

C0. Introduction

C0.1

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

Waste Management (WM) is North America's leading provider of waste management environmental services and the largest recycler of post-consumer waste. We are capturing value from waste streams- by processing wastes to replace raw materials with recycled materials that have lower carbon footprints or by generating clean energy from landfill gas plants, or by investing in new technologies to convert post-recycled residuals into lower carbon fuel or chemicals. Our customers look to us to help them participate in the "circular economy" by helping them avoid creating waste, design for recycling, and convert discards into new products. Our customers are recognizing that they can reduce costs and improve their operations by meeting recycling goals. The WM Sustainability Services team helps customers reach their sustainability goals by evaluating every aspect of their operations, recommending overall strategies to improve sustainability – providing strategies to maximize recycling and reduce waste as well as avoiding the generation of waste. WM has four climate-change related sustainability goals that have been shaping our business and our investments since 2007:

i) To increase waste-based energy production: In 2017, WM created enough energy through our waste-to-energy operations to power nearly one-half million homes. In our drive to provide pragmatic sustainability options, we now focus on the technologies most likely to serve our customers' sustainability needs, including our new CORe® technology, which provides municipalities a cost-effective means to convert organic wastes into increased production of renewable energy, and landfill gas to fuel facilities that provide renewable natural gas to our natural gas collection fleet.

ii) To increase the volume of recyclable materials we process: WM continues to be North America's largest residential recycler. Our goal to manage more than 20 million tons of recyclables each year by 2020 represents 48.9 million MTCO_{2e} avoided emissions. To this end, we actively advocate for customers and regulators to evaluate and communicate their waste reduction and recycling progress in the form of GHG reductions achieved in order to shift from simply weight-based metrics to a more science-based delineation of climate change benefits. In 2017, we managed 15.3 million tons of recyclables

iii) To invest in cleaner technologies: WM set a goal in 2007 to reduce CO₂ emissions and increase fleet efficiency by 15 percent. We exceeded that goal in 2011, reducing CO₂ emissions by 20 percent and continue to exceed our 2020 goal year-over-year despite acquisitions and changes in the US EPA methodology for calculating efficiency. We are implementing a range of technologies to make our trucks more efficient, including using on-board camera-assisted efficiency logistics; using alternative fuels; optimizing truck design; using hybrid "yellow iron" vehicles; investing in the largest natural gas heavy-duty fleet in the U.S; actively supporting improvements in heavy-duty truck fuel efficiency standards; and investing in green technologies to convert waste to fuel and/or chemicals, convert landfill gas to liquefied natural gas or diesel, and converting organic waste to high-octane transportation fuel and high value compost products. We innovate in collection logistics to reduce emissions. Our At Your Door Special Collection provides a simple, one trip option for collecting special household waste items. We are using on-board computers to optimize routes, and compactor monitoring technologies to time pick-ups when the compactor is full.

iv) To protect more wildlife habitat across North America: We achieved our fourth goal of providing wildlife habitat at 100 of our landfills – 10 years ahead of schedule.

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 2017	December 31 2017	Yes	1 year
Row 2	January 1 2016	December 31 2016	<Not Applicable>	<Not Applicable>
Row 3	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Row 4	<Not Applicable>	<Not Applicable>	<Not Applicable>	<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) of the individual(s) on the board with responsibility for climate-related issues.

Position of individual(s)	Please explain
Board Chair	The entire Board is briefed on climate-related segments of WM's operations at each meeting. It is important to understand that 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 planning in the recycling, composting, renewable energy production, fleet composition and consultancy/in-plant service sectors of our business. Any changes in service preference and any elements impacting the profitability of these services (for example, impacts of international trade on the markets for recycled commodities) are part of the discussion of business trends at each Board meeting. These discussions occur at the full Board level rather than the Committee level because of the materiality of these segments 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	<ul style="list-style-type: none"> Reviewing and guiding strategy Reviewing and guiding major plans of action Reviewing and guiding risk management policies Reviewing and guiding annual budgets Reviewing and guiding business plans Setting performance objectives Monitoring implementation and performance of objectives Overseeing major capital expenditures, acquisitions and divestitures Monitoring and overseeing progress against goals and targets for addressing climate-related issues 	<p>As noted above, carbon reductions essential to addressing climate change are central factors in our customers selection of an environmental service company. From p. 3 of our 10K: "Increasingly, customers want more of their waste materials recovered while waste streams are becoming more complex, and our aim is to address the current needs, while anticipating the expanding and evolving needs of our customers. We believe we are uniquely equipped to meet the challenges of the changing waste industry and our customers' waste management needs, both today and as we work together to envision and create a more sustainable future. As the waste industry leader, we have the expertise necessary to collect and handle our customers' waste efficiently and responsibly by delivering environmental performance—maximizing resource value, while minimizing environmental impact—so that both our economy and our environment can thrive." http://services.corporate-ir.net/SEC.Enhanced/SecCapsule.aspx?c=119743&fid=15457346. The carbon reductions provided by recycling, production of low-carbon/renewable energy, and in-plant services for commercial and industrial customers are core elements of our business. Our business strategy and success are materially impacted by the extent to which our landfills reduce risk by converting landfill gas into renewable energy and fuel, we provide customers the data they need on how our recycling services provide customers' specific carbon reductions, and our work as consultants and in waste and environmental operations to reduce emissions overall. Our business plans in 2017 have addressed urgent action to assure the continued financial viability of recycling through use of technology, logistics, and contract specifications crafted to maximize recycling productivity by reducing contamination. Deployment of capital in our fleet corresponds to our business plan to reduce these emissions by conversion to natural gas. Yearly targets for fleet conversion, emissions and cost reduction at recycling facilities, increase in the WM's development of landfill-gas-to-fuel facilities producing cellulosic biofuel, and increased commercial and industrial service contracts linked to customer preferences for low-carbon elements of their waste programs are discussed, in whole or in part, at each meeting.</p>

C1.2

(C1.2) Below board-level, provide the highest-level management 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.

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 recycling 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, the competitive landscape, and customer service selection trends, 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 WM Phoenix Open Sustainability Forum livestreamed on GreenBiz, and in numerous presentations to trade associations annual conventions. He relies on the specific quarterly data from departmental 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 position on 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.

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.).

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.

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, 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 logistics efficiency protocols, which reduce fuel use, vehicle miles and emissions.

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 personally 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	Risk of economic collapse of recycling programs. WM'S short-term strategy is to improve the economics of recycling programs. This is an urgent, short-term horizon driven by China's ban on acceptance of mixed waste paper and mixed plastics in early 2018 and their development of stringent contamination limits, dramatically impacting the price of the commodities. These changes and the corresponding market impacts have caused more material to be landfilled, reducing GHG emissions reductions associated with recycling and increasing emissions associated with transportation inefficiencies as recyclables are shipped to alternative markets across the globe that have no backhaul capabilities. Our work with the industry to alert customers of the need to eliminate contamination in recycling bins aligns with our business strategy of reducing contamination, thereby increasing the market and price for the commodities we process. Sustaining the level of our recycling is essential to meeting our goal of managing 20M tons of recyclables (achieving in 2017 GHG emissions reductions over 32,586,647 MTCO2e). Other elements of meeting this 2020 goal include logistics improvements, conversion to lower GHG emitting fleet, and producing renewable fuel and reducing overall fleet fossil fuel.
Medium-term	3	10	WM is setting new goals for recycling and production of renewable natural gas (2028 and 2038), with an overarching goal of reducing for our customers 4 times the GHG emissions we generate ourselves in managing their wastes. These goals are aligned with our analysis of the recycling market (including options to substitute for the historic reliance on the Chinese market), our customers' recycling and GHG reduction goals and their timelines, the financial underpinning of natural gas, renewable natural gas fuel, and the capital allocation that would be reasonable to forecast for development of renewable natural gas projects. 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. As global competition for raw materials and fuel increases, sustainable solutions for managing materials will become a necessity, and by offering sustainable, lower carbon management options, WM is competitive in new areas, and insulating itself from long-term losses.
Long-term	10	30	Our new 2028 and 2038 goals take into account not only environmental aspiration, but pragmatic forecasting of market demand and allocation of capital, thus integrating our climate goals with our strategic planning for expansion and acquisitions. WM continues to invest in companies developing carbon reducing technologies and is also evaluating the technical and commercial viability to be found in automation, augmented reality and autonomous vehicles in the waste and recycling sector.

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 in short- and long-time 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 industrial waste reduction consultancy), frequency is at least twice a year.

C2.2b

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

At 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 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 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. <http://investors.wm.com/phoenix.zhtml?c=119743&p=irol-recentnewsArticle&ID=2332689> 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 are related to air emission limits or renewable transportation fuels. (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. EPA committed to reconsidering certain technical aspects of the rules and plan to issue a new proposal in Spring of 2019. (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% as 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 requires regulations by late 2018 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 could result in loss of revenue and 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, 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 two central GHG reduction services is recycling, which also faces both technology constraints related to changes in the waste stream and quality requirement. 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, 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 deteriorating market conditions 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 93 material processing 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 the 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. An erroneous perception by the public or WM customers that WM is somehow responsible for the global shifts occurring in the recycling industry today was considered as a risk early and has been mitigated by our efforts to maintain our programs, our success in marketing materials, and in our efforts to shore up the industry. In addition, WM worked with municipal customers to engage their support in improving commodity quality and therefore salability and discouraging landfilling of recyclables. Our RecycleOften.RecycleRight.SM 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 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 contingency response plans and supplies for severe storm events at high-risk facilities, and damage to facilities; 47% of our Material Recovery Facilities are in high flood areas and 8% are in extremely high flood areas. The unpredictability of these 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 continues to expand and improve its emergency 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 or 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 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.
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 fuels.: (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 cost of recyclables too contaminated for sale (GHG reductions are only realized if materials placed in recycling processing facilities are actually 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. In 2016 and 2017 we developed a methodology for customers to evaluate the cost and the GHG reduction benefit of recycling individual commodities. This allowed 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 RightSM 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 the renewable energy and used to create 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, that may be presented to 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 a Transitional Risk (to reputation) example. The potential adoption of Extended Producer Responsibility legislation at the state level puts national curbside recycling at risk, along with Chinese halt to imports of recyclables and the consequent impact on commodity pricing. Both impact lifecycle greenhouse gas reduction benefits associated with recycling and meeting sustainability goals for WM and our customers. Considered a Priority Risk, it 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 therefore 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. Results are ongoing, but we estimate that our educational campaigns reach approximately 90% of our total customers, our Recycle Often. Recycle Right campaign shows our municipal customers with long-term commitments to public education are at 10% contamination rate versus the national average of 24%, and in 2017 we reduced our contamination by a full point.

