C0. Introduction

C0.1

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

Essential Utilities, Inc. (referred to as “Essential”, the “Company”, “we”, “us”, or “our”), a Pennsylvania corporation, is the holding company for regulated utilities providing water, wastewater, and natural gas distribution services. Previous CDP submissions were filed under our previous name, Aqua America, Inc., which, at the time, solely provided water or wastewater services to an estimated three million people in Pennsylvania, Ohio, Texas, Illinois, North Carolina, New Jersey, Indiana, and Virginia. On October 22, 2018, we entered into a purchase agreement to acquire, from LDC Funding LLC, the parent company of PNG Companies, a natural gas distribution company consisting of Peoples Natural Gas Company LLC, Peoples Gas Company LLC, Peoples Gas West Virginia, Inc., Peoples Gas Kentucky, Inc., and Delta Natural Gas Company Inc. expanding the Company’s regulated utility business to include natural gas distribution. This acquisition is referred to as the “Peoples Gas Acquisition", and collectively these businesses are referred to as “Peoples". Peoples serves approximately 747,000 gas utility customers in western Pennsylvania, West Virginia, and Kentucky. Approval from the United States Federal Trade Commission was obtained in December 2018, and approvals from the public utility commissions of Kentucky, West Virginia, and Pennsylvania were obtained in March 2019, April 2019, and January 2020, respectively. This acquisition closed on March 16, 2020.

As this CDP submission presents information for the year of 2019, prior to the Peoples Gas Acquisition, the descriptions of our business and operations, results, and operational data included in this report are historical and do not include natural gas utility operations. The information included solely discusses the 2019 operations of our water and wastewater utility business. This is also consistent with prior years' submissions, as a matter of record and comparability, under the principle of financial control noted in C0.5.

Our largest operating subsidiary is Aqua Pennsylvania, Inc., which accounted for approximately 54% of our operating revenues and approximately 72% of our Regulated water segment’s income for 2019. As of December 31, 2019, Aqua Pennsylvania provided water or wastewater services to approximately one-half of the total number of water and wastewater customers we serve. Aqua Pennsylvania’s service territory is located in the suburban areas in counties north and west of the City of Philadelphia and in 27 other counties in Pennsylvania. Our other regulated water utility subsidiaries provide similar services in seven additional states. In addition, the Company’s market-based activities are conducted through Aqua Infrastructure, LLC and Aqua Resources Inc. Aqua Infrastructure provides non-utility raw water supply services for firms in the natural gas drilling industry. Aqua Resources manages a water system operating and maintenance contract; and offers,

through a third-party, water and sewer line protection solutions and repair services to households. In 2017, we completed the sale of business units that were reported within Aqua Resources, one which installed and tested devices that prevent the contamination of potable water and another that constructed, maintained, and repaired water and wastewater systems.

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
Reporting year	January 1 2019	December 31 2019	Yes	2 years

C0.3

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

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 chosen approach for consolidating your GHG inventory.

Financial control

C1. Governance

C1.1

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

Yes

C1.1a

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

Position of individual(s)	Please explain
Board-level committee	The Board is briefed on environmental, social and governance (ESG) matters in its regularly scheduled meetings, through various channels and reporting paths. Climate-related items are covered under the enterprise risk management (ERM) review conducted by the Risk Mitigation and Investment Policy Committee of the Board and is reported to the full Board at each of its regularly scheduled meetings. Also, there is additional oversight provided by the Audit Committee, which is informed about climate change risks through the Compliance and Disclosure Committees, comprised of the company's management. Annually, the Chief Environmental Officer formally presents to the Board on environmental sustainability matters. During this detailed review, there is analysis and discussion of climate change initiatives, strategies, and progress towards related goals. These matters are discussed both in terms of impact to current operations as well as through the lens of future plans of acquisition and expansion opportunities.
Chief Executive Officer (CEO)	Our Chief Executive Officer is responsible for the overall direction and strategy related to climate issues for operations and aligning corporate growth with consideration of climate-related issues. Further, the CEO is the most direct interface with current and future investors in addressing our company's alignment with ESG and climate goals. As such, the CEO provides a valuable voice and perspective to Board discussions on climate change matters and serves as a crucial bridge between the Board and the company's management to ensure alignment on climate-related matters.

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	Scope of board-level oversight	Please explain
Other, please specify (Quarterly)	Reviewing and guiding strategy Reviewing and guiding major plans of action	<Not Applicable>	There is significant board-level oversight of climate-related issues through various channels and reporting paths. At least quarterly, our Compliance and Disclosure Committees, comprised of the company's executive management and representatives of all major functional areas within the

Frequency with which climate-related issues are a scheduled agenda item	Governance mechanisms into which climate-related issues are integrated	Scope of board-level oversight	Please explain
	Reviewing and guiding risk management policies 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		company, review the risks facing the organization and evaluate our operations with respect to many issues, including the risk factors associated with climate change that are disclosed in our Form 10-K. The results of these committee meetings are then reported to the Board's Audit Committee, which in turn reports to the full Board of Directors. Separately, the Board's Risk Mitigation and Investment Policy Committee oversees Essential's Enterprise Risk Management (ERM) program. The ERM program focuses on the risks facing the company, including climate change, and seeks to mitigate those risks. At least 5 times a year, the General Counsel provides a report to the full Board on the progress that is being made with the company's ERM program. Annually, the Chief Environmental Officer formally presents to the Board on environmental sustainability matters. During this detailed review, there is analysis and discussion of climate change initiatives, strategies, and progress towards related goals. These matters are discussed both in terms of impact to current operations as well as through the lens of future plans of acquisition and expansion opportunities. The Chief Executive Officer is a member of the Risk Mitigation and Investment Policy Committee as well as the Executive Committee. As such, the CEO provides a valuable voice and perspective to Board discussions on climate change matters, as he is separately tasked with the responsibility for the overall direction and strategy related to climate issues for operations and aligning corporate growth with consideration of climate-related issues.

C1.2

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

Name of the position(s) and/or committee(s)	Reporting line	Responsibility	Coverage of responsibility	Frequency of reporting to the board on climate-related issues
Other C-Suite Officer, please specify (Chief Environmental Officer)	<Not Applicable>	Both assessing and managing climate-related risks and opportunities	<Not Applicable>	Annually
Energy manager	<Not Applicable>	Both assessing and managing climate-related risks and opportunities	<Not Applicable>	As important matters arise
Chief Executive Officer (CEO)	<Not Applicable>	Both assessing and managing climate-related risks and opportunities	<Not Applicable>	Quarterly
Other, please specify (Vice President, Chief Of Staff, Investor Relations and Communications)	<Not Applicable>	Both assessing and managing climate-related risks and opportunities	<Not Applicable>	As important matters arise
Other, please specify (Executive Vice President, General Counsel and Secretary)	<Not Applicable>	Both assessing and managing climate-related risks and opportunities	<Not Applicable>	Quarterly
Chief Financial Officer (CFO)	<Not Applicable>	Both assessing and managing climate-related risks and opportunities	<Not Applicable>	As important matters arise
Chief Operating Officer (COO)	<Not Applicable>	Both assessing and managing climate-related risks and opportunities	<Not Applicable>	As important matters arise
Other, please specify (Vice President, Fleet Operations)	<Not Applicable>	Both assessing and managing climate-related risks and opportunities	<Not Applicable>	As important matters arise

C1.2a

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

As set forth in response to C1.1b, the company has various reporting pathways, touch points, and methods in actively managing climate-related issues. For example, climate related issues through the Enterprise Risk Management (ERM) framework are reviewed by the General Counsel to determine risks related to both short term acute events and risk due to longer term climate change issues for both physical assets and production operations. At least five times per year, an update on the progress being made with ERM is presented to the full Board of Directors. Our Chief Executive Officer is responsible for the overall direction and strategy related to climate issues for operations and aligning corporate growth with consideration of climate-related issues. Further, the CEO is the most direct interface with current and future investors in addressing our company's alignment with ESG and climate goals. Our Chief Financial Officer is responsible for monitoring the financial impact of climate-related events and projecting the financial risk of future events for current operations. The CFO assesses the financial impact of climate-related issues in both growth and expansion opportunities. Further, the CFO is responsible for approval by the Board for all capital budget requests including those related to climate change mitigation. Our Chief Operating Officer is responsible for ensuring physical assets are protected from climate related issues and implementing operational procedures and efficiencies to reduce energy consumption. The COO is also responsible for performing a climate due diligence assessment on future acquisitions and expansion opportunities. The Chief Environmental Officer reports to the Chief Operating Officer and downward to each state president and corporate engineering functions to provide the overarching guidance and oversight in managing risk and evaluating risk through our Key Performance Indicators (KPIs) which, among others, includes energy intensity. It is the Chief Environmental Officer's responsibility to prepare and present an annual report on environmental sustainability matters to the Board of Directors. The Corporate Energy manager, who reports through the Vice President Corporate Engineering to the Senior Vice President, Chief Operating Officer, leads the assessment and tracking of energy intensity for production assets. This individual assists each state's president and chief engineer with identifying and implementing energy reduction measures at well stations, water treatment plants and wastewater treatment plants. The Corporate Energy Manager is also responsible for energy purchases, including procurement of green energy within those states with deregulated markets and the assessment and implementation of on-site renewable energy projects where feasible. The Vice President of Fleet Operations, reporting up through the Chief Administrative Officer to the Chief Executive Officer, is responsible for managing the large fleet of vehicles across the enterprise and implementing efficiency initiatives that reduce emissions and climate impact. The Chief of Staff, among other responsibilities especially surrounding public and investor relations, oversees the company's ESG program. In this capacity, the Chief of Staff coordinates with the aforementioned individuals and others within the organization on various initiatives and also manages both internal and external communications on these matters. Although this filing details governance in place during 2019, as a matter of transparency and demonstration of our commitment to continual improvement, we also wish to disclose that in May 2020, Essential Utilities created an ESG Manager position. This is a full-time role that reports to the Chief of Staff and is completely dedicated to further developing and maturing the ESG profile of the Company, which includes climate change matters and impacts. We remain

dedicated to continually strengthening our governance on climate-related matters in recognition of its critical importance to our society, planet, and company.

