

AGENDA

Denver Board of Water Commissioners

Denver Water Board Room, 1600 W 12th Avenue, Denver, Co 80204 and

Video Conference: <http://zoom.us/join>, Meeting ID: 882 3417 6376 - Passcode: 600590 or

Dial in (669) 900-6833 - Meeting ID: 882 3417 6376 - Passcode: 600590

Members of the public are welcome to attend either in person or by video conference

Wednesday, January 24, 2024 9:00 a.m.

I. INTRODUCTORY BUSINESS

A. Call to Order and Determination of Quorum

B. Public Comment and Communications

At this point in the agenda, the Board may allow members of the public to address the Board on any item of interest within the jurisdiction of the Board, and not on the agenda for action. Speakers wishing to address a specific Action Item will be invited to address the Board when the item is being considered. Three minutes are allowed for each person unless the President determines otherwise.

1. Distributor Communications
2. Citizen Advisory Committee Communications

C. Ceremonies, Awards, and Introductions

D. Executive Personnel Matter **Dominique Gómez**

E. Legislative Update **Andrew Hill**

II. ACTION ITEMS

A. Consent Items

Items listed below are considered routine and may be enacted by one motion and vote. If any Board member desires discussion beyond explanatory questions, or corrections to the Minutes, the President may order that item to be considered in a separate motion and vote.

1. Donation of Property at Gross Dam Road and Highway 72 to Colorado Department of Transportation – Contract 505926

Our vision is to sustain vibrant communities that value water for future generations.

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B. Individual Approval Items

- | | | |
|--|-----------------|------------|
| 1. WISE DIA Connection | Jessica Barbier | 10 minutes |
| a. WISE DIA Connection 18-inch Main from E 96th Ave to E 114th Avenue – Contract 505687 | | |
| b. South Adams County Water and Sanitation District WISE DIA Connection Cost Sharing Agreement for E-470 Crossing – Intergovernmental Agreement 505968 | | |

III. POLICY MATTERS

- | | | |
|-----------------------------------|-----------|------------|
| A. Sustainability Overview | Kate Taft | 30 minutes |
|-----------------------------------|-----------|------------|

IV. EXECUTIVE UPDATE

- A. CEO Update**
- B. CFO Update**
- C. Operations Update**

V. BRIEFING PAPERS & REPORTS

- A. Briefing Paper**
 - 1. Sustainability Overview
- B. Report**
 - 1. NTP Update
 - 2. Water Supply Update

VI. ADJOURNMENT

VII. TRUSTEE MATTERS

VIII. EXECUTIVE SESSION

The Board may adjourn the regular meeting and reconvene in executive session on topics authorized by D.R.M.C Sec. 2-34.

A. Confidential Report

DENVER BOARD OF WATER COMMISSIONERS

Meeting Date: January 24, 2024

Board Item: II-A-1

Donation of Property at Gross Dam Road and Highway 72 to Colorado Department of Transportation Contract 505926

Action by Consent

Individual Action

Purpose and Background:

The purposes of this Board item are to: 1) declare 0.803 acres of property acquired for the construction of intersection improvements at Colorado State Highway 72 and Gross Dam Road as surplus property; and 2) donate the property to Colorado Department of Transportation (CDOT) via Contract 505926.

In 2016, Denver Water staff began to identify areas of Gross Dam Road in need of improvements to accommodate construction traffic for the Gross Reservoir Expansion project. The intersection from Colorado State Highway 72 onto Gross Dam Road was identified as needing improvement due to the turn radius of the existing intersection not being sufficient for large construction vehicles. Denver Water staff worked with CDOT to identify a new intersection configuration and began the process to acquire property. Property approved by CDOT was acquired on February 16, 2022 from 2030 Investments, LLC. The new intersection was designed and constructed to CDOT's standards. CDOT has chosen to make the intersection improvements permanent, which is both a benefit to public safety and eliminates Denver Water's role to own and maintain the property acquired and the associated transportation improvements. CDOT has agreed to accept a Bargain and Sale Deed and own and operate this donated property and transportation improvements in perpetuity.

Budget and Schedule:

There is no budgetary impact for this item.

Recommendation:

Staff recommends that the Board declare 0.803 acres of surplus property as it is no longer needed for water works purposes and approve Contract 505926 to donate the surplus property to CDOT by the Bargain and Sale Deed.

Approvals

- | | |
|---|---|
| <input checked="" type="checkbox"/> Alan Salazar, CEO/Manager | <input type="checkbox"/> Brian D. Good, Chief Administrative Officer |
| <input type="checkbox"/> Julie Anderson, Chief of Staff | <input type="checkbox"/> Richard B. Marsicek, Chief Water Resource Strategy Officer |
| <input type="checkbox"/> Jessica R. Brody, General Counsel | <input checked="" type="checkbox"/> Robert J. Mahoney, Chief Engineering Officer |
| <input checked="" type="checkbox"/> Angela C. Bricmont, Chief Finance Officer | <input type="checkbox"/> Thomas J. Roode, Chief Operations Officer |

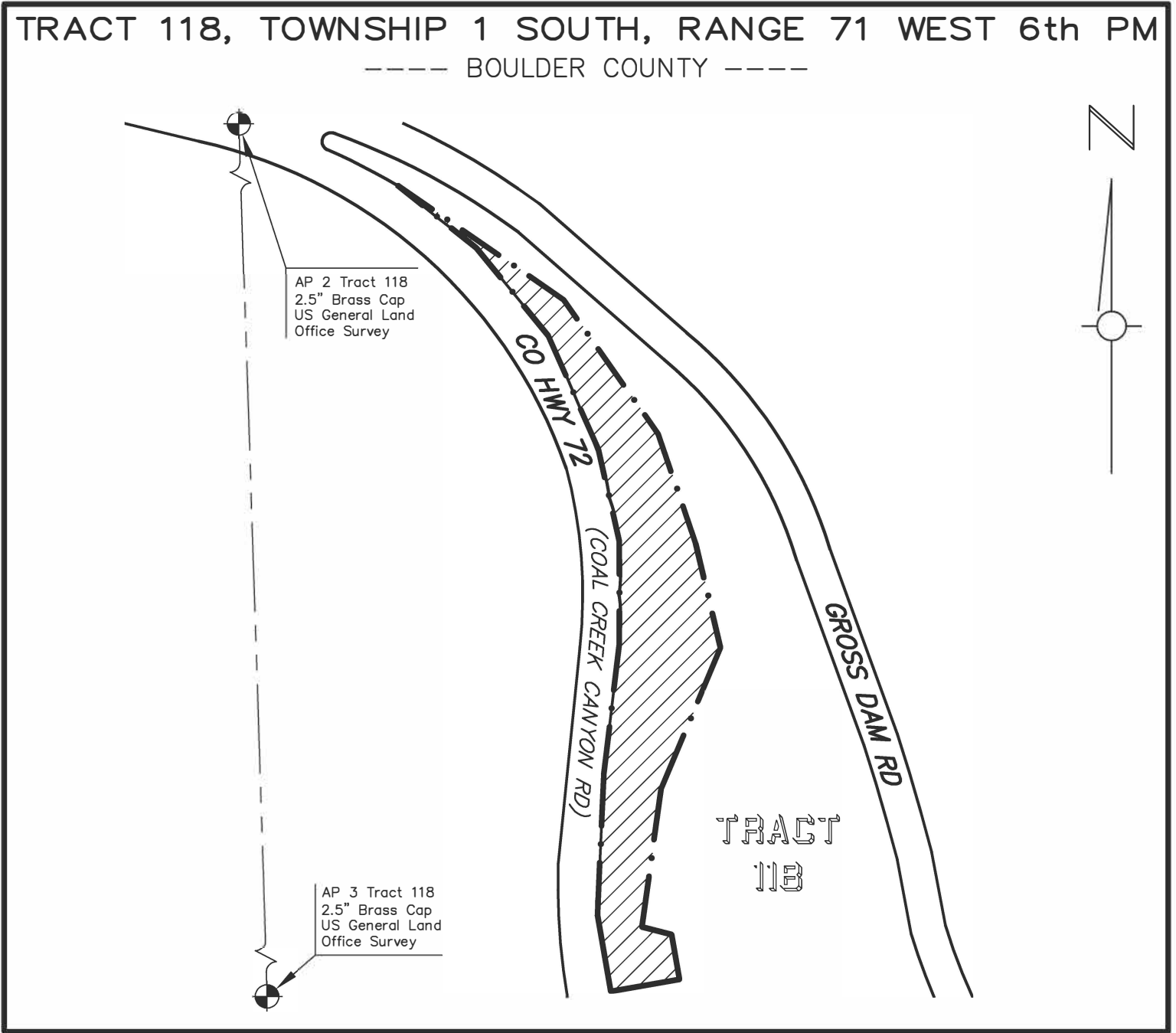
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TRACT 118, TOWNSHIP 1 SOUTH, RANGE 71 WEST 6th PM

----- BOULDER COUNTY -----



The property depicted and hatched above is no longer useful or required for present or future Water Works purposes, and it is recommended that this property be presented to the Board for consideration as surplus only.

Thomas J. Roode
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Thomas J. Roode
Chief of Operations and Maintenance Officer

Robert J. Mahoney
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Robert J. Mahoney
Chief Engineering Officer

Angela Bricmont
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Angela Bricmont
Chief Finance Officer

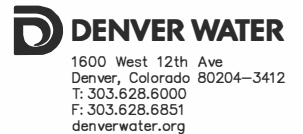
Jessica Brody
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Jessica Brody
General Counsel

Rick Marsicek
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Rick B. Marsicek
Chief of Resource Strategy

Brian Good
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Brian Good
Chief Administrative Officer

I agree with the staff recommendation and instruct that a board item be prepared and presented at the earliest possible regularly scheduled Board meeting, requesting surplus designation.

Julie Anderson
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Julie Anderson
CEO/Manger



DENVER BOARD OF WATER COMMISSIONERS

Meeting Date: January 24, 2024

Board Item: II-B-1-a

WISE DIA Connection 18-inch Main from E 96th Ave to E 114th Avenue Contract 505687

Action by Consent

Individual Action

Purpose and Background:

The purpose of this Board item is to approve Contract 505687 for the WISE DIA Connection, a six-mile, 18-inch pipeline and regulating facility. The DIA Connection project will construct infrastructure needed by the Water Infrastructure and Supply Efficiency (WISE) Partnership, which is a cooperative regional water supply project among Denver Water, the City of Aurora (Aurora), and the South Metro WISE Authority (South Metro). WISE incorporates excess capacity in existing infrastructure, and as-available, unused water supplies from Denver Water and Aurora to create a new sustainable water supply for South Metro. The DIA Connection is being constructed pursuant to the Amended and Restated WISE Water Delivery Agreement approved by the Board in December of 2013.

The DIA Connection will connect Denver Water's DIA infrastructure to Aurora's Prairie Waters system (raw water) at Prairie Waters Pump Station Number 2. The six-mile pipeline will help meet Denver Water's water delivery obligation pursuant to the Water Delivery Agreement. The new regulating facility, located at Aurora's pump station, will control mixing rates of the two water sources to maintain specific water quality parameters. Aurora will provide downstream treatment and delivery to South Metro.

South Adams County Water and Sanitation District (District) will share in the cost of the work within the E-470 Right of Way, as described in Intergovernmental Agreement 505968.

Budget and Schedule:

The total amount of this contract is \$13,718,378 and the term of the contract is January 24, 2024 through April 30, 2025. Funds for this contract will come from the 2024 budget for the WISE DIA Connection business unit, which has sufficient funds to pay the \$9,538,785 estimated to be needed in 2024. The remaining \$4,179,593 will be budgeted in year 2025.

Under the terms of the Cost Sharing IGA with the District, Contract 505968, \$998,857.50 of the construction costs will be reimbursed by the District. In accordance with the 2013 WISE Water Delivery Agreement, South Metro will reimburse Denver Water for 85% of the remaining \$12,719,520.50, leaving \$1,907,928.08 as Denver Water's responsibility.

Selection of Business Partner:

Denver Water solicited bids from eight general contractors listed on the prequalified contractors list for Civil Pipelines discipline. This contract was a restricted bid process using invitations to bid on the QuestCDN platform. On January 9, 2024, bids were received from five general contractors. JHL Constructors, Inc. was selected based on the lowest cost bid.

S/MWBE Information:

The Small Minority and Women-owned Business Enterprise goal established for this project is 5% participation. JHL Constructors, Inc. has proposed 5.6% participation.

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Recommendation:

Staff recommends that the Board approve Contract 505687 with JHL Constructors, Inc. for the WISE DIA Connection 18-inch Main from E 96th Ave to E 114th Ave project for the contract period January 24, 2024 through April 30, 2025 for a total contract amount not to exceed \$13,718,378.