Severe storms provide a Physical Risk example. 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

(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 driver

Policy and legal: 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. More importantly, however, the rules failed to include an implementation transition period and failed to address conflicts between the old and new rules which at some sites will apply simultaneously, triggering conflicts among requirements and confusion for state regulators and regulated entities. This 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

Virtually certain

Magnitude of impact

Medium-low

Potential financial impact

10000000

Explanation of financial impact

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. The cost to complete surface emissions monitoring will likely double due to additional monitoring and new equipment requirements which are more stringent than the 1996 rules. The 2016 rules include new recordkeeping elements, specifically root cause and corrective action analysis for wellhead temperature and pressure exceedances, and new reporting requirements, specifically 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.

Management method

WM assembled a coalition of municipal and private sector landfill operators to engage U.S. EPA on the need for specific terms for making the new rules as precise and site-specific as possible in order to accurately inform the public and provide a reliable base of information on landfill gas emissions and their relative contribution to climate change. Precision in this reporting is essential to accurately project the GHG emissions reductions provided by conversion of landfill gas to electricity and fuel, which would be essential data over the longer term in the event of a carbon pricing proposal that included this category of sources. As a result, technical negotiations have ensued, and administrative and judicial action have been filed. The Coalition also advocated for correction under the new Administration's Regulatory Reform initiative, which affords a procedural opportunity to petition for paperwork inconsistency. In addition, WM has assembled a coalition of industry and state governments advocating for U.S. EPA to receive appropriations sufficient to correct this rule and fully maintain associated climate change informational sites and platforms to calculate GHG emissions from waste operations. 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 government in the need to reform a specific set of regulations.

Cost of management

725000

Comment

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 \$725,000.

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 driver

Increased operating costs (e.g., inadequate water supply for hydroelectric plants or to cool nuclear and fossil fuel plants)

Company- specific description

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. In particular, in three of WM's Business Divisions located in coastal areas – WM Florida, WM South Atlantic, and WM Gulf Coast, facilities engage in hurricane preparedness; these and other facilities near bodies of water and in low lying areas engage in flood preparedness and even inland facilities engage in tornado/severe thunderstorm preparedness. Physical risks, including flooding/storm surges and wind damage from severe storm events, have potential to damage these facilities, necessitate repairs to facilities and disrupt the logistics of delivery of services. Associated electricity outages and fuel shortages have the potential to exacerbate the initial impacts. This in turn could reduce revenues and increase operational costs. In addition, the unpredictability of these events requires that our facilities be prepared to respond at all times, requiring significant investments in response planning, supplies and equipment. WM has expanded its emergency plan in response to recent, more extreme climatic events like Hurricanes Harvey and Irma, 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. These additional costs have represented less than 1% annual operating cost. Increased operational cost of less than 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 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.

Time horizon

Medium-term

Likelihood

Very likely

Magnitude of impact

Low

Potential financial impact

2500000

Explanation of financial impact

The financial implications for WM posed by potential increases in severe floods and storms include costs associated with the repair of damaged facilities, equipment and loss of revenue from logistics interruption. Emergency plan development undertaken in response to recent 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. It also conservatively assumes only one week each of facility disruption, reflecting our ability post-Harvey and Irma to restore service within that time frame.

Management method

We are managing these risks with business continuity planning, emergency response planning, investigating innovations like use of vegetative cover for landfills to reduce repair costs, and mapping our facilities to identify those in water challenged areas. Actions taken:1. Three years ago, rolled out 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 an incoming storm and plan ahead to provide efficient services in aid of clean-up and disaster recovery. In 2017, we added more layers to enhance its functionality and information attributes and users are able to create and maintain spatial boundaries on maps

specific to their market areas and businesses. 2. After significant storms like Hurricane Harvey, we reviewed our flood maps, identified facilities that are at risk, and implemented broader mitigation measures that have shown to be effective. 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 2017, we used our internal communications capacity to disseminate information on emergency resources available for emergency response.

Cost of management

50000

Comment

Note that the estimate of cost is for the additional equipment identified, not the accelerated equipment upgrade and repair also related to this risk, but with offsetting benefits in terms of business continuity. In 2017, the costs of emergency planning and WAVE are modest (less than 0.1 percent annual cost of \$8. 2B) because internal staffs manage each program. 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.

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 driver

Market: Reduced demand for goods and/or services due to shift in consumer preferences

Company- specific description

(i)WM is a full service environmental services company, not just a landfill company. WM is able to make this claim because of a reputation built over years of doing "more than the minimum" to provide sustainable materials management solutions. Although one of our competitive edges is our management system for our landfills, which over time have proven effective in eliminating migration of any contaminants from our modern landfills, an important adjunct to this assurance of safety is our ability to offer sustainability services. Given the impact of global trade on US domestic recyclable commodity markets, the entire recycling industry is at financial risk. This has broad implications for our customers, whose greenhouse gas reduction goals rely upon availability of recycling infrastructure like ours. Moreover, carbon reductions services largely based on recycling are core to our over 400-member consulting firm providing full service environmental tracking and solutions services. Moreover, the expenditures of WM's Venturing Department, which manages a broad portfolio of investments in innovate waste reduction and treatment technologies, is also based on an assumption that the materials WM successfully converts into recyclable commodities will in fact be used as such. This differentiation is critical to our market advantage for 50% of our annual revenues.

Time horizon

Long-term

Likelihood

About as likely as not

Magnitude of impact

Medium

Potential financial impact

120000000

Explanation of financial impact

Our contracts with municipalities and medium and large private sector customers rely upon the quantity and quality of WM's recycling and renewable energy capabilities as well as its capacity to provide environmental data management and waste elimination/ reduction/ recycling services. If our revenue was to decrease 1% due to negative public perception of our capabilities or long-term investment in sustainable assets, that could be a loss of \$120 million dollars.

Management method

The US domestic recyclable commodity markets have been impacted by global trade and Chinese halt to imports of recyclables such that the entire recycling industry at financial risk. This has broad implications for our customers whose GHG reduction goals rely upon availability of recycling infrastructure like ours. Educating consumers about how to recycle to minimize contamination can

have a significant impact on how material is collected and whether it can be recycled into new products. These issues must be communicated through channels and formats available to a wide range of stakeholders (investors, customers, and the general public) to manage the risk. WM does this through sustainability reporting, consulting with customers to translate waste management practices into GHG reductions and educating customers on how to recycle right through ongoing partnerships and a focused campaign. WM Sustainability Services provides environmental tracking and solutions to help customers link our services with GHG reductions and the cost of various ways of achieving those reductions to advocate nationally. Each year, more customers take advantage of our ENSPIRE program to aggregate and visualize waste diversion data and calculate GHGs. WM's Recycle Often. Recycle Right campaign is educating customers: our municipal customers with long-term commitments to public education are at 10% contamination rate versus the national average of 24%. In 2017 we reduced our contamination by a full point.

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 driver

Increased revenue through demand for lower emissions products and services

Company- specific description

(i) WM is finding increased demand for renewable fuels, which reduce GHGs and in particular reduce NOx 90%. The Federal Renewable Fuels Standard and state incentive programs encourage investment in our facilities that produce renewable fuel from landfill gas. (ii) Similarly, our Organics Recycling Group has 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 decreases our risk of the increasing prices of fossil fuel.

Time horizon

Medium-term

Likelihood

Virtually certain

Magnitude of impact

Medium

Potential financial impact

650000000

Explanation of financial impact

The financial implications of pursuing organic waste derived fuel and energy technologies may include enhanced business growth in both WM's new and established lines of business. According to US EPA's new 2015 Facts and Figures, 15.1% of waste generated is food. Using US EPA's average municipal solid waste disposal fee of \$48.10, WM's CORE food waste processing could, when food waste is fully captured, realize \$650 M in revenue. As our newer alternative fuel and energy activities are executed, this sometimes results in additional business for WM's recycling, reuse and waste hauling businesses. [THIS WAS PART OF OUR PREVIOUS RESPONSE, NEED TO UPDATE Our 2016 sustainability report shows recycling constitutes 9% of total revenues of \$13.6B. Green energy constitutes 8% of total revenues of \$14.5B. Therefore, the financial implications of not pursuing organic waste derived fuel and energy technologies would result in a loss of revenue of less than 5% of our \$13B revenue for 2016.]

Strategy to realize opportunity

WM's Government Affairs, Legal, Organics and Public Sector Sales departments coordinate to sustain and increase legislative and regulatory support for renewable fuels. Innovative lowcarbon and renewable fuels projects from 127 Waste Management landfills is used to fuel electricity generators, and the electricity is then sold to public utilities, municipal utilities or power cooperatives; used at the landfill or delivered by pipeline to industrial customers as a direct substitute for fossil fuels in industrial processes; processed to pipeline-quality natural gas and then sold to natural gas suppliers; processed into liquefied natural gas and used as vehicle fuel. In 2017, WM created enough energy through our waste-to-energy operations to power nearly one-half million homes; 2.4M tons of carbon dioxide equivalent was indirectly offset as a result of our renewable fuels projects. WM has contracts with wastewater facilities in Los Angeles, CA, Boston, MA, 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 renewable natural gas 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

10000000

Comment

The cost of providing organic waste-based fuel and energy projects and capitalizing on business opportunities arising from these projects is not a severable cost item. It is part of the investment in building a new line of business, promoting it and executing it. As such in 2017, the "cost" is offset by revenue gained by operating the business and revenue gained by other lines of business benefiting from these projects.

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 driver

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 can be an important means to assist the community and relieve hardship. Because WM facilities are equipped and WM personnel are trained to respond quickly and safely to certain damage caused by extreme weather events such as floods and high winds, we do so when such services are needed. (ii) WM facilities have equipment, supplies and trained staff to secure its own interests after damage from extreme weather events. They also 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 cleanup of extreme events such as floods 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. Moreover, after Hurricane Sandy, WM determined that its emergency response planning avoided the kind of loss a competitor experienced (\$9 million in lost revenues) and in fact was able to service the competitor's customers. It also informed our on-going 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 has successfully mitigated our risk of losses due to these uncontrollable events.

