attach the relevant statements.

Scope

Scope 3- at least one applicable category

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Attach the statement

WM RY2018 Greenhouse Gas Verification Assurance Statement.pdf

Page/section reference

Pages 1 - 3

Relevant standard

ISO14064-3

C10.2

(C10.2) Do you verify any climate-related information reported in your CDP disclosure other than the emissions figures reported in C6.1, C6.3, and C6.5?

Yes

C10.2a

(C10.2a) Which data points within your CDP disclosure have been verified, and which verification standards were used?

Disclosure module verification relates to	Data verified	Verification standard	Please explain
C11. Carbon pricing	Other, please specify	Verification of the West Edmonton Landfill in accordance with the requirements of the Carbon Competitiveness Incentive Regulation, conducted to a reasonable level of assurance, in accordance with ISO 14064-3 and with AEP's Technical Guidance for Greenhouse Gas Verification at Reasonable Level Assurance, Version 1.0 (AEP, 2013) and the Facility Verification Report Template.	The Alberta Carbon Competitiveness Incentive Regulation (CCIR) Program is a mandatory, carbon intensity based GHG reduction program in which WM's West Edmonton Landfill is currently engaged. WM elected to approach compliance aggressively, with the overall strategy of reducing emissions as much as possible. Instead of paying an emissions fee or buying offsets annually, WM installed a landfill gas collection and control system to reduce GHG emissions from the site. This approach has and continues to generate the benefit of excess, saleable allowances (EPCs) because the operation of the landfill gas collection system exceeds the requirements of the associated rule, and EPCs generated are verified and serialized under the Alberta CCIR Program during the reporting period. Verified emissions are scope 1 and verification is completed annually. More on our reporting to CCIR can be found in CDP sections 11.1b, 11.1d, and 11.2a. 11114917 RPT 7 FINAL WMEL Verification Report.pdf
C12. Engagement	Emissions reduction activities	Golf Environment Organization - "GEO Certified" Sustainable Golf Tournament Certification	The 2018 Waste Management Phoenix Open became the first two-time "GEO Certified®" tournament – the highest international award for sustainability in golf, awarded by Scotland-based Golf Environment Organization (GEO) Foundation. To become "GEO Certified" the Waste Management Phoenix Open must complete a custom-built program for golf tournaments, including: document and evidence submission, a third-party verification carried out by the Council for Responsible Sport (the official verification body for GEO Certified Tournaments in North America), a thorough review by GEO, and agree to a range of Continual Improvement Points. The 2018 WMPO sustainability program details are available in the annual sustainability report: https://www.wm.com/thinkgreen/wmpo-2019/pdf/WMPO-Sustainability-Report.pdf . C10.2 - Golf Environment Organization - 2018 WMPO Certification Report.pdf
C12. Engagement	Emissions reduction activities	UL Environment - Environmental Claims Validation - Zero Waste to Landfill Operations	For the sixth straight year, UL provided a third-party verification of the Waste Management Phoenix Open's waste diversion. UL evaluated the procurement, on-course operations and the material diversion chain to verify the tournament's efforts, awarding the 2018 WMPO "100% landfill diversion rate with 9% incineration with energy recovery." The Waste Management Phoenix Open maintained its status as the largest verified zero waste event in the world. C10.2 - UL - 2018 WMPO Environmental Claims Validation.pdf

C11. Carbon pricing

C11.1

(C11.1) Are any of your operations or activities regulated by a carbon pricing system (i.e. ETS, Cap & Trade or Carbon Tax)?

Yes

C11.1a

(C11.1a) Select the carbon pricing regulation(s) which impacts your operations.

Alberta carbon tax

Other ETS, please specify (Alberta Carbon Competitiveness Incentive Regulation (CCIR). Alberta CCIR replaced Alberta SGER on January 1, 2018.)

C11.1b

(C11.1b) Complete the following table for each of the emissions trading systems in which you participate.

Other ETS, please specify

% of Scope 1 emissions covered by the ETS

100

Period start date

January 1 2018

Period end date

December 31 2018

Allowances allocated

43761

Allowances purchased

0

Verified emissions in metric tons CO₂e

11921

Details of ownership

Facilities we own and operate

Comment

The Alberta CCIR Program is a mandatory, carbon intensity based GHG reduction program that applies to WM's West Edmonton Landfill. After implementation of Alberta's previous emissions trading system—the Specified Gas Emitter Regulation (SGER)—in 2007, WM elected to approach compliance aggressively, with the overall strategy of reducing emissions as much as possible. Instead of paying an emissions fee or buying offsets annually, WM installed a landfill gas collection and control system to actually reduce GHG emissions from the site. Operation of this system continues under the current CCIR program, which took effect in 2018. This approach has and continues to generate the benefit of excess, saleable allowances (Emission Performance Credits or "EPCs") because the operation of the landfill gas collection system exceeds the requirements of the associated programs.

C11.1c

(C11.1c) Complete the following table for each of the tax systems in which you participate.

Alberta carbon tax

Period start date

January 1 2018

Period end date

December 31 2018

% of emissions covered by tax

7

Total cost of tax paid

423561

Comment

WM of Canada's Tax Exempt Fuel User certificate exempts WM facilities located in Alberta from tax on marked diesel.

C11.1d

(C11.1d) What is your strategy for complying with the systems in which you participate or anticipate participating?

The Alberta CCIR Program is a mandatory, carbon intensity based GHG reduction program in which WM's West Edmonton Landfill is currently engaged. WM elected to approach compliance aggressively, with the overall strategy of reducing emissions as much as possible. Instead of paying an emissions fee or buying offsets annually, WM installed a landfill gas collection and control system to reduce GHG emissions from the site. This approach has and continues to generate the benefit of excess, saleable allowances (EPCs) because the operation of the landfill gas collection system exceeds the requirements of the associated rule. As for the carbon tax, the natural gas and propane fuel are used for comfort heating and flare start-up; we continue to evaluate opportunities to employ energy efficiency practices to reduce usage.

C11.2

(C11.2) Has your organization originated or purchased any project-based carbon credits within the reporting period?

Yes

C11.2a

(C11.2a) Provide details of the project-based carbon credits originated or purchased by your organization in the reporting period.

Credit origination or credit purchase

Credit origination

Project type

Landfill gas

Project identification

West Edmonton Landfill (Alberta) LFG Recovery and Destruction. EPCs generated, verified, and serialized under the Alberta CCIR Program during the reporting period.

Verified to which standard

Other, please specify (Alberta CCIR Program)

Number of credits (metric tonnes CO2e)

31840

Number of credits (metric tonnes CO2e): Risk adjusted volume

31840

Credits cancelled

Not relevant

Purpose, e.g. compliance

Other, please specify (Compliance, with additional voluntary reductions)

Credit origination or credit purchase

Credit origination

Project type

Landfill gas

Project identification

WM originally developed, third party verified, CAR certified and registered 549,968 metric tons Co2e credits (Vintage 2008-2012) at Mahoning with CAR. We sold 98,487 metric tons CO2e Mahoning Credits to third party for retirement/compliance purposes in November 2018. We have 10,000 metric tons CO2e Mahoning offsets remaining in our CAR account. Some credits have been sold to third parties so ultimate use of the offsets is unknown other than retirement. WM retains some credits for internal retirement or third party sale.

Verified to which standard

CAR (The Climate Action Reserve)

Number of credits (metric tonnes CO2e)

98487

Number of credits (metric tonnes CO2e): Risk adjusted volume

0

Credits cancelled

Not relevant

Purpose, e.g. compliance

Not applicable

Credit origination or credit purchase

Credit origination

Project type

Landfill gas

Project identification

WM originally developed, third party verified, CAR certified and registered 82,562 metric tons Co2e credits (Vintage 2010-2012) at Northwestern with CAR. We sold 68,790 metric tons CO2e Northwestern Credits to third party for retirement/compliance purposes in November 2018. We have zero Northwestern offsets remaining in our CAR account. Some credits have been sold to third parties so ultimate use of the offsets is unknown. WM retains some credits for internal retirement or third party sale.