Approvals

- | | |
|---|--|
| <input checked="" type="checkbox"/> Alan Salazar, CEO/Manager | <input type="checkbox"/> Brian D. Good, Chief Administrative Officer |
| <input type="checkbox"/> Julie Anderson, Chief of Staff | <input checked="" type="checkbox"/> Richard B. Marsicek, Chief Water Resource Strategy Officer |
| <input type="checkbox"/> Jessica R. Brody, General Counsel | <input checked="" type="checkbox"/> Robert J. Mahoney, Chief Engineering Officer |
| <input checked="" type="checkbox"/> Angela C. Bricmont, Chief Finance Officer | <input type="checkbox"/> Thomas J. Roode, Chief Operations Officer |

DENVER BOARD OF WATER COMMISSIONERS

Meeting Date: January 24, 2024

Board Item: II-B-1-b

South Adams County Water and Sanitation District WISE DIA Connection Cost Sharing Agreement for E-470 Crossing Intergovernmental Agreement 505968

Action by Consent

Individual Action

Purpose and Background:

The purpose of this Board item is to recommend approval of an Intergovernmental Agreement (IGA) with the South Adams County Water and Sanitation District (SACWSD), Agreement 505968 to cost share in a joint crossing of E-470 included in the WISE DIA Connection project, Contract 505687. As part of the plan review of Denver Water's application for a Commerce City Conditional Use Permit, SACWSD requested that Denver Water investigate a potential partnership to cross E-470. SACWSD needs a 16-inch diameter crossing in approximately the same location as Denver Water's 18-inch crossing. Denver Water's consultant concluded that enlarging the casing size to house both pipes would only marginally increase the tunnel cost. A 50/50 cost share of the tunnel will realize significant cost savings and, share the risk of the trenchless crossing.

This IGA is necessary to allow Denver Water to include the SACWSD scope in its construction contract, and to define cost sharing and invoicing procedures. SACWSD and Denver Water will share in the costs for the original tunnel design and the construction of the tunnel. SACWSD will pay the full costs to modify the original tunnel design and all costs to install their 16-inch pipeline beyond the tunnel casing. This IGA was approved by the SACWSD Board on January 10, 2024.

Budget and Schedule:

The total amount of this agreement to be paid by SACWSD to Denver Water will be determined after construction is complete and all costs have been assessed. The total receivable amount is anticipated to be approximately \$1,160,000 and includes construction costs, engineering costs, use taxes and permitting costs for the SACWSD scope. The term of the agreement is January 24, 2024 through April 30, 2033. No additional funds are needed for this IGA since SACWSD will be invoiced for these additional costs.

S/MWBE Information:

Small/Minority and Women-owned Business Enterprise goals are not applicable for this item since this Board item only involves execution of an IGA.

Recommendation:

Staff recommends that the Board approve IGA Agreement 505968 with SACWSD for cost sharing in the WISE DIA Connection crossing of E-470 for the Agreement period of January 24, 2024 through April 30, 2033 for a total receivable amount of approximately \$1,160,000.

Approvals

- | | |
|---|--|
| <input checked="" type="checkbox"/> Alan Salazar, CEO/Manager | <input type="checkbox"/> Brian D. Good, Chief Administrative Officer |
| <input type="checkbox"/> Julie Anderson, Chief of Staff | <input checked="" type="checkbox"/> Richard B. Marsicek, Chief Water Resource Strategy Officer |
| <input type="checkbox"/> Jessica R. Brody, General Counsel | <input checked="" type="checkbox"/> Robert J. Mahoney, Chief Engineering Officer |
| <input checked="" type="checkbox"/> Angela C. Bricmont, Chief Financial Officer | <input type="checkbox"/> Thomas J. Roode, Chief Operations Officer |

Denver Water aspires to be the best water utility in the nation.

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Briefing Paper for Sustainability 2024 Business Model and Policy Discussions

Introduction

Denver Water is committed to continuously improving operations while remaining responsible stewards of the natural environment and contributing to a vibrant community. “Sustainability” at Denver Water is defined as any effort or improvement that allows for a better and longer existence of operations. In other words, sustainability is any change that makes systems more efficient, resilient, or healthier for ecosystems, staff, and the community. As the Board considers a variety of policy decisions in 2024, the lens of sustainability supports those decisions and helps define *how* the organization will accomplish them.

Denver Water’s mission is inextricably linked to the environment. Nature, via precipitation (currently, 80% snow), provides the water supply that is purified and delivered to customers, and which supports 25% of Colorado’s economy. Healthy and productive watersheds are arguably Denver Water’s largest asset and remarkable steps have been taken over the past few years to protect them. In addition, climate change has shifted, and is predicted to continue shifting, how and when precipitation falls within those watersheds. The changing climate is also creating more unpredictability with the electricity grid. Climate extremes will require more energy to heat and cool homes, further stressing the same grid needed to treat and pump water. This uncertainty and dependency on finite energy resources make it difficult to predict energy reliability and anticipate long-term energy costs.

The most recent Intergovernmental Panel on Climate Change (IPCC) report warns that global greenhouse gas (GHG) emissions need to be reduced drastically (45% from 2010 levels) to keep warming within a 1.5 degrees Celsius target. IPCC states that this action needs to take place before 2030 and that net-zero emissions needs to be achieved by 2050.

While Denver Water is not currently subject to any regulatory requirements related to sustainability, the U.S. Securities and Exchange Commission has proposed rule changes that would require public companies to report GHG emissions and other operational climate change risks. There is potential for similar requirements to become standard for all businesses in the future, particularly those, like Denver Water, that regularly access the bond market.

In the absence of significant action from governments across the globe, individuals and companies are taking the lead to combat climate change and decrease GHG emissions. Denver Water employees are currently participating in a greenhouse gas reduction cohort in which many utilities are sharing goals of reaching carbon neutrality between 2030 and 2050. Some of those goals, as well as goals from other peers, are shown in Table 1:

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Entity	Metric	Target Year
Seattle Public Utilities	Carbon Neutrality	2030
Metropolitan Water District of Southern California	GHG 40% below 1990 Carbon Neutrality	2030 2045
East Bay Municipal Utility District	Carbon Neutrality	2030
Los Angeles County Sanitation District	Carbon Neutrality	2021✓
Sonoma Water	Carbon-Free Water	2015✓
District of Columbia Water	GHG 50% below 2006 Carbon Neutrality	2032 2050
Melbourne Water	Reduce GHG 50% Net-Zero Emissions	2025 2030
Xcel Energy	80% Carbon-Free Electricity 100% Carbon-Free Electricity	2030 2050
City and County of Denver	Reduce GHG 40% Reduce GHG 65% Reduce GHG 100% 100% Renewable Electricity	2025 2030 2040 2030
State of Colorado	GHG 26% below 2005 GHG 50% below 2005 GHG 100% below 2005	2025 2030 2050
White House	GHG 52% below 2005 100% Carbon-Free Electricity Net-Zero Emissions Economy	2030 2035 2050

Table 1: Greenhouse Gas and Carbon-Reduction Goals of Peers and Other Entities

Without standardized regulatory requirements, entities are defining goals in a myriad of ways. These goals use different terms, sometimes interchangeably, and are not always defined the same way:

- **“Net-zero emissions”** has been used in more than one way. Overall, the term is used to describe the physical science of capturing emissions to negate emissions being produced. Sometimes only carbon emissions are included in this definition, while other entities use the term to include all emissions (see below).
- **“Net-negative emissions”** means that more emissions are removed from the atmosphere by an organization than what that organization emits. This can be achieved by reducing greenhouse gas emissions to as close to zero as possible and then removing more than the remaining

operational emissions. Removing emissions is typically done through one of three currently available pathways: nature-based solutions, enhanced natural processes, or technology solutions.

- **“Carbon neutral”** allows the purchase of carbon credits to offset the emissions being produced. This doesn’t physically remove any emissions from the environment; it is a cap-and-trade program.
- **“Carbon zero”** refers to the ability to run operations without creating any emissions. Whether or not an organization defines these terms to include only carbon emissions, or all emissions, is inconsistent.
- **“Social Cost of Carbon”** (SCC) is an estimate, in dollars, of the economic damage that would result from emitting one additional ton of carbon dioxide into the atmosphere. The federal estimate is currently \$51 per ton, but new studies suggest it is closer to \$185 per ton.

At Denver Water, the Sustainability team uses the term “carbon zero” to represent no net release of any emissions into the atmosphere. And “net-zero” or “net-negative” are used to include all GHG emissions as well, not just carbon. This language is standardized in Denver Water’s Sustainability Guide as well as the draft Carbon Strategy.

Denver Water Overview / History

Denver Water’s history of stewardship goes back more than 100 years, and the organization is seen as a leader in many areas, including sustainability. From installation of hydroelectric power generating turbines, to building a recycled water treatment plant, to the From Forests to Faucets program, Denver Water leads by doing what is right. Staff participate in trials with emerging technology, such as piloting hydrokinetic turbines in the South Boulder Canal. And in recent years, the team has taken design standards to the highest level of environmental and energy efficiency at the Operations Complex and Northwater Treatment Plant.

Since 2008, Denver Water has voluntarily calculated and reported an annual Greenhouse Gas Inventory of operational emission contributions to the environment. This GHG Inventory is submitted to the Climate Registry, a nonprofit collaboration among North American entities that sets consistent standards to calculate, verify, and publicly report greenhouse gas emissions into a single registry.

The GHG Inventory calculates carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and other ‘fugitive’ emission sources of sulfur hexafluoride (SF₆), and refrigerants (HFCs) R134, R134a, 404A and 410B as metric tons of CO₂ equivalent (mtCO₂e). There are three categories of emissions:

- Scope 1 emissions are direct GHG emissions that occur from sources that are controlled or owned by Denver Water (e.g. combustion of natural gas, vehicle petroleum, and other fuels.)
- Scope 2 emissions are indirect GHG emissions calculated from the purchase of electricity, steam, heat, or cooling.
- Scope 3 emissions are produced by assets not owned or controlled by the organization (e.g. manufacturing, shipping, or hauling). Denver Water does not currently report Scope 3 emissions, though it is a possible future addition.

Operational GHG emissions have trended down over the last 15 years, and Denver Water's current internal goal is to reach 24,400 mtCO₂e in 2025, a 50% reduction from the 2015 baseline (see attachments). While the decreasing trend is encouraging, much of the progress is due to the improvement of the emissions factor (EF) of the Western Electric Coordinating Council and Xcel Energy. Renewable energy will continue to be added to the grid and improve the EF, but much more can be done to reduce other Denver Water emissions to zero or reach net-negative.

In August of 2023, Denver Water held a week-long Sustainability Value Stream Assessment with participants from all areas of operations. The goal was to integrate additional efforts across the organization to reduce energy use. The event identified improvements that, once implemented, are estimated to save Denver Water 1-2 million KWh of electricity per year. This is the equivalent to 100-200 US households' entire annual electricity use.

Denver Water's Sustainability Guide (attached) was published in 2017 and refreshed in 2021. It was developed with input from teams across the organization regarding existing sustainability efforts to document sustainability improvements and set targets for all areas of the operation. These improvements are organized into goals, standards, and commitments. Goals have measurable metrics and target dates for completion. Standards follow an internal or external policy or guiding document. And commitments are industry best practices that contribute to efficiency. These goals and practices were designed to integrate sustainable thinking throughout operations and reduce GHG emissions. The Sustainability Guide was endorsed by the Board of Commissioners in 2018. Concepts from the guide have been incorporated into Denver Water's Engineering Standards and Capital Project Construction Standards.

While significant progress has been made over the past few years, staff has identified two significant gaps in Denver Water's sustainability strategy. First, while the original Sustainability Guide was "endorsed" by the Board, the goals contained therein have never been formally adopted as Board Policy. Most employees know about them, but they are not always utilized. A potential solution to this is adoption of the guide and its goals through a Board resolution.

Second, Denver Water does not have a formal carbon-reduction goal. The Sustainability team developed the first draft of a Carbon Strategy to guide Denver Water. This strategy gives an overview of the current carbon footprint and lays out pathways to reach carbon zero and/or net-negative carbon. This draft strategy was presented to the Executive Team and the Board in 2023. Having a clear carbon-reduction goal would lead to other subgoals necessary to reduce Denver Water's environmental impact, stabilize energy costs, and create better energy resiliency.

Policy Questions Staff has identified the following policy questions for the Board's consideration:

1. Should Denver Water formally adopt a carbon-reduction goal?
 - a. If yes, what should the timeline be?
 - b. If yes, what should the metric be (net-negative, carbon-neutral, carbon zero)?
2. Should Denver Water formally adopt some or all the goals, standards and commitments listed in the Sustainability Guide? The guide covers energy and transportation, land and ecosystems, materials and waste, people and infrastructure/assets. A commitment to these areas would result in goals being incorporated into all aspects of Denver Water operations, resulting in faster and consistent progress.
3. As the Board reviews other strategic topics and considers other policy questions, how should a sustainability lens be applied?

Alternatives

There are two alternatives to net-negative carbon emissions presented in the draft Carbon Strategy. Both strategies take similar steps to zero emissions but involve different timelines.

Scenario 1 is the current path. If Denver Water does no more than what is currently committed to in goals and operations, it is estimated that the organization will arrive at net-zero carbon in 2050 with the following assumptions:

- Add 1 MW of renewable energy behind the meter every 5 years.
- Replace fleet vehicles with electric alternatives when available. The fleet would be 50% electric by 2040.
- Reduce natural gas use by 10% annually starting in 2030.
- All renewable energy generation (hydro and solar) moved behind the meter, to be used before any excess power is sent to the grid.
- Xcel meets its goal of zero carbon emissions in 2050.
- Colorado meets its 2050 goal of 90% emission reduction by 2050.
- The current financial plan contains investments needed to reach net-zero carbon by 2050 (e.g., annual fleet replacements, planned hydro improvements, facilities upgrades).
- Reduced energy and fuel costs as new renewables come online.
- There is no net impact on the current financial plan.