C1.3

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

	Provide incentives for the management of climate-related issues	Comment
Row 1	Yes	Our management team is provided financial incentives for successful management of a variety of environmental factors. One such factor, relevant to certain managers in our organization, is energy intensity, a crucial metric for our operations. More indirectly, our entire management team is assessed on its ability to reduce costs across the enterprise. We recognize the financial savings that come from energy efficiency and other environmental efforts and initiatives that have climate-related impacts. We believe our incentive program plays an effective role in driving performance improvement on reducing our business operation's climate impact.

C1.3a

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

Entitled to incentive	Type of incentive	Activity inventivized	Comment
Management group	Monetary reward	Energy reduction project	Incentives are realized through achieving/exceeding KPIs based on internal benchmarks for each state and meeting external industry metrics, which include cost of operations and energy consumption, management, and engineering. Annually, these benchmarks are evaluated and adjusted to meet new goals. Incentive levels vary by position and state. While there are no specific carbon-related KPIs factored, there is an energy intensity KPI for certain managers in our organization and this drives awareness of the acute climate threat and its potential impact on operational costs. This KPI encourages management to proactively implement measures to address and reduce energy intensity in an effort to lower costs and reduce carbon emissions.

C2. Risks and opportunities

C2.1

(C2.1) Does your organization have a process for identifying, assessing, and responding to climate-related risks and opportunities?

Yes

C2.1a

(C2.1a) How does your organization define short-, medium- and long-term time horizons?

	From (years)	To (years)	Comment
Short-term	0	5	Through our scenario analysis methodology, we have determined that, within our areas of operations, the short-term time horizon of 0-5 years is an actionable and pertinent range, as both physical and transitional risks are likely to adjust and shift in the short-term. Evaluating our exposure to them in the short-term allows us to develop more effective strategies to reach our sustainability goals and transition to a low-carbon economy. In addition, because we are a state-regulated utility, we also have other business activities that align with this time frame, such as rate changes dictated by local regulatory bodies.
Medium-term	6	15	The company is a long-term holder of water and wastewater assets. Through our scenario analysis methodology, we have determined that water and wastewater assets, along with their associated risks and opportunities, must be addressed in the medium-term (6-15 years). As such, the company engages in annual five-year planning cycles and, on occasion, ten-year planning cycles to address capital improvement to infrastructure and operations. The planning in each case involves budgeting capital, environmental needs, maintenance, and operations. Deficiencies noted during repeated acute events can be addressed through capital infrastructure improvement projects and costs can be allocated for within future rate cases. Climate-related issues recognized in the medium-term can be addressed by the existing planning process for improvement projects and managed effectively within the context of resilient operations. This time horizon is congruent with the company's climate goals.
Long-term	16	30	Long-term or emerging risks include economic, social, environmental, regulatory, and political change, as well as new technologies. Engaging in long-term (16-30 year) planning cycles where enterprise-wide issues are evaluated are important in addressing actions today where their outcomes pay dividends far into the future.. An example of a long-term business activity is the replacement of water and wastewater pipe to ensure long-term product delivery. As identified through our scenario analysis methodology, we have determined that many climate-related issues are most impactful to our areas of operations in the long-term, and company-wide strategies include contingencies for various climate-related scenarios.

C2.1b

(C2.1b) How does your organization define substantive financial or strategic impact on your business?

Essential Utilities defines climate-related impacts though a model which weights likelihood, cost, magnitude of impact and time horizon. Evaluating exposure to climate-related risks and opportunities over a range of time horizons allows for a strategy for the transition to a low-carbon economy recognized in the Paris Agreement and UN SDGs. In conjunction with the Villanova University Sustainable Engineering program, the goal was to define a model focused on processes for identifying, assessing, and managing climate-related issues as well as on the climate-related risks and opportunities identified by the company. This information offers investors greater confidence that the company understands and has properly assessed the potential impacts to climate related issues.

This model was developed in conjunction with Villanova University and formalizes the process, adding consistency in approach and providing a method that is easily repeatable and evergreen. The model was also defined using the CDP framework as a reference to allow for consistency in evaluation and reporting and to maintain consistency with CDP as it evolves over time. The scoring methodology developed applies to both risks and opportunities. This is the first year this model has been applied and uses a broad annualized cost impact as related to climate risk from temperature rise and precipitation change across several of the company's geographic areas. Financial impacts in terms of the analysis are defined at three levels (Low $0 to 250K, Med $250K to 1M, and High >$1M) and they can be from a single event/occurrence or an annualized cost impact of a specified time horizon (for negative impact, we included labor, control infrastructure and O&M risk; for opportunities, we included cost savings or additional revenue). While cost is a quantitative assessment of impact, it was also important to assess the qualitative factors within the Magnitude of Impact (MOI).

C2.2

(C2.2) Describe your process(es) for identifying, assessing and responding to climate-related risks and opportunities.

Value chain stage(s) covered

Direct operations

Risk management process

Integrated into multi-disciplinary company-wide risk management process

Frequency of assessment

Annually

Time horizon(s) covered

Short-term
Medium-term
Long-term

Description of process

Risks and opportunities within the model are defined using a STEEP (Sociological, Technological, Economical, Environmental, and Political) analysis method to evaluate both internal and external forces on their likelihood of occurrence and then on the magnitude of their impact, time horizon and likelihood. Topic areas were selected and, for implications within those areas specific risks or opportunities (R&O) were addressed. The implications are given a score based on likelihood, cost and magnitude of impact on operations as they relate to climate impacts under the Businesses as Usual and Temperature Rise Below 2 Degrees Celsius climate-related scenarios. This method allows for a semi-quantitative method for ranking of risks and opportunities and serves to triage a larger number of implications. The process also allows for implications to be updated and easily re-evaluated on an annual basis. This re-evaluation takes into consideration updates to climate models and the addition of new topics and implications as the businesses and business locations change. The analysis has six topic areas: Capital Investments vs Extreme Temperatures, Higher Energy Costs vs Temperature, Market Growth vs. Groundwater Availability, Infrastructure Resilience vs. Frequency and Intensity of Storm Events, System Compliance vs. Regulations on Contaminants of Emerging Concern (CECs), and Population Dynamics vs. Source Water Availability. The six topic areas we identified yielded 37 implications of a risk or opportunity (R&O) across three geographic areas encompassing our operations. The STEEP analysis method helped provide the scoring rational and justification in selecting specific R&Os over others. Based on previous qualitative methods, implications such as flooding figured more prominently. However, when analyzed within the STEEP process, other implications scored higher. The implications with the highest scores are presented in the subsections below. Review of the STEEP analysis was used to guide the selection of Risks and Opportunities (R&Os) reported below. The review of the entire analysis was conducted by the Sustainability Team Members (e.g. Corporate Environmental Officer, Corporate Energy Manager, and Investor Relations) to select the most relevant R&Os using the analysis results and individual section scores for each implication. Note: To address the sections of implications and scoring, we utilized WRI's Aqueduct Water Risk Atlas, Global Flood Analyzer and GEMI's Local Water Tool and analysis of existing infrastructure within 100-yr and 500-yr flood plains. Quantitative scenario analyses from the CMPI5 climate data set for the period 1950-2099 under the RCP2.6 and RCP8.5 scenarios within the BCCAv2 ccsm4 model run were used to gauge time-frame and MOI. Also, we considered past recent history with hurricanes in North Carolina and Texas in relation to actual operational and financial impacts.

C2.2a

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

	Relevance & inclusion	Please explain
Current regulation	Relevant, always included	The company is a publicly traded utility that is regulated by State and Federal Government agencies (e.g. Environmental Protection Agency, Securities Exchange Commission, and the Public Utility Commissions) in each state that it operates. Therefore, current climate-based regulations are considered relevant and always considered in temporal risk planning.
Emerging regulation	Relevant, sometimes included	Emerging regulations are considered in risk planning and need to be addressed as they arise (e.g. PFAS, lead, cyanotoxins) for both water and wastewater activities. These emerging water quality and CEC regulations may impact rates, require alternative water sources or increase treatment costs and can be financially significant. These are important because they may increase the energy required to process water and wastewater. Further, specific climate-related regulation in the future can impact our business as well. Examples may include tariffs and/or fees from acute weather events or new mandates on renewable energy. As such, designing and managing a strong environmental program that anticipates future trends and issues is an important way to mitigate such risk.
Technology	Relevant, sometimes included	Transitional risks such as technology are considered when assessing the potential to substitute existing equipment or processes with lower emission options. There is also the risk of utilizing a new technology in our operations that does not prove to be a worthy investment. There is an obvious need for digital technologies within the water and wastewater sectors, in particular technologies that can improve infrastructure performance (process and pump automation), the effectiveness of repairs to infrastructure and capital investments. In a capital-intensive business such as ours, making correct choices on efficient technology represents a major part of our climate risk mitigation strategy, especially given the longer-term period of service of much of this equipment.
Legal	Relevant, always included	Climate change litigation against companies, governments and individuals is on the rise, and these risks are considered relevant due to their potential economic impact to the company. Legal risks go hand-in-hand with policy risks, which the company may face in the form of rate changes imposed by regulatory mandates, interruption in service due to extreme weather or emerging drinking water contaminants. CDP recently reported that the world's 50 largest companies expect almost US$1 trillion at risk from climate impacts, and higher operating costs associated with legal and policy changes making up a significant part of this risk. Therefore, legal considerations represent an important part of our climate-based risk assessments.
Market	Relevant, always included	Shifts in supply and demand for water and wastewater services will invariably be affected by climate change. This risk is considered relevant to the company as water demands decrease with changing customer behavior and extreme weather affects water quality and quantity. As a result, we consider climate-related market risks as our operations and services evolve over the short, medium and long-term periods.
Reputation	Relevant, always included	Climate change leads to multiple challenges for water and wastewater utilities, in particular meeting quantity and quality requirements. Our company mission statement is to 'To improve quality of life and economic prosperity by safely and reliably delivering earth's most essential resources.' while maintaining