Verified to which standard

CAR (The Climate Action Reserve)

Number of credits (metric tonnes CO2e)

82562

Number of credits (metric tonnes CO2e): Risk adjusted volume

0

Credits cancelled

Not relevant

Purpose, e.g. compliance

Not applicable

C11.3

(C11.3) Does your organization use an internal price on carbon?

Yes

C11.3a

(C11.3a) Provide details of how your organization uses an internal price on carbon.

Objective for implementing an internal carbon price

Navigate GHG regulations
Stakeholder expectations
Drive low-carbon investment
Stress test investments
Identify and seize low-carbon opportunities

GHG Scope

Scope 1
Scope 2
Scope 3

Application

We use our internal price on carbon to assess exposure to risk, to inform our responses to inquiries about climate change strategy and greenhouse gas reduction, to protect assets and investments against regulatory risk, to demonstrate management of risk to shareholders and to discover new market, revenue, and investment opportunities. In addition, we seek to use it as a transition tool to drive investment in energy efficiency initiatives and low-carbon products and services.

Actual price(s) used (Currency /metric ton)

5

Variance of price(s) used

WM's internal price on carbon is differentiated and evolutionary. It varies by region and department from \$5-10 per ton and develops over time to incorporate changes related to landfill regulations, renewable energy policy, impacts on the recycling industry, and mandates that may impact our customers' waste management decisions.

Type of internal carbon price

Shadow price

Impact & implication

WM has used the cost of carbon to analyze state regulations in Oregon, Washington and California, and as a tool to assess priorities for other activities. In the past few years, WM has embarked upon a project to better understand the relationship between GHG emissions and economics across the spectrum of services in our industry. Using U.S. EPA Facts and Figures, we pulled out tons available for diversion for each scenario and then applied U.S. EPA's WASTE Reduction Model (WARM) to create an estimate of the associated GHG emissions reduction. Then, we examined the cost associated with each scenario, based on our national cost averages for that scenario. Future iterations included the cost of carbon in the analysis, the overlay of which reveals the relative cost of achieving the GHG emissions reductions (or not) associated with each scenario. These analyses have impacted our business decisions. For example, our analysis yields tangible results in shaping our strategic plan for recycling, creating a broader contract negotiation strategy (such as charging for contamination and pricing by carbon value) and allocating capital to material recovery facility (MRF) technology to improve recovery rates. These changes are essential to achieving our new goals, and we are already seeing results in terms of reducing contamination and GHG reductions as a consequence. Alternative markets also allowed WM to hedge the impacts of the trade wars, thereby supporting financial resilience.

C12. Engagement

C12.1

(C12.1) Do you engage with your value chain on climate-related issues?

Yes, our suppliers
Yes, our customers
Yes, other partners in the value chain

(C12.1a) Provide details of your climate-related supplier engagement strategy.**Type of engagement**

Engagement & incentivization (changing supplier behavior)

Details of engagement

Run an engagement campaign to educate suppliers about climate change

% of suppliers by number

20

% total procurement spend (direct and indirect)

40

% Scope 3 emissions as reported in C6.5

31

Rationale for the coverage of your engagement

WM is a member of a number of coalitions that specifically focus on disclosing and reducing GHG emissions by means of recycling— the National Waste and Recycling Association, the Solid Waste Association of North America, The Recycling Partnership, AMERIPEN, the Association of Lighting and Mercury Recyclers, the Association of Plastics Recyclers, the Coalition for American Electronics Recycling, the Food Industry Environmental Council, the Institute of Scrap Recycling, the Sustainable Materials Management Coalition, and the Sustainable Packaging Coalition, among others. See 2018 SR p. 199 (<https://sustainability.wm.com/downloads/report.php>). WM is further partnered with numerous Environmental, Social and Governance (ESG) organizations including Supplier Partnerships for the Environment, EREF, GreenBiz, Council for Responsible Sport, among other. Approximately 20% of total suppliers (and nearly 50% of WM's top suppliers) engage on recycling, climate change initiatives and ESG issues via these and other coalitions and working groups. See 2018 SR pp 147-151 199-209 (<https://sustainability.wm.com/downloads/report.php>).

Impact of engagement, including measures of success

One impact of this engagement effort includes improving the sustainability of our fleet, which requires collaboration by means of such memberships as the National Clean Fleets Partnership. This partnership, which includes both direct and indirect suppliers, operates more than 1 million commercial vehicles nationwide, and is committed to finding ways to improve the fuel efficiency of U.S. trucks. The success of this specific program has been measured in the environmental impact of the initiatives undertaken including averting nearly 369,000 tons of GHGs and conserving more than 152 million gasoline gallon equivalents of traditional fuel in 2015 nationwide. Further impacts of this engagement includes building supplier partnerships to help preserve the environment. In 2018, we asked suppliers to join us in biodiversity efforts by signing a commitment to undergo one pollinator project during the year under the Suppliers Partnership for the Environment's biodiversity work group project. Partners this year in the Supplier Partnership for the Environment — along with Waste Management — included ERA Environmental Management Solutions, Ford Motor Company, General Motors, Heritage Interactive Services, Lear Corporation, Mobile Fluid Recovery, MPS Group, Tetra Tech, and Toyota. See 2018 SR pp 149 (<https://sustainability.wm.com/downloads/report.php>). Waste Management believes that active engagement in business groups and broadly based stakeholder groups is one of the best ways to continually challenge ourselves and our suppliers to do better. We strive to expand our supplier relationships via recycling, climate change and ESG focused coalitions and working groups. We disclose our federal, state and local partnerships in our sustainability reporting. See 2018 SR pp. 198-209 (<https://sustainability.wm.com/downloads/report.php>).

Comment

Please note that because of the breadth of our engagement on the topic of GHG emissions reduction and the number of suppliers participating in each association in any given year, these estimates are necessarily approximate.

Type of engagement

Innovation & collaboration (changing markets)

Details of engagement

Run a campaign to encourage innovation to reduce climate impacts on products and services

% of suppliers by number

2

% total procurement spend (direct and indirect)

20

% Scope 3 emissions as reported in C6.5

24

Rationale for the coverage of your engagement

The single-largest category in our supply chain spending in any given year is collection equipment and the fuel to run it (over 20 percent of total spending). For nearly a decade, we have focused on equipment efficiency and innovations to reduce the GHGs associated with this aspect of our supply chain. See 2018 SR p. 149 (<https://sustainability.wm.com/downloads/report.php>).

Impact of engagement, including measures of success

Our truck fleet continues to transition from diesel to natural gas, cutting GHG emissions by 15% with each new truck. In 2018 80% of new fleet purchases are natural gas vehicles. We have also worked for years with truck suppliers to develop ways to lightweight our vehicles, using new types of materials as technology develops and safety specifications allow. Waste Management has also been a leader in the use of hybrid vehicles, piloting them for use in our industry. WM has set a goal to reduce fleet emissions 45% by 2038, against a 2010 baseline. See 2018 SR p. 7 (<https://sustainability.wm.com/downloads/report.php>). From 2010 through 2017 we have reduced emission 28%. This is partly the result of upgrading or replacing more than 7,600 of our 18,000 collections vehicles with ones that run on cleaner-burning compressed natural gas. See 2018 SR p. 84-89 (<https://sustainability.wm.com/downloads/report.php>) and WM 10K p. 78 (<https://investors.wm.com/node/22761/html>).

Comment

C12.1b

(C12.1b) Give details of your climate-related engagement strategy with your customers.