Scenario 2 presents a more aggressive approach that would take a concerted effort to reach net-zero carbon in 2040, ten years earlier. In this scenario, Denver Water's emission-reduction efforts would significantly change with increased funding and changes to operations. This scenario assumes:

- Aggressive adoption of renewable energy, fleet electrification, facility electrification, and carbon sequestration.
- Renewable energy installations increase to 1MW installed every year, until net-zero is reached.
- Fleet (passenger cars and light-duty trucks) would be 100% electric by 2040.
- Reduce natural gas use by 10% annually starting in 2025.
- Meet new facility energy efficiency standards including electrification.
- Find alternative for SF6 gas in transformers and replace by 2035.
- Direct carbon removal plan implemented by 2030.
- Xcel meets its goal of zero carbon emissions in 2050.

- Colorado meets its 2050 goal of 90% emission reduction by 2050.
- Reduced energy and fuel costs as new renewables come online.
- Not all renewables have the same capital and operating costs. For the purposes of the cost analysis, staff used a new, 28 MW portfolio of 65% solar, 35% wind and 5% hydro power.

Highlights of the 2025-2050 analysis include:

Total Capital Costs	Total Operating Costs	Operating Savings
\$52,309,238	\$64,230,513	\$111,997,303

In this scenario, while carbon neutrality is achieved in 2040, operating savings would not exceed costs until after 2050.

Staff ran another analysis, which used the same capital investment in renewable energy but accelerated even further, finishing those investments by 2030.

Total Capital Costs	Total Operating Costs	Operating Savings
\$52,309,238	\$36,739,591	\$142,340,405

In this case, operating savings would exceed costs in 2042. The analysis demonstrates that earlier investments result in a longer period of less energy purchased from utility providers, more years of cost savings, and a faster payoff. It is important to note that this extra analysis was just for renewable energy and does not change any other assumptions in Scenario 2 regarding the timing of fleet electrification or reduction of natural gas use.

Denver Water's Rates Team has determined that neither timeline for Scenario 2 investments would, by itself, require an increase in rate revenue.

Attachments

Sustainability Guide

Carbon Strategy (draft)

Respectfully submitted,

Kate Taft, Sustainability Manager

Brian Good, Chief Administrative Officer



DENVER WATER

PLANNING FOR OUR FUTURE



SUSTAINABILITY GUIDE
2021-2025

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- 12 Where are We Now?
- 14 Key to Our Future

WATER

Water Use | Water Supply | Water Quality and Treatment

ENERGY AND TRANSPORTATION

Energy Use and Supply | Transportation

LAND AND ECOSYSTEMS

Land Use and Ecosystem Stewardship

MATERIALS

Materials Management | Procurement

DENVER WATER PEOPLE

Inspired People

INFRASTRUCTURE AND ASSETS

Built Environment and Operations | Assets

- 21 Implementation and Reporting

Sustainability is at the heart of everything Denver Water does. It has been our responsibility to sustain the growth, development, and economic, social and physical health of the Denver-metro area for more than 100 years. To meet this challenge, we developed and sustained a vast, complex water infrastructure system that reaches Denver from the heart of Colorado's forests and mountains.

However, the concept of sustainability involves more than developing and maintaining our water supply system and delivering safe drinking water to our customers. As we look forward to our next 100 years, we face numerous challenges that merit rethinking and expanding what the term sustainability means to us. We will be increasingly challenged by climate change, regulatory uncertainty, economic and social changes, natural and perhaps manmade disasters, and other unknown events. In 2020, we learned just how unexpected some challenges can be, as the COVID-19 pandemic fundamentally changed how we operate on a day-to-day basis while we continued delivering safe water to our customers.

We have updated our Sustainability Plan since its initial rollout in 2016. The newest plan continues to represent the evolution of Denver Water's sustainability ethic and details how we will integrate it into our business operations. Since our inaugural plan, we have made important progress in reducing our dependence on fossil fuel, increasing our own inventory of renewable energy sources, limiting waste, and reducing the energy we require to operate across the organization. Few achievements represent this progress better than the redevelopment of our 35-acre Operations Complex, now a Colorado showcase for sustainability and innovative design.

Sustainability for the next 100 years will require continued reinvention, resilience and adaptability in everything we do. It means long-range planning based on uncertainty. It means ensuring that the development and collection of water supplies do not degrade aquatic habitats, and partnering with the federal government, private landowners and other stakeholders to protect the ecological health of watersheds that supply our water.

It means developing and protecting flows in the urban reach of the South Platte River. It means working to protect and enhance the High Line Canal as an ecological and recreational resource for the metro area. It means promoting the most efficient use of water throughout our service area, including expanding the use of nonpotable water. It means partnering with our neighbors regionally to achieve better management of water resources. It means scaling our systems to allow for nimble and flexible operations in an era of climate change and extreme patterns of rainfall and drought.

It means protecting the security of our infrastructure and facilities, and being prepared for emergencies. And it means operating our infrastructure, facilities and buildings in ways that demonstrate the most efficient water uses, that generate the most and use the least amount of energy, and that promote the health and wellbeing of our employees.

Given this expanded ethic of sustainability, we will develop and implement this updated plan as a further commitment not only to today's customers, but also to our customers over the next 100 years and beyond. We have much work to do. This plan will guide us in implementing the best industry-leading practices in our operations. It will keep us accountable to our commitment to sustainability and will be a critical tool in our journey to becoming the best water utility in the nation.



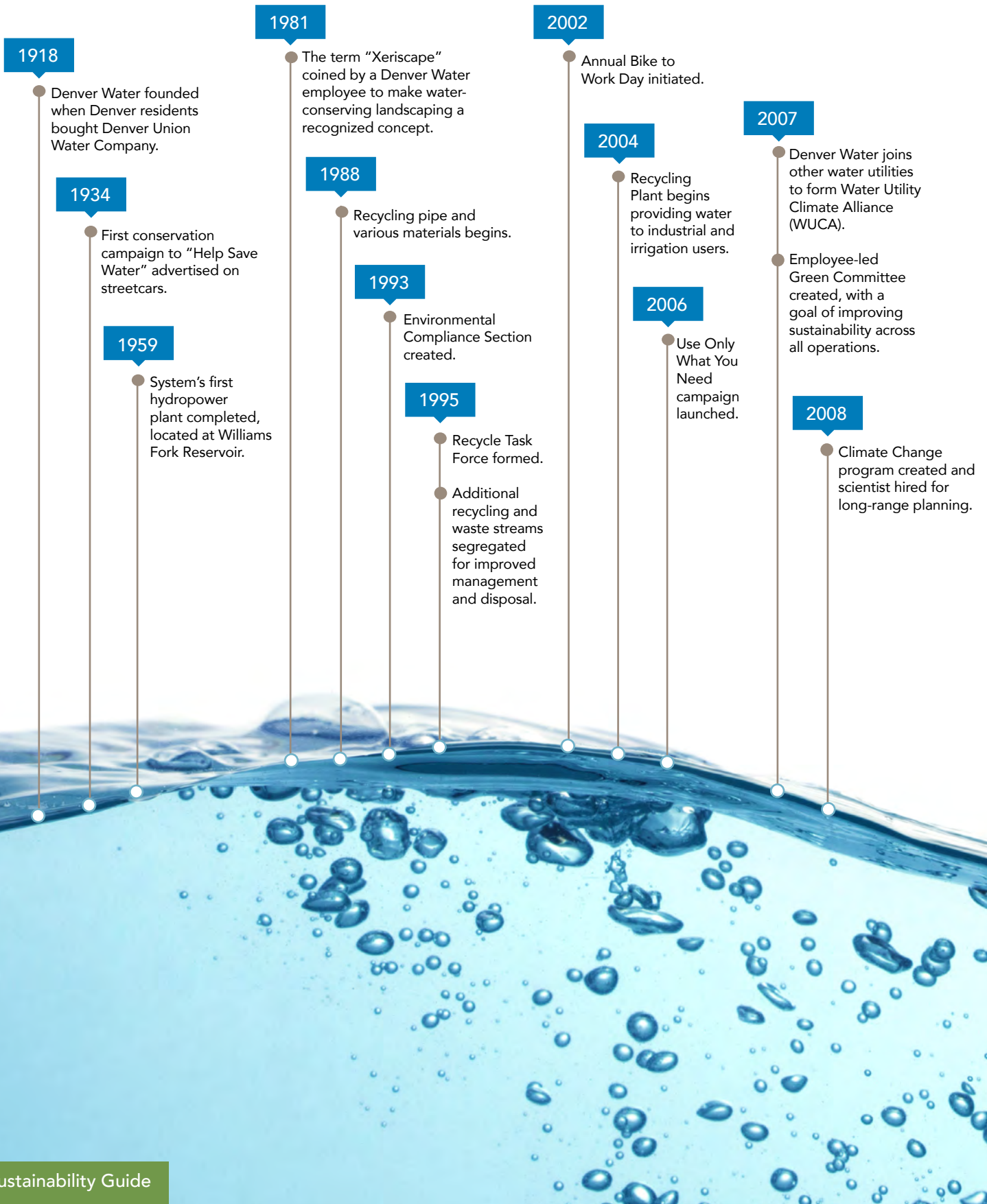
Gary M. Reiff, President, Board of Water Commissioners



James S. Lochhead, CEO/Manager

Our Sustainability Timeline

Denver Water's efforts in sustainability and stewardship



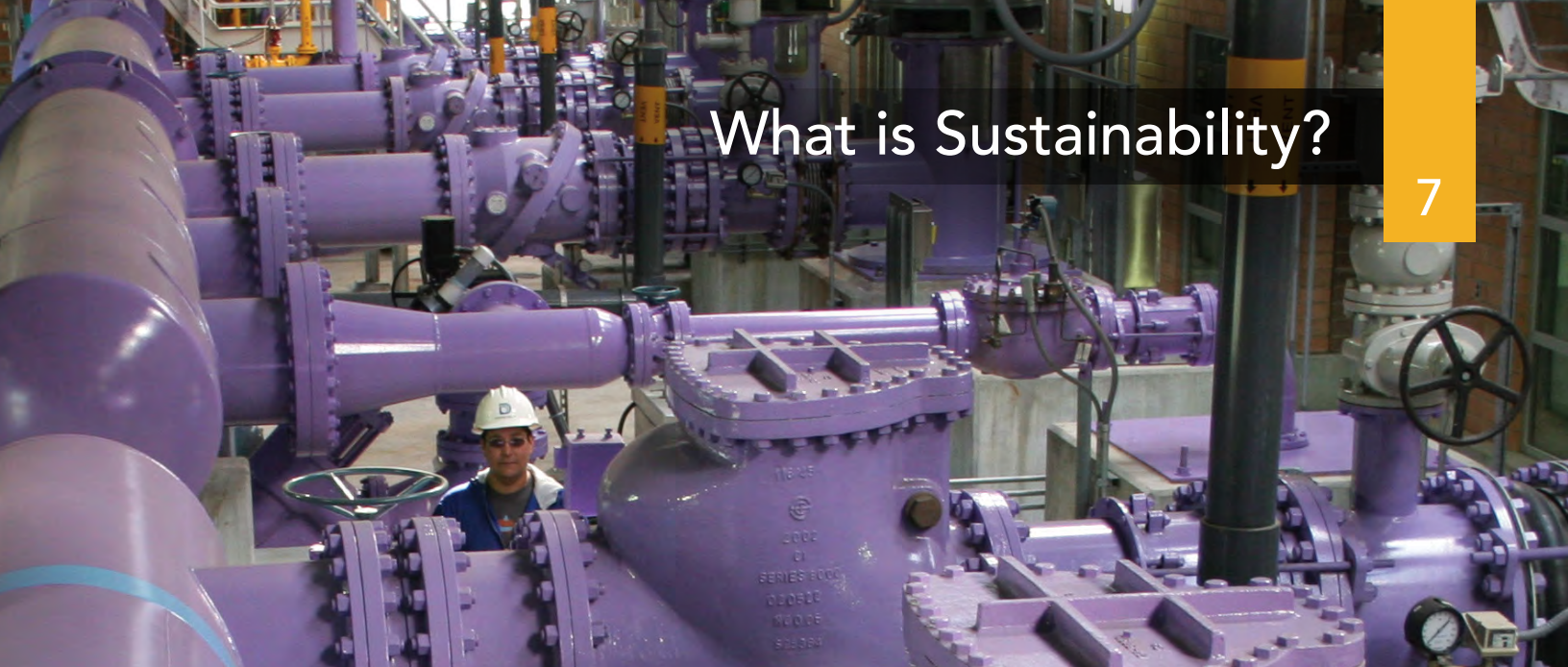
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- 2009**
- Regional Transportation District bus and light rail passes issued to staff.
 - Carpool intranet page initiated.
- 2010**
- First annual greenhouse gas inventory completed.
- 2011**
- Sustainability incorporated into Strategic Plan.
- 2012**
- Colorado River Cooperative Agreement (CRCA) completed with West Slope entities.
- 2014**
- Colorado River System Conservation Agreement (CRSCA) completed.
- 2015**
- Regional Transportation District and staff increase bus access to Operations Complex.
- 2016**
- Sustainability manager hired.
 - Compost introduced at Denver Water facilities.
 - GoTober commuting challenge and carpooling incentives initiated.
- 2017**
- Energy analyst and sustainability program assistant hired.
 - Hydropower research pilot begins testing an array of 10 turbines along South Boulder Canal.
 - Compost introduced at treatment plants and remaining Operations Complex facilities.
 - First Sustainability Guide published.
 - Green bonds developed and released to strengthen stewardship and partnerships.
- 2019**
- Net-zero energy Administration Building constructed with highly efficient design and 1.3 megawatts of onsite solar.
- 2020**
- Denver Water facilities are awarded Gold status in the Colorado Environmental Leadership Program.
 - Operations Complex Redevelopment completed as a LEED-certified campus.