	Relevance & inclusion	Please explain
		trust with our customers, regulators and governing state public utility commissions and agencies. Developing a strong ESG program with credibility and consistent improvement is vital to fulfilling our mission as well as earning the necessary trust to facilitate the relationships needed for operating our business and acquiring new systems. Speaking broadly, across the United States, there is growing awareness of critical infrastructure issues and rising expectations of utilities as a force for positive change. Thus, the public's confidence in our commitment to the community and stewardship of the planet is at the core of everything we do. Our actions surrounding climate change is one important element of this. Engaging with the customer, our regulators, investors, and our other stakeholders on climate change is important to us and something we will continue to address going forward. To underscore this importance, in 2020, Essential created and filled a new position of ESG Manager to address the need and effort required evolve our ESG handprint and engage our community of customers and investors. We are proud to disclose the creation of this important position with the CDP as a transparent element of this dialogue.
Acute physical	Relevant, always included	Acute physical climate-related risks are always considered and are relevant in all states we operate. Increased precipitation leads to flooding and increasing temperatures lead to droughts. As a result of Hurricane Harvey, the customer demand was reduced during the storm and also during the recovery effort. This has direct financial implications as well. In an effort to better assess and manage the potential impacts from acute physical risks in the short, medium and long-term, we have explored tools such as WRI's Aqueduct Water Risk Atlas.
Chronic physical	Relevant, always included	Chronic physical climate-related risks are always considered and are relevant. Due to increasing precipitation in various regions we operate, we are increasing capital expenses toward infrastructure to safeguard our dams and reservoirs. In addition to this, we assess and manage the potential impacts from chronic physical risks in the short, medium and long-term by preliminary analysis using tools like WRI's Aqueduct Water Risk Atlas and Global Flood Analyzer. The primary risks and effects are; Temperature – increased cost and energy to treat water and wastewater and increased risk of exceeding water quality criteria. Strain on the electrical grid. Drought – Not being able to meet customer demand, increased cost and energy to treat water, increased cost and energy to pump water and increased risk of exceeding water quality criteria. Flooding - Physical risk to facilities, increased cost and energy to treat water and wastewater, increased risk of exceeding water quality criteria for water and waste water. Also associated with flooding are often from other severe weather resulting in widespread and long-lasting power outages. .

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 & Primary climate-related risk driver

Chronic physical	Changes in precipitation patterns and extreme variability in weather patterns

Primary potential financial impact

Increased capital expenditures

Climate risk type mapped to traditional financial services industry risk classification

<Not Applicable>

Company-specific description

Wastewater I&I and SSO - Protecting the environment from untreated sewage is a top priority as the owner and operator of wastewater systems. However, our company does acquire many systems that, due to historical lack of repair and investment, require time to make major infrastructure investments to prevent sewers from overflowing to the environment. Overflows can be caused during non-rain events by sewer collapses, electrical failures, and blockages. Also, extreme weather events such as hurricanes and tropical storms, increased frequency of extreme rainfall events, or climate-related trends can force a well-operated and maintained system to experience the occasional sanitary sewer overflow. Our company works to eliminate overflows through capital investments and operations, minimize and report overflows when they happen, and track the location, frequency, and duration of any overflows for future improvements.

Time horizon

Short-term

Likelihood

Very likely

Magnitude of impact

Medium

Are you able to provide a potential financial impact figure?

Yes, an estimated range

Potential financial impact figure (currency)

<Not Applicable>

Potential financial impact figure – minimum (currency)

1000

Potential financial impact figure – maximum (currency)

10000

Explanation of financial impact figure

This estimate is based on impacts from physical climate-related risks only and not reputational risks associated with an interruption in service. The range of financial impact cited above is an estimate in terms of cost per wastewater system per storm event.

Cost of response to risk

1000000

Description of response and explanation of cost calculation

This financial impact is based on the past costs of capital investments and expenditures of additional infrastructure per collection system to address wet weather impacts, infiltration, and inflow as a result of increased regulations. Costs can vary significantly due to local/regional factors, so this figure is more directional in nature.

Comment

We perform routine O&M and capital projects to respond to and mitigate this risk by building resiliency throughout our wastewater systems.

Identifier

Risk 2

Where in the value chain does the risk driver occur?

Direct operations

Risk type & Primary climate-related risk driver

Emerging regulation	Mandates on and regulation of existing products and services

Primary potential financial impact

Increased capital expenditures

Climate risk type mapped to traditional financial services industry risk classification

<Not Applicable>

Company-specific description

Cyanotoxins/CECs (contaminants of emerging concern)- Blooms of toxin-producing cyanobacteria are expected to proliferate in surface water as global temperatures rise. These organisms produce cyanotoxins, a CEC that we have identified as a potential climate-related risk to our ability to provide safe and healthy drinking water to our customers. However, there is

currently research being performed internally and externally to further assess this risk. Our company's response to regulations for CECs, and specifically cyanotoxins, depends on the speed and structure by which these regulations are implemented. The EPA has begun conducting studies to determine chronic and acute maximum contaminant level (MCL) in humans and aquatic life for the pollutants. Once these studies are complete and potentially translated into regulatory policy, this could influence the regulations of water quality for surface water plants. How quickly these regulatory policies are adapted and implemented, and their results, will determine how soon and strict future CEC regulations in drinking water quality are. Our company's response to these future regulations depends on these results and we are actively monitoring the latest scientific and regulatory developments in this area.

Time horizon

Short-term

Likelihood

Very likely

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

Yes, an estimated range

Potential financial impact figure (currency)

<Not Applicable>

Potential financial impact figure – minimum (currency)

10000

Potential financial impact figure – maximum (currency)

50000

Explanation of financial impact figure

This range estimate refers to the annual financial impact for additional O&M to maintain and operate infrastructure, per surface water plant, to address cyanotoxins as a result of a likely scenario of increased regulations.

Cost of response to risk

1000000

Description of response and explanation of cost calculation

This financial impact is based on the capital investments and expenditures of the additional infrastructure, per surface water plant, to address cyanotoxins as a result of increased regulations.

Comment

We have already begun installation of treatment upgrades to address cyanotoxins in our Ohio subsidiary.

Identifier
Risk 3
Where in the value chain does the risk driver occur?
Direct operations
Risk type & Primary climate-related risk driver

Emerging regulation	Mandates on and regulation of existing products and services

Primary potential financial impact
Increased indirect (operating) costs
Climate risk type mapped to traditional financial services industry risk classification
<Not Applicable>
Company-specific description
Disinfection by-products - An unintended consequence of drinking water disinfection is the generation of disinfection by-products (DBPs). These chemical disinfection by-products, either organic or inorganic depending on the context, form as part of normal chemical disinfection treatment through the interaction between naturally occurring organic materials present in the source water and the treatment technology being used. In the case of our operations, the disinfectant most prone to cause DBP is chlorine. Chlorine dosage, and by extension the prevalence of DBP, is highly dependent on temperature. Through the use of scenario analysis, we determined the potential implications to our business operations under an optimistic scenario (RCP 2.6) and a Business-as-Usual pathway (BAU, RCP 8.5). We have determined that, based on this scenario analysis, there is a high likelihood that regulatory authority and requirements will also be highly dependent on similar climate-related trends. Our company may address increased DBPs as a result of treatment by implementing new filtration and treatment processes (e.g. organics removal, carbon treatment, membranes) for their effective removal prior to delivery, with the ability to scale these efforts based on the regulatory requirements, justified through the results of the scenario analysis.
Time horizon
Medium-term
Likelihood
Likely
Magnitude of impact
High
Are you able to provide a potential financial impact figure?
Yes, an estimated range
Potential financial impact figure (currency)
<Not Applicable>
Potential financial impact figure – minimum (currency)

1

Potential financial impact figure – maximum (currency)

2

Explanation of financial impact figure

This financial impact is based on the capital investments and expenditures, along with corresponding operating costs, of the additional infrastructure required to remove disinfection by-products as a result of increased regulations as a cost ($) per 1 million gallons of water produced .

Cost of response to risk

1000000

Description of response and explanation of cost calculation

This financial impact is based on the capital investments and expenditures of the additional infrastructure, per surface water plant, to address disinfection by products as a result of increased regulations.

Comment

We perform routine O&M and capital projects to respond to and mitigate this risk by building resiliency throughout our wastewater systems.

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

Energy source

Primary climate-related opportunity driver

Use of lower-emission sources of energy

Primary potential financial impact

Reduced indirect (operating) costs

Company-specific description

Renewable energy use- Essential has installed solar panels at two treatment plant locations in the State of Illinois - Manteno WWTP and Danville WTP. Through favorable grants for solar installations, Aqua Illinois is able to realize 25 to 50% savings for its retail power supply costs at both a water and wastewater treatment plant while supplying 75 percent of the plants' annual kWh requirement. This an example of how solar can reduce operating costs with the right mix of incentives and comparative grid supplier power costs either under an own-and-operate or PPA arrangement. This also includes off-site PPA agreements with retail providers. In 2019, we entered into an agreement which provides Aqua Texas, beginning in July 2020, with 25% solar power through an off-site PPA agreement. This agreement provide a cost advantageous scenario as compared to 100% grid power. We continually evaluate the cost of retail power, available grants, land availability, and PPA opportunities. As such, we are ready to act with agility on advantageous opportunities.

Time horizon

Short-term

Likelihood

Likely

Magnitude of impact

Medium-low

Are you able to provide a potential financial impact figure?