Type of engagement

Education/information sharing

Details of engagement

Run an engagement campaign to educate customers about the climate change impacts of (using) your products, goods, and/or services

% of customers by number

90

% Scope 3 emissions as reported in C6.5

0

Please explain the rationale for selecting this group of customers and scope of engagement

WM has developed a nationwide campaign, Recycle Often. Recycle Right.® (RORR) to educate customers and the general public on proper recycling practices to maximize diversion and value. RORR is a national research-based education and outreach program built on community-based social marketing strategies aimed at changing consumer behavior. See <http://recycleoftenrecycleright.com/>. Nearly all of our service contracts include these educational components for recycling and waste diversion. Given the various lines of business we operate (Residential, Commercial) we estimate that our educational campaigns reach approximately 90% of our total customers, however through continued growth in resources and educational outlets we aim to reach 100% of our customer base.

Impact of engagement, including measures of success

Foundational education and communication efforts focus on helping consumers recycle right and improve the quality of their recycling materials. We have seen significant impact from this campaign including reduced recycling contamination rates in communities where the RORR educational materials have been utilized to target consumer recycling behavior. In best practices areas with long term commitments by cities to public education, we are seeing recycling contamination rates at 10% versus the national average of 24%. The additional 14% is equivalent to 500,000 tons, and at \$125/ton that is a possible benefit of \$62M. The success of this program was measured in 2017 as a full point reduction in contamination levels for a savings of \$4.375M. Additionally, we measure traffic to the RORR website and the reach of the RORR campaign via social media and local recycling campaigns. There is new focus on growing the reach of these platforms and developing further metrics to track growth in traffic and customer retention rates.

Type of engagement

Collaboration & innovation

Details of engagement

Other – please provide information in column 5

% of customers by number

5

% Scope 3 emissions as reported in C6.5

0

Please explain the rationale for selecting this group of customers and scope of engagement

Since 2011, WM has organized a Sustainability Forum, bringing together a mix of experts, customers, government employees, non-government organizations and businesses to contribute to an open-minded dialogue around sustainability principles, best management practices and bottom-line results. With a theme of “Big Ideas. Bold Action. Better World.” the 2018 Forum focused on recycling in a new, bigger-than-recycling era and choosing the right metrics to measure success. The Forum brings together customers who are at various stages of their sustainability journey, from those just starting out and facing significant challenges to those who have advanced en route to their goals. The forum provides an opportunity for all stakeholders to have high quality, engaging discussions on key sustainability issue that affect our businesses, our communities and our planet.

Impact of engagement, including measures of success

In-person attendance grows each year, increasing by approximately 30% from 2017 to 2018. The Forum is streamed online live, and a recording is available after. WM also offers a Behind-the-Scenes Tour for Forum attendees to show them how the environmental programs are implemented on course to offer a case study that reinforces the dialogue driven by the Forum.

C12.1c

(C12.1c) Give details of your climate-related engagement strategy with other partners in the value chain.

Where the market is available, we recycle our retired equipment by grinding up plastic garbage cans to make new plastic containers, reclaiming steel from scrap containers, repurposing used tires into cutting edges for scrapers and dozers, and having used oil recycled for other purposes.

We use new products such as enhanced-longevity motor oil and new materials to reduce the weight of fleet trucks. We pay attention to the degree to which plastic containers can be recycled into other plastic containers and buy accordingly. Our suppliers are working to increase the amount of recycled plastic in our products. Our Real Estate department oversees the deployment of recycled and energy-efficient materials in its Capital Projects and Construction Management Program, identifying vendors for controlled lighting and HVAC, occupancy sensors, recycled-content carpet and furniture, and low-emitting paints and adhesives. See 2018 SR pp 148-149 (<https://sustainability.wm.com/downloads/report.php>).

At the WMPO, we continue to engage and recognize our stakeholders from all sectors of our operations and event. As such, we manage expectations, set new goals and give every stakeholder the opportunity to provide feedback and recommendations to improve WMPO. This continuous stakeholder engagement also gives us the chance to know more about our supplier processes, which lead us to better management of our material flow – a critical component of our success in our zero waste challenge program. The strategy we have from the beginning in vendor engagement is to understand the vendor's contribution to the event's overall waste stream. Therefore, the vendors that provide high volumes of materials that will be composted or recycled – such as the larger food catering groups and signage manufacturers - are prioritized more in terms of education, training, and materials tracking. We measure success year over year through inclusion in our sustainability report, collaborating with industry non-profit organizations and highlighting the tournament impact on the (1) environment, through use of resources such as energy, water and waste we generate; (2) community, through public awareness and education, charitable giving, safety and overall experience; and (3) economic, through the tournament's impact on the local economy. We started tracking supplier delivery processes to estimate their greenhouse gas emissions. All food and beverage materials are required to be compostable or recyclable. Since the 2012 event, vendors are provided a list of acceptable materials to bring on site and required to adhere to this list. Sponsors are provided with a similar list for promotional items.

In addition, WM worked with Envirofit International to offset all GHG emissions from WMPO operations, volunteer travel, and player travel, a total of 844 MTCO_{2e}, through cookstove programs to reduce GHGs in India and Tanzania. Greenhouse gas emissions from WMPO operations totaled 204 MTCO_{2e} while player travel generated 58 MTCO_{2e}. In 2013, we achieved the Council for Responsible Sport Gold Certification. In 2015, we improved to get Evergreen Certification, becoming the first PGA TOUR tournament and the largest event ever to achieve this level of recognition. In 2017, we were invited to the Council's Inspire program, which requires data tracking, analysis, and has a mentoring component. The WMPO chose to mentor the Golf Environment Organization (GEO) by piloting their sustainable golf tournament standard at the 2017 tournament, providing feedback on credits and the documentation process. In 2017, the WMPO became the first GEO Certified[©] tournament. Since 2013, UL has provided a third-party verification of the event's waste diversion. UL reviews WMPO procurement information and weight tickets to understand where materials are initially delivered, and where all waste streams are processed down the line. UL verified this effort, awarding the WMPO "100% landfill diversion rate with 9% incineration with energy recovery." The WMPO implements conservation measures to ensure that water is used responsibly and limits pressures on the municipal water supply. Hand-washing stations used hand sanitizer instead of water. Since 2011, approximately 37,787 gallons of water from cooking and cleaning have been reused in the portable toilets. 2018 marked the third year of the WMPO Water Campaign. Working with Bonneville Environmental Foundation (BEF) as a Change the Course sponsor, and teaming up with Coca-Cola and the Thunderbirds, WM restored 236 million gallons of water to the Colorado River Basin and the Verde River in Arizona over three years.

For more information on WMPO material, water, energy and greenhouse gas impacts, please see the 2018 WMPO Sustainability Report (<https://www.wm.com/thinkgreen/wmpo-2019/pdf/WMPO-Sustainability-Report.pdf>).

C12.3

(C12.3) Do you engage in activities that could either directly or indirectly influence public policy on climate-related issues through any of the following?

- Direct engagement with policy makers
- Trade associations
- Funding research organizations
- Other

C12.3a

(C12.3a) On what issues have you been engaging directly with policy makers?