Environmental Stewardship

Denver Water serves one-quarter of the state's population with less than 2% of all water used in the state. And Colorado's population is expected to nearly double by 2050. Everyone is starting to think about resources, and Denver Water wants to continue to lead the industry and the community with best practices.

Denver Water has taken a leadership role in understanding and promoting sustainability. Our Environmental Stewardship Statement identifies our guiding principles for environmental stewardship and sustainability:

- **Best Practices and Compliance with Environmental Requirements** – Denver Water will comply with all applicable environmental laws, regulations and standards, and will develop and adhere to environmental best practices and performance standards in order to achieve environmental sustainability beyond minimum legal requirements.
- **Leading by Example** – Denver Water will be a leader and engage with environmental communities, government, industry and academic research agencies in order to learn and further develop our environmental stewardship programs and share our experience and expertise. We will develop progressive positions on evolving environmental issues impacting the interests of the organization and our customers.
- **Healthy Built Environment** – Denver Water is committed to workforce safety, health, wellness, and quality of work-life through buildings and grounds integrated with the natural environment and promotion of indoor environmental quality.
- **Responsible Operations** – Denver Water is committed to the responsible management and sustainable growth and operation of all our assets, including land, forest, water and other natural resources in our control. We recognize the impacts to the environment from our operations and will take active measures to minimize this footprint. Denver Water will continue to improve environmental best practice standards and will include such standards in procurement and contract processes. Employees will work to recognize and resolve environmental impacts within Denver Water facilities, operations and policies.
- **Waste Diversion and Pollution Prevention** – Denver Water is steadfast in our commitment to responsible solid and electronic waste management. This includes reuse, recycling and compost programs, and the careful and proper use, tracking, storage and disposal of hazardous materials.
- **Climate Adaptation and Mitigation** – Denver Water is a nationally recognized leader in understanding and preparing for the complex challenges of climate change. A multi-faceted approach focuses on partnerships, knowledge generation and transfer, research, long-range planning, and operationalizing adaptation practices across the organization. Denver Water will minimize our own climate impacts by measuring and tracking goals for the reduction of climate changing emissions, including updating an annual greenhouse gas inventory and incorporating climate adaptation and mitigation into current and future operations, plans and policies.
- **Environmental Management System** – Annually, with internal and external stakeholder input, the Environmental Compliance Section will review the Environmental Management System and Denver Water's compliance. The review will assess existing environmental objectives, performance standards and best practices. Based on review, the section will make updates and recommend changes in Denver Water's operations to achieve better performance.
- **Environmental Education and Awareness** – Employee training will include a review of the commitments, related policies, introduction to the Environmental Management System and best sustainability practices.



Who Are We?

As a major water provider in the West, Denver Water views itself as having a special responsibility to the environment. It is a responsibility we take very seriously. We incorporate it into both our strategic thinking and daily operations.

We view ourselves as stewards of the environment. It is an ethic and value that runs deep in our organization. It is inherent in everything we do because our infrastructure is not just our pipes and reservoirs – it is also millions of acres of Colorado forests and thousands of miles of rivers and streams.

Our environmental commitment also stems from the preciousness of the resource with which we work. Water is essential to making Colorado beautiful and to ensuring the quality of life we enjoy. Yet it is scarce in our state. And demands for it are intensifying.

With that understanding, Denver Water's highest responsibility remains to serve 1.5 million people today and a growing population in the future. We strive to do so while minimizing our environmental footprint and working collaboratively with our neighbors to protect and enhance supplies for agriculture, riparian habitat, stream health and many other needs.

Denver Water is committed to continuously improving our operations while remaining responsible stewards of our natural environment and contributing to a vibrant community.

Sustainability in Denver Water operations is any effort or improvement that allows for a better and longer existence. In other words, sustainability is any change in any employee's workday that makes our systems more efficient and healthier for our ecosystems, our staff and the community.



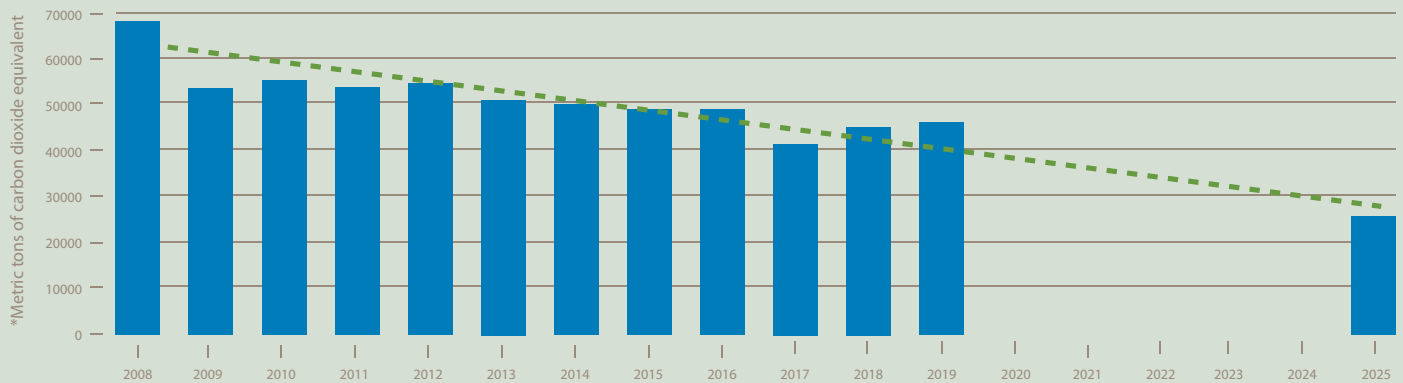
Sustainability Program and Greenhouse Gas Inventory

Every Denver Water employee makes decisions that have environmental, social and financial impacts. In 2016 Denver Water hired a sustainability manager to internalize, systemize and track sustainability within our operations. Developing a Sustainability Program with high-level sustainability strategies and goals for the organization provides clear direction to employees and supports sustainability in their everyday work responsibilities.

In 2017, a sustainability program assistant and energy management analyst joined the team to support education and outreach to staff and improve the metrics and reporting of operational utility consumption and waste streams.

Denver Water participates with the Climate Registry, a nonprofit collaboration among North American entities that sets consistent standards to calculate, verify and publicly report greenhouse gas emissions into a single registry. Since 2008, we have been tracking and reporting our greenhouse gas footprint so we can find ways to reduce our impact.

DENVER WATER GREENHOUSE GAS INVENTORY



*Metric tons of carbon dioxide equivalent is a measure used to calculate the global warming potential of greenhouse gases.



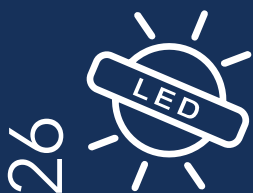
Environmental Compliance and Environmental Management System

The Environmental Compliance Section at Denver Water is responsible for organization-wide adherence to air, water and environmental regulations, safe waste recycling and disposal, and required inspections. This team visits Denver Water facilities and sites and meets with operational teams to develop standard operating procedures.

An Environmental Management System, implemented by our Environmental Compliance team, manages environmental commitments and obligations at Denver Water. This system inventories the aspects and environmental impacts of our operations to ensure they are being effectively controlled.

Both the Environmental Management System and the Sustainability Guide serve as a gap analysis to identify all our impacts and best practices, and what areas we still must cover.

Environmental Management System (EMS) 2019 Highlights



26
Percent reduction in energy usage due to LED lighting retrofits at 11 facilities.



12,648
Pounds of metal returned to manufacturer for processing into new meters.



100
Gallons of glyphosate weed killer eliminated.



194
Pounds of oil-based paint recycled.

Climate Change Planning and Integrated Resource Plan

Climate change is a new and complex challenge for water utilities. There is a wide range of future climate predictions for Colorado, which makes supply planning difficult. Yet Denver Water is a leader in addressing and incorporating climate change. In 2008, Denver Water hired a climate scientist and brought climate change into resource planning. We are working with national climate agencies and universities to best understand how climate conditions may change in our area. We also are promoting the need for better science, and better modeling and uncertainty planning, in order to meet the needs of water providers.

In preparing for multiple scenarios in our Integrated Resource Plan, we continue to build a resilient system that ensures service of a reliable supply of high-quality water to our customers. Our new Integrated Resource Plan details the possible water-system effects of climate change and will help us decide on future water supply projects. We will use the plan to guide our decisions related to our water system over the next 50 years.

Green Committee

Denver Water has always had passionate employees, and years prior to the Sustainability Program, a volunteer committee came together to focus on environmental and sustainable improvements at Denver Water. The Green Committee inspires environmentally responsible behavior, stewardship and sustainability in the lives of employees through education, outreach and advocacy in order to build a strong and connected community. The Green Committee also partners with the Sustainability Program to support best practices and improvements across the organization.



Operations Complex Redevelopment project

At Denver Water, we know our operations are inextricably linked to the environment. We take this responsibility very seriously and designed our new Operations Complex with resource efficiency and environmental health as priorities.

The fleet services, warehouse, trades and meter shop facilities were completed in summer 2017. The Administration Building and parking garage were completed in 2019, followed by the final conversion of a historic pump station into a conference center and renovation of campus landscaping in 2020.

Sustainable building features include:



Natural daylighting in all buildings through large windows and skylights.

100% LED lighting with daylight harvesting.



Passive treatment of stormwater through rain gardens and detention ponds.



Robust building envelopes that include triple-pane glass and extra insulation.



Radiant heating and cooling from a central utility plant that uses water from a large water pipeline for preheating and precooling (similar to geothermal).



Automatic window blinds in the Administration Building for heat and glare control.



Centralized waste for garbage, recycling and compost.



Controlled outlets in nonoperations buildings that turn off computer monitors and other unneeded equipment when the space is not occupied.



Rainwater capture for irrigation.

NET-ZERO ENERGY

for the Administration Building (offset with 1.3 megawatts of onsite solar).



Blackwater capture with onsite treatment and reuse for toilet flushing and irrigation.

Where Are We Now?

12

Sustainability is not new to Denver Water. Even if it were not always known by that name, stewardship of the environment, extensive financial and future planning, and focus on the welfare of both employees and customers have always been priorities in our goal of becoming the best water utility in the nation.

The following goals have been met for the organization:

Water

- Water reuse and the concept of One Water is integral to Denver Water operations, including recycled water options for customers and an onsite blackwater treatment system at the main Operations Complex.
- Organizational water usage is reported against site budgets, which are set based on facility and grounds size, occupants and use type.
- All major irrigated sites on Denver Water property have central control systems.

Energy

- Organizational energy portfolio is tracked and reported continually, with a goal of continued energy neutrality.
- Renewable energy, including hydroelectric generation and solar photovoltaic systems, is in place at nine sites, with 26.5 megawatts of capacity and average production of 60,000 MWh.
- Innovative efficiency systems, including thermal heat recovery at the main Operations Complex, are used to drive down demand.
- Treatment plants continue to adjust operating hours and processes to conserve energy when possible.

Land Use and Ecosystems

- Denver Water supports the Coalition for Upper South Platte in its planning and restoration of Horse Creek to reduce sediment loading into the Strontia Springs Reservoir by 50,000 tons per year.
- The From Forests to Faucets partnership with the U.S. Forest Service includes fuels reduction, restoration and wildfire prevention projects in priority watersheds.
- For more than 30 years, Denver Water's partnership with the Colorado State Forest Service has helped maintain the health and resiliency of forests on Denver Water properties.

Materials

- Denver Water works to close loops and divert waste continuously, including providing shred bins for direct paper recycling, returning waste material to manufacturer for reuse when possible, and donating electronics before recycling.
- Road base material used to access Denver Water's raw water collection system is reused by the U.S. Forest Service, reducing landfill waste.
- Compost and recycling bins are located throughout facilities, where hauling is available, reducing landfill waste.

People

- Denver Water supports employee committees that focus on inclusivity, wellness, and environmental activism.
- Denver Water's smoke-free campus includes smoking cessation programming at all facilities.
- Employees receive a transit pass to encourage alternative transportation opportunities.

Infrastructure and Assets

- All operating facilities are recognized with Gold status in the Colorado Department of Public Health and Environment's Environmental Leadership Program.
- Organizational green cleaning standards have been developed for all facilities.
- Sustainability goals, standards, and commitments were integrated into Denver Water's Engineering Standards and Capital Project Construction Standards.



Planning For Our Future

We are proud of the innovation, determination and environmental consideration that Denver Water has always led with, but we know that there are always improvements to be made. In the pages that follow, we chart our course and lay out a set of stretch goals, standards and commitments we aspire to. This is an inventory and overview of the best practices Denver Water operates within. It showcases both our successes and trials at advancement. We have analyzed and scrutinized projections for sustaining our operations into the future, with our customers and the environment at the forefront of this planning. As we work toward these goals with our commitments and standards, we will see areas for improvement that will become new goals.