Yes, an estimated range

Potential financial impact figure (currency)

<Not Applicable>

Potential financial impact figure – minimum (currency)

100000

Potential financial impact figure – maximum (currency)

1000000

Explanation of financial impact figure

Costs savings depend on location, grid retail power costs, and agreements. Estimates provided are representative of what can be reasonably achieved on an annual basis and the maximum represents what can possible for achievement, depending on the cost of retail grid power and incentives to allow us to deploy additional solar power.

Cost to realize opportunity

0

Strategy to realize opportunity and explanation of cost calculation
Through the PPA contract vehicle, the cost could be zero. Under the own-and-operate scenario, the costs could be $1M-$5M depending on the size of the solar asset and location.
Comment
None

Identifier
Opp2
Where in the value chain does the opportunity occur?
Direct operations
Opportunity type
Markets
Primary climate-related opportunity driver
Access to new markets
Primary potential financial impact
Increased revenues resulting from increased demand for products and services
Company-specific description
System Purchases due to water quality and quantity issues - Mergers and acquisitions as a growth strategy can allow for Essential to expand into new markets through opportunities that, in part, result from impacts of climate change. There are many factors that could lead municipalities to sell their systems, but as climate changes, water and wastewater systems become more complex to operate, require increased capital investment to meet change, and regulatory compliance becomes more complex. While these are the same risks identified as risks to our business, they are also present opportunities for acquisition. Fair Market Value (FMV) policies provide a mechanism for municipal systems to sell their water and wastewater systems. These municipalities seek a company such as Essential with broad expertise and experience, access to capital, and a strong understanding of current and future regulations and legislation. Through the use of scenario analysis, we have identified specific areas of operations and climate scenarios that would provide a strategic advantage on this front, leading to acquisitions that would improve service reliability and quality to local stakeholders.
Time horizon
Short-term
Likelihood
Very likely
Magnitude of impact
High

Are you able to provide a potential financial impact figure?
Yes, an estimated range
Potential financial impact figure (currency)
<Not Applicable>
Potential financial impact figure – minimum (currency)
1000000
Potential financial impact figure – maximum (currency)
100000000
Explanation of financial impact figure
For a utility, climate change alone may not be the reason for a sale of water or wastewater system, but the impacts of climate change may be one of the considerations and perhaps a decision point for sale of a system. The expertise of the successful bidder to address climate change risk could also be a winning factor in the bid process. The figures cited are an estimate of financial impact which is variable based on the size and number of systems acquired. This is very directional in nature and extremely difficult to estimate.
Cost to realize opportunity
0
Strategy to realize opportunity and explanation of cost calculation
Costs for acquisition are already included in routine marketing and business opportunity budgets.
Comment
None

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
Primary potential financial impact
Increased revenues through access to new and emerging markets
Company-specific description

Wastewater discharge reuse and purple pipe projects- As climate change may alter precipitation patterns, a consequence of this may be the impact to groundwater and surface water quantity and quality in various regions. Reducing the demand for freshwater and reducing demand on less resilient sources of supply will require communities to consider alternatives sources and technologies. Irrigation is a significant demand on household water use and cooling for power generation and server farms requires significant water. If these uses for homes, businesses, technology, agriculture, and golf courses are to be maintained for growing populations, the treatment and reuse of wastewater for potable and other uses will need to be expanded. This may provide opportunities to add customers within a given service area or provide access to new communities and businesses that cannot meet their supply demands. The company is currently involved in several agreements in which it treats wastewater and returns the water to various fields, including golf courses, where the water is used for irrigation. This opportunity includes expanded services for wastewater effluent used in irrigation, as well as services to convert wastewater back to a fully potable source.

Time horizon

Long-term

Likelihood

More likely than not

Magnitude of impact

Low

Are you able to provide a potential financial impact figure?

Yes, an estimated range

Potential financial impact figure (currency)

<Not Applicable>

Potential financial impact figure – minimum (currency)

100000

Potential financial impact figure – maximum (currency)

5000000

Explanation of financial impact figure

This range represents annual revenue increase and is based on an increase in total water sales of 1%.

Cost to realize opportunity

0

Strategy to realize opportunity and explanation of cost calculation

We are unable to estimate costs at this time.

Comment

None

C3. Business Strategy

C3.1

(C3.1) Have climate-related risks and opportunities influenced your organization's strategy and/or financial planning?

Yes

C3.1a

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

Yes, qualitative and quantitative

C3.1b

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

Climate-related scenarios and models applied	Details
RCP 2.6 RCP 8.5	In an effort to better incorporate the potential effects of climate change on our business, Essential has assessed climate-related risks and opportunities through the use of scenario analysis. Consistent with the recommendations of the TCFD, we herein provide details of our organizations use of climate-related scenario analysis. Guidance on conducting both qualitative and quantitative scenario analysis comes from 'Recommendations of the Task Force on Climate-Related Financial Disclosures' (2017) to identify our most pertinent climate-related business risks (transition and physical) and opportunities under the 2°C warming scenario (RCP2.6) and the greater than 2°C Business-As-Usual (RCP8.5) warming scenario. To perform qualitative scenario analyses, we implemented an 8-step scenario development process in which we identified issues, key factors influencing those issues, driving forces, ranked them by importance and uncertainty, and created scenario matrices with axes of uncertainty. Each matrix was given a meaningful name and described qualitatively in the form of a narrative. From these narratives we derived implications, allowing for future selection of leading indicators. Relevant stakeholders within Essential, including, but not limited to, management, operations personnel, and employees were asked to provide potential risk areas and the implications these risks areas could affect within Essential's operations profile within three geographic regions; Northern Region (NJ, PA, OH, IL and IN), Mid South (VA and NC) and the Texas Region (TX) To perform quantitative scenario analyses, we downloaded temperature and precipitation data from the downscaled CMPI5 climate data set for the period 1950-2099 under the RCP2.6 and RCP8.5 scenarios within the BCCAv2 ccsm4 model run. This quantitative model data was

Climate-related scenarios and models applied	Details
	then used in tandem with stakeholder feedback to produce several key rating indicators for each region that Essential operates in. These key rating indicators included a potential magnitude of impact (MOI) for the indicator on operations (MOI definition consistent with CDP terminology), the likelihood of impact (consistent with institutional knowledge and historic climate data), and cost (annualized cost impact on labor, control infrastructure, operations and maintenance, etc.). These key rating indicators were given individual weights and scores by interviewed stakeholders, on a scale from 0-3. These ratings were then compiled to generate a total implication score (TIS), representing the impact that any particular implication could have on Essential's operations and as to whether it was an opportunity or a risk. The TIS was then cross calculated with the relative urgency, a metric developed from the results of the RCP 2.6 and RCP 8.5 climate analysis. By analyzing the climate variability within the applicable time horizon, a branching logical flow diagram was generated, allowing for variable and dynamic decision making on the relative importance and timeliness of actions, based on an indicator's susceptibility to either climate scenario. The resulting modified impact score (MIS) included all relevant information pertinent to individual risk or opportunities, adjusted for climate impact, in a format designed for managerial and operational expedience.

C3.1d

(C3.1d) Describe where and how climate-related risks and opportunities have influenced your strategy.

	Have climate-related risks and opportunities influenced your strategy in this area?	Description of influence
Products and services	Evaluation in progress	Climate change presents risks and opportunities to utilities like ours involved in water and wastewater treatment and services. One example we are exploring and evaluating is using treated wastewater effluent for irrigation. This conserves freshwater, a resource growing scarcer. Another example we are exploring and evaluating is acquisition of combined sewer and stormwater systems and upgrading the infrastructure to something more resilient and environmentally sound. Changing weather patterns are further exposing the need to upgrade such systems to ensure associated runoff issues do not occur. At Essential, we are continually thinking about how to engineer resilient infrastructure for sustainable communities.

	Have climate-related risks and opportunities influenced your strategy in this area?	Description of influence
Supply chain and/or value chain	Yes	As energy is a major input for treating water and wastewater in our business, we made a strategic decision to increase the resiliency of our energy supply through various alternative and renewable energy initiatives where permissible through state regulatory frameworks. Our water and wastewater business set a target for all grid power from non-regulated electric suppliers (in PA, OH, NJ, and IL) to be 100% renewable through Green-e certified wind RECs by 2022. The associated energy sourcing agreement started in January 2020. Additionally, in 2019, Aqua Texas signed a solar PPA agreement for 25% of the state operation's power.
Investment in R&D	Yes	As climate-related risks and opportunities are identified, we must continue our research and development of new techniques to source, treat, and transport water and wastewater efficiently. Our systems must be climate resilient. For example, as discussed in the C2 section, we have defined risks and opportunities using the STEEP (Sociological, Technological, Economical, Environmental and Political) analysis method to evaluate both internal and external forces on their likelihood of occurrence and then on the magnitude of their impact. This analysis focuses our research on the most efficient and effective methods. We are investing in a new lab and additional cutting-edge capabilities that will allow us to better respond to such emerging issues and devise sustainable solutions.
Operations	Yes	Designing and implementing efficient and resilient infrastructure and operational processes has a dual purpose of addressing climate change and reducing financial costs. As we make improvements to our systems, we drive energy efficiency, conservation, and waste minimization. There are many examples of how we have made changes or decisions in our operations, both minor and major, and a number of these are included throughout this report. For example, automation and efficient valves help reduce energy needed to operate our systems. Another example is through management of our operations while utilizing production metrics such as kWh/1,000 gallons. Managers with direct responsibility for these goals have compensations dependent on specific energy consumption targets.

C3.1e

(C3.1e) Describe where and how climate-related risks and opportunities have influenced your financial planning.