Focus of legislation	Corporate position	Details of engagement	Proposed legislative solution
Clean energy generation	Support	We continue to seek Congressional and regulatory and tax incentives for renewable energy production based upon energy value and GHG reductions. Active coordination with other companies and trade associations to advocate before Congress and federal agencies on incentivizing the production of renewable energy, fuels and fueling infrastructure (e.g., wind, solar, biomass, low-carbon fuels).	Include in tax and/or energy legislation incentives for renewable energy and low-carbon fuel options.
Clean energy generation	Support	State renewable energy incentives are essential means to address climate change by encouraging renewable, low carbon substitutes. Active coordination with other companies and trade associations focused on incentivizing the production of renewable energy (e.g., wind, solar, biomass); direct lobbying of US Congress.	State renewable energy incentives are essential means to address climate change by encouraging renewable, low carbon substitutes. Active coordination with other companies and trade associations to lobby state legislatures on incentivizing the production of renewable energy (e.g., wind, solar, biomass) and transportation fuels, refueling and renewable fuel vehicles. Each state should provide renewable energy incentives as consistent with state environmental priorities and finances.
Mandatory carbon reporting	Support	Support EPA in using best available data and protocols to establish accurate GHG inventories for industry sectors. Actively coordinating with the public and private landfill sector, landfill gas-to-energy project and equipment owners, academic and industry researchers, and US EPA. WM has been working with EPA since 2012 on improving landfill methane emissions measurements processes, including emission reductions from landfill cover and landfill gas collection. EPA's latest reporting methodology, finalized in 2016, reflects enhancements for precise, site-specific methods that WM suggested as part of its advocacy with the agency. WM assisted EPA in enhancing the accuracy of its waste sector emissions in the 2017 and 2018 nationwide US GHG Inventory. With academic and industry researchers, WM continues to assist EPA in accurately characterizing waste disposed in landfills and the associated levels of methane generation.	Site-specific data are more precise than sector-wide default assumptions. Successful advocacy to maintain existing inventory reporting was undertaken in 2017-2018. Provided expert review and advice on EPA's draft U.S. Inventory in 2017 and 2018 as requested by the Agency.
Other, please specify (Reporting recycling as carbon reduction)	Support	WM believes the value and performance of recycling must be measured by reductions in GHG emissions and energy use versus simple measures of tons processed. The WM-sponsored Sustainable Materials Management Coalition produced and disseminated a report describing this approach during 2016, with another report in 2017 on metrics for recycling. Dialogue with U.S. EPA, states and industrial trade associations have further developed these concepts, allowing local governments to understand material-specific GHG emissions reductions achieved by each recycled commodity and the relative prices of recycling -- adding transparency and GHG emissions reduction performance to municipal and company recycling programs. With EPA expertise, WM developed a protocol to estimate GHG reductions per recyclable commodity and services provided. WM continues to communicate these tools and emissions reduction opportunities to stakeholders.	US EPA, states, and local governments should encourage or mandate that materials management goals be developed based on GHG emissions reduction potential. The State of Oregon has already adopted legislation and implemented a program based upon the concepts contained in the Sustainable Materials Management Coalition report, and this kind of GHG emissions reduction-based life cycle approach is now being actively considered in other states and municipalities.
Other, please specify (biogenic CO2 Emission)	Support	Other: Regulatory treatment of biogenic CO2 Emissions from waste-derived fuels under the federal Clean Air Act: Beginning in 2011, WM has worked with U.S. EPA, the municipal and private waste sector, and academia to develop a framework for accounting and treating biogenic emissions of CO2 from collection and combustion of landfill gas and combustion of fuels derived from biogenic components of MSW. WM commented on EPA's draft Biogenic Accounting Framework and on EPA's Science Advisory Board (SAB) recommendations; we further commented on treatment of biogenic CO2 under various Clean Air Act regulations associated with GHG emissions reductions.	U.S. EPA should finalize its Biogenic Accounting Framework for combustion of landfill gas and waste-derived fuels to recognize the carbon neutrality of those CO2 emissions as recommended by EPA in its draft framework and as recommended by EPA's SAB in its review of various iterations of the framework. EPA regulations should reflect the scientific determinations made by the Agency and its SAB.

Focus of legislation	Corporate position	Details of engagement	Proposed legislative solution
Other, please specify (Clean transportation fuel)	Support	WM has directly lobbied the U.S. Congress, and has worked closely with senior Administration officials, in support of maintaining and modernizing EPA's Renewable Fuels Standard (RFS2) program. WM has also provided technical support and data to EPA, OMB, and the White House for implementation of the RFS2 program. WM has developed four renewable fuels projects that produce cellulosic biofuel from landfill gas. WM uses the renewable natural gas in our collection fleet, and we are developing four additional projects this year and next. We contract with other landfill owners to purchase additional renewable fuel to use in our vehicles. At the end of 2018, approximately 2,400 of our collection vehicles were using renewable natural gas. Use of renewable natural gas results in 90% reduction of CO2 emissions as compared to use of diesel fuel it replaces.	EPA should continue to implement the RFS2 program consistent with Congressional intent: to incentivize the production and use of renewable alternatives to many fossil-based transportation fuels.
Other, please specify (Phase 2 heavy-Duty Truck GHG Rule)	Support	Other: Phase 2 heavy-Duty Truck GHG Rule -- WM engaged with EPA and DOT providing technical information on our fleet and its operations and providing recommendations on ways to promote continued conversion of vehicles to renewable natural gas.	Although this rule is on hold, WM has supported it. If finalized, it would increase fuel economy standards and reduce vehicle emissions standards WM supports implementation of the heavy-duty truck standards as compatible with our transition to a natural gas fleet operating on Renewable Natural Gas.

C12.3b

(C12.3b) Are you on the board of any trade associations or do you provide funding beyond membership?

Yes

C12.3c

(C12.3c) Enter the details of those trade associations that are likely to take a position on climate change legislation.

Trade association

Solid Waste Management Association of North America (SWANA)

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

Supports renewable energy development, Supports accurate accounting of GHG emissions from the solid waste sector.

How have you influenced, or are you attempting to influence their position?

Yes, as members of the SWANA Board we advocate for SWANA involvement in supporting renewable energy and fuel standards that support low-carbon energy development like our landfill gas to energy facilities. In 2017 and 2018, we encouraged SWANA to participate in advocacy to improve the accuracy of GHG emissions accounting under U.S. EPA rules and for Congress to support the EPA resources to maintain the GHG inventory and the GHG assessment tools on which the public and private waste sector, states and local governments and NGOs depend.

Trade association

Environmental Industries Association (EIA)

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

Supports renewable energy deployment, precision in GHG accounting

How have you influenced, or are you attempting to influence their position?

Yes, as Board members we participate in direct lobbying in Congress for extension of the renewable energy production tax credits for our landfill gas to energy facilities, and for continuing the Renewable Fuels Standard program. The association also works with WM and EPA to enhance GHG accounting.

Trade association

Board, American Biogas Council (ABC)

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

Supports renewable energy deployment

How have you influenced, or are you attempting to influence their position?

Yes, as Board members we advocate before Congress and U.S. EPA for policy and regulations that encourage development of landfill gas to energy and fuels projects and anaerobic digesters.

Trade association

Board, Energy Security Leadership Council

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

Supports precision in GHG accounting

How have you influenced, or are you attempting to influence their position?

Yes, as Board members, we lobby Congress to enhance domestic security by encouraging through tax incentives use of domestic natural gas and lobby the Administration to improve mileage performance by heavy-duty trucks, reducing GHGs associated with climate change concerns.

Trade association

Board, National Association of Manufacturers (NAM)

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

Supports fossil fuel and renewable energy development equally

How have you influenced, or are you attempting to influence their position?

Yes, as Board members, we press to assure NAM advocacy includes support for renewable energy tax incentives, including those for our landfill gas to energy facilities. We have seen progress in their support for renewable energy in an "all of the above" strategy.

Trade association

Board, Secure America's Future Energy (SAFE)

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

Supports renewable energy deployment

How have you influenced, or are you attempting to influence their position?

We have engaged in public policy advocacy to raise awareness of the organization's mission, specifically by participating in issue forums, sharing best practices with lawmakers, and mobilizing other trade organizations behind shared interests.

Trade association

Renewable Natural Gas (RNG) Coalition

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

Supports renewable natural gas for electricity and transportation fuel

How have you influenced, or are you attempting to influence their position?

Yes, as part of our Board membership we advocate in support of EPA's Renewable Fuel Standard Program and for federal incentives to produce and use renewable transportation fuel and renewable electricity.

Trade association

Natural Gas Vehicles of America (NGVAmerica) Coalition

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

Yes, as part of our membership we advocate for federal and state incentives to promote growth in use of natural gas and renewable natural gas fueled vehicles, and incentives to promote growth of fueling infrastructure for NG vehicles.

How have you influenced, or are you attempting to influence their position?

Yes, as part of our membership we advocate for federal and state incentives to promote growth in use of natural gas and renewable natural gas fueled vehicles, and incentives to promote growth of fueling infrastructure for natural gas vehicles.

Trade association

Board, American Institute for Packaging and the Environment (Ameripen)

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

Supports

How have you influenced, or are you attempting to influence their position?