Framework

This document includes Denver Water's best practices and commitments, broken into six resource areas. Many times, these best practices create positive change in more than one resource area. In order to reach the goals, standards and commitments have been established and will be quantified.

Goal: A goal is a metric set for improvement that is both tracked and reported. Goals are organization-wide resource reductions with measurable metrics.

"Increase Denver Water energy portfolio by one megawatt of renewable energy by 2025."

Standard: A standard is an internal policy, a third-party standard or a guiding document that goes above and beyond standard work. Standards are organization-wide standards that govern our operations.

"Develop policy with regional and state agencies that allows and encourages 'One Water' implementation."

Commitment: A commitment is a best practice that contributes to efficiency or resource conservation.

"Account for value of sustainability in scoring procurement proposals (RFPs)."

Key to Our Future

WATER



WATER USE



WATER SUPPLY



WATER QUALITY AND TREATMENT

ENERGY AND TRANSPORTATION



ENERGY USE AND SUPPLY



TRANSPORTATION

LAND AND ECOSYSTEMS



LAND USE AND ECOSYSTEM STEWARDSHIP

MATERIALS



MATERIALS MANAGEMENT



PROCUREMENT

DENVER WATER PEOPLE



INSPIRED PEOPLE

INFRASTRUCTURE AND ASSETS



BUILT ENVIRONMENT AND OPERATIONS



ASSETS

Water

Creating a culture of conservation in Denver dates back to 1936 when Denver Water put messaging on street trolleys to educate the community about saving water. The modes of transportation have changed, but the message remains the same, as does our operational commitment to using this precious resource wisely. Denver Water ensures a continuous supply of water to 25% of Colorado's population with only 2% of the state's water supply. We continue to explore further conservation opportunities through technical, policy and behavioral adaptation.



WATER USE

Goals:

- Reduce Denver Water facility irrigation by meeting LEED standards for low water use by 2025.
- Reduce Denver Water facility water use by meeting LEED fixture standards by 2025.

Commitments:

- Include water-saving fixtures and applicable irrigation controls on all new construction and renovation.
- Continuously improve water budget and reporting to include Denver Water facilities outside of Denver Water service area.
- Include community education about leading-edge water best practices at all Denver Water facilities with public interface.



WATER SUPPLY

Standard:

- Develop policy with regional and state agencies that allows and encourages "One Water" implementation.



WATER QUALITY AND TREATMENT

Goal:

- Install real-time watershed water quality monitoring units at 15 sites by 2025.

Commitment:

- Remove customer-owned lead service lines from distribution system through current Lead Reduction Program and when encountered.

Energy and Transportation

As the oldest and largest water utility in Colorado, Denver Water is fully aware of the water-energy nexus, and extremely focused on conserving resources. The energy needed to collect, store, treat and distribute water is continuously decreasing because of policy and behavioral changes, technologically efficient upgrades, and generation of renewable hydropower within our operations.



ENERGY USE AND SUPPLY

Goals:

- Reduce organization-wide greenhouse gas emissions 50% from 2015 baseline by 2025.
- Maintain energy neutrality while decreasing energy use (electricity and natural gas) 10% from baseline (2015-2019 average annual use) by 2025.
- Increase Denver Water energy portfolio by 1 MW of renewable energy by 2025.

Commitments:

- Install occupancy/vacancy sensors on all new construction and renovation.
- Upgrade to LED on all new and replacement lighting.
- Offset at least 50% of energy use with renewable energy generation, preferable on-site, with all new construction and major renovation projects.
- Continue to improve hydroelectric system operations with holistic integration of water resources, maintenance planning and contractual obligations.
- Maximize participation and benefits available through demand-side management programs, utility incentives and external efficiency sources when applicable.
- Continue to participate in the Carbon Footprint Registry program to qualify Denver Water's greenhouse gas inventory for higher certification.



TRANSPORTATION

Goals:

- Update Denver Water idling policy to include idle-free campuses by 2022.

Standards:

- Uphold Denver Water idling policy with continued annual reporting and goals for reduction.

Commitments:

- Monitor all fleet vehicles with software for anti-idling and speed-limit fuel efficiency.

Land and Ecosystems

Denver Water's collection system covers about 2.5 million acres of land. We are committed to supporting and improving natural ecosystems and using resources wisely. We work with multiple federal agencies, nongovernmental organizations, private landowners and other Front Range water providers to identify and prioritize at-risk watersheds that will be the focus of protection measures, and to preserve, restore and ensure the health of watersheds. We work with mountain communities daily to proactively identify ways to operate our system so that flows are provided for rivers and streams.



LAND USE AND ECOSYSTEM STEWARDSHIP

Goals:

- **Convert 185 acres of the High Line Canal land to green infrastructure to benefit public recreation and to treat approximately 200 acre-feet (66 million gallons) of stormwater, by 2025.**
- **Develop drought-tolerant, pollinator-supporting landscaping on five Denver Water properties by 2025.**

Standards:

- Uphold federal and state standards regarding the detection, monitoring and prevention of aquatic nuisance species within Denver Water's collection system.
- Uphold state standards regarding detection, monitoring and eradication of noxious weeds on Denver Water properties through an integrated management plan.

Commitments:

- Create opportunities for innovation in watershed health through collaborations and research with the National Western Stock Show Complex redevelopment.
- Support the assessment and implementation of an additional 90,000 acres, both National Forest and private lands, into the From Forests to Faucets Partnership, for forest restoration and wildfire risk reduction projects.
- Develop a watershed inventory, assessment, prioritization and plan for our South Collection System.
- Develop a 20-year plan to reduce sediment loading in Strontia Springs Reservoir.
- Increase survivability of revegetation efforts in the Hayman burn scar by selecting more resilient species and using innovative planting methodologies.

Materials

Our operations are focused on closing loops and responsibly managing waste streams. Denver Water's teams work tirelessly within our operations to safely recycle or dispose of operational waste with a priority to minimize the use of hazardous materials. Additionally, our compost, recycling and e-waste programs are successfully diverting waste from the landfill.



MATERIALS MANAGEMENT

Goals:

- **Reduce municipal solid waste going to landfill 25% from 2020 baseline by 2025.***
- **Reduce per-capita municipal solid waste (all streams) 25% from 2020 baseline by 2025.***
* Data does not currently include remote location facilities where recycling and compost hauling are not available.
- **Reduce per-capita electronic waste 25% from 2020 baseline by 2025.**
- **Develop and implement print standards to reduce paper use 50% from 2019 baseline by 2025.**

Commitments:

- Compost all landscaping.
- Optimize water treatment chemicals in volume and type.
- Identify beneficial reuse options for water treatment residual disposal.



PROCUREMENT

Standards:

- Uphold Denver Water sustainability procurement standards regarding waste reduction, product and service improvement, and efficiencies within Denver Water operations.

Commitments:

- Continue to reduce shop and maintenance chemical use and work with the purchasing department to find more sustainable alternatives.
- Account for value of sustainability in scoring RFPs.

Denver Water People

Denver Water knows that employee satisfaction means employee retention, which is at the heart of a sustainably run organization. To attract and retain the best talent, Denver Water focuses on safety, health, wellness and high quality of work life for employees. As a result, our employees have a passion for stewardship and are preparing for the future. Because it is the right thing to do.



INSPIRED PEOPLE

Goals:

- Increase Denver Water safety maturity, a metric calculated from traditional safety measures of accidents, incidents, program quality metrics, and cultural indicators, from 3.75 to 4.2 by 2025.

Standard:

- Maximize participation and benefits available through WELL Building Standard and other wellbeing certifications by implementing optimizations on Denver Water properties when applicable.

Commitments:

- Continue to offer sustainability awareness training through communication, education events, lunch and learns, coffee breaks and new employee orientation.
- Expand and improve supplier diversity strategy to strengthen relationships and create more business opportunities for small, woman-owned and minority-owned businesses.
- Continue to promote telework and flexible work opportunities for safety and health of employees.
- Facilitate collaborations to support employee pilot innovations and sustainable improvements to our operations.
- Promote professional development for future leaders.
- Continue to improve sustainable transportation incentives and programs for employees.
- Continue to improve employee wellbeing at all Denver Water locations with options for physical activity and healthy food.

Infrastructure and Assets

Denver Water has taken a leadership role in understanding and promoting sustainability both in the state of Colorado and in water utility planning. Our goal is to build environments responsibly and enhance Denver Water property. We are dedicated to sustainable growth and operation of our assets and leading by example to share experience and expertise.



BUILT ENVIRONMENT AND OPERATIONS

Goals:

- Incorporate standards that include stormwater runoff in the redevelopment of two Denver Water properties by 2025.

Standards:

- Maximize participation and benefits of LEED, Envision, SITES and other building certifications by implementing standards in all new construction and major renovation when applicable
- Uphold Denver Water's green cleaning standards regarding chemical type in product and services within Denver Water operations.

Commitments:

- Continue to participate in the Colorado Department of Public Health and Environment's (CDPHE) Environmental Leadership Program (ELP) at the Gold Leader level.
- Continue to participate in the City and County of Denver's Certifiably Green Denver Program to qualify Denver Water's fleet shop for certification.
- Continue to invest and participate in new trials and pilots for energy, water, and waste savings within our infrastructure.
- Install permeable pavement and surfaces when applicable in development and resurfacing projects.
- Include sustainability goals for all Continuous Improvement events.



ASSETS

Commitments:

- Consider fuel-efficient vehicles and alternative transportation options for all new fleet vehicles.
- Continue to evaluate and update IT Asset Management Plan.



Sustainability Implementation and Reporting

This guide applies to all of Denver Water's operations. A majority of the reporting will require implementing metering and tracking mechanisms that establish baselines. These mechanisms are in the process of being defined and implemented if an existing tracking system is not already in place. Additionally, Denver Water is committed to assessing the software used for tracking work orders to report on improvements and upgrades to our infrastructure's efficiency.

Continuous Improvement

A key component of our sustainability implementation is following a continuous improvement model to determine new opportunities for advancement.

Sustainability is full-circle thinking at Denver Water, and we take these steps in our work:

- Continuously analyze the current state of operations and ecosystems.
- Identify baselines.
- Engage stakeholders.
- Define opportunities.
- Set goals.
- Initiate changes.
- Deploy programs.
- Document and verify results.
- Evaluate processes.
- Analyze the current state again.



As technology advances and best practices evolve, Denver Water continues to revisit and update our operations to make them as sustainable as possible.

Denver Water's Outdoor Recreation Areas

There's more to water than drinking it. Denver Water's reservoirs and watershed areas offer many recreational activities. Denver Water owns nine sites that are open to public recreation, including Antero, Cheesman, Dillon, Eleven Mile, Gross and Williams Fork reservoirs, as well as the High Line Canal, South Platte River and Waterton Canyon/Strontia Springs Reservoir.

Ultimately, this is why we incorporate sustainability into everything we do: So that future generations can enjoy and experience the great outdoors as much as we do today.

Activities allowed at each site vary, but include:

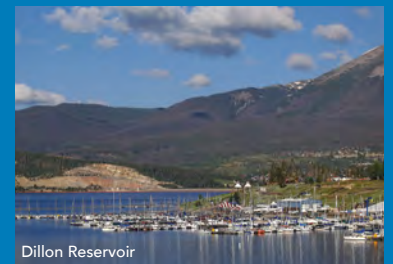


- Bicycling
- Camping
- Canoeing
- Cross country skiing
- Fishing
- Hiking
- Horseback riding
- Hunting (big game and fowl)
- Ice fishing

- Paddle boarding
- Kayaking
- Motorboating
- Nature viewing
- Picnicking
- Renting
- Rowing
- Sailboating
- Snowmobiling
- Windsurfing



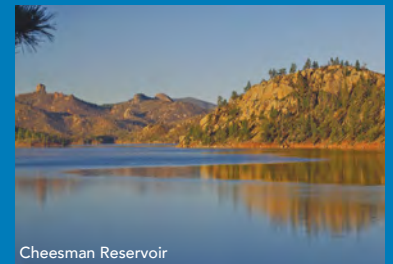
Antero Reservoir



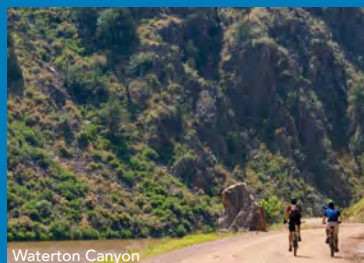
Dillon Reservoir



Eleven Mile Canyon Reservoir



Cheesman Reservoir



Waterton Canyon



Williams Fork Reservoir

Many minds and voices were engaged in conversation to compile the history, best practices and current efforts in efficiency and sustainability within Denver Water operations. We would like to acknowledge the contribution of those who participated in the development of this guiding document. This guide shares Denver Water's foundation of stewardship, engagement in continuous improvement and plans for future generations. We would like to acknowledge the contributions and efforts of all employees who steadily improve our operational use of energy, water, and resources while diverting waste and maintaining focus on ecological health and social justice.

And thank you to the organizations and partners that continue to work alongside us and recognize our efforts.