	Financial planning elements that have been influenced	Description of influence
Row 1	Direct costs Indirect costs Capital expenditures	Our financial planning process is influenced by climate change in several ways. The first relates to our procurement of energy. We are creatively and proactively assessing our energy supply options, which involve forward purchasing of renewable energy and investments in various renewable energy projects. These alter the cadence of our cash outflows and often have a larger outlay at the outset of a project before earning savings in subsequent periods. As a water utility operating in an energy-intensive industry, these decisions involve planning, coordination, and financial considerations to ensure we are increasing resiliency and maintaining affordability for customers for this vital resource. As a water utility, treating our water and protecting our systems requires us to maintain constant focus on emerging contaminants. Always looking to the future, we have identified cyanotoxins, as one example, of an emerging contaminant impacted by climate change, as detailed in C2. We have worked hard, and will continue to do so, to ascertain the impact of climate change on our water systems in accordance with the latest science. Our researchers and engineers are devising treatment methods to address risks by emerging contaminants, such as cyanotoxins, and this often requires additional investment in new technologies or processes to increase the resiliency of our various water systems. Additionally, we seek to reduce water loss and leakage wherever possible. The more water we need to treat at our plants, the more energy we need to use as an organization. Upfront investment in infrastructure and systems creates efficiency in the future. We replace water mains and many miles of pipe regularly to ensure that our systems are efficient and result in less water loss. This requires significant capital investment to maintain our systems and ensure they are resilient.

C3.1f

(C3.1f) Provide any additional information on how climate-related risks and opportunities have influenced your strategy and financial planning (optional).

As the company has doubled in size as a result of our recent acquisition of Peoples, completed in March of 2020, a formal climate-related strategies need to developed and based on the new organization. The main activity of both organizations has been and will continue to be replacing aging underground pipe infrastructure. Pipe replacement is a major component of our capital projects and budget. Replacing pipe reduces leaks and breaks which has a significant effect on reducing lost product and, as such, GHG emissions.

C4. Targets and performance

C4.1

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

No target

C4.1c

(C4.1c) Explain why you did not have an emissions target, and forecast how your emissions will change over the next five years.

	Primary reason	Five-year forecast	Please explain
Row 1	Other, please specify (Major Acquisition)	Essential Utilities consists of two business units: water/wastewater services and natural gas distribution services. The water and wastewater business, through power contacts executed in 2019, will be able to reduced its market-based CO2e emission by approximately 60% from it's 2018 baseline. The natural gas distribution business is undergoing its first complete assessment of Scope 1 & 2 emissions inventory. Once the inventory is completed, in late 2020, Essential will begin to develop formal targets and goals as a combined organization, as well as for each of its two businesses.	In March of 2020, Aqua America acquired Peoples Gas and was renamed Essential Utilities. In light of the acquisition and integration of a new business line, Essential is currently in the process of measuring company-wide GHG emissions and evaluating how we could reach the goals of the Paris Agreement, including through intermediate targets and business unit timelines. Within the key principles of the Paris Agreement, three articles to which Essential is currently taking substantive action are: Long-term temperature goal (Art. 2) – In seeking to strengthen the global response to climate change, reaffirms the goal of limiting global temperature increase- Essential, in 2019, contracted to sourcing 25% of its power in Aqua TX through a solar PPA starting in 2020. Further, the company contracted with a retail power supplier for 100% wind power through Green-e Renewable Energy Certificates starting in 2022 for its deregulated power supply for its water and wastewater operations in PA, OH, NJ and IL. Aqua IL also entered into on-site solar PPA agreements to build two solar fields totaling 3MW, beginning operation in late 2020 and early 2021 to provide 75% of the power for a water and wastewater plant. Global peaking and 'climate neutrality' (Art. 4) – To achieve this temperature goal, Parties aim to reach global peaking of GHGs as soon as possible- Essential understands the urgency to act sooner than later. Based on current efforts and investments, our water and wastewater business is expected to lower its overall market-based CO2e emissions by 60% from its 2018 baseline by 2022 This reduction is well within intermediate carbon reduction goal timetables for

	Primary reason	Five-year forecast	Please explain
			achieving the science-based target goal of limiting global temperature increase to well below 2 degrees C. Sinks and reservoirs (Art.5) –Encourages Parties to conserve and enhance, as appropriate, sinks and reservoirs of GHGs- Essential maintains numerous surface water reservoirs and protects more than 7,600 acres of natural area across our eight states. The goal of maintaining our forests as a carbon reservoir is complementary to our needs to maintain a forested buffer as a natural filter for run-off into the our reservoirs. Essential, since 2005, in PA alone has invested more than $1.7 million in TreeVitalize habitat restoration programs where more than 170,000 trees have been planted.

C4.2

(C4.2) Did you have any other climate-related targets that were active in the reporting year?

No other climate-related targets

C4.3

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

Yes

C4.3a

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

	Number of initiatives	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	3	2500
To be implemented*	0	0

	Number of initiatives	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Implementation commenced*	3	82700
Implemented*	0	0
Not to be implemented	0	0

C4.3b

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

Initiative category & Initiative type

Low-carbon energy consumption | Solar PV

Estimated annual CO2e savings (metric tonnes CO2e)

2800

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

140000

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

0

Payback period

<1 year

Estimated lifetime of the initiative

21-30 years

Comment

Two solar projects have been approved and are under construction. A 1 MW solar field at the Manteno IL wastewater plan is currently under construction and is expected to begin production by late 2020. The solar field is expected to supply 85% percent of the plants annual power requirement. A 2 MW solar field at the Danville IL water treatment plant has begun site preparation activities for solar production starting in early 2021. The Danville solar field is expected to produce over 70% of the plants annual power consumption.

Initiative category & Initiative type

Low-carbon energy consumption	Solar PV

Estimated annual CO2e savings (metric tonnes CO2e)

3900

Scope(s)

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

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

40000

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

0

Payback period

No payback

Estimated lifetime of the initiative

6-10 years

Comment

Aqua Texas in 2019 entered into an agreement power to source about 25% of its electricity from renewable sources through a new seven-year solar PPA agreement with Texas-based NRG Energy that started June 1, 2020. This agreement will help our Texas operations reduce its carbon footprint, lower the company's overall energy spend, and locally source its renewable power to better serve water and wastewater customers statewide.

Initiative category & Initiative type

Low-carbon energy consumption	Wind

Estimated annual CO2e savings (metric tonnes CO2e)

76000

Scope(s)

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

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

0

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

0

Payback period

No payback

Estimated lifetime of the initiative

3-5 years

Comment

In 2019, our water and wastewater business contracted with a retail power supplier for 100% wind power through Green-e Renewable Energy Certificates starting in 2022 for its deregulated power supply for our water and wastewater operations in PA, OH, NJ and IL. This contract is for a three year period.

Initiative category & Initiative type

Low-carbon energy consumption	Solar PV

Estimated annual CO2e savings (metric tonnes CO2e)

2500

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

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

50000

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

0

Payback period

<1 year

Estimated lifetime of the initiative

21-30 years

Comment

Currently, Essential is investigating three locations for the potential to add additional on-site solar production to its portfolio, either as an owner or operator, through a PPA arrangement. Currently, with retail grid power costs depressed, that lack of price parity does not result in a favorable ROI. Once price parity can be achieved through higher retail grid power costs and/or incentives, we are prepared to move forward to complete a detailed feasibility analysis.

C4.3c

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

Method	Comment
Financial optimization calculations	The company utilizes a ROI based methodology referred to as 8:1 in which projects are justified based roughly on project spend versus payback period. This mechanism is used to justify a variety of energy efficiency projects from the installation of solar fields ranging in the millions of dollars to smaller projects in the tens of thousands for VFD motor upgrades. For energy projects the cost variance per and post project plus utility, state or federal incentives are the primary factors that influence the out come of energy based 8:1 projects.

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?

No

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 2017

Base year end

December 31 2017

Base year emissions (metric tons CO2e)

14383

Comment

80% of Scope 1 emissions are the result of mobile source fuel combustion consisting of gasoline, diesel and compressed natural gas (CNG). The remaining 20% results from natural gas combustion from heating,

Scope 2 (location-based)

Base year start

January 1 2017

Base year end

December 31 2017

Base year emissions (metric tons CO2e)

152980

Comment

With this CDP submission, Essential is restating its market-based CO2e value resulting from updating the calculation methodology. The total market-based CO2e value (Scope 1 and Scope 2) for 2017 remain unchanged including the resulting reported intensity metrics . In 2017 data was reported and apportioned between Scope 2 (location-based) and Scope 2 (market-based) fields as CO2e calculated by market-based emission factor and calculated by location-based emission factor and not the sum in the Scope 2 market-based field. Only the Scope 2 emissions calculated by locations-based emission factors was previously reported.

Scope 2 (market-based)

Base year start

January 1 2017

Base year end

December 31 2017

Base year emissions (metric tons CO2e)

132858

Comment

With this CDP submission, Essential is restating its market-based CO2e value resulting from updating the calculation methodology. The total market-based CO2e value (Scope 1 and Scope 2) for 2017 remain unchanged including the resulting reported intensity metrics . In 2017 data was reported and apportioned between Scope 2 (location-based) and Scope 2 (market-based) fields as CO2e calculated by market-based emission factor and calculated by location-based emission factor and not the sum in the Scope 2 market-based field. NJ, OH and PA - De-regulated utility states; market-based emission factors from our energy supplier are only available for CO2, and E-Grid location based emissions factors are used for CH4 and N2O.

C5.2

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

US EPA Center for Corporate Climate Leadership: Indirect Emissions From Purchased Electricity
US EPA Center for Corporate Climate Leadership: Direct Emissions from Stationary Combustion Sources
US EPA Center for Corporate Climate Leadership: Direct Emissions from Mobile Combustion Sources

US EPA Emissions & Generation Resource Integrated Database (eGRID)

C6. Emissions data

C6.1

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

Reporting year

Gross global Scope 1 emissions (metric tons CO2e)

16057

Start date

January 1 2019

End date

December 31 2019

Comment

Includes natural gas for heating, fuel for vehicle, construction equipment and generators.