Time horizon

Medium-term

Likelihood

Very likely

Magnitude of impact

Medium-low

Potential financial impact

1000000

Explanation of financial impact

WM's emergency plans allow us to adjust facility design and IT capabilities. WM avoided comparable loss and was able to serve other customers displaced by outage at other facilities. Revenues from that diversion were estimated to exceed \$1M based on our experience with Hurricane Sandy. We believe that this remains an accurate basis for estimating in 2017 the potential financial implication of the opportunity for other climate-related changes. Costs for this planning are less than 0.05% of operating costs of \$10.9B. Profits from one storm event in one year exceeded \$1 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 and focuses on protection of physical assets and employees before the storm. WM's plans have established standardized lines of communication and prearranged methods of communication post-storm to account for all employees, communication with customers and re-establishment of services. Each coastal site has a Waste Management Hurricane 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 Hurricane Sandy, a WM competitor experienced \$9 million in lost revenues. WM avoided this kind of loss and serviced the competitor's customers. After Hurricanes Harvey and Irma, WM expanded its emergency plan by making adjustments in facility design and IT capabilities. In 2016-2017 Sustainability Services was trained on severe weather safety and response, including best practices organizing a site safety plan with procedures and equipment. We updated hazardous materials emergency action plans, including continued natural disaster training, and training for all operational personnel. In 2017, these modifications are estimated to cost less than 0.05% of operating costs; profits from one storm event in one year exceeded \$1 million.

Cost to realize opportunity

10000

Comment

In 2017, 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.

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 driver

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 could result in more value being assigned to opportunities for 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/> Most of the costs of this campaign are

internalized. The potential benefits of significantly increased recycling are enormous. According to EPA, in 2012 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 GHG emissions from more than 33 million passenger vehicles.

Time horizon

Medium-term

Likelihood

Very likely

Magnitude of impact

Medium

Potential financial impact

100000000

Explanation of financial impact

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. 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

WMRS, WMSS, WM Organic Growth, Sales and Marketing compile supply chain questionnaires to understand customer trends and tailor our service offerings to market demand. These efforts are analyzed by WM Financial Planning and Analysis 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. WM offers multiple renewable energy options in many markets and is now offering natural gas refueling stations. 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 "Recycle Often. Recycle Right" public campaign to increase productivity from community recycling programs. 3. WM has 125 natural gas fueling facilities, 28 of which serve the public or pre-approved third parties, in 30 states and three Canadian provinces.

Cost to realize opportunity

0

Comment

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.

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 driver

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 and as 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 invest in innovative sustainable 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, part of which was building out our WM Sustainability Services consulting

arm. WMSS offers customized solutions. The consulting team 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, the transformation effort can be seen in the changes to our sustainability reporting and a deeper understanding of our sales teams and account managers of what our customers mean when they talk about their sustainability needs, which ensures we can continue to address them. We are capitalizing on existing reputation and logistical assets in waste recovery and expanding sharpening our focus on recycling, waste-to-energy and integration with consulting and project management services. The transformation effort has increased customer satisfaction and has enabled the company to sustain business during what has been, with respect to recycling, an economically challenging decade.

Time horizon

Long-term

Likelihood

Likely

Magnitude of impact

Medium

Potential financial impact

1400000000

Explanation of financial impact

Increasing public desire to address climate change and its recognition that sustainable practices such as recycling and renewable energy as means to do so has enhanced WM's reputation for service innovation and its competitive position with customers with sustainability goals. We are able to demonstrate that in 2017 we processed 15.3M tons of recyclables and used renewable energy equivalent to 2.5M 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 \$14B revenue for 2017.

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 forum, to show how major public venues 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 to reinforce, externally and throughout our workforce, our commitment to recycling and renewable energy generation. In 2017, WM's operations avoided three times the GHGs we generated. WM processed 15.3M tons of recyclables and used renewable energy equivalent to 2.5M tons of coal and preserved 25,000 acres of land in certified wildlife habitat.

Cost to realize opportunity

0

Comment

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 2017, the cost thus remains zero.

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 cleanup of extreme events such as floods 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. In an effort to shore up the industry, WM has used its market connections to ship more material to domestic markets, as well as to a wide range of customers across the globe. In addition, WM worked with municipal customers to engage their support in improving commodity quality and therefore saleability, and discouraging landfilling of recyclables. Our RecycleOften.RecycleRight. training program provided 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, 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. See California Senate Bill (SB) 1382 and the Short-lived Climate Pollutants (SLCP) 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 cost of recyclables too contaminated for sale. These risks impact our supply chain because higher commodity prices may inhibit their ability to purchase recycled content 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 and even inland facilities engage in tornado/severe thunderstorm preparedness. Three of WM's Business Divisions located in coastal areas are particularly impacted—WM Florida, WM South Atlantic, and WM Gulf Coast. WM has expanded its emergency plan in response to recent, more extreme climatic events like Hurricanes Harvey and Irma, 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 MRF operations to increase time and labor to sort. 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 factored into your financial planning process.

	Relevance	Description
Revenues	Impacted	Increasing public desire to address climate change and its recognition that sustainable practices such as recycling and renewable energy as means to do so has enhanced WM's reputation for service innovation and its competitive position with customers with sustainability goals. We are able to demonstrate that in 2017 we processed 15.3M tons of recyclables and used renewable energy equivalent to 2.5M 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% less than 1% of our \$14B revenue for 2017. Changing consumer behavior and increased recycling demand, revenues could increase over \$100M, and 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. On the other hand, the risk from being unable to change consumer behavior and increase recycling demand is also factored into financial planning. Magnitude of impacts are low.
Operating costs	Impacted	(i)The financial implications for WM posed by potential increases in severe floods and storms include costs associated with the repair of damaged facilities, equipment and loss of revenue from logistics interruption. Emergency plan development undertaken in response to recent 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 and conservatively assumes only one week each of facility disruption, reflecting our ability post-Harvey and Irma to restore service within that timeframe. In 2017, the costs of emergency planning and WAVE are less than 0.05 percent annual cost of \$8. 2B because internal staffs manage each program. Our business continuity planning carefully monitors fuel prices and availability and relies on the natural hedges resulting from 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. (ii)Recycling commodity prices were volatile in 2017 and sensitive to geopolitics. We monitor prices, trade policy, and work closely with customers to sustain the infrastructure by, for example, changing contractual terms and mitigating the cost of recyclables too contaminated for sale. (iii)In response to the risk of policy to impact operations and revenue at landfills, we are assessing electronic real-time recordkeeping of field monitoring results, evaluating 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, and testing new landfill gas collector designs for functionality and reliability to improve existing gas collection/drive earlier gas collection. (iv)The 2016 Federal NSPS and EG rules requirements could lead to compliance costs potentially increasing by \$10M/year; annual costs for WM staff and consultants is approximately \$725,000. 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. Magnitude of impacts are low.
Capital expenditures / capital allocation	Impacted	In our financial forecasting, we are evaluating allocation of capital among carbon-reducing investment opportunities like continued transition to natural gas vehicles, 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. WM budgets for investment in the skills and knowledge needed (human capital) to respond to customer requests for low-carbon products and services. WM budgets for maintaining varying partnerships (social capital) with organizations such as the Sustainable Materials Management Coalition, 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. Magnitude of impacts are low.
Acquisitions and divestments	Impacted	In 2016, one of the factors in our divestment of our waste-to-energy division was its higher life cycle carbon footprint in comparison to our other lines of business. Carbon reduction is at the core of our monitoring through the Venturing Department, which manages a broad portfolio of investments in innovate waste reduction and treatment technologies. Magnitude of impacts are low.
Access to capital	Not impacted	Access to capital 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	Risk of increased cost of trucks is factored into budgeting for new CNG trucks to replace diesel, part of WM's greenhouse gas reduction goals, along with costs to purchase renewable natural gas fuel. As WM is finding increased demand for renewable fuels, which reduce GHGs and in particular reduce NOx by over 90%, costs to build new landfill gas projects is also part of WM's long-term budget. Similarly, our Organics Recycling Group's CORE unit technology to help divert foodwaste and expand the renewable energy produced from wastewater treatment facilities partners is part of WM's medium-term budget. Magnitude of impacts are medium.
Liabilities	Impacted	WM was the first company in our sector to develop a fleet of landfill-gas-to-energy facilities, converting a potent greenhouse gas, methane, from a liability into a renewable source of energy and fuel. 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. Magnitude of impacts are medium.
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, either as market development opportunities across our customer base of communities and industries – providing recycling, renewable energy and sustainability consulting services, or as potential operational costs or cost savings. For the past decade, all aspects of our operations and services touch on climate-related issues as determined by our senior leadership team in response to customer demand and evolving regulatory requirements.

Cross-disciplinary teams monitor customer needs for carbon reduction by analyzing waste streams, service offerings and programs, identifying carbon emission reduction opportunities and corresponding services using methods appropriate for our business. WM developed a detailed model that calculates the cost per ton of carbon emissions for all materials in the waste stream and all services provided in our industry. We use this with customers to help prioritize opportunities for carbon reduction efforts. This includes transitioning to a low carbon natural gas fleet using non-fossil fuel renewable natural gas, providing recycling and organics management services, and consulting services.

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 truck manufacturers in the development of a new "Near Zero" carbon emissions engine that is now the only natural gas truck engine that WM is purchasing. WM allocates significant capital and invests in infrastructure to process biogas from our landfills into renewable natural gas 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 natural gas trucks operating on renewable natural gas is planned to grow to over 60% of our overall collection fleet. WM has four facilities producing renewable natural gas from our landfills for our fleet, reducing emission from our landfills and from our fleet operations. WM has exceeded 15% emissions reduction goal from its fleet and plan to announce new goals in 2018.

Recycling and organics management services are another carbon reduction and business opportunity that applies across our business enterprise and has been identified by our senior leadership team as a priority for improvement. WM maintains 93 recycling processing facilities and recycled 15.3 million tons of recyclables in 2017, as we work towards our 20 million ton goal. Our recycling services reduced GHG emission by 30.9 million metric tons. Increasing state and local regulations as well as specific customer demand have led to growth in these services. 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 2017, WM spent \$12 million on public education programs to teach our customer how to recycle correctly.