- U.S. Green Building Council's LEED certification for Operations Complex, including Platinum for the Administration Building (2021).
- City and County of Denver's award Certifiably Green Business for the Administration Building (2020).
- Colorado Department of Public Health and Environment's Environmental Leadership Program's recognition for Gold Leader (2020).
- Carbon Footprint Registry's Award for Gold Status (2019).
- City and County of Denver Office of Sustainability's "Love This Place" Award for Implementer of Sustainability (2018).
- Association of Metropolitan Water Agencies' Award for Sustainable Water Utility Management (2018).
- Blue Star Recycler's Award for Star Partner (2017).
- Association of Municipal Water Agencies' Platinum Award for Utility Excellence (2015).
- Global Water Award for Water Performance Initiative of the Year (2015).
- Trout Unlimited River Stewardship Honoree in the "Learning by Doing" partnership (2016).
- EPA WaterSense Excellence Awards (2015 and 2014).



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Carbon (Emission) Strategy

High level overview of current emissions and pathways to reach net-negative carbon (and equivalent) emissions.

Contents

- Introduction
- Net-Negative Emissions
- Denver Water Greenhouse Gas Inventory
- 2022-2050 Pathways to Net-Negative Emissions
- Opportunities for Further Development
- Summary
- Resources

DRAFT

Introduction

Denver Water’s mission, “To serve our customers by being a national leader in delivering clean water, operating and maintaining a reliable and resilient system, and protecting the water resources of the West” will require strong commitments to climate action and decarbonization. Denver Water is inextricably linked to the environment, and our operational emissions directly impact the climate on which we depend for water. Our snowpack is changing with the changing climate, affecting our spring melt and ultimately, our supply throughout the year. It is our duty to reduce our environmental impact as quickly as possible and be a leader in regenerating the fragile ecosystems upon which we depend.



Denver Water employees calculate the density of a snow sample collected near Winter Park on April 28, 2022. The samples are used to assess how much water is in the mountain snowpack.

To maintain a healthy and productive watershed Denver Water must decarbonize and guide other institutions do the same to support society’s transition to a green future. The time for climate action is now. The most recent Intergovernmental Panel on Climate Change (IPCC) report warns that global emissions need to be reduced drastically (45% from 2010 levels) and this action needs to take place before 2030 (only six years), on our way to net-zero emissions by 2050, to keep warming within the 1.5 degrees Celsius target. Although, climate data is showing that warming is happening faster. Even if the world can get to net-zero emissions by 2050, it is likely that the climate will heat to more than 1.5 degrees Celsius and only drop back to the 1.5 degrees target by 2100.

In 2015 at the 21st Conference of Parties (COP21) in Paris, an agreement was adopted (Paris Agreement) with a goal to limit global warming below 2 degrees Celsius compared to preindustrial levels. Unfortunately, climate simulations are showing that we will exceed this 2 degrees.

The lack of climate action from governments across the globe means individuals and individual companies have a responsibility to do as much as possible, as fast as possible to, combat climate change. Organizations capable of going beyond net-zero faster than the IPCC timeline need to do so now. Together with other water agencies across the country, and organizations throughout Colorado, Denver Water can lead on climate solutions that result in net-negative emissions.

To support adoption of aggressive climate action strategies, this report defines what net-negative carbon means for Denver Water, gives an overview of the current carbon footprint, and lays out potential pathways to reach net-negative carbon emissions by 2050 at the latest.

Key Terminology

Denver Water Reports the following Greenhouse Gases:

- Carbon Dioxide (CO₂)
- Methane (CH₄)
- Nitrous Oxide (N₂O)
- Other 'fugitive' emission sources: Sulfur Hexafluoride (SF₆), and refrigerants (HFCs): R134, R134a, 404A and 410B
- **Scope 1 emissions** are direct greenhouse (GHG) emissions that occur from sources that are controlled or owned by an organization (e.g., emissions associated with fuel combustion in boilers, furnaces, vehicles). These generally result from the use of fossil fuels or other manmade chemicals and must be subdivided within the inventory into the four types of sources they result from:
 - Stationary combustion of fuels in any stationary equipment including boilers, furnaces, burners, turbines, heaters, incinerators, engines, flares, etc.;
 - Mobile combustion of fuels in transportation sources (e.g., cars, trucks, marine vessels and planes) and emissions from non-road equipment such as those in construction, agriculture and forestry;
 - Physical and chemical processes other than fuel combustion (e.g., for the manufacturing of cement, aluminum, adipic acid, ammonia, etc.); and,
 - Fugitive sources, i.e., intentional or unintentional releases from the production, processing, transmission, storage, and use of fuels and other substances, that do not pass through a stack, chimney, vent, exhaust pipe or other functionally equivalent opening (such as releases of SF₆ from electrical equipment; HFC releases during the use

of refrigeration and air conditioning equipment; and CH₄ leakage from natural gas transport or landfills).ⁱ

Denver Water reports Stationary, Mobile, and Fugitive scope 1 emissions in the annual greenhouse gas inventory.

- **Scope 2 emissions** are indirect GHG emissions associated with the purchase of electricity, steam, heat, or cooling. Although scope 2 emissions physically occur at the facility where they are generated, they are accounted for in an organization's GHG inventory because they are a result of the organization's energy use.

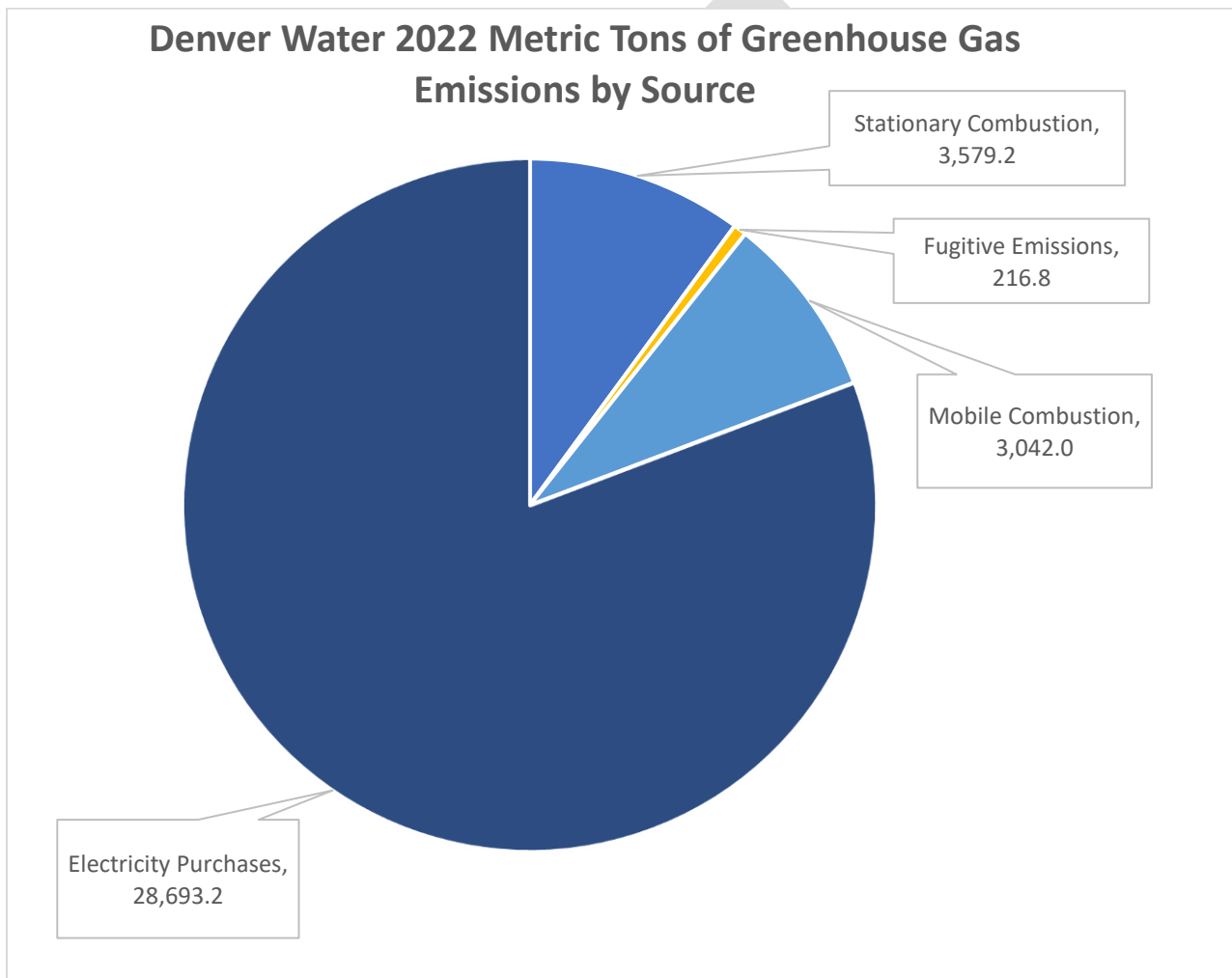
Denver Water reports Scope 2 emissions in the annual greenhouse gas inventory.

- **Scope 3 emissions** are the result of activities from assets not owned or controlled by the reporting organization, but that the organization indirectly affects in its value chain. Scope 3 emissions include all sources not within an organization's scope 1 and 2 boundary.ⁱⁱ Denver Water does not report Scope 3 emissions in the annual greenhouse gas inventory.
- CO₂ equivalents (**CO₂e**) is a metric measure used to compare the emissions from various greenhouse gases on the basis of their global-warming potential (GWP), by converting amounts of other gases to the equivalent amount of carbon dioxide with the same global warming potential.
- The Global Warming Potential (**GWP**) was developed to allow comparisons of the global warming impacts of different gases. Specifically, it is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of carbon dioxide (CO₂).
- Social Cost of Carbon (**SCC**) is an estimate, in dollars, of the economic damages that would result from emitting one additional ton of carbon dioxide into the atmosphere. The federal estimate is currently \$51 per ton, but new studies suggest it is closer to \$185 per ton.ⁱⁱⁱ

Net-negative Carbon

The proposed goal for Denver Water is to achieve net-negative greenhouse gas emissions as soon as possible.

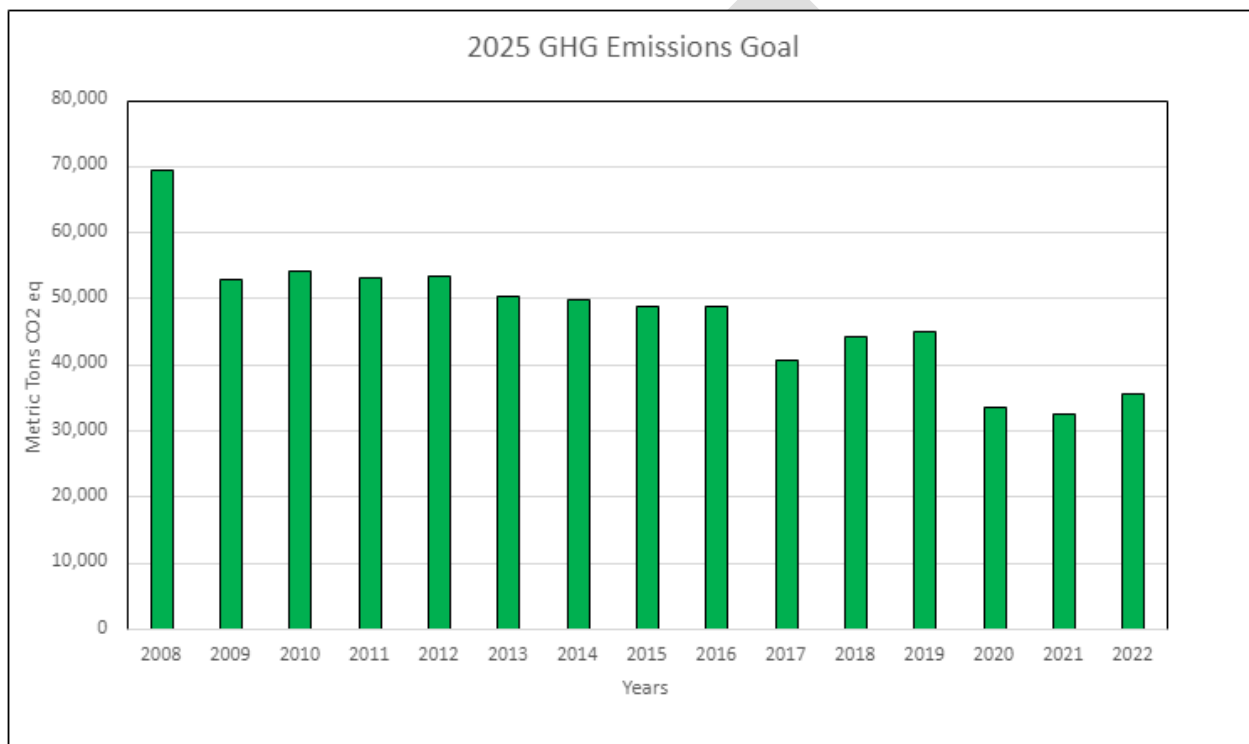
Net-negative greenhouse gas emissions means that more emissions are removed from the atmosphere by Denver Water than what Denver Water operations emit to the atmosphere. This can be achieved by reducing greenhouse gas emissions to as close to zero as possible and removing more than the remaining operational emissions. Removing emissions would use one of three currently available pathways: nature-based solutions, enhanced natural processes, or technology solutions. Denver Water operations emitted 35,531 metric tons of CO₂e in 2022.



Denver Water Greenhouse Gas Inventory

Denver Water has tracked greenhouse gas emissions since 2008. Emissions have been reported through The Climate Registry and are publicly available.