Past year 1

Gross global Scope 1 emissions (metric tons CO2e)

16304

Start date

January 1 2018

End date

December 31 2018

Comment

No change from prior year's CDP submission

Past year 2

Gross global Scope 1 emissions (metric tons CO2e)

14383

Start date

January 1 2017

End date

December 31 2017

Comment

No change from prior year's CDP submission

C6.2

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

Row 1

Scope 2, location-based

We are not reporting a Scope 2, location-based figure

Scope 2, market-based

We are reporting a Scope 2, market-based figure

Comment

We are reporting our emissions across 8 states. With over 100 utilities providing electric service to over 4,200 electrical utility accounts and three retail electric suppliers, we have focused on our deregulated states with retail electric suppliers in obtaining market-based emission factors. Market-based emission factors are used for to calculate CO2 emission for Illinois, Pennsylvania, New Jersey and Ohio. This represents 67% our Scope 2 emissions reported as market-based CO2 emission factors. Both Constellation New Energy and Mid-America Energy Services replied with market-based emission factors for 2019. Our retailer supplier in TX was not able to provide market-based emissions and recommend using EPA eGrid. Other regulated utilities in regulated states or municipalities and co-ops the most recent EPA eGrid2018v2 factors were utilized.

C6.3

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

Reporting year

Scope 2, location-based

<Not Applicable>

Scope 2, market-based (if applicable)

115124

Start date

January 1 2019

End date

December 31 2019

Comment

None

Past year 1

Scope 2, location-based
<Not Applicable>
Scope 2, market-based (if applicable)
128612
Start date
January 1 2018
End date
December 31 2018
Comment
With this CDP submission, Essential is restating its market-based CO2e value resulting from updating the calculation methodology. The total market-based CO2e value (Scope 1 and Scope 2) for 2018 remain unchanged including the resulting reported intensity metrics . In 2018, data was reported and apportioned between Scope 2 (location-based) and Scope 2 (market-based) fields as CO2e calculated by market-based emission factor and calculated by location-based emission factor and not the sum in the Scope 2 market-based field.
Past year 2
Scope 2, location-based
<Not Applicable>
Scope 2, market-based (if applicable)
132858
Start date
January 1 2017
End date
December 31 2017
Comment
With this CDP submission, Essential is restating its market-based CO2e value resulting from updating the calculation methodology. The total market-based CO2e value (Scope 1 and Scope 2) for 2017 remain unchanged including the resulting reported intensity metrics . In 2017, data was reported and apportioned between Scope 2 (location-based) and Scope 2 (market-based) fields as CO2e calculated by Market-based emission factor and calculated by location-based emission factor and not the sum in the Scope 2 market-based field.

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 gross global Scope 3 emissions, disclosing and explaining any exclusions.

Purchased goods and services

Evaluation status

Relevant, calculated

Metric tonnes CO2e

35765

Emissions calculation methodology

List of purchased chemicals from 2019 was provided by our Purchasing Department. Emission factors for top bulk chemicals was gathered from Eco-invent 3 LCI and Agri-footprint-gross energy allocation database. Eco-invent 3 used a Market for Consequential Systems-approach LCA. LCI data for >95% of the sum of the bulk weight of chemicals was obtained.

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

0

Please explain

Many vendors for chemicals are local and small business entities and do not provide supplier emission factors.

Capital goods

Evaluation status

Relevant, calculated

Metric tonnes CO2e

37845

Emissions calculation methodology

Pipeline infrastructure replacement includes ductile iron and PVC pipe and HDPE pipe replacement, backfill, and re-pavement of roads. Pipe replacement: Calculated using CO2 emissions factors for a cradle to grave life cycle from an LCI performed by the University of Tehran (Hajibabaei, Mohsen, et al. "Life Cycle Assessment of Pipes and Piping Process in Drinking Water Distribution Networks to Reduce Environmental Impact." Sustainable Cities and Society, vol. 43, Nov. 2018, pp. 538–549., doi:10.1016/j.scs.2018.09.014.). Note that due to negligible observed emissions differences, HDPE and PVC were grouped together. Backfill: Cradle to grave emission factors were gathered from LCI data from Ecoinvent-3 for crushed and washed limestone, consequential systems GLO Asphalt: Emission factors for embodied energy of asphalt were gathered from an LCI done by the Michigan Technology University for the National Asphalt and Pavement Association.

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

0

Please explain
Vendors of ductile iron do not provide emissions information.
Fuel-and-energy-related activities (not included in Scope 1 or 2)
Evaluation status
Relevant, calculated
Metric tonnes CO2e
28742
Emissions calculation methodology
Emissions for fuel-and-energy-related activities was calculated using the methodology found in the Quantis Methodology and 2016 Registration Document. Scope 3 energy emissions = (scope 1 x 0.25) + (scope 2 x 0.20)
Percentage of emissions calculated using data obtained from suppliers or value chain partners
0
Please explain
Supplier information is not available.
Upstream transportation and distribution
Evaluation status
Not relevant, explanation provided
Metric tonnes CO2e
<Not Applicable>
Emissions calculation methodology
<Not Applicable>
Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>
Please explain
Included in purchased products and capital goods. As a water and wastewater utility, our upstream transportation and conveyance of water and wastewater is included in our Scope 1 and 2 emissions. We do not purchase or rely on other vendors to provide our raw source water or wastewater.
Waste generated in operations
Evaluation status
Relevant, not yet calculated
Metric tonnes CO2e
<Not Applicable>
Emissions calculation methodology

<Not Applicable>

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

<Not Applicable>

Please explain

Greater than 98% of waste by weight consists of sediment residuals from the processing of surface water and process sludge from wastewater treatment plants. We rely on both vendors and our own truck fleet for waste disposal. When our assets are utilized, those emissions are included in our Scope 1 emissions.

Business travel

Evaluation status

Relevant, calculated

Metric tonnes CO2e

115

Emissions calculation methodology

Emissions for business travel were calculated based on travel destinations, total number of trips per destination, trip length based on destination (determined from https://www.distance.to), relevant CO2, CH4, and N2O emissions factors per air travel passenger-mile of travel type (air travel - medium haul emissions factors determined from EPA (2020)), emissions factors for greenhouse gas inventories (https://www.epa.gov/climateleadership/center-corporate-climate-leadership-ghg-emission-factors-hub); and conversion factors from CH4 and N2O to amount of CO2.

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

0

Please explain

Business travel is predominately through the use of company vehicles (either assigned or pool) and are included in our Scope 1 emissions. The whole of relevant Scope 3 business travel is comprised of air travel. The company maintains no air travel-related database or travel vendor due to the very low volume of air travel.

Employee commuting

Evaluation status

Relevant, calculated

Metric tonnes CO2e

2447

Emissions calculation methodology

Emissions for employee commuting were calculated from the results of an employee survey conducted. Survey participation rate was 54% for those employees not assigned a company vehicle. Emissions factors for various vehicle/transportation types from emissions factors determined from EPA (2020) Emissions Factors for Greenhouse Gas Inventories

(https://www.epa.gov/climateleadership/center-corporate-climate-leadership-ghg-emission-factors-hub and https://evtool.ucsusa.org/). Note that 42% percent of employees are assigned a company vehicle, which they use to commute to their assigned work location(s) and whose GHG Emissions are included the companies Scope 1 emissions.

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

0

Please explain

No vendor supplier data was used because 97% of employee travel is by personal ICE (internal combustion engine) vehicles.

Upstream leased assets

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

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

<Not Applicable>

Please explain

No upstream leased assets.

Downstream transportation and distribution

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

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

<Not Applicable>

Please explain

We provide water as a product, which is distributed through a pipe water system directly to the customer's point of use. Therefore, emissions are already included in Scope 1+2. Similarly, wastewater is discharged after treatment to a discharge point, either a stream or river adjacent to the facility, and any energy expended is captured in our Scope 1+2 emissions.

Processing of sold products

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

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

<Not Applicable>

Please explain

The product, treated water, is at its final finished state.

Use of sold products

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

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

<Not Applicable>

Please explain

We supply water, which has a multitude of uses and which may result in the heating of water and the use in industrial process. We do not have operational control or data relating to our customer use of water we supply and, therefore, those impacts are not included.

End of life treatment of sold products

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

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

<Not Applicable>

Please explain

Water we deliver to customers is suitable for human consumption and requires no end of life treatment.

Downstream leased assets
Evaluation status
Not relevant, explanation provided
Metric tonnes CO2e
<Not Applicable>
Emissions calculation methodology
<Not Applicable>
Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>
Please explain
We have no downstream assets.
Franchises
Evaluation status
Not relevant, explanation provided
Metric tonnes CO2e
<Not Applicable>
Emissions calculation methodology
<Not Applicable>
Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>
Please explain
We do not own any franchises.
Investments
Evaluation status
Relevant, calculated
Metric tonnes CO2e
1058
Emissions calculation methodology
Same as defined within the market-based Scope 2 calculations and based on 10% wind renewable energy credits. Also included are the emissions for fuel-and-energy-related activities, which were calculated using the methodology found in the Quantis Methodology and 2016 Registration Document. Scope 3 energy emissions = (Purchased electric x 0.20) 100% of emissions are included even though, regarding Aqua-ETC Water Solutions, LLC, Essential owns only 49% of this joint venture.
Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

Please explain

Purchased electricity from Constellation New Energy market-based emission factors

Other (upstream)

Evaluation status

Relevant, calculated

Metric tonnes CO2e

4703

Emissions calculation methodology

In addition to treating water, we also purchase water from adjoining interconnected water companies/systems. Purchased water contains embodied energy as it is processed and received under pressure. If we did not purchase this water, our utility would need to produce more water, so, conversely, our Scope 1 and 2 emissions would increase proportionally. We apply our own emission factors for each state, defined as Tonnes CO2e/million gallons x volume of purchased water = Tonnes CO2e for purchased water.