Management of food waste is another key area of focus in our industry. WM has made a commitment to working with a regulators and other stakeholders to support food reduction activities, which reduce carbon by 6 to 7 times that of end-of-life management. Our thirty-seven 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 plays a key role in communities when weather events occur. During this reporting period, WM's disaster response efforts were

tested with hurricanes Harvey and Irma, as well as flooding in Southern California. These events highlighted the disruption to our business continuity that severe weather events can create. WM has well-developed continuity plans in place that prioritize geographic areas of risk of disasters using FEMA maps. During hurricanes of 2017, 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.

WM Sustainability Services 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. WM Sustainability Services 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
Other, please specify (IEA 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 have used the WRI Aqueduct tool in previous years to analyze the impact of water on our facilities for CDP’s Water questionnaire response, and more recently to determine if there are risks we have not considered. Given our low use of water for operations, the most relevant physical scenario analyses were flood occurrence, drought severity, media activity threatened amphibians, and the business as usual case for projected change in water stress, water supply and demand in 2030 and 2040. For 2018 reporting, WM chose 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, 2035 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, it seemed important to include the 2060 time horizon in our analysis. Although it is a challenge to incorporate that planning so far in the future, the data obtained from the models is valuable. In 2018 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 use 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 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.</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. We used the IEA’s WEO World Energy Outlook (WEO) 2DS scenario analysis for the first time this reporting year, analyzing emissions reductions and energy flows mainly related to transport fuels, from 2025 to 2060. For 2018 reporting, WM 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. The 2020 scenario was not particularly useful because, although it fits within the short-term climate strategies, 2020 is not very far in the future and preparations for risks occurring within this short time frame are already underway or complete. In 2018 reporting, all facilities were considered. All WM material recycling facilities (MRFs) 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. 47% of MRFs are in high flood areas and 8% are in extremely high flood areas; 2 of these MRFs are also in areas with threatened amphibians. 10% of MRFs are in areas of medium to high drought severity. In a business as usual scenario, looking ahead at both 2030 and 2040, the majority MRFs are located in areas anticipated to experience near normal water demand and supply. Two MRFs may experience up to 1.4x increase in water supply, and to 1.2x decrease in current water supply, and 3 MRFs may experience up to 1.4x in water demand. Results of the scenario analysis: one MRF is in an area of high flooding AND medium to high drought severity and is not anticipated to experience near normal supply and increased demand (1.2x) in 2030 and 2040. 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 are intimately aware of the risks, with Hurricane Preparedness 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, over half of WM materials recycling facilities are currently in high or extremely high flood areas. WM realized through using the WRI Aqueduct tool that we should look to the longer-term future to consider other locations that might be similarly impacted in 2030 and begin to adapt existing Hurricane Preparedness Plans for these locations. We will also consider 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

% 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

% achieved (emissions)

91

Target status

New

Please explain

In 2007, as part of our corporate sustainability goals, we committed to reduce our total carbon dioxide fleet emissions by 15 percent below 2007 levels by 2020. We achieved this carbon dioxide fleet emissions goal several years ahead of schedule, reducing fleet carbon dioxide emissions by 20 percent below 2007 levels in 2011. In 2016, we updated this goal using climate science and expanded it to be long term. Nonetheless, the goal remains focused on reducing GHG emissions from our fleet, which was 9% of our total base year emissions. The start year was changed from 2011 to 2017 and the target year changed from 2020 to 2038 (CY) to align with other WM goals. 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 have grown our fleet to 6,630 trucks, operating 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 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; new 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

% 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

% achieved (emissions)

50

Target status

New

Please explain

The previous goal, Abs2, was changed although it remains a medium-term goal focused on reducing greenhouse (GHG) emissions by recycling more materials. The start year changed from 2011 to 2017 and the target year changed from 2020 to 2028 (CY). 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, providing a firm platform for additional growth. WM is regularly investing in new programs such as our "Recycle Often. Recycle Right.®" campaign to encourage our residential, commercial and municipal customers to recycle and decrease contamination. WM is engaged broadly with stakeholders on means to increase the productivity and sustainable economics of recycling, in 2015 inaugurating a Sustainable Materials Management Coalition on recycling, headed by a former US EPA Assistant Administrator for Solid Waste and Emergency Response. 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. WM's recycling activities result in a wide variety of GHG reductions that otherwise very likely would not occur. Since 2015 we are explicitly advocating 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. By the end of 2017, WM operated 42 organics processing plants and 95 recycling facilities; although the number of recycling facilities decreased in 2017, WM managed 15.3 million tons of recyclables, 4% more than in 2016.

Target reference number

Abs 3

Scope

Scope 1+2 (location-based)

% emissions in Scope

100

% 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

% achieved (emissions)

28

Target status

Replaced

Please explain

The previous Abs3 goal was replaced but remains a long-term goal focused on reducing GHG emissions by recycling more materials. The start year changed from 2011 to 2018 and the target year changed from 2020 to 2038 (CY) to align with other WM goals. 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, providing a firm platform for additional growth. WM is regularly investing in new programs such as our "Recycle Often. Recycle Right.®" campaign to encourage our residential, commercial and municipal customers to recycle and decrease contamination. WM is engaged broadly with stakeholders on means to increase the productivity and sustainable economics of recycling, in 2015 inaugurating a Sustainable Materials Management Coalition on recycling, headed by a former US EPA Assistant Administrator for Solid Waste and Emergency Response. 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. Since 2015 we are explicitly advocating 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. The base year emissions were previously reported using incorrect units and has been adjusted. By the end of 2017, WM operated 42 organics processing plants and 95 recycling facilities; although the number of recycling facilities decreased in 2017, WM managed 15.3 million tons of recyclables, 4% more than in 2016.

C4.2

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

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 projects at each stage of development, and for those in the implementation stages, the estimated CO₂e savings.

	Number of projects	Total estimated annual CO ₂ e savings in metric tonnes CO ₂ e (only for rows marked *)
Under investigation	5	
To be implemented*	7	5551103
Implementation commenced*	5	3773348
Implemented*	7	5074493
Not to be implemented	2	

C4.3b

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

Activity type

Low-carbon energy purchase

Description of activity

Biogas

Estimated annual CO2e savings (metric tonnes CO2e)

32020

Scope

Scope 1

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)

7100000

Investment required (unit currency – as specified in CC0.4)

2900000

Payback period

>25 years

Estimated lifetime of the initiative

16-20 years

Comment

Starting in 2007, we increased our fleet efficiency and reduced its GHG emissions by 2.1% year over year for an 18.9% reduction by 2020. We are implementing a range of technologies to make our trucks more efficient, including controlling emissions, using alternative fuels and optimizing truck design. At the time of this report, we have 6,536 natural gas-powered trucks in our fleet, reducing NOx and greenhouse gases. Other initiatives that decrease greenhouse gas emissions: installed 5minute maximum idle-time limiters, enforced protocols on tire pressure, employed a vehicle weight tracker (which reduced GHG emissions by 1.77%), and rethread over 150,000 tires, saving 13 gallons of petroleum per tire. We are a U.S. EPA SmartWay Partner and previous winner of the Natural Gas Vehicle Industry Achievement Award. In addition, our fleet efficiency program, "Service Delivery Optimization" or SDO, optimizes our logistics through a combination of technological advancement in onboard computing, fleet maintenance, route management (and overall safety), leading to greenhouse gas reductions.

Activity type

Energy efficiency: Building services

Description of activity

Lighting

Estimated annual CO2e savings (metric tonnes CO2e)

165912

Scope

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)

26000

Investment required (unit currency – as specified in CC0.4)

1575000

Payback period

4 - 10 years

Estimated lifetime of the initiative

3-5 years

Comment

Activity type

Low-carbon energy installation

Description of activity

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

Estimated annual CO2e savings (metric tonnes CO2e)

1564053

Scope

Scope 3

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)

0

Investment required (unit currency – as specified in CC0.4)

0

Payback period

Please select

Estimated lifetime of the initiative

16-20 years

Comment

Activity type

Energy efficiency: Processes

Description of activity

Other, please specify (recycling + food waste)

Estimated annual CO2e savings (metric tonnes CO2e)

844644

Scope

Scope 3

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)

2500

Investment required (unit currency – as specified in CC0.4)

12000000

Payback period

4 - 10 years

Estimated lifetime of the initiative

16-20 years

Comment

As of December 31, 2017, WM has 42 organics processing facilities and 95 material recycling facilities. The potential benefits of significantly increased recycling and keeping organic waste out of the landfill are enormous. According to EPA, in 2012, 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.

Activity type

Energy efficiency: Processes

Description of activity

Other, please specify (campaigns/education to reduce GHGs)

Estimated annual CO2e savings (metric tonnes CO2e)

404316

Scope

Scope 3

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)

18200000

Investment required (unit currency – as specified in CC0.4)

12000000

Payback period

11-15 years

Estimated lifetime of the initiative

11-15 years

Comment

Our single-stream recycling activities focused on "Recycle Often. Recycle Right" public campaign to increase productivity from community recycling programs, which relies on educating communities, schools, companies, non-profits, governments, and CEOs. The potential benefits of significantly increased recycling are enormous. According to EPA, in 2012, 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.

Activity type

Low-carbon energy installation

Description of activity

Biogas

Estimated annual CO2e savings (metric tonnes CO2e)

140158

Scope

Scope 1

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)

45600000

Investment required (unit currency – as specified in CC0.4)

0

Payback period

Please select

Estimated lifetime of the initiative

1-2 years

Comment

Part of our fleet efficiency goal is to increase renewable natural gas produced from WM's landfill gas, which significantly reduces greenhouse gas emissions compared with diesel fuel. Since we have already invested in the landfill projects, there is no investment required for this particular input and therefore no payback period.

Activity type

Process emissions reductions

Description of activity

New equipment

Estimated annual CO2e savings (metric tonnes CO2e)

4329

Scope

Scope 1

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)

1125780

Investment required (unit currency – as specified in CC0.4)

0

Payback period

Please select

Estimated lifetime of the initiative

1-2 years

Comment

We continue to invest in hybrid Caterpillar D7Es for our landfill operations, which replace D8 tractors at many of our landfills and continue to produce a solid 40%+ fuel savings per hour, leading to greenhouse gas emissions reductions. We continue to run the first-ever Deere 644K diesel-electric loader at our Hillsboro, OR MRF, and are currently running a number of Caterpillar's 336EL hybrid excavators with fuel savings ranging from 15-25% over the non-hybrid units, and in California, use a Volvo hybrid wheel loader. We are an EPA NONROAD Model Supporter. These units were all purchased prior to 2017 reporting, therefore there is 0 investment required and no payback period.