Emissions have trended down over this time and the current goal is to reach 24,400 metric tons of CO₂e in 2025. This goal would cut 2015 (baseline year) emissions in half in that 10-year period. While the decreasing trend is encouraging, much of the progress has been made due to the improvement of the emissions factor (EF) of the Western Electric Coordinating Council and Xcel Energy. Renewable energy will continue to be added to the grid and improve the EF but much more can be done to reduce overall Denver Water emissions to zero.



Greenhouse gas inventory data for 2010, 2015, and 2020 are presented below in tabular form. These are representative of the trends of emissions from Denver Water operations.

Five important takeaways from the inventories:

1. Scope 2 Emissions (emissions from purchased electricity) are by far the largest emissions source for Denver Water. These emissions from electricity purchases are a direct result of the energy supplying the grid. These will trend down as more renewables are incorporated into the grid. These can be reduced by generating and using renewable energy at Denver Water facilities. The

reduction in Scope 2 emissions from 2010 to 2020 is mostly due to Xcel increasing renewable energy on the grid.

2. Pump Stations are the largest emitters by facility type, accounting for 40-45% of total Denver Water annual emissions. The emissions from Pump Stations are roughly 90-95% Scope 2 and 5-10% Scope 1.
3. All Scope 1 Mobile emissions are attributed to the fleet and not individual locations or divisions. These emissions account for 8-12% of total emissions.
4. Fugitive emissions account for a very small percentage of total annual emissions. These emissions are estimated using standardized best practices. Almost all these emissions can be attributed to the estimation of SF6 (sulfur hexafluoride) gas used/lost in high voltage transformers. The global warming potential (GWP) of SF6 is 23,900. For comparison the GWP for Carbon Dioxide (CO₂) is 1, Methane (CH₄) is 21, and Nitrous Oxide (N₂O) is 310.
5. The Operations Campus Redevelopment decreased the campus wide emissions by roughly 70% and reduced total organization emissions by almost 11%. Not all projects will be capable of such drastic reductions, but the redevelopment shows how much improvement can be made in older facilities and small steps taken right now will make a large impact, hopefully before it is too late.

Facility	2010		2015		2020	
	Total CO ₂ e	% of Total	Total CO ₂ e	% of Total	Total CO ₂ e	% of Total
Admin Buildings	7,694	14.2%	7,384	15.1%	1,974	5.9%
Water Treatment Plants	12,795	23.6%	14,223	29.1%	9,428	28.1%
Pump Stations	25,694	47.4%	19,786	40.5%	16,226	48.3%
SOS Facilities	2,370	4.4%	2,422	5.0%	2,154	6.4%
Distribution System	511	0.9%	908	1.9%	549	1.6%
Vehicles	5,179	9.5%	4,154	8.5%	3,238	9.6%
Total	54,242		48,878		33,568	

2010 Greenhouse Gases Reported - Metric Tons of Gas								
Source		CO ₂	CH ₄	N ₂ O	HFC (t of CO ₂ e)	SF ₆	CO ₂ e	%
Scope 1	Stationary Combustion	4,735	0.606	0.014	-	-	4,752	8.8%
	Mobile Combustion	5,099	0.244	0.126	35.380	0.000	5,179	9.5%
	Fugitive Emissions	0	0.000	0.000	9.389	0.001	129	0.2%
Scope 2	Electricity Purchases	43,951	0.581	0.710	0.000	0.000	44,183	81.5%
Total		53,785	1.4	0.8	44.8	0.001	54,242	
Total CO ₂ e		53,785	30.0	263.5	44.8	119.2	54,242	

2015 Greenhouse Gases Reported - Metric Tons of Gas								
Source		CO ₂	CH ₄	N ₂ O	HFC (t of CO ₂ e)	SF ₆	CO ₂ e	%
Scope 1	Stationary Combustion	4,437	0.568	0.012	-	-	4,453	9.11%
	Mobile Combustion	4,064	0.143	0.169	0.0	0.000	4,119	8.43%
	Fugitive Emissions	0	0.000	0.000	10.3	0.001	129	0.26%
Scope 2	Electricity Purchases	39,971	0.480	0.630	0.0	0.000	40,176	82.20%
Total		48,472	1.191	0.811	10.3	0.001	48,878	
Total CO ₂ e		48,472	25.01	251.41	10.3	119	48,878	

2020 Greenhouse Gases Reported - Metric Tons of Gas								
Source		CO ₂	CH ₄	N ₂ O	HFC (t of CO ₂ e)	SF ₆	CO ₂ e	%
Scope 1	Stationary Combustion	3,637	0.468	0.012	-	-	3,651.08	10.9%
	Mobile Combustion	3,222	0.039	0.046	0	0	3,236.66	9.6%
	Fugitive Emissions	-	-	-	10.3	0.005	130.3	0.4%
Scope 2	Electricity Purchases	26,400	2.34	0.325	-	-	26,550	79.1%
Total		33,259	2.85	0.38	10.3	0.0050	33,568	
Total CO ₂ e		33,259	59.89	118.83	10.3	119.25	33,568	

2022-2050 Pathways to Net-negative Carbon

Water utilities, companies, and government entities across the nation are starting to make plans and goals to reach carbon neutrality in accordance with best practices. Denver Water employees are currently participating in a greenhouse gas reduction cohort where many of the utilities are sharing goals of reaching carbon neutral between 2030 and 2050. Some of those goals are listed below:

Seattle Public Utilities

- Manage utility-wide energy use and associated greenhouse gas (GHG) emissions throughout operations, contracting, construction projects and service delivery, aiming for carbon neutrality by 2030.

Metropolitan Water District of Southern California

- Carbon neutrality by the year 2045, with 40% reduction from 1990 levels by 2030.

District of Columbia (DC) Water

- The District of Columbia (DC) is committed to reducing greenhouse gas emissions 50% below 2006 levels by 2032 and achieving carbon neutrality by 2050.

Xcel Energy

- Reduce carbon emissions 80% from electricity by 2030. Lower greenhouse gas emissions 25% from our natural gas service, enable one out of five vehicles in the areas we serve to be electric.
- Deliver 100% carbon-free electricity, net-zero methane emissions from the gas system, provide the infrastructure and energy to run all vehicles with carbon-free electricity or other clean energy by 2050.

City and County of Denver

- Achieve 100% Renewable Electricity by 2030. GHG emission reduction of 40% by 2025, 65% by 2030, and 100% by 2040.

Presented below are two variations of the path to net-negative carbon emissions for Denver Water. These two paths are taking similar steps to zero emissions just at different rates. We recommend (strongly suggest) being net-zero carbon as soon as possible but know that the effort and cost is not insignificant. Scenario 2 presents a more aggressive approach that would take a very concerted effort and still arrives at net-zero carbon in 2040. Although this is 5-10 years later than some peer utilities, both scenarios presented do not use offsets. Focusing on emissions reduction and actual carbon (and equivalent emission) removal will result in true operational net-zero carbon emissions at Denver Water, avoid any ambiguity with offset accounting, and create more societal benefit (e.g. air quality) for the local region.

As noted in the historical greenhouse gas section, Scope 2 emissions from electricity purchase are the main source of DW emissions and present the biggest opportunity for reduction. There are infinite paths to reaching net-negative, but the strategies can really be boiled down to: 1) Reduce organization emissions to lowest amount possible and 2) remove the equivalent remainder of CO₂e from the atmosphere.

The following tables describe the quantitative steps needed for Denver Water to arrive at net-zero and continue to net-negative emissions. The tables provide percentages of current emissions that would need to be removed along with assumptions and some estimated values for each emission type along the path to net-negative. In general, this list shows the current established method for reducing each emission type. This is not a comprehensive list of emission reduction strategies. Some strategies that are still in development could be used in the future when they are effective and available at scale.

Scope 2 – Purchased Electricity

- Improve energy efficiency of processes and facilities
- Implement renewable energy (on site, PPA, energy storage, community solar gardens, etc....)

Scope 1 – Mobile Combustion

- Electrify fleet and power with renewable energy
- Increase mpg efficiency of fleet
- Alternative fuel vehicles
- Downsize fleet

Scope 1 – Stationary Combustion

- Improve energy efficiency of facilities
- Electrify facilities and use renewable energy

Scope 1 – Fugitive Emissions

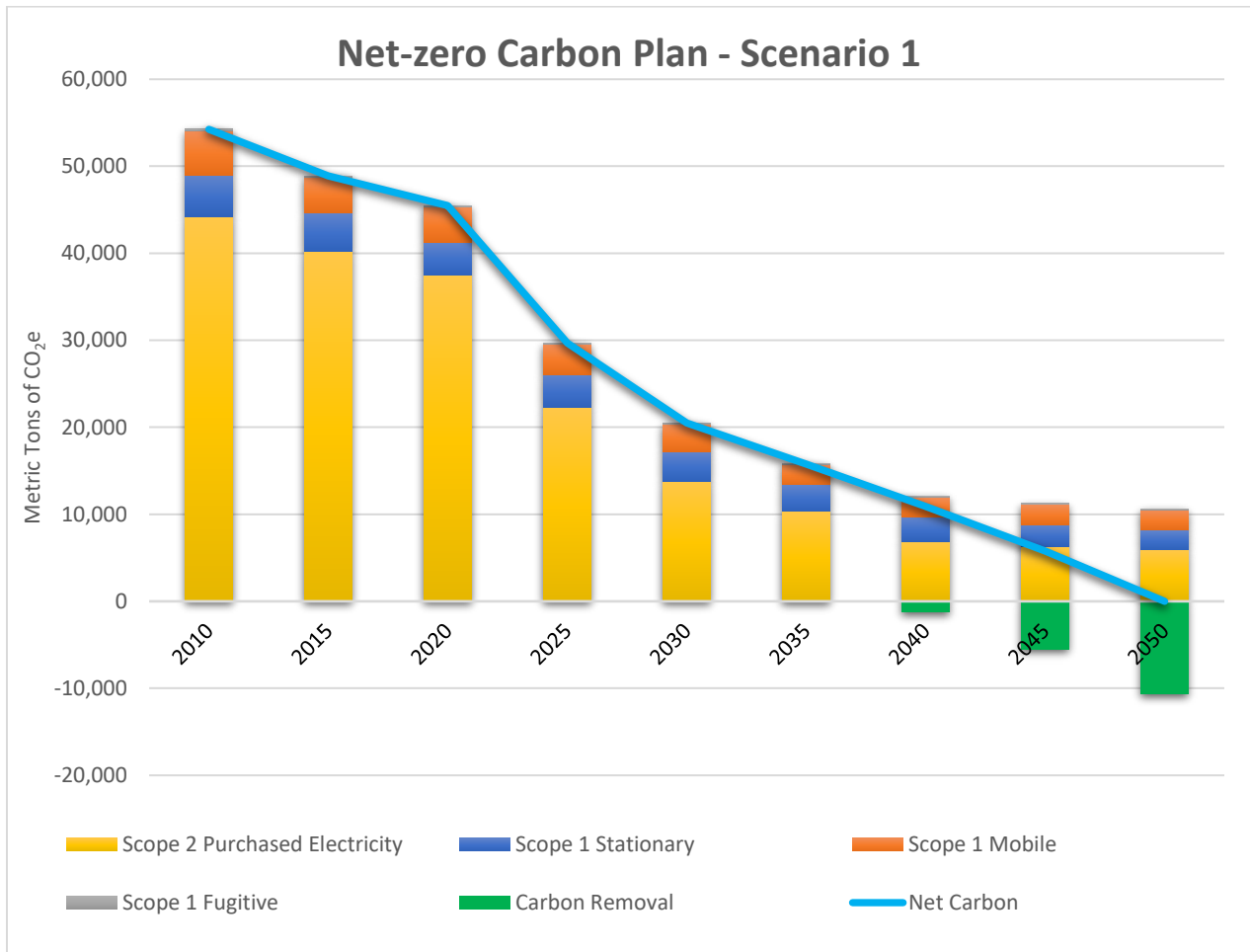
- Switch to low global warming potential refrigerants
- Find alternative to SF₆ (sulfur hexafluoride) gas use in electric power systems

Carbon Removal

- Natural strategies e.g. afforestation, reforestation, marine habitat restoration
- Enhanced natural processes e.g. land management, ocean fertilization
- Technology solutions e.g. bioenergy with carbon capture and storage (BECCS), direct air capture

Scenario 1 (Current Path)

Scenario 1 arrives at Net-zero carbon in 2050 and would result in Net-negative Carbon beyond 2050. In this scenario, current Denver Water emission reduction efforts would **not significantly** change.



Scenario 1 Assumptions/Notes:

- Continue with current operations. This scenario arrives at net-zero emissions in 2050.
- Add 1 MW of renewable energy behind the meter (Denver Water side before grid) every five years
- Renewables portfolio is assumed to be split between Xcel and other electric utilities after 2030 based on ease of access and current plans of renewable integration from all utilities.
- Switch fleet to electric vehicles when available. Denver Water fleet (passenger cars and light trucks) would be 50% electric by 2040. Construction and non-highway vehicles would still consume fossil fuels.

- Denver Water meets 10% reduction of natural gas use organization wide every 5 years (2% annual decrease) starting in 2030.
- All current renewable generation (hydros and Operations Complex solar) offset facility use behind the meter (used before it is sent to grid). This would continue to be the model for all new renewable energy generation.
- Xcel meets its goal of zero carbon emissions in 2050.
- Colorado meets 2050 goal of 90% emission reduction by 2050.
- IPCC calls for carbon pollution reduction of 45% of 2010 levels by 2030. That would be 24,400 mtCO₂e for Denver Water. Current trajectory would meet this goal if Xcel Energy continued to improve grid emission factor.