Yes, as a Board member of Ameripen, we are working with state regulators to promote concepts of GHG lifecycle analysis in decision making and development of materials management goals.

C12.3d

(C12.3d) Do you publicly disclose a list of all research organizations that you fund?

No

C12.3e

(C12.3e) Provide details of the other engagement activities that you undertake.

U.S. EPA has established a Sustainable Materials Management framework that works to reduce climate change impacts by reducing waste, increasing the volume and environmental benefits of recycling, and increasing the use of waste diversion technologies that, under life cycle evaluation, provide environmental benefits. WM sponsored three terms of the Sustainable Materials Management Coalition, a stakeholder group including regulators, representatives of local and state officials, environmentalists, community advocates, academia and business and industry, convened to make recommendations on sustainable materials management, life cycle thinking and improving the performance and understanding of recycling. See <https://www.michaeldbaker.com/portfolio-items/guidance-on-taking-a-life-cycle-perspective-to-sustainability/>. WM uses this information to work with companies and state agencies to encourage a shift to Sustainable Management policies for their goal setting. WM has supported these efforts in CA, IA, MD and WA and with numerous corporations.

C12.3f

(C12.3f) What processes do you have in place to ensure that all of your direct and indirect activities that influence policy are consistent with your overall climate change strategy?

WM has a multi-disciplinary team with members from the Legal, Government Affairs, Communications, Environmental Management, Operations, and Sustainability Services departments, which monitors emerging sustainability and greenhouse gas (GHG) legislation, regulatory programs, and other events and provides feedback internally to our SVP and Chief Legal Officer, our Senior Leadership Team, our Board of Directors, and our business units, as well as externally to legislators and regulators, on policy elements that may impact the company and the environmental services industry. The same cross-functional team ensures that engagements and activities that may influence policy, directly or indirectly, are properly monitored and vetted for consistency with the company's overall climate change strategies, particularly with regard to reducing fleet emissions, enhancing recycling, and deploying renewable energy infrastructure. An internal Public Policy Group oversees federal and state legislative and regulatory responses to enhance the consistency of WM advocacy across multiple forums. This group reports to the SVP and Chief Legal Officer and the SVP of Operations, Safety & Environmental Compliance. Individual responsibility for policy oversight for issues with climate change implications (e.g., clean air regulations, natural gas vehicle incentives, recycling policy) is identified on the WM intranet site to enhance consistency and coordination.

C12.4

(C12.4) Have you published information about your organization's response to climate change and GHG emissions performance for this reporting year in places other than in your CDP response? If so, please attach the publication(s).

Publication

In mainstream reports

Status

Complete

Attach the document

WM 10K 2018.pdf

Page/Section reference

In particular Item 1a Risk Factors p. 15

Content elements

Governance

Strategy

Risks & opportunities

Other metrics

Other, please specify (risks and impacts of climate change)

Comment

WM 2018 10K, also available online: <https://investors.wm.com/node/22761/html>

Publication

In voluntary sustainability report

Status

Complete

Attach the document

WM_2018_SR.pdf

Page/Section reference

WM 2018 Sustainability Report, pp 7-12, 22-68, 77-89, 140-145, 152-154, 157, 160-177.

Content elements

Governance

Strategy

Risks & opportunities

Emissions figures

Emission targets

Other metrics

Comment

WM 2018 Sustainability Report is also available online: <https://sustainability.wm.com/downloads/report.php>

Publication

In voluntary sustainability report

Status

Complete

Attach the document

WM_2018_SASB.pdf

Page/Section reference

WM SASB index, pp 1-4

Content elements

Emissions figures

Emission targets

Other metrics

Comment

SASB Index is also available online: https://sustainability.wm.com/downloads/WM_2018_SASB.pdf

C14. Signoff

C-FI

(C-FI) Use this field to provide any additional information or context that you feel is relevant to your organization's response. Please note that this field is optional and is not scored.

C14.1

(C14.1) Provide details for the person that has signed off (approved) your CDP climate change response.

	Job title	Corresponding job category
Row 1	President and CEO	Chief Executive Officer (CEO)

SC. Supply chain module

SC0.0

(SC0.0) If you would like to do so, please provide a separate introduction to this module.

Waste Management is a waste service provider. As such, we can allocate a significant portion of our GHG emissions to the waste materials we handle.

In order to complete the Supply Chain questionnaire, we utilize the U.S. Environmental Protection Agency's Waste Reduction Model (WARM) to calculate the emissions created by the waste generated from specific customers. We use WARM to calculate GHG emissions for baseline and alternative waste management practices. Those practices include source reduction, recycling, combustion, composting, and landfilling. WARM calculates emissions in metric tons of carbon dioxide equivalent (MTCO₂e) and metric tons of carbon equivalent (MTCE) across a wide range of material types commonly found in municipal solid waste (MSW).

SC0.1

(SC0.1) What is your company's annual revenue for the stated reporting period?

	Annual Revenue
Row 1	14485000000

SC0.2

(SC0.2) Do you have an ISIN for your company that you would be willing to share with CDP?

No

SC1.1

(SC1.1) Allocate your emissions to your customers listed below according to the goods or services you have sold them in this reporting period.

Requesting member

Walmart, Inc.

Scope of emissions

Scope 1

Allocation level

Company wide

Allocation level detail

<Not Applicable>

Emissions in metric tonnes of CO2e

84593

Uncertainty (±%)

25

Major sources of emissions

Waste generated by customer as a result of their operations.

Verified

No

Allocation method

Other, please specify (EPA WARM model based on customer specific tonnage reports.)

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

WM does not provide waste hauling services specific to customer's location but instead provides transportation as part of general customer routing, which changes based upon a changing customer base and local logistical variables. Thus, quantifying emissions from our hauling transportation to service an individual customer is not possible at this time. However, we can estimate total emissions from waste disposal and avoided emissions as a result of diversion processes using the EPA WARM model and customer-specific tonnage. We collect annual waste stream tonnage reports from facilities across the country for this calculation. In addition, please note that many of our larger customers generate diverse, complicated waste streams (universal waste, medical waste, fuel waste, etc.) that are difficult to include in this calculation.

Requesting member

Fiat Chrysler Automobiles NV

Scope of emissions

Scope 1

Allocation level

Company wide

Allocation level detail

<Not Applicable>

Emissions in metric tonnes of CO2e

0

Uncertainty (±%)

25

Major sources of emissions

Waste generated by customer as a result of their operations.

Verified

No

Allocation method

Other, please specify (EPA WARM model based on customer specific tonnage reports.)

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

WM does not provide waste hauling services specific to customer's location but instead provides transportation as part of general customer routing, which changes based upon a changing customer base and local logistical variables. Thus, quantifying emissions from our hauling transportation to service an individual customer is not possible at this time. However, we can estimate total emissions from waste disposal and avoided emissions as a result of diversion processes using the EPA WARM model and customer-specific tonnage. We collect annual waste stream tonnage reports from facilities across the country for this calculation. In addition, please note that many of our larger customers generate diverse, complicated waste streams (universal waste, medical waste, fuel waste, etc.) that are difficult to include in this calculation. In the case of Fiat Chrysler Automobiles NV, the emissions generated from the management of their wastes is actually negative as all calculated waste streams are diverted from landfill to recycling or waste-to-energy.

Requesting member

Caesars Entertainment

Scope of emissions

Scope 1

Allocation level

Company wide

Allocation level detail

<Not Applicable>

Emissions in metric tonnes of CO2e

4824

Uncertainty (±%)

25

Major sources of emissions

Waste generated by customer as a result of their operations.

Verified

No

Allocation method

Other, please specify (EPA WARM model based on customer specific tonnage reports.)