Activity type

Low-carbon energy installation

Description of activity

Biogas

Estimated annual CO2e savings (metric tonnes CO2e)

2400000

Scope

Scope 3

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)

0

Investment required (unit currency – as specified in CC0.4)

30000000

Payback period

16-20 years

Estimated lifetime of the initiative

>30 years

Comment

Innovative low-carbon and renewable fuels projects from 127 Waste Management landfills is used to fuel electricity generators, and the electricity is then sold to public utilities, municipal utilities or power cooperatives; used at the landfill or delivered by pipeline to industrial customers as a direct substitute for fossil fuels in industrial processes; processed to pipeline-quality natural gas and then sold to natural gas suppliers; processed into liquefied natural gas and used as vehicle fuel.

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 our Board has approved 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. In 2014 – 2015, we began a nationwide campaign, Recycle Often. Recycle Right.SM, to leverage partnerships and community engagement to increase recycling 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. 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.
Please select	

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 process shares 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 truly 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

10

Comment

34,611,468 MTCO₂e in 2014 32,483,904 MTCO₂e in 2015, 32,571,862 MTCO₂e in 2016 and 32,586,647 in 2017.

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?

Row 1

Gross global Scope 1 emissions (metric tons CO2e)

15689993

End-year of reporting period

<Not Applicable>

Comment

Row 2

Gross global Scope 1 emissions (metric tons CO2e)

End-year of reporting period

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?

Row 1

Scope 2, location-based

244828

Scope 2, market-based (if applicable)

<Not Applicable>

End-year of reporting period

<Not Applicable>

Comment

Row 2

Scope 2, location-based

Scope 2, market-based (if applicable)

<Not Applicable>

End-year of reporting period

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

470255

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

2017 was the first year WM accounted for Bagster as an individual line of business. Emissions from the purchase of the 442,000 Bagsters produced by third party vendors have been included in the total Purchased Good and Services and account for 2,522 MtCO2e of the total 470,255 MtCO2e. This is still an overall decrease from 2016 emissions of 634,961 MtCO2e.

Capital goods

Evaluation status

Relevant, calculated

Metric tonnes CO2e

7962954

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

2343764

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

1190

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

2017 was the first year WM accounted for Bagster as an individual line of business. Reported emissions include ocean and rail freight and tax.

Waste generated in operations

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

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

Explanation

Being an environmental solutions provider, waste generated through WM operations is 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 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

20545

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 20,537.97 MtCO_{2e}. Prior to 2015, WM submitted vehicle travel under employee commuting. Combining it with air business travel has resulted in an increase in MtCO_{2e} the past few years. WM's GHG emissions from air business travel increased slightly in 2017 from 2016. Emissions from air travel were 7,093.77 metric tonnes CO_{2e} compared to 6,200.49 metric tonnes CO_{2e} in 2016. Emissions from vehicle travel were 13,444.20 MtCO_{2e}, a slight increase from the 13,441.95 MtCO_{2e} in 2016.

Employee commuting

Evaluation status

Relevant, calculated

Metric tonnes CO₂e

208391

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

0

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 2017, WM employee commuting resulted in 208,276.23 MtCO₂e. The calculation is based on the accounting for the total employee count of 42,300. This is 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

Emissions calculation methodology

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

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

317

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

2017 was the first year WM accounted for Bagster as an individual line of business. Reported emissions include domestic shipping and tax.

Processing of sold products

Evaluation status

Not relevant, explanation provided

Metric tonnes CO₂e

Emissions calculation methodology

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

Explanation

WM does not process any sold, intermediate products. WM does create SpecFuel™ (see "Fuel-and-energy-related activities"); however, emissions generated from these services are Scope 1 and Scope 2 and reported in those sections.

Use of sold products

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

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

Explanation

WM does not use sold products. 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

Emissions calculation methodology

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

Explanation

WM does not process sold products nor treat its end of life. 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

1934

Emissions calculation methodology

Using the Office 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

25

Explanation

WM's GHG from Upstream Leased Assets total 1,933.60 MtCO2e for 2017.

Franchises

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

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

Explanation

WM does not have franchises.

Investments

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

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

Explanation

WM is not a financial institution.

Other (upstream)

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

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

Explanation

WM has no other relevant upstream activity to report.

Other (downstream)

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

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

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.

36319

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

0.000110009

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

15934821

Metric denominator

unit total revenue

Metric denominator: Unit total

14485000000

Scope 2 figure used

Location-based

% change from previous year

5.57

Direction of change

Decreased

Reason for change

GHG emissions per dollar of total revenue increased between 2016 and 2017 because GHG emissions (numerator) had a 0.51% increase while revenue had a 6.05% increase. WM also implemented emission reduction activities: i.) WM's diesel fleet vehicle count went down by about 1,000 vehicles, while CNG fleet increased by about 750 vehicles, leading to a decrease in conventional fuel consumption that was also supported by an increase in renewable natural gas. CNG fuel generates fewer GHG emissions than diesel. ii.) WM operates the world's largest fleet of Caterpillar D7E bulldozers, a diesel-electric hybrid machine with a smaller diesel engine powering an electric generator that provides the tractive effort as well as powering many previously gear driven components. Each unit saves approximately 9,440 gallons of diesel fuel; iii) 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; iv.) Facilities' methane destruction efficiencies were improved slightly, so less methane passed through and was emitted from the stacks in 2017 compared to 2016. Overall emissions increased because WM added landfill capacity, generating more landfill gas in 2017 compared to 2016. WM recovered, and combusted and converted more methane in our engines and turbines in 2017; v.) Reporting methodologies have also changed and become more accurate. In 2017, more sites uploading data into EnerNoc replaced estimates with full-year usage data. Facility utilities increased because sites were added to our portfolio through acquisition as well as re-classification to better categorize multi-use facilities (e.g., transfer stations that share facilities with local hauling operations or area offices).

C7. Emissions breakdowns

C7.1

(C7.1) Does your organization have greenhouse gas emissions other than carbon dioxide?

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	2005208	IPCC Fourth Assessment Report (AR4 - 100 year)
CH4	13634569	IPCC Fourth Assessment Report (AR4 - 100 year)
N2O	2169	IPCC Fourth Assessment Report (AR4 - 100 year)
HFCs	48047	IPCC Fourth Assessment Report (AR4 - 100 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	14913347
Canada	776646

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	1866
Inactive or Closed Sites	1023414
WM of Ark Tenn Alabama Kentucky	870901
WM of Florida	751423
WM of Four Corners	1045953
WM of Greater Mid Atlantic	271834
WM of Gulf Coast	557876
WM of Illinois Missouri Valley	1182721
WM of Michigan Ohio Indiana	1867487
WM of New England	626925
WM of Northern California	512038
WM of Pacific Northwest BC	373734
WM of South Atlantic	717930
WM of Southern California	675683
WM of Texas Oklahoma	2519093
WM of Wisconsin Minnesota	863693
WM of WPA MD WV VA	1471161
WM SBS	89
WM of Eastern Canada	300042
WM of Western Canada	56130

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	232709		498857	0
Canada	12119		32046	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	4914	
Inactive or Closed Sites	4435	
WM of Ark Tenn Alabama Kentucky	7210	
WM of Florida	18848	
WM of Four Corners	26939	
WM of Greater Mid Atlantic	14617	
WM of Gulf Coast	6827	
WM of Illinois Missouri Valley	28434	
WM of Michigan Ohio Indiana	10922	
WM of New England	22215	
WM of Northern California	17436	
WM of Pacific Northwest BC	13922	
WM of South Atlantic	23752	
WM of Southern California	4892	
WM of Texas Oklahoma	7215	
WM of Wisconsin Minnesota	9766	
WM of WPA MD WV VA	18478	
WM SBS	402	
WM of Eastern Canada	441	
WM of Western Canada	3163	

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		<Not Applicable>		
Other emissions reduction activities	74745	Decreased	5.26	The gross fleet emissions (CNG, LNG, diesel, motor gasoline) for this reporting year are 1,345,898 MtCO2e. WM's gross fleet emissions for the previous reporting year were 1,420,643 MtCO2e. This means that the total change in emissions is -74,745 MtCO2e, equal to a 5.26% decrease, according to the formula in the explanation of terms, above: $(-74,745/1,420,643) * 100 = -5.26\%$. The change from 1,420,643 to 1,345,898 MtCO2e is attributed to the emissions reduction activity of switching more WM fleet vehicles to compressed natural gas, additionally reducing the usage of motor gasoline, diesel, and LNG. More specifically, in 2017, WM's diesel fleet vehicle count went down by about 1,000 vehicles, while CNG fleet increased by about 750 vehicles, leading to a decrease in conventional fuel consumption that was also supported by an increase in renewable natural gas. CNG fuel generates fewer GHG emissions than diesel. 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 22 metric tons of greenhouse gas emissions per year (the equivalent of a 21 percent emissions reduction per truck). The emissions value (percentage) for each of these two connected factors can also be calculated using the same formula described in the guidance. The percentage change in emissions due to the decrease in motor gasoline, diesel and LNG is: $(-101,465 \text{ MtCO}_2\text{e} / 1,085,036 \text{ MtCO}_2\text{e}) * 100 = -9.35\%$. CNG emissions conversely increased with a percentage change of: $(26,711 \text{ MtCO}_2\text{e} / 335,606 \text{ MtCO}_2\text{e}) * 100 = 7.96\%$. When these totals are combined, it results in a 5.26% decrease in fleet emissions in emissions due to emissions reduction activities.
Divestment		<Not Applicable>		
Acquisitions		<Not Applicable>		
Mergers		<Not Applicable>		
Change in output	277362	Increased	1.11	WM's gross landfill emissions and biogenic landfill emissions for this reporting year are 25,357,211 MtCO2e. WM's gross landfill emissions and biogenic landfill emissions for the previous reporting year were 25,079,850 MtCO2e. This means that the total change in emissions is 277,361 MtCO2e, equal to a 1.11% increase, according to the formula in the explanation of terms: $(277,361/25,079,850) * 100 = 1.11\%$. The change from 25,079,850 to 25,357,211 MtCO2e is attributed to a change in output. More specifically, WM added landfill capacity and was able to recover and combust or convert more methane in our turbines in 2017 compared to the previous year. The emissions value (percentage) for each of these two connected factors can also be calculated using the same formula described in the guidance. The percentage change in landfill emissions is: $77,956 \text{ MtCO}_2\text{e} / 13,555,185 \text{ MtCO}_2\text{e} * 100 = 0.575\%$. Biogenic landfill emissions also increased with a percentage change of: $(199,406 \text{ MtCO}_2\text{e} / 11,524,665 \text{ MtCO}_2\text{e}) * 100 = 1.70\%$. When these totals are combined, it results in a 1.11% increase in fleet emissions in emissions due to emissions reduction activities.
Change in methodology	70865	Increased	12.57	The gross utility emissions (natural gas and electricity) for this reporting year are 634,816.13 MtCO2e. WM's gross utility emissions for the previous reporting year were 563,951.41 MtCO2e. This means that the total change in emissions is 70,864.72 MtCO2e, equal to a 12.57% increase, according to the formula in the explanation of terms: $(70,864.72/563,951.41) * 100 = 12.57\%$. The change from 563,951.41 to 634,816.13 MtCO2e is attributed to a change in methodology. WM's reporting methodologies have changed and become more accurate. In 2017, facility utilities increased because sites were added to our portfolio through acquisition as well as re-classification to better categorize multi-use facilities (e.g., transfer stations that share facilities with local hauling operations or area offices). More sites uploading data into EnerNoc replaces estimates with full-year usage data. The emissions value (percentage) for each of these two connected factors can also be calculated using the same formula described in the guidance. The percentage change in emissions due to the increase in utility natural gas is: $(62,042 \text{ MtCO}_2\text{e} / 327,947 \text{ MtCO}_2\text{e}) * 100 = 18.92\%$. Electricity consumption also increase with a percentage change of: $(8,823 \text{ MtCO}_2\text{e} / 236,005 \text{ MtCO}_2\text{e}) * 100 = 3.74\%$. When these totals are combined, it results in a 12.57% increase in utility emissions in emissions due to a change and improvement in methodologies.
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 0% but less than or equal to 5%