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

0

Please explain

We use our own state-defined emissions factors as a representative facsimile.

Other (downstream)

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

<Not Applicable>

Emissions calculation methodology

<Not Applicable>

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

<Not Applicable>

Please explain

No other downstream emissions.

C6.7

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

No

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
147.44

Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)
131181

Metric denominator
unit total revenue

Metric denominator: Unit total
889692

Scope 2 figure used
Market-based

% change from previous year
17.3

Direction of change
Decreased

Reason for change
Our revenue (unit total revenue reported as millions of dollars) varies based on several business factors, including capital project performance, acquisition efforts, general and administrative (G&A) costs, and volume water and wastewater processed. The combination of reduced annual Scope 1 & 2 carbon emissions resulting from lower market-based emission factors for our power supply and increase in net revenue resulted in the year-over-year decrease. We track intensity-based metrics by water and wastewater business units as measured by water and wastewater processed per energy consumed, as this is a more representative measure of monitoring of carbon intensity trends versus using market based carbon values.

Intensity figure
1.253

Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)
105045

Metric denominator
Other, please specify (Unit of product, Millions of gallons WATER Produced)

Metric denominator: Unit total
83723
Scope 2 figure used
Market-based
% change from previous year
11
Direction of change
Decreased
Reason for change
Favorable change in the market-based emission factors for purchased power for NJ, PA, and OH led ultimately to a 7% decrease based the updated CO2 emission factors for water produced. Energy efficiency measured as kWh/1,000 gallons also improved by 4% which sums to an over 11% reduction from 2018.

Intensity figure
2.221
Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)
26135
Metric denominator
Other, please specify (Unit of product, Millions of gallons WASTEWATER Treated)
Metric denominator: Unit total
11765
Scope 2 figure used
Market-based
% change from previous year
3.6
Direction of change
Decreased
Reason for change
The noted change prior to updating emissions factors from 2018 was less than 1%. However, a favorable change in the market-based emission factors for purchased power for NJ, PA, and OH led ultimately to a 3.6% decrease based the updated CO2 emission factors.

C7. Emissions breakdowns

C7.1

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

Yes

C7.1a

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

Greenhouse gas	Scope 1 emissions (metric tons of CO2e)	GWP Reference
CO2	15991.4	IPCC Fourth Assessment Report (AR4 - 100 year)
CH4	1.1	IPCC Fourth Assessment Report (AR4 - 100 year)
N2O	0.13	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	16057

C7.3

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

By business division

By activity

C7.3a

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

Business division	Scope 1 emissions (metric ton CO2e)
Aqua Illinois	1665
Aqua Indiana	343

Business division	Scope 1 emissions (metric ton CO2e)
Aqua North Carolina	2997
Aqua New Jersey	569
Aqua Pennsylvania	6051
Aqua Ohio	1963
Aqua Virginia	692
Aqua Texas	1777

C7.3c

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

Activity	Scope 1 emissions (metric tons CO2e)
Water Production	15143
Wastewater Treatment	914

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 for in Scope 2 market-based approach (MWh)
United States of America	123639	115124	0	294507

C7.6

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

By business division

By activity

C7.6a

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

Business division	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Aqua Illinois	16422	9501
Aqua Indiana	6782	6782
Aqua North Carolina	10331	10331
Aqua New Jersey	3502	3810
Aqua Pennsylvania	49019	52357
Aqua Ohio	18353	13113
Aqua Virginia	3127	3127
Aqua Texas	16103	16103

C7.6c

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

Activity	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Water Production	95287	89903
Wastewater Treatment	28352	25221

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?

Decreased

C7.9a

(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	0	No change	0	No significant changes in renewable energy consumption during the reporting period.
Other emissions reduction activities	4392	Decreased	3	The decrease resulted from the Water businesses unit and three main factors included numerous small energy efficiency projects, utilization of a more energy efficient pumping assets and a reduction of heating degree days as compared to the previous year.
Divestment	0	No change	0	No significant divestments during the reporting period.
Acquisitions	0	No change	0	No significant acquisitions during the reporting period.
Mergers	0	No change	0	No mergers during the reporting period.
Change in output	0	No change	0	Both water and wastewater processed was with 1% of the previous years total.
Change in methodology	9343	Decreased	6.4	Market-based emission factors for NJ, PA and OH were reduced in for 2019, which resulted in approximately a 6.4 percent reduction of our market based emissions. Other changes to emission factors did not result in a materially significant change.
Change in boundary	0	No change	0	No changes in boundary occurred in 2019.
Change in physical operating conditions	0	No change	0	No significant changes in physical operation conditions.
Unidentified	0	No change	0	None
Other	0	No change	0	None

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?

Market-based

C8. Energy

C8.1

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

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

C8.2

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

	Indicate whether your organization undertook this energy-related activity in the reporting year
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 (renewable and non-renewable) MWh
Consumption of fuel (excluding feedstock)	HHV (higher heating value)	0	70222	70222
Consumption of purchased or acquired electricity	<Not Applicable>	19157	290739	309896
Consumption of purchased or acquired heat	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>

	Heating value	MWh from renewable sources	MWh from non-renewable sources	Total (renewable and non-renewable) MWh
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>	3768	<Not Applicable>	3768
Total energy consumption	<Not Applicable>	22925	360961	383886

C8.2b

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

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

C8.2c

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

Fuels (excluding feedstocks)

Natural Gas

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

19162

MWh fuel consumed for self-generation of electricity
<Not Applicable>
MWh fuel consumed for self-generation of heat
<Not Applicable>
MWh fuel consumed for self-generation of steam
<Not Applicable>
MWh fuel consumed for self-generation of cooling
<Not Applicable>
MWh fuel consumed for self-cogeneration or self-trigeneration
<Not Applicable>
Emission factor
53.06
Unit
kg CO2 per million Btu
Emissions factor source
Center for Corporate Climate Leadership GHG Emission Factors Hub, Emission Factors for Greenhouse Gas Inventories - Last Modified: 26 March 2020; Mobile Combustion CO2 Emission Factors.
Comment
g CH4 per MMBtu = 1.00 *GWP 25 = CO2e g NM per MMBtu = 0.10 * GWP 298 = CO2e

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Fuels (excluding feedstocks)
Compressed Natural Gas (CNG)
Heating value
HHV (higher heating value)
Total fuel MWh consumed by the organization
2828
MWh fuel consumed for self-generation of electricity
<Not Applicable>
MWh fuel consumed for self-generation of heat
<Not Applicable>
MWh fuel consumed for self-generation of steam
<Not Applicable>
MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

<Not Applicable>

Emission factor

1.92173

Unit

kg CO2 per m3

Emissions factor source

Center for Corporate Climate Leadership GHG Emission Factors Hub, Emission Factors for Greenhouse Gas Inventories - Last Modified: 26 March 2020; Mobile Combustion CO2 Emission Factors. Converted 0.05444 kg CO2 per scf * 35.3 scf per m3 = 1.92173 to Kg CO2 per m3

Comment

Mobile Combustion CH4 and N2O Emission Factors for On-Road Diesel and Alternative Fuel Vehicles "CH4 Factor (g / mile)" CNG Light-Duty Vehicles - 0.123 and LNG Medium- and Heavy-Duty Vehicles 3.7 ; "N2O Factor (g / mile)" CNG Light-Duty Vehicles - 0.011 and LNG Medium- and Heavy-Duty Vehicles 0.011

Fuels (excluding feedstocks)

Motor Gasoline

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

42472

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

<Not Applicable>

Emission factor

8.78

Unit

kg CO2e per gallon

Emissions factor source

Center for Corporate Climate Leadership GHG Emission Factors Hub, Emission Factors for Greenhouse Gas Inventories - Last Modified: 26 March 2020; Mobile Combustion CO2 Emission Factors.

Comment

Cars g CH4 per mile = 0.0072 *GWP 25 = CO2e g N20 per mile = 0.0049 *GWP 298 = CO2e Vans Pickup Trucks and SUVs g CH4 per mile = 0.0 96 *GWP 25 = CO2e g N20 per mile = 0.0036 *GWP 298 = CO2e Heavy Duty Vehicles g CH4 per mile = 0.034 *GWP 25 = CO2e g N20 p er mile = 0.0084 *GWP 298 = CO2e. Note worst case emission for vehcial ages between 2008 to 2018 for each vehicle class from Table 3 was used.

Fuels (excluding feedstocks)

Diesel

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

5760

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat

<Not Applicable>

MWh fuel consumed for self-generation of steam

<Not Applicable>

MWh fuel consumed for self-generation of cooling

<Not Applicable>

MWh fuel consumed for self-cogeneration or self-trigeneration

<Not Applicable>

Emission factor

10.21

Unit

kg CO2 per gallon

Emissions factor source

Center for Corporate Climate Leadership GHG Emission Factors Hub, Emission Factors for Greenhouse Gas Inventories - Last Modified: 26 March 2020; Mobile Combustion CO2 Emission Factors.

Comment

Motor Diesel g CH4 per mile = 0.0095 *GWP 25 = CO2e g N20 per mil e = 0.0431 *GWP 298 = CO2e Non-Road Diesel g CH4 per gal = 0.2 * GWP 25 = CO2e g N20 per gal = 0.47 *GWP 298 = CO2e

C8.2d

(C8.2d) 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	3768	3768	3768	3768
Heat	19162	0	0	0
Steam	0	0	0	0
Cooling	0	0	0	0

C8.2e

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

Sourcing method

Green electricity products (e.g. green tariffs) from an energy supplier, supported by energy attribute certificates

Low-carbon technology type

Wind

Country/region of consumption of low-carbon electricity, heat, steam or cooling

United States of America

MWh consumed accounted for at a zero emission factor

19157

Comment

Green-e Energy Certified New Renewable

C9. Additional metrics

C9.1

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

Description

Energy usage

Metric value

3.77

Metric numerator

Annual kilowatt hours

Metric denominator (intensity metric only)

Thousand gallons of water produced

% change from previous year

3.1

Direction of change

Decreased

Please explain

The company, in 2018, added kWh/1,000 gallon as a metric to its management scorecard. Managers are incentivized to maintain and lower energy consumption as measured by this metric. Three factors that led to the decrease are: greater energy efficiency efforts at the local level, utilization of a more-energy efficient mix of pumping assets, and fewer heating degree days compared with the prior year (HVAC is only about 10% of our total kWh in northern states, however).