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

WM does not provide waste hauling services specific to customer's location but instead provides transportation as part of general customer routing, which changes based upon a changing customer base and local logistical variables. Thus, quantifying emissions from our hauling transportation to service an individual customer is not possible at this time. However, we can estimate total emissions from waste disposal and avoided emissions as a result of our diversion processes for our customers. We collect annual waste stream tonnage reports from facilities across the country using the EPA WARM model and customer-specific tonnage. In addition, please note that many of our larger customers generate diverse, complicated waste streams (universal waste, medical waste, fuel waste, etc.) that are difficult to include in this calculation.

Requesting member

AT&T Inc.

Scope of emissions

Scope 1

Allocation level

Company wide

Allocation level detail

<Not Applicable>

Emissions in metric tonnes of CO2e

23743

Uncertainty (±%)

25

Major sources of emissions

Waste generated by customer as a result of their operations.

Verified

No

Allocation method

Other, please specify (EPA WARM model based on customer specific tonnage reports.)

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

WM does not provide waste hauling services specific to customer's location but instead provides transportation as part of general customer routing, which changes based upon a changing customer base and local logistical variables. Thus, quantifying emissions from our hauling transportation to service an individual customer is not possible at this time. However, we can estimate total emissions from waste disposal and avoided emissions as a result of our diversion processes for our customers. We collect annual waste stream tonnage reports from facilities across the country using the EPA WARM model and customer-specific tonnage. In addition, please note that many of our larger customers generate diverse, complicated waste streams (universal waste, medical waste, fuel waste, etc.) that are difficult to include in this calculation.

Requesting member

California Department of General Services (DGS)

Scope of emissions

Scope 1

Allocation level

Company wide

Allocation level detail

<Not Applicable>

Emissions in metric tonnes of CO2e

588

Uncertainty (±%)

25

Major sources of emissions

Waste generated by customer as a result of their operations.

Verified

No

Allocation method

Other, please specify (EPA WARM model based on customer specific tonnage reports.)

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

WM does not provide waste hauling services specific to customer's location but instead provides transportation as part of general customer routing, which changes based upon a changing customer base and local logistical variables. Thus, quantifying emissions from our hauling transportation to service an individual customer is not possible at this time. However, we can estimate total emissions from waste disposal and avoided emissions as a result of our diversion processes for our customers. We collect annual waste stream tonnage reports from facilities across the country using the EPA WARM model and customer-specific tonnage. In addition, please note that many of our larger customers generate diverse, complicated waste streams (universal waste, medical waste, fuel waste, etc.) that are difficult to include in this calculation.

Requesting member

Wells Fargo & Company

Scope of emissions

Scope 1

Allocation level

Company wide

Allocation level detail

<Not Applicable>

Emissions in metric tonnes of CO2e

4579

Uncertainty (±%)

25

Major sources of emissions

Waste generated by customer as a result of their operations.

Verified

No

Allocation method

Other, please specify (EPA WARM model based on customer specific tonnage reports.)

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

WM does not provide waste hauling services specific to customer's location but instead provides transportation as part of general customer routing, which changes based upon a changing customer base and local logistical variables. Thus, quantifying emissions from our hauling transportation to service an individual customer is not possible at this time. However, we can estimate total emissions from waste disposal and avoided emissions as a result of our diversion processes for our customers. We collect annual waste stream tonnage reports from facilities across the country using the EPA WARM model and customer-specific tonnage. In addition, please note that many of our larger customers generate diverse, complicated waste streams (universal waste, medical waste, fuel waste, etc.) that are difficult to include in this calculation.

SC1.2

(SC1.2) Where published information has been used in completing SC1.1, please provide a reference(s).

US EPA's Waste Reduction Model (<https://www.epa.gov/warm>).

SC1.3

(SC1.3) What are the challenges in allocating emissions to different customers, and what would help you to overcome these challenges?

Allocation challenges	Please explain what would help you overcome these challenges
Diversity of product lines makes accurately accounting for each product/product line cost ineffective	WM's services are particularly ill suited to emissions allocation among different customers. Materials collection routes are designed to minimize fuel use and the resulting emissions, not to segregate the materials of different customers. For the same reason, our materials processing, conversion, recycling and disposal processes are not "batch", but rather continuous processes, precluding segregation of material loads by a customer at our facilities without compromising efficiency and increasing emissions. Even if individual customers maintained records of the amount and type of materials they supplied to WM at particular locations, the full value of WM's services would not likely be captured, as some materials originally slated for a disposal technology are redirected by WM, after acceptance, to a recycling or conversion technology if they are suitable for such use. WM focuses on customer satisfaction and on deriving as much value as possible from the materials supplied to us by our customers. We believe that emissions accounting procedures should reflect the benefit of our services and focus on specific product lines will develop in accordance with customer demand.
Managing the different emission factors of diverse and numerous geographies makes calculating total footprint difficult	WM is a supplier of services to our customers including waste management, environmental management, logistics and security services. WM is also a supplier of products, producing renewable energy in the form of electricity provided to the grid or the provision of renewable landfill gas and other renewable fuels directly to our customers. In regard to waste management services, WM focuses on providing services that recover value from customers' residual materials in the form of energy or material reuse, both of which reduce GHG emissions on a life-cycle basis. Some of WM's services/products are GHG emitters, while others are GHG sinks. Particularly, in regard to those activities that are GHG sinks, protocols to calculate and apportion the GHG benefits to all parties involved in life-cycle of that activity are not yet available. In addition, the services and product package provided to each WM customer is unique, and frequently complex, especially for customers for whom WM serves multiple facilities and/or for whom WM provides multiple services/products. The number of variables associated with calculating the GHG emissions from WM's services for a particular site or company is so great, each calculation is itself a labor-intensive, comprehensive carbon footprint in its own right. Even if individual customers maintained records of the amount and type of materials they supplied to WM at particular locations, the full value of WM's services would not likely be captured, as some materials originally slated for a disposal technology are redirected by WM, after acceptance, to a recycling or conversion technology if they are suitable for such use. When customers have a need for carbon footprint services, WM works with the customer to devise unique, detail- and cost-appropriate, solutions. While this customer-specific approach appears to work today on a case-to-case basis, we continuously engage with our customers to develop different approaches to efficiently manage emissions in diverse geographies with varying emissions factors.

SC1.4

(SC1.4) Do you plan to develop your capabilities to allocate emissions to your customers in the future?

Yes

SC1.4a

(SC1.4a) Describe how you plan to develop your capabilities.

WM is currently using the WARM model to calculate the GHG emissions reductions achieved by recycling according to the commodities recycled.

SC2.1

(SC2.1) Please propose any mutually beneficial climate-related projects you could collaborate on with specific CDP Supply Chain members.

Requesting member

Walmart, Inc.

Group type of project

New product or service

Type of project

New product or service that reduces customers operational emissions

Emissions targeted

Actions that would reduce both our own and our customers' emissions

Estimated timeframe for carbon reductions to be realized

3-5 years

Estimated lifetime CO2e savings

137500

Estimated payback

Cost/saving neutral

Details of proposal

WM has rolled out innovative waste collection and monitoring solutions to companies willing to explore and develop a more efficient waste management system. The solutions proved effective and enabled the customers to reduce their GHG emissions and improve their financial capacity for being efficient in the way they manage their waste stream. We invite Wal-Mart Stores, Inc. to engage our Sustainability Services group to work with them to develop innovative solutions to meet GHG emissions reduction goals and improve Wal-Mart Stores, Inc.'s bottom line.

Requesting member

Fiat Chrysler Automobiles NV

Group type of project

Reduce Logistics Emissions

Type of project

Route optimization

Emissions targeted

Actions that would reduce our own operational emissions (our scope 1 & 2)

Estimated timeframe for carbon reductions to be realized

3-5 years

Estimated lifetime CO2e savings

Estimated payback

Cost/saving neutral

Details of proposal

Our optimized collection and routing program, called "Service Delivery Optimization" or SDO, uses on-board GIS-based computing to make routing more efficient, lower costs and enhance reliability and customer satisfaction. It has also eliminated paper route sheets for drivers, improved safety, and improved preventive maintenance on our vehicles. These efforts augment the CO2 emissions reductions realized with our conversion to a natural gas fleet. In the mid to long term, we believe that SDO will have wider impact to most of our customers and to the rest of our supply chain, providing information that is critical in quantifying our emissions that are specific to our customers and their scope of services.