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	Yes

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)	HHV (higher heating value)	282843	7574994	7857837
Consumption of purchased or acquired electricity	<Not Applicable>	0	0	530903
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>	0	<Not Applicable>	0
Total energy consumption	<Not Applicable>	282843	7574994	8388740

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	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

HHV (higher heating value)

Total fuel MWh consumed by the organization

3792903

MWh fuel consumed for the self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

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>

Fuels (excluding feedstocks)

Motor Gasoline

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

37066

MWh fuel consumed for the self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

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>

Fuels (excluding feedstocks)

Jet Kerosene

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

6218

MWh fuel consumed for the self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

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>

Fuels (excluding feedstocks)

Fuel Oil Number 2

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

3181

MWh fuel consumed for the self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

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>

Fuels (excluding feedstocks)

Natural Gas

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

1926313

MWh fuel consumed for the self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

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>

Fuels (excluding feedstocks)

Compressed Natural Gas (CNG)

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

1647689

MWh fuel consumed for the self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

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>

Fuels (excluding feedstocks)

Liquefied Natural Gas (LNG)

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

79078

MWh fuel consumed for the self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

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>

Fuels (excluding feedstocks)

Landfill Gas

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

282515

MWh fuel consumed for the self-generation of electricity

25795

MWh fuel consumed for self-generation of heat

0

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>

Fuels (excluding feedstocks)

Acetylene

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

380

MWh fuel consumed for the self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

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>

Fuels (excluding feedstocks)

Propane Gas

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

42165

MWh fuel consumed for the self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

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>

Fuels (excluding feedstocks)

Other, please specify (Methanol)

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

328

MWh fuel consumed for the self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

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>

Fuels (excluding feedstocks)

Kerosene

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

9306

MWh fuel consumed for the self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

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>

Fuels (excluding feedstocks)

Other, please specify (Used Oil)

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

30695

MWh fuel consumed for the self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

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>

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) 2017 default emission factors.

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

SmartWay 2.0.17 Truck Carrier Tool: Technical Documentation 2017 Data Year - United States Version (PDF)
(<https://www.epa.gov/sites/production/files/2018-01/documents/420b18004.pdf>)

Comment

Diesel

Emission factor

10.18

Unit

kg CO2 per gallon

Emission factor source

SmartWay 2.0.17 Truck Carrier Tool: Technical Documentation 2017 Data Year - United States Version (PDF)
(<https://www.epa.gov/sites/production/files/2018-01/documents/420b18004.pdf>)

Comment

Fuel Oil Number 2

Emission factor

10.18

Unit

kg CO2e 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

9.57

Unit

kg CO2 per gallon

Emission factor source

World Resources Institute (2015). GHG Protocol tool for mobile combustion. Version 2.6.

Comment

Kerosene

Emission factor

75.2

Unit

kg CO2 per million Btu

Emission factor source

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

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

SmartWay 2.0.17 Truck Carrier Tool: Technical Documentation 2017 Data Year - United States Version (PDF) (<https://www.epa.gov/sites/production/files/2018-01/documents/420b18004.pdf>)

Comment

Motor Gasoline

Emission factor

8.887

Unit

kg CO2 per gallon

Emission factor source

SmartWay 2.0.17 Truck Carrier Tool: Technical Documentation 2017 Data Year - United States Version (PDF) (<https://www.epa.gov/sites/production/files/2018-01/documents/420b18004.pdf>)

Comment

Natural Gas

Emission factor

66.88

Unit

kg CO2 per GJ

Emission factor source

World Resources Institute (2015). Emission Factors from Cross-Sector Tools - March 2017.

Comment

WRI uses IPCC 2006 Guidelines for National Greenhouse Gas Inventories, <http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html>

Propane Gas

Emission factor

0.0061

Unit

kg CO2e per gallon

Emission factor source

World Resources Institute (2015). GHG Protocol tool for stationary combustion. Version 4.1.

Comment

Other

Emission factor

4.1

Unit

lb CO2 per million Btu

Emission factor source

Methanol - The Climate Registry (TCR) 2017 default emission factors; also referenced:
https://www.epa.gov/sites/production/files/2015-07/documents/emission-factors_2014.pdf

Comment

There is only one 'Other' section so we are including the emissions factor information her 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).

C8.2e

(C8.2e) Provide details on the electricity, heat, steam, and cooling your organization has generated and consumed in the reporting year.

	Total Gross generation (MWh)	Generation that is consumed by the organization (MWh)	Gross generation from renewable sources (MWh)	Generation from renewable sources that is consumed by the organization (MWh)
Electricity	3948210	25795	3948210	25795
Heat	0	0	0	0
Steam	0	0	0	0
Cooling	0	0	0	0

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

Off-grid energy consumption from an on-site installation or through a direct line to an off-site generator owned by another company

Low-carbon technology type

Other low-carbon technology, please specify (Landfill gas)

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

25795

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

0.6823

Comment

Off-grid energy consumption from an on-site installation. There are two EFs used that are combined to reach 0.6823 MtCO₂e / MWh. The first is 0.6997 MtCO₂e / MWh and the second is 0.5219 MtCO₂e / MWh, though the latter is used for a smaller volume of landfill gas. The total equation is 19,400.18 MtCO₂e / 25,795.2 MWh.

C9. Additional metrics

C9.1

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

Description

Waste

Metric value

184

Metric numerator

pounds of waste generated annually

Metric denominator (intensity metric only)

per on-site employee

% change from previous year

0

Direction of change

No change

Please explain

Waste Management's business is to safely manage and where possible, transform waste created by others, recycle as much as can be recycled, repurpose what can be converted to energy or other beneficial uses, and then to safely manage the residuals over the long term. Wastes received at our recycling facilities, compost facilities, transfer stations, and landfills are largely derivative of wastes generated by our customers rather than the result of WM's own production of goods. Because the volume of customer-managed waste dwarfs the amount of waste WM generates, we believe the material issue is the degree to which our handling of customer wastes shows progress in revenues from consulting on waste reduction, increasing recycling revenues, increasing use of waste to generate energy and products like compost, and increasing efforts to commercialize diversion technologies. Our public reporting of waste disposal vs. reuse and recycling is based upon what we do with other entities' waste, not our de minimis internal generation. See 2016 WM Sustainability Report p. 7, which will be updated in our 2018 report. Waste generated 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. In 2014, WMSS consultants audited different types of WM facilities to generate a WM-specific waste per full time employee (FTE) per facility type, used to calculate total waste generated internally. We initiated this study in an effort to be responsive to surveys such as DJSI, as well as to continue to monitor the materiality of our disclosure. Tons of waste generated per facility type and full time employees per facility type were used to calculate waste generated. Note that the amount of materials WM managed in 2017 totaled 15 million tons. We estimate that the volume of waste generated by WM itself is less than 1% of the materials WM recycled in 2017 alone.

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_CDP_Assurance_Letter_Final 27July_.pdf

Page/ section reference

pages 1-3

Relevant standard

ISO14064-3

The inventory was verified in accordance with the ISO 14064–3:2006 Specification with guidance for validation and verification of greenhouse gas assertions. The inventory was verified using the WRI/WBCSD the WRI/WBCSD Greenhouse Gas (GHG) Protocol, WRI/WBCSD Scope 2 Guidance: A Corporate Accounting and Reporting Standard and The GHG Protocol for Project Accounting, and WM's GHG Inventory Management Plan. In that respect, the GHG inventory was evaluated against the following criteria: - Adherence to the principles of materiality, completeness, neutrality, and reliability, as set out in the ISO 14064-3, and - The World Business Council for Sustainable Development (WBCSD) / World Resources institute (WRI) Greenhouse Gas protocol

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_CDP_Assurance_Letter_Final 27July_.pdf

Page/ section reference

Pages 1-3

Relevant standard

ISO14064-3

The inventory was verified in accordance with the ISO 14064–3:2006 Specification with guidance for validation and verification of greenhouse gas assertions. The inventory was verified using the WRI/WBCSD the WRI/WBCSD Greenhouse Gas (GHG) Protocol, WRI/WBCSD Scope 2 Guidance: A Corporate Accounting and Reporting Standard and The GHG Protocol for Project Accounting, and WM's GHG Inventory Management Plan. In that respect, the GHG inventory was evaluated against the following criteria: - Adherence to the principles of materiality, completeness, neutrality, and reliability, as set out in the ISO 14064-3, and - The World Business Council for Sustainable Development (WBCSD) / World Resources institute (WRI) Greenhouse Gas protocol