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

	Verification/assurance status
Scope 2 (location-based or market-based)	Third-party verification or assurance process in place
Scope 3	No third-party verification or assurance

C10.1a

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

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance

Moderate assurance

Attach the statement

CDP Verification Essential 2020.pdf

Page/ section reference

Page one of verification letter.

Relevant standard

The Climate Registry's General Verification Protocol

Proportion of reported emissions verified (%)

100

C10.1b

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

Scope 2 approach

Scope 2 market-based

Verification or assurance cycle in place

Annual process

Status in the current reporting year

Complete

Type of verification or assurance
Moderate assurance
Attach the statement
CDP Verification Essential 2020.pdf
Page/ section reference
Page one of verification letter.
Relevant standard
The Climate Registry's General Verification Protocol
Proportion of reported emissions verified (%)
100

Scope 2 approach
Scope 2 location-based
Verification or assurance cycle in place
Annual process
Status in the current reporting year
Complete
Type of verification or assurance
Moderate assurance
Attach the statement
Page/ section reference
The Climate Registry's General Verification Protocol
Relevant standard
The Climate Registry's General Verification Protocol
Proportion of reported emissions verified (%)
100

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
C7. Emissions breakdown	Product footprint verification	No standard was utilized	Emission are calculated from base data at the operating unit level for all Scope 1 & 2 emissions and aggregated to the company level. All calculation arithmetic's were verified for the emissions breakout.

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)?

No, and we do not anticipate being regulated in the next three years

C11.2

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

No

C11.3

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

No, and we do not currently 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

C12.1a

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

Type of engagement

Innovation & collaboration (changing markets)

Details of engagement

Other, please specify (As a large electricity user, the company looks to our retail power suppliers with innovative power purchase agreements that allow us to control expenses, but focus on green and renewable power purchase options)

% of suppliers by number

100

% total procurement spend (direct and indirect)

100

% of supplier-related Scope 3 emissions as reported in C6.5

0

Rationale for the coverage of your engagement

We request that our retail power suppliers provide energy portfolio mixes that offer both lower utility rates and increased options for green power purchases. We work with local utilities to utilize energy efficiency incentives. In some of our larger systems, we participate in energy load shedding events to take power off the grid during the highest demand times of the year. This is the result of active collaboration with our power providers to set up and participate in these programs, thus stabilizing the electric grid, and reducing the need for additional fossil fuel-consuming electric generation plants.

Impact of engagement, including measures of success

In 2019, in our Texas operations, we signed a solar PPA agreement which will deliver about 25% solar power for the state's operations starting in July of 2020. All of these improvements enable us to save on expenses which benefits our customers while reducing our Scope 2 emissions. In 2022, all grid power from non-regulated utilities (for PA, OH, NJ, and IL) will be 100% renewable through Green-e certified wind RECs.

Comment

Our power suppliers are aware of the company's desire to source renewable energy and are engaging the company with potential and initiative solutions that can also also be delivered at grid parity pricing. All electrical power in deregulated markets is serviced by retail power suppliers therefore 100% of our electrical supply is through our suppliers. Purchased electric is a Scope 2 Emission therefore the Scope 3 value field is zero.

Type of engagement

Compliance & onboarding

Details of engagement

Climate change is integrated into supplier evaluation processes

% of suppliers by number

100

% total procurement spend (direct and indirect)

100

% of supplier-related Scope 3 emissions as reported in C6.5

100

Rationale for the coverage of your engagement

We have begun a more formal process of screening, requiring all our major suppliers, new and old, to re-sign our Code of Conduct periodically. We are committed to purchasing from suppliers that strive to improve the environmental quality of our water and wastewater operations. We seek to do business with suppliers who share our concerns for, and commitment to, preserving the environment. Our suppliers will act in accordance with all applicable laws, codes, and regulations regarding environmental protection and sustainability. Suppliers will use reasonable efforts to minimize pollution and improve in environmental protection and sustainability. Moving forward, as existing contracts expire, we will strongly encourage our major suppliers, where applicable, to track, and improve on their environmental footprint as we continue to explore innovative ways to reduce our carbon emissions. Specifically, we will be asking our pipe and chemical vendors to begin providing Cradle-to-Gate emissions factors for selected products and incorporate this practice into our bid evaluation.

Impact of engagement, including measures of success

As these efforts evolve and mature, we continue to assess how to best measure impact of such engagement, as well as expand our dialogue with suppliers. We hope to use the information collected from suppliers to both make more informed and responsible choices in procurement, as well as encourage our existing suppliers to reduce emissions.

Comment

None

C12.1b

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

Type of engagement

Education/information sharing

Details of engagement

Other, please specify (Engagement with customer on water efficiency, which reduces energy needed to treat and heat water)

% of customers by number

100

% of customer - related Scope 3 emissions as reported in C6.5

100

Portfolio coverage (total or outstanding)

<Not Applicable>

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

We are very aware of the relationship between volume of water used by our customers and climate change. The higher the volume of water demanded by our customers, the more energy we must use to treat and deliver it. Further, our customer often uses energy in the home to heat water for various purposes. Therefore, encouraging efficiency in water use achieves a dual purpose of conserving precious water resources and reducing climate change impact through energy use. While we do not explicitly make this connection to climate change to our customers in our communications, we believe the trend of American homes becoming more efficient with water usage is materially reducing the impact of inherently energy-intensive water utility operations.

Impact of engagement, including measures of success

There are several methods by which we engage customers on water efficiency. We operate an interactive website called aquawatersmart.com which allows customers to click on areas of a house, which displays various tips for conserving water. The user has the ability to share tips directly through social media and download various infographics. We also send tips and communications directly to customers by email and mail, including through our welcome kit brochure. We ensure customer portals provide tools and means by which customers can closely monitor their water usage. Additionally, we want to ensure we provide as much guidance and support as possible to economically distressed and low-income customers to reduce their bills through water efficiency, among other initiatives. We send an "eco-kit" to these customers which include an efficient showerhead as well as other materials that improve water usage in a home. We will also send water conservation tips to these customers. While it is difficult to isolate or quantify the exact impact of these initiatives (greater adoption of efficient appliances is a national trend we cannot credit solely to our engagement with customers), our customers are using less water per household, in line with trends other water utilities are seeing. We believe engagement of the customer by water utilities is a material driver of this change. Efficient water usage not only promotes water conservation, but also mitigates climate change impact through energy reduction relating to production at our facilities. These are both extremely important goals for our company.

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?

Trade associations

Funding research organizations

Other

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

National Association of Water Companies (NAWC), American Water Works Association(AWWA) and the Water Research Foundation (WRF)

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

Investment in Infrastructure to Support Climate Change Resilience: The Sooner We Act, The Lower The Cost And Risk. No other resource is likely to be more affected by climate change than water, as precipitation patterns change, sea levels rise, and water quality degrades. The nation's drinking water and wastewater infrastructure is already in need of significant investment to maintain current levels of service over the coming decades. Climate change will stress the system further. Adaptation approaches will in many cases require additional resources. Federal, state and local funding must continue to be directed to the Water Sector to adapt infrastructure and water supplies to climate change. Two principal goals for water and wastewater utilities regarding impacts due to climate change are: to assess risk and uncertainty due to climate change; and to develop and take actions to improve resiliency and sustainability in utility facilities and overall utility management. WEF Position Statement on Climate Change, Adopted by WEF Board of Trustees: February 5, 2010 AWWA Position Statement on Climate Change, Approved by the Board of Directors Jan. 17, 2010. Revised Jan. 19, 2014

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

We provide technical information and participate on various committees in AWWA and NAWC (i.e. AWWA Energy Committee) related to climate change and resiliency.

C12.3d

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

Yes

C12.3e

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

We engage with policy makers on climate-related issues. We are a heavily regulated company. As such, we routinely engage with elected representatives of the government, environmental regulators and policy makers, and local officials on climate-related issues. We encourage actions to combat climate change and both remind and educate others on the linkages between climate change and impacts on water supply.

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?

Our company's overall climate strategy is aligned with our government affairs activities. Given the limited size of our company, there is very close oversight of all our engagement with public officials by senior management. There are several members of senior management, listed and described in this questionnaire, that are responsible for climate change risk management and mitigation in addition to being involved in all government affairs policy-related decision making. This helps to ensure our company is consistent with respect to climate change and that our behaviors and actions are representative of this CDP climate change disclosure.

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

Other, please specify (2019 ESG Report)

Status

Underway – this is our first year

Attach the document

Page/Section reference

NA

Content elements

Governance

Emissions figures

Other metrics

Comment

Our previous Corporate Responsibility Report reported emission figures from 2017. Essential plans to issue a comprehensive updated ESG report including 2019 emission data which will mirror the data within this CDP submission.

C15. 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.

None

C15.1

(C15.1) Provide details for the person that has signed off (approved) your CDP climate change response.

	Job title	Corresponding job category
Row 1	Vice President, Chief Environmental Officer	Other C-Suite Officer

Submit your response

In which language are you submitting your response?

English

Please confirm how your response should be handled by CDP

	I am submitting to	Public or Non-Public Submission
I am submitting my response	Investors	Public

Please confirm below

I have read and accept the applicable Terms