Requesting member

Fiat Chrysler Automobiles NV

Group type of project

New product or service

Type of project

New product or service that reduces customers operational emissions

Emissions targeted

Actions that would reduce both our own and our customers' emissions

Estimated timeframe for carbon reductions to be realized

3-5 years

Estimated lifetime CO2e savings

275

Estimated payback

Cost/saving neutral

Details of proposal

WM has rolled out innovative waste collection and monitoring solutions to companies willing to explore and develop a more efficient waste management system. The solutions proved effective and enabled the customers to reduce their GHG emissions and improve their financial capacity for being efficient in the way they manage their waste stream. We invite Fiat Chrysler Automobiles NV to engage our Sustainability Services group to work with them to develop innovative solutions to meet GHG emissions reduction goals and improve Fiat's bottom line.

Requesting member

Fiat Chrysler Automobiles NV

Group type of project

New product or service

Type of project

New product or service that reduces customers products / services operational emissions

Emissions targeted

Actions that would reduce both our own and our customers' emissions

Estimated timeframe for carbon reductions to be realized

1-3 years

Estimated lifetime CO2e savings

718

Estimated payback

Cost/saving neutral

Details of proposal

WM has worked with companies to evaluate waste materials to determine generation including through the organizations supply chain. This analysis has allowed WM to provide insight and recommendations on a Supply Chain Management program that would reduce overall waste generation, optimize available diversion programs and in turn allow for further optimization of transportation efforts and reduction of associate emissions.

Requesting member

Caesars Entertainment

Group type of project

Reduce Logistics Emissions

Type of project

Route optimization

Emissions targeted

Actions that would reduce our own operational emissions (our scope 1 & 2)

Estimated timeframe for carbon reductions to be realized

3-5 years

Estimated lifetime CO2e savings**Estimated payback**

Cost/saving neutral

Details of proposal

Our optimized collection and routing program, called "Service Delivery Optimization" or SDO, use systemwide processes and on-board GIS-based computing to make routing more efficient, lower costs and enhance reliability and customer satisfaction. It has also eliminated paper route sheets for drivers, improved safety, and improved preventive maintenance on our vehicles. These efforts augment the CO2 emissions reductions realized with our conversion to a natural gas fleet. In the mid to long term, we believe that SDO will have wider impact to most of our customers and to the rest of our supply chain, providing information that is critical in quantifying our emissions that are specific to our customers and their scope of services.

Requesting member

Caesars Entertainment

Group type of project

New product or service

Type of project

New product or service that reduces customers operational emissions

Emissions targeted

Actions that would reduce both our own and our customers' emissions

Estimated timeframe for carbon reductions to be realized

3-5 years

Estimated lifetime CO2e savings

7700

Estimated payback

Cost/saving neutral

Details of proposal

WM has rolled out innovative waste collection and monitoring solutions to companies willing to explore and develop a more efficient waste management system. The solutions proved effective and enabled the customers to reduce their GHG emissions and improve their financial capacity for being efficient in the way they manage their waste stream. We invite Caesars Entertainment to engage our Sustainability Services group to work with them to develop innovative solutions to meet GHG emissions reduction goals and improve Caesars' bottom line.

Requesting member

Caesars Entertainment

Group type of project

New product or service

Type of project

New product or service that reduces customers products / services operational emissions

Emissions targeted

Actions that would reduce both our own and our customers' emissions

Estimated timeframe for carbon reductions to be realized

1-3 years

Estimated lifetime CO2e savings

8958

Estimated payback

Cost/saving neutral

Details of proposal

WM has worked with companies to evaluate waste materials to determine generation including through the organizations supply chain. This analysis has allowed WM to provide insight and recommendations on a Supply Chain Management program that would reduce overall waste generation, optimize available diversion programs and in turn allow for further optimization of transportation efforts and reduction of associate emissions. We invite Caesars Entertainment to engage our Sustainability Services group to work with them to develop innovative solutions to meet GHG emissions reduction goals and improve Caesars' overall operating standards.

Requesting member

AT&T Inc.

Group type of project

New product or service

Type of project

New product or service that reduces customers operational emissions

Emissions targeted

Actions that would reduce both our own and our customers' emissions

Estimated timeframe for carbon reductions to be realized

3-5 years

Estimated lifetime CO2e savings

37675

Estimated payback

Cost/saving neutral

Details of proposal

WM has rolled out innovative waste collection and monitoring solutions to companies willing to explore and develop a more efficient waste management system. The solutions proved effective and enabled the customers to reduce their GHG emissions and improve their financial capacity for being efficient in the way they manage their waste stream. We invite AT&T Inc. to engage our Sustainability Services group to work with them to develop innovative solutions to meet GHG emissions reduction goals and improve AT&T's bottom line.

Requesting member

AT&T Inc.

Group type of project

New product or service

Type of project

New product or service that reduces customers products / services operational emissions

Emissions targeted

Actions that would reduce both our own and our customers' emissions

Estimated timeframe for carbon reductions to be realized

3-5 years

Estimated lifetime CO2e savings

141349

Estimated payback

Cost/saving neutral

Details of proposal

WM has worked with companies to evaluate waste materials to determine generation including through the organizations supply chain. This analysis has allowed WM to provide insight and recommendations on a Supply Chain Management program that would reduce overall waste generation, optimize available diversion programs and in turn allow for further optimization of transportation

efforts and reduction of associate emissions. We invite AT&T Inc. to engage our Sustainability Services group to work with them to develop innovative solutions to meet GHG emissions reduction goals and improve AT&T's overall operating standards.

Requesting member

California Department of General Services (DGS)

Group type of project

New product or service

Type of project

New product or service that reduces customers operational emissions

Emissions targeted

Actions that would reduce both our own and our customers' emissions

Estimated timeframe for carbon reductions to be realized

3-5 years

Estimated lifetime CO2e savings

935

Estimated payback

Cost/saving neutral

Details of proposal

WM has rolled out innovative waste collection and monitoring solutions to companies willing to explore and develop a more efficient waste management system. The solutions proved effective and enabled the customers to reduce their GHG emissions and improve their financial capacity for being efficient in the way they manage their waste stream. We invite DGS to engage our Sustainability Services group to work with them to develop innovative solutions to meet GHG emissions reduction goals and improve DGS' bottom line.

Requesting member

California Department of General Services (DGS)

Group type of project

New product or service

Type of project

New product or service that reduces customers products / services operational emissions

Emissions targeted

Actions that would reduce both our own and our customers' emissions

Estimated timeframe for carbon reductions to be realized

1-3 years

Estimated lifetime CO2e savings

977

Estimated payback

Cost/saving neutral

Details of proposal

WM has worked with companies to evaluate waste materials to determine generation including through the organizations supply chain. This analysis has allowed WM to provide insight and recommendations on a Supply Chain Management program that would reduce overall waste generation, optimize available diversion programs and in turn allow for further optimization of transportation efforts and reduction of associate emissions. We invite DGS to engage our Sustainability Services group to work with them to develop innovative solutions to meet GHG emissions reduction goals and improve DGS' overall operating standards.

Requesting member

Wells Fargo & Company

Group type of project

New product or service

Type of project

New product or service that reduces customers operational emissions

Emissions targeted

Actions that would reduce both our own and our customers' emissions

Estimated timeframe for carbon reductions to be realized

3-5 years

Estimated lifetime CO2e savings

7287

Estimated payback

Cost/saving neutral

Details of proposal

WM has rolled out innovative waste collection and monitoring solutions to companies willing to explore and develop a more efficient waste management system. The solutions proved effective and enabled the customers to reduce their GHG emissions and improve their financial capacity for being efficient in the way they manage their waste stream. We invite Wells Fargo to engage our Sustainability Services group to work with them to develop innovative solutions to meet GHG emissions reduction goals and improve Wells Fargo's bottom line.