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- all relevant categories

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Attach the statement

WM_CDP_Assurance_Letter_Final 27July_.pdf

Page/section reference

Pages 1-3

Relevant standard

ISO14064-3

The inventory was verified in accordance with the ISO 14064–3:2006 Specification with guidance for validation and verification of greenhouse gas assertions. The inventory was verified using the WRI/WBCSD the WRI/WBCSD Greenhouse Gas (GHG) Protocol, WRI/WBCSD Scope 2 Guidance: A Corporate Accounting and Reporting Standard and The GHG Protocol for Project Accounting, and WM's GHG Inventory Management Plan. In that respect, the GHG inventory was evaluated against the following criteria: - Adherence to the principles of materiality, completeness, neutrality, and reliability, as set out in the ISO 14064-3, and - The World Business Council for Sustainable Development (WBCSD) / World Resources institute (WRI) Greenhouse Gas protocol

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
C6. Emissions data	Other, please specify (Biogenic Scope 1 Emissions)	Biogenic scope 1 emissions were verified in accordance with the ISO 14064–3:2006 Specification with guidance for validation and verification of greenhouse gas assertions. The inventory was verified using the WRI/WBCSD the WRI/WBCSD Greenhouse Gas (GHG) Protocol, WRI/WBCSD Scope 2 Guidance: A Corporate Accounting and Reporting Standard and The GHG Protocol for Project Accounting, and WM's GHG Inventory Management Plan. In that respect, the GHG inventory, including biogenic scope 1 emissions, was evaluated against the following criteria: - Adherence to the principles of materiality, completeness, neutrality, and reliability, as set out in the ISO 14064-3, and -The World Business Council for Sustainable Development (WBCSD) / World Resources Institute (WRI) Greenhouse Gas protocol	Biogenic Scope 1 Emissions include emissions from renewable landfill gas used in WM vehicles and carbon from MSW that is permanently sequestered by the landfill. Total emissions in 2017, described in the WM_CDP_Assurance_Letter_Final 27July_.pdf attached in C10, equal to 11,760,390.26 MTCO2e.

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
Alberta SGER

C11.1b

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

Alberta SGER

% of Scope 1 emissions covered by the ETS

1

Period start date

January 1 2010

Period end date

December 31 2017

Allowances allocated

1194467.25

Allowances purchased

0

Verified emissions in metric tons CO₂e

686597.91

Details of ownership

Facilities we own and operate

Comment

The carbon tax program took effect January 1, 2017. Tax was paid on fossil fuel (natural gas and propane) used at our West Edmonton Landfill operations. Percent of West Edmonton emissions covered by the carbon tax is based on total annual emissions reported to the SGER Program.

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 2017

Period end date

December 31 2017

% of emissions covered by tax

0.26

Total cost of tax paid

6162.14

Comment

West Edmonton Landfill carbon intensity target converted to absolute emissions and reported as allowances allocated. The difference between the allowances allocated and the verified emissions is the amount of verified, certified and serialized Emission Performance Credits (EPCs), with the exception of Calendar Year 2017 EPCs. Alberta has yet to certify and serialize these EPCs. EPCs were generated by aggressively collecting and combusting the landfill gas, preventing methane emissions from being emitted at the facility. Alberta has

C11.1d

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

US EPA's regulations identify the sites where emissions are sufficient to trigger the need for controls. We seek to optimize the effectiveness of these controls. Where we have sites subject these types of systems, we evaluate how we can reduce emissions and when it is most appropriate to implement reduction measures. We also consider costs associated with program compliance, which includes the cost to implement reduction measures as well as to comply without reduction measures such purchasing offsets or paying a tax. For example, the Alberta SGER Program is a mandatory, carbon intensity based GHG reduction program in which WM's West Edmonton Landfill is currently engaged. After it began in 2007, WM elected to approach compliance aggressively, with the overall strategy of reducing emissions as much as possible. Instead. 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. This approach has and continues to generate the benefit of excess, saleable allowances (Emission Performance Credits) 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 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. Emission Performance Credits (EPCs) generated, verified and

serialized for 01/01/2010 - 12/31/2016 in accordance with the Alberta SGER regulatory program. Also included EPCs generated for 1/1/2017-12/31/2017, but that have not yet been serialized and registered by Alberta.

Verified to which standard

Other, please specify (SGER regulatory program)

Wes Ed verification follows the SGER regulatory program and verification is conducted to a reasonable level of assurance. The verifier applied the following ISO and AER criteria: ISO 14064 Greenhouse gases - Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals, ISO, March 2006 (ISO 14064-1) • ISO 14064 Greenhouse gases – Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions (ISO 14064-3) Specified Gas Emitters Regulation with amendments up to Alta Reg. 199/2015, Climate Change and Emissions Management Act, (Alta Reg. 139/2007), Province of Alberta, 2015 • Standard for Completing Specified Gas Compliance Reports, Version 1.0 (AEP, 2017) • Technical Guidance for Greenhouse Gas Verification at Reasonable Level Assurance, Version 1.0 (AEP, 2013)

Number of credits (metric tonnes CO2e)

507870

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

0

Credits cancelled

Not relevant

Purpose, e.g. compliance

Voluntary Offsetting

Credit origination or credit purchase

Credit origination

Project type

Landfill gas

Project identification

Mahoning Landfill generated, third party verified, certified and registered voluntary offsets through the CAR program. 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)

339109

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

Northwestern Landfill generated, third party verified, certified and registered voluntary offsets through the CAR program. 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?

No, but we anticipate doing so in the next two years

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

(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 2016 SR p. 128. 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 2016 SR p. 101-104; 128-132.

Impact of engagement, including measures of success

The impact of this engagement effort includes improving the sustainability of our fleet which requires collaboration, such as membership in 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. 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. Additionally, we are in the process of further tracking the successes of the efforts and initiatives within these working groups.

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

23

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 2016 SR p. 102.

Impact of engagement, including measures of success

Our truck fleet continues to transition from diesel to natural gas, cutting GHG emissions by 21% with each new truck. More than 90% of the trucks we purchased in 2015 had natural gas engines. 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 had set a goal to reduce CO2 emissions and improve the efficiency of our on-road fleet vehicles by 15% and in 2016 we had a 26% reduction. See 2017 SR p. 3. This is partly the result of upgrading or replacing more than 5,000 of our 18,000 collection vehicles with ones that run on cleaner-burning compressed natural gas. See 2016 SR p. 58.

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

Size of engagement

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

Size of engagement

10

% 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 “Coming Full Circle: What’s the Right Goal?,” the 2017 Forum focused on how to rethink current environmental goals and collectively serve the opportunity to chart a bigger, broader, bolder course forward. 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 11% from 2016 to 2017. The Forum is streamed online live, and a recording is available after. Viewership increased by over 36% in 2017 to reach almost 62,000 people. WM also offers a Behind-the-Scenes Tour for Forum attendees to show them five stations of 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.

At the Waste Management Phoenix Open (WMPO), we engage and recognize our stakeholders from all sectors of our operations and event management. This includes not only our own WM suppliers and customers, but event vendors including the PGA tour, media outlets, food service providers, transportation vendors, among other, as well as event sponsors at every sponsorship level. Continuous stakeholder engagement begins as early as 10 months before the event and gives us the chance to manage expectations, set new goals, receive feedback and know more about our supplier processes which has led 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; (2) community and (3) economy. We started tracking supplier delivery processes to estimate their greenhouse gas emissions. While we don't yet track every element of their operations, in many cases we prioritize choosing suppliers who are in line with our environmental initiatives in particular, the implementation of sustainable best practices. 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. Vendors who showed up to the event with materials not on the list were required to remove said materials. We continue to focus on measuring key performance indicators such as GHG emissions to drive changes in our supply chain's behaviors. Our 100% diversion rate for the 2013 through 2017 WMPO tournaments demonstrates that we are on the right track and our suppliers are responding every year. We track all energy and water use, and estimate transportation emissions for attendees, intrasite transport, and golfers. The 2017 WMPO Sustainability Report Update reports all of the inputs and outputs and associated GHG emissions from the WMPO. The World Resources Institute Greenhouse Gas Protocol, The Climate Registry General Reporting Protocol, and the U.S. EPA's WARM model were used to calculate GHG emissions.

In addition, WM worked with Envirofit International to offset all GHG emissions from WMPO operations, volunteer travel, and player travel, a total of 720 MTCO_{2e}, through cookstove programs to reduce GHGs in India and Tanzania. Greenhouse gas emissions from WMPO operations totaled 115 MTCO_{2e} while player travel generated 66MTCO_{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 and 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 13.9% 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 31,434 gallons of water from cooking and cleaning have been reused in the portable toilets. 2017 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 161 million gallons of water to the Colorado River Basin and the Verde River in Arizona over three years.

For more information, please see the 2017 WMPO Sustainability Report (<http://www.wm.com/thinkgreen/pdfs/2017WMPOSustainabilityReportUpdate.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) 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	Although not part of comprehensive tax reform, we continue to seek Congressional incentives for renewable energy production based upon energy value and GHG reductions. Active coordination with other companies and trade associations to lobby Congress 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 an accurate GHG inventory for each sector. Actively coordinating with public and private landfill sector, landfill gas-to-energy project and equipment owners, academic and industry researchers, and US EPA. WM working with EPA since 2012 on enhancing estimation of landfill methane emissions, including reductions made in landfill cover and landfill gas collection. EPA's latest reporting methodology finalized in 2016, reflects enhancements for precise, site-specific methods WM advocated. WM assisted EPA in enhancing 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 retain funding for the inventory undertaken in 2017. 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 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 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 an implemented program based upon the concepts contained in the Sustainable Materials Management Coalition report, and this kind of GHG reduction-based life cycle approach is now being actively considered in other states and at the local level.
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 their review of various iterations of the framework. EPA regulations should reflect the scientific determinations made by the Agency and its SAB.
Other, please specify (Clean transportation fuel)	Support	WM has directly lobbied the U.S. Congress in support of maintaining EPA's Renewable Fuels Standard (RFS2) program. WM has also provided technical support and data to EPA 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 two additional projects this year and next. We contract with other landfill owners to purchase additional renewable fuel to use in our vehicles. In 2017, 2,000 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.	Congress and EPA should continue implementation of the RFS2 program, which promotes 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 clean natural gas.	The rule, finalized in the fall of 2016, will increase fuel economy standards and reduce vehicle emissions standards for our collection fleet between model years 2021 and 2027; however, we expect to be able to purchase compliant natural gas vehicles that can meet our operational needs in 2017, WM supports implementation of the heavy-duty truck standards.

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, or are you attempting to, influence the 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 have 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, or are you attempting to, influence the 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, or are you attempting to, influence the position?

Yes, as Board members we lobby 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, or are you attempting to, influence the 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, or are you attempting to, influence the 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?

Please select

Please explain the trade association's position

Supports renewable energy deployment

How have you, or are you attempting to, influence the 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

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, or are you attempting to, influence the 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 (NGV America) 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, or are you attempting to, influence the 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, or are you attempting to, influence the 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 has 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. WM continues to support their work and advocate their recommendations. See <https://www.michaeldbaker.com/portfolio-items/guidance-on-taking-a-life-cycle-perspective-to-sustainability/>. In 2016, the Coalition produced its work on the recycling report and members participated in U.S. EPA's G7 Symposium on sustainable materials management. In 2017, the group developed a report recommending new metrics to measure recycling benefits.

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 and WM Sustainability Services (WMSS) departments which monitors emerging sustainability and greenhouse gas (GHG) regulatory programs and other events and provides feedback internally to our SVP and Chief Legal Officer, our Senior leadership Team and our Board of Directors and our business units, as well as externally to legislators and regulators on elements that may impact the company and the environmental services industry at policy level. The same cross-functional team ensures that engagements and activities that may influence a 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 providing renewable energy. An internal Public Policy Group oversees federal and state legislative and regulatory response to enhance the consistency of WM advocacy across multiple forums. This group reports to the SVP and Chief Legal Officer and SVP 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 2017.pdf

Content elements

Governance

Strategy

Risks & opportunities

Other metrics

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

Publication

In voluntary sustainability report

Every two years WM prepares a new sustainability report, with an update in off-year. Our last new report was in 2016, with an update in 2017. Both are attached for completeness. In 2018, we will be reporting performance on Sustainability Accounting Standards Board (SASB) standards and the Task Force on Climate-Related Financial Disclosures (TCFD).

Status

Complete

Attach the document

WM 2016 Sustainability Report.pdf

WM 2017 Sustainability Report Update.pdf

Content elements

Governance

Strategy

Risks & opportunities

Emissions figures

Emission targets

Other metrics

Other, please specify (Avoided emissions, GRI content index)

Publication

In voluntary communications

Seattle Public Utilities, Goals, Metrics, and More: Defining Success in Materials Management (SPU's Measurement Symposium) on November 2, 2017 at the University of Washington's Center for Urban Horticulture. A Summary Report of the Symposium and several You Tube Videos of the Symposium are also available for you to review online. The Summary Report includes information about the New Metrics Symposium and additional information and feedback from those who attended.

http://spucmsprod/cs/groups/public/@spu/@garbage/documents/webcontent/1_071783.pdf The You Tube Videos have been broken down into specific videos, so you can navigate to specific information, or presentations. The You Tube Videos are available at: SPU Measurement Symposium Morning Program & Participants: <https://youtu.be/Ztbzei-EBmk> SPU Measurement Symposium Small Group Exercise & Reporting Out: <https://youtu.be/laOT9BcMftg> SPU Measurement Symposium Afternoon Participants Par

Status

Complete

Attach the document

Robinson Seattle Workshop Final 11-2-2017.pdf

Content elements

Strategy

Risks & opportunities

Other metrics

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.

(i) Regarding an internal price on carbon, we have presented to the Board of Directors a benchmarking of companies projecting a cost of carbon, and we have an on-going obligation to update the Board on changes in WM's footprint and major changes in customers' disclosed carbon pricing strategies. We monitor state government and customer response strategies closely and review how carbon pricing models or cap-and-trade programs are applied in North America. We have concluded that the complex nature of our business – WM products and services offset three times the GHG emissions we generate through our Sustainability Services consulting, recycling, renewable energy production and carbon sequestration in landfills – and the absence of a clear regulatory framework for carbon pricing for our sector makes price projections unreliable. Our assessment has been further complicated by recent U.S. position changes on climate strategy. Anticipating a price on carbon is part of our initiative to change reporting on recycling productivity from tonnage to GHG reductions gained. We believe our ability to provide verifiable metrics on carbon reduction to our customers will be a competitive advantage.

(ii) Emissions from biologically sequestered carbon emissions are relevant to WM and includes emissions from renewable landfill gas used in WM vehicles, scope 1 but reported separately as per The Greenhouse Gas Protocol due to being biogenic. An additional source, excluded from section CC6.7a but still relevant, is carbon from municipal solid waste (MSW) that is permanently sequestered by the landfill, which acts as a sink, allowing these emissions to be avoided. CDP's new reporting format does not provide a text box for explanation that biogenic emissions are reported separate from non-biogenic emissions; however, WM's verified Scope 1 Biogenic Emissions are equal to 11,760,390 MtCO_{2e}, which comes from 36,319 MtCO_{2e} reported in C6.7a and 11,724,071 MtCO_{2e} described above.

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 (MTCO_{2e}) 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

Wal-Mart Stores, Inc.

Scope of emissions

Scope 3

Emissions in metric tonnes of CO₂e

53132.9

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 and customer specific tonnage)

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 3

Emissions in metric tonnes of CO₂e

178.7

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 and customer specific tonnage)

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

Caesars Entertainment

Scope of emissions

Scope 3

Emissions in metric tonnes of CO₂e

2476.2

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 and customer specific tonnage)

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 3

Emissions in metric tonnes of CO₂e

20992.5

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 and customer specific tonnage)

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 3

Emissions in metric tonnes of CO₂e

5086.1

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 and customer specific tonnage)

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 3

Emissions in metric tonnes of CO₂e

601.9

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 and customer specific tonnage)

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 not on disposal, but 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

Wal-Mart Stores, 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

283525

Estimated payback

3-5 years

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 in providing to them, similar and other innovative solutions to meet its GHG emissions reduction goals and improve its 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

0-1 year

Estimated lifetime CO2e savings

Estimated payback

0-1 year

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

262

Estimated payback

3-5 years

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 in providing to them, similar and other innovative solutions to meet its GHG emissions reduction goals and improve its 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

2154

Estimated payback

1-3 years

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 Fiat Chrysler Automobiles NV to engage our Sustainability Services group in providing to them, similar and innovative solutions to meet its GHG emissions reduction goals and improve its overall operating standards.

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

0-1 year

Estimated lifetime CO2e savings**Estimated payback**

0-1 year

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

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

3923

Estimated payback

3-5 years

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 in providing to them, similar and other innovative solutions to meet its GHG emissions reduction goals and improve its 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

1095

Estimated payback

1-3 years

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 in providing to them, similar and innovative solutions to meet its GHG emissions reduction goals and improve its 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

12453

Estimated payback

3-5 years

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 in providing to them, similar and other innovative solutions to meet its GHG emissions reduction goals and improve its 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

1-3 years

Estimated lifetime CO2e savings

117057

Estimated payback

1-3 years

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 in providing to them, similar and innovative solutions to meet its GHG emissions reduction goals and improve its 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

8059

Estimated payback

3-5 years

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 in providing to them, similar and other innovative solutions to meet its GHG emissions reduction goals and improve its 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

31548

Estimated payback

1-3 years

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 in providing to them, similar and innovative solutions to meet its GHG emissions reduction goals and improve its 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

953.7

Estimated payback

3-5 years

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 in providing to them, similar and other innovative solutions to meet its GHG emissions reduction goals and improve its 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

2982

Estimated payback

1-3 years

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 in providing to them, similar and innovative solutions to meet its GHG emissions reduction goals and improve its 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

Wal-Mart Stores, 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 2017, WM diverted 515,547 tons of Wal-Mart waste from landfill to recycling thereby reducing lifecycle GHG emissions by 1,683,203 MTCO2e. This contributes to WM's goal of increasing the amount of recycling we manage per year to be 20 million tons by 2020, which will result in a decrease of 42.7 million MTCO2e. 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. WM has also tracked diversion and emissions reductions through our ENSPIRE Business Intelligence (BI) Tool.

Emissions reduction for the reporting year in metric tons of CO₂e

1683203

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 2017, WM diverted 277 tons of Fiat waste from landfill to recycling as well as an additional 476 tons from landfill to WTE, thereby reducing lifecycle GHG emissions by 832 MTCO₂e. This contributes to WM's goal of increasing the amount of recycling we manage per year to be 20 million tons by 2020, which will result in a decrease of 42.7 million MTCO₂e. 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 CO₂e

832

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 2017, WM diverted 660.78 tons of Caesars waste from landfill to recycling thereby reducing lifecycle GHG emissions by 1,996 MTCO₂e. This contributes to WM's goal of increasing the amount of recycling we manage per year to be 20 million tons by 2020, which will result in a decrease of 42.7 million 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

1996

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 2017, WM diverted 13,451.64 tons of AT&T waste from landfill to recycling thereby reducing lifecycle GHG emissions by 38,566 MTCO_{2e}. This contributes to WM's goal of increasing the amount of recycling we manage per year to be 20 million tons by 2020, which will result in a decrease of 42.7 million MTCO_{2e}. This diversion was achieved by working closely with AT&T to increase the number of stores participating in comprehensive recycling programs. 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 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 CO_{2e}

38566

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

Please select

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

Please select

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 2017, WM diverted 5,530.64 tons of Wells Fargo waste from landfill to recycling thereby reducing lifecycle GHG emissions by 15,071 MTCO_{2e}. This contributes to WM's goal of increasing the amount of recycling we manage per year to be 20 million tons by 2020, which will result in a decrease of 42.7 million MTCO_{2e}. 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 CO_{2e}

15071

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 2017, WM diverted 175.32 tons of California DGS waste from landfill to recycling thereby reducing lifecycle GHG emissions by 329 MTCO₂e. This contributes to WM's goal of increasing the amount of recycling we manage per year to be 20 million tons by 2020, which will result in a decrease of 42.7 million MTCO₂e. 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

329

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 2018-2019 CDP Action Exchange initiative?

No

SC3.2

(SC3.2) Is your company a participating supplier in CDP's 2017-2018 Action Exchange initiative?

No

SC4.1

(SC4.1) Are you providing product level data for your organization's goods or services, if so, what functionality will you be using?

No, I am not providing data

SC4.2d

(SC4.2d) Have any of the initiatives described in SC4.2c been driven by requesting CDP Supply Chain members?

Please select

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