Requesting member

Wells Fargo & Company

Group type of project

New product or service

Type of project

New product or service that reduces customers products / services operational emissions

Emissions targeted

Actions that would reduce both our own and our customers' emissions

Estimated timeframe for carbon reductions to be realized

1-3 years

Estimated lifetime CO2e savings

11055

Estimated payback

Cost/saving neutral

Details of proposal

WM has worked with companies to evaluate waste materials to determine generation including through the organizations supply chain. This analysis has allowed WM to provide insight and recommendations on a Supply Chain Management program that would reduce overall waste generation, optimize available diversion programs and in turn allow for further optimization of transportation efforts and reduction of associate emissions. We invite Wells Fargo to engage our Sustainability Services group to work with them to develop innovative solutions to meet GHG emissions reduction goals and improve Wells Fargo's overall operating standards..

SC2.2

(SC2.2) Have requests or initiatives by CDP Supply Chain members prompted your organization to take organizational-level emissions reduction initiatives?

Yes

SC2.2a

(SC2.2a) Specify the requesting member(s) that have driven organizational-level emissions reduction initiatives, and provide information on the initiatives.

Requesting member

Walmart, Inc.

Initiative ID

2018-ID3

Group type of project

Relationship sustainability assessment

Type of project

Aligning goals to feed into customers targets and ambitions

Description of the reduction initiative

In 2018, WM diverted 928,088 tons of Wal-Mart waste from landfill to recycling thereby reducing lifecycle GHG emissions by 2,770,693 MTCO_{2e}. This diversion was achieved by working closely with Wal-Mart, aggressively addressing waste in store operations, and when possible, in the products they sell. WM has worked with Wal-Mart to assess their waste streams and determine the material makeup. The assessments provided Wal-Mart with information to improve material management at the store level and ensure cardboard, organics and other recyclables are disposed of in the established programs and not through MSW. Additionally, WM continues to optimize compactor hauls through Compactor Monitoring System (CMS) and right-sizing equipment, resulting in considerable financial savings for Wal-Mart locations.

Emissions reduction for the reporting year in metric tons of CO_{2e}

3047177

Did you identify this opportunity as part of the CDP supply chain Action Exchange?

No

Would you be happy for CDP supply chain members to highlight this work in their external communication?

Yes

Requesting member

Fiat Chrysler Automobiles NV

Initiative ID

2018-ID3

Group type of project

Relationship sustainability assessment

Type of project

Aligning goals to feed into customers targets and ambitions

Description of the reduction initiative

In 2018, WM diverted 14,811.2 tons of Fiat waste from landfill to recycling as well as an additional 8,612.7 tons from landfill to WTE, thereby reducing lifecycle GHG emissions by 42,229 MTCO_{2e}. This diversion was achieved by working closely with Fiat to evaluate and implement diversion opportunities at all their WM serviced locations, typically through WM's Sustainability Services in-plant employees. WM Sustainability Services deploys on-site project managers to manage and coordinate waste, recycling and efficiency efforts across WM serviced Fiat locations. Across locations, WM championed and implemented state-of-the-art waste reduction and recycling initiatives, implemented mapping of all recycling throughout the WM serviced sites for enhanced recognition of departments with recycling, and provided compliance audits.

Emissions reduction for the reporting year in metric tons of CO_{2e}

42229

Did you identify this opportunity as part of the CDP supply chain Action Exchange?

No

Would you be happy for CDP supply chain members to highlight this work in their external communication?

Yes

Requesting member

Caesars Entertainment

Initiative ID

2018-ID3

Group type of project

Relationship sustainability assessment

Type of project

Aligning goals to feed into customers targets and ambitions

Description of the reduction initiative

In 2018, WM diverted 865.2 tons of Caesars waste from landfill to recycling thereby reducing lifecycle GHG emissions by 2,608 MTCO2e. This diversion was achieved by working with Caesars to evaluate and implement diversion opportunities at all their WM serviced locations. WM regularly works with all customers to evaluate service levels, contamination rates and issues, and methods to increase material diversion from landfill.

Emissions reduction for the reporting year in metric tons of CO2e

2608

Did you identify this opportunity as part of the CDP supply chain Action Exchange?

No

Would you be happy for CDP supply chain members to highlight this work in their external communication?

Yes

Requesting member

AT&T Inc.

Initiative ID

2018-ID3

Group type of project

Relationship sustainability assessment

Type of project

Aligning goals to feed into customers targets and ambitions

Description of the reduction initiative

In 2018, WM diverted 9,797.1 tons of AT&T waste from landfill to recycling thereby reducing lifecycle GHG emissions by 30,852MTCO2e. This diversion was achieved by working closely with AT&T to increase the number of stores participating in comprehensive recycling programs. WM Sustainability Services has also assisted in zero waste initiatives at AT&T's HQ in Dallas. With the introduction of the additional waste and recycling initiatives, WM applied right-sizing methodology, Load Max initiatives, Service Delivery Optimization and Regulatory Recycling reviews to appropriate WM serviced AT&T locations, optimizing the collection and transportation of all waste streams. These efforts eliminate paper route sheets for drivers, improve safety, improved vehicular preventive maintenance programs and augment the CO2 emissions reductions realized with our conversion to a natural gas fleet.

Emissions reduction for the reporting year in metric tons of CO2e

30852

Did you identify this opportunity as part of the CDP supply chain Action Exchange?

No

Would you be happy for CDP supply chain members to highlight this work in their external communication?

Yes

Requesting member

California Department of General Services (DGS)

Initiative ID

2018-ID3

Group type of project

Relationship sustainability assessment

Type of project

Aligning goals to feed into customers targets and ambitions

Description of the reduction initiative

In 2018, WM diverted 421.8 tons of California DGS waste from landfill to recycling thereby reducing lifecycle GHG emissions by 736 MTCO2e. Along with the introduction of the additional recycling programs, WM applied right-sizing methodology, Load Max initiatives, Service Delivery Optimization and Regulatory Recycling reviews to appropriate WM serviced DGC locations, optimizing the collection and transportation of all waste streams. These efforts eliminate paper route sheets for drivers, improve safety, improved vehicular preventive maintenance programs and augment the CO2 emissions reductions realized with our conversion to a natural gas fleet.

Emissions reduction for the reporting year in metric tons of CO2e

736

Did you identify this opportunity as part of the CDP supply chain Action Exchange?

No

Would you be happy for CDP supply chain members to highlight this work in their external communication?

Yes

Requesting member

Wells Fargo & Company

Initiative ID

2018-ID3

Group type of project

Relationship sustainability assessment

Type of project

Aligning goals to feed into customers targets and ambitions

Description of the reduction initiative

In 2018, WM diverted 5,391.7 tons of Wells Fargo waste from landfill to recycling thereby reducing lifecycle GHG emissions by 14,560 MTCO₂e. This diversion was achieved by working with Wells Fargo to evaluate and implement diversion opportunities at all WM serviced locations. WM has proposed initiatives to right size containers, optimize collection and routing and engage our Sustainability Services team in an effort to continue reducing associated emissions.

Emissions reduction for the reporting year in metric tons of CO₂e

14560

Did you identify this opportunity as part of the CDP supply chain Action Exchange?

No

Would you be happy for CDP supply chain members to highlight this work in their external communication?

Yes

SC3.1

(SC3.1) Do you want to enroll in the 2019-2020 CDP Action Exchange initiative?

No

SC3.2

(SC3.2) Is your company a participating supplier in CDP's 2018-2019 Action Exchange initiative?

No

SC4.1

(SC4.1) Are you providing product level data for your organization's goods or services?

No, I am not providing data

Submit your response

In which language are you submitting your response?

English

Please confirm how your response should be handled by CDP

	Public or Non-Public Submission	I am submitting to	Are you ready to submit the additional Supply Chain Questions?
I am submitting my response	Public	Investors Customers	Yes, submit Supply Chain Questions now

Please confirm below

I have read and accept the applicable Terms