Scenario 1 Steps to Net-zero Carbon

2025

- Stationary - No current plan for reduction, implement study to identify most suitable methods of replacing fossil fuel consumption, goal is to remove 10% of gas use every five years.
- Mobile - Fuel Efficiency gains mandated by Fed Gov. Replace 10-20 vehicles with full EV into Fleet.
- Fugitive - No current plan for reduction, implement study to identify most suitable methods of replacing.
- Purchased Electricity - Minimal operation of Moffat with NTP taking majority of system load. Addition of 1 MW of renewables between 2020-2025.
- Carbon Removal – Implement study into what DW can do for CO₂ removal. Explore Nature based, Enhanced natural processes, Technology solutions.

2030

- Stationary - Upgrade an additional 10% of facilities to renewable plus storage to replace fossil fuel combustion.
- Mobile – Assume another 10% increase in fuel efficiency mandated by government.
- Fugitive - Maintain current levels
- Purchased Electricity – Emission savings based on Xcel meeting 80% GHG reduction goal. Additional 1 MW of renewable added to DW energy portfolio
- Carbon Removal - Adopt a plan to implement most cost-effective path for carbon removal by 2035.

2035

- Stationary – Upgrade an additional 10% of facilities to renewable plus storage to replace fossil fuel combustion.

- Mobile – Assume another 10% increase in fuel efficiency mandated by government. Continue replacing internal combustion engine vehicles in fleet with full electric vehicles. Fugitive - Maintain current levels
- Purchased Electricity - Additional 1 MW of renewables added to DW portfolio. Other progress made from grid progress (Xcel, WECC).
- Carbon Removal - Implement carbon removal plan identified in 2030 to remove at least 100 metric tons of CO₂e per year.

2040

- Stationary - Upgrade an additional 10% of facilities to renewable plus storage to replace fossil fuel combustion.
- Mobile – 50% of passenger vehicles and light duty trucks are electric vehicles. Emissions for heavy duty and off highway vehicles remain will be negated by carbon removal.
- Fugitive - Maintain current levels
- Purchased Electricity - Additional 1 MW of renewables added to DW portfolio. Other progress made from grid progress (Xcel, WECC).
- Carbon Removal - Implement carbon removal plan identified in 2030 to remove at least 1,200 metric tons of CO₂e per year.

2045

- Stationary - Upgrade an additional 10% of facilities to renewable plus storage to replace fossil fuel combustion.
- Mobile - Maintain 50% passenger vehicles and light duty trucks as electric vehicles. Assume an additional 10% increase in fuel efficiency mandated by government. Emissions for heavy duty and off highway vehicles remain will be negated by carbon removal.
- Fugitive - Maintain current levels
- Purchased Electricity - Additional 1 MW of renewables added to DW portfolio. Other progress made from grid progress (Xcel, WECC).
- Carbon Removal - Implement carbon removal plan identified in 2030 to remove at least 5,500 metric tons of CO₂e per year.

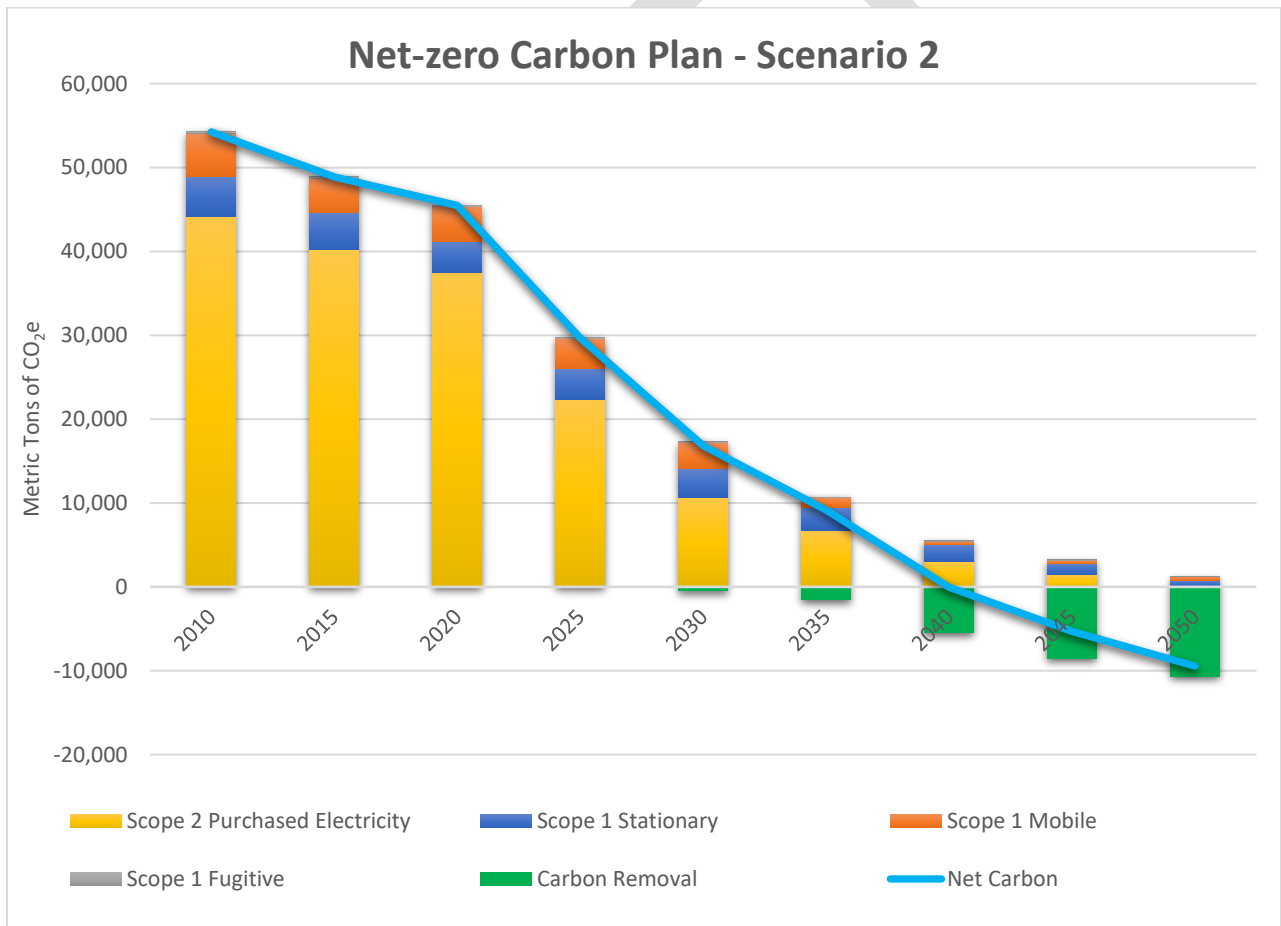
2050

- Stationary - Upgrade an additional 10% of facilities to renewable plus storage to replace fossil fuel combustion.
- Mobile - Maintain 50% passenger vehicles and light duty trucks as electric vehicles. Assume an additional 10% increase in fuel efficiency mandated by government. Emissions for heavy duty and off highway vehicles remain will be negated by carbon removal.
- Fugitive - Maintain current levels

- Purchased Electricity - Additional 1 MW of renewables added to DW portfolio. Other progress made from grid progress (Xcel, WECC). This would assume Xcel generation is 95% carbon free and WECC is 90% carbon free.
- Carbon Removal - Implement carbon removal plan identified in 2030 to remove at least 10,650 metric tons of CO₂e per year.

Scenario 2 (Recommended Path)

Scenario 2 arrives at Net-zero Carbon in 2040 and would result in Net-negative Carbon beyond 2040. In this scenario current Denver Water emission reduction efforts **would significantly** change with increased funding and changes to operations needed to meet the goal.



Scenario 2 Assumptions/Notes:

- Aggressive adoption of renewable energy, fleet electrification, facility electrification, and carbon sequestration.

- Renewable energy installations increase from 1MW every 5 years to 1MW installed every year (on average).
- Renewables portfolio is assumed to be split between Xcel and other Utility locations after 2030 based on ease of access and current plans of renewable integration from all utilities.
- Switch fleet to electric vehicles on rapid schedule. Denver Water fleet (passenger cars and light trucks) would be 100% electric by 2040. Emissions from construction vehicles would be examined for removal in 2040.
- Denver Water meets 10% reduction of gas use organization wide every 5 years (2% annual decrease) starting in 2025.
- Retire or upgrade older facilities to approach new facility energy efficiency standards including electrification of old facilities and equipment.
- Find alternative for SF6 gas in transformers and replace by 2035.
- Direct carbon removal plan implemented by 2030.
- Xcel meets its goal of zero carbon emissions in 2050.
- Colorado meets 2050 goal of 90% emission reduction by 2050.

Scenario 2 Steps to Net-negative Carbon

2025

- Stationary - No current plan for reduction, implement study to identify most suitable methods of replacing.
- Mobile - Fuel Efficiency gains mandated by Fed Gov. Replace 10-25 vehicles with hybrids and 3-10 fully electric vehicles into the Fleet.
- Fugitive - No current plan for reduction, implement study to identify most suitable methods of reducing all fugitive emission with focus being on SF₆.
- Purchased Electricity - Minimal operation of Moffat with NTP taking majority of system load. Addition of 1 MW of renewables between 2020-2025.
- Carbon Removal – Implement study into what DW can do for CO₂ removal. Explore nature based, enhanced natural processes, technology solutions.

2030

- Stationary - Upgrade facilities to decrease stationary combustion by 10%. Maximize energy efficiency and switch to renewable + storage to replace combustion.
- Mobile – Assume another 10% increase in fuel efficiency mandated by government. Continue to replace ICE vehicles with hybrid and EV.
- Fugitive – Implement plan to replace 50% of SF₆ with lower/no emission alternative.
- Purchased Electricity – Implement renewables and/or efficiency gains equal to 25% of the electricity from top 10 highest use facilities.
- Carbon Removal - Implement Carbon Removal Strategy capable of removing 500 metric tons of CO₂e per year.

2035

- Stationary - Increase facility efficiency or electrify to reduce total stationary emissions by 20% from 2025 levels. This could be focused on 1-2 locations or multiple locations based on current use.
- Mobile – Continue adoption of electric vehicles powered by renewable fuel to offset 75% of fleet emissions not including nonhighway vehicles.
- Fugitive – Implement plan to replace 100% of SF6 with lower/no emission alternative.
- Purchased Electricity – Renewable electricity integration/efficiency equal to 50% of energy from top 10 electricity users in DW portfolio. Install an additional 1 MW of renewables at non-Xcel serviced facilities.
- Carbon Removal - Implement Carbon Removal Strategy capable of removing 1,500 metric tons of CO₂e per year.

2040

- Stationary - Increase facility efficiency or electrify to reduce total stationary emissions by 40% from 2025 levels. This could be focused current largest users of natural gas.
- Mobile - Continue adoption of electric vehicles powered by renewable fuel. Denver Water highway fleet (all passenger cars, light, and medium duty trucks) are 100% electric vehicles.
- Fugitive - Maintain minimal Fugitive Emissions levels at 10 mt CO₂e or below
- Purchased Electricity - Reduce utility purchased electricity by 50% from 2025 levels.
- Carbon Removal - Implement Carbon Removal Strategy capable of removing 5,500 metric tons of CO₂e per year.

2045

- Stationary - Increase facility efficiency or electrify to reduce total stationary emissions by 60% from 2025 levels. This could be focused current largest users of natural gas.
- Mobile - Maintain 100% electric highway vehicle fleet. Investigate nonhighway vehicle electrification, alternative fuels, and efficiency increase.
- Fugitive – Maintain current levels. Investigate options to reduce remaining Fugitive Emissions levels 10% from 2040 levels.
- Purchased Electricity – Implement additional renewable energy/efficiency projects that result in 10% decrease in energy use from Xcel, 5% decrease from other utilities from 2040 levels.
- Carbon Removal - Implement Carbon Removal Strategy capable of removing 8,500 metric tons of CO₂e per year.

2050

- Stationary - Increase facility efficiency or electrify to reduce total stationary emissions by 80% from 2025 levels. This could be focused current largest users of natural gas.

- Mobile - Maintain 100% electric highway vehicle fleet. Implement plan to increase non-highway vehicle efficiency by 15% and/or start transition to non-highway electric vehicles or renewable fuel use.
- Fugitive – Implement 2045 plan to reduce remaining fugitive emissions 10%.
- Purchased Electricity – Install renewables/efficiency projects to decrease energy use from Xcel 10% and 5% from other utilities from 2040 levels.
- Carbon Removal - Implement Carbon Removal Strategy capable of removing 10,650 metric tons of CO₂e per year.

Reducing Stationary Combustion – Identification of Top Candidate Sites

A major step in reducing carbon emissions will be the transition from burning fuel for heating or process purposes to using renewably produced electricity for those same reasons. As recommended in the assessment above a first goal should be to reduce these emissions by 10%. It is also recommended that any new construction projects be all electric and avoid all combustion of fossil fuels.

Denver Water uses on average 570,000 therms of natural gas per year and 95,000 gallons of propane. A 10% decrease of 57,000 therms and 9,500 gallons of propane per year would reduce carbon emissions by approximately 360 metric tons of CO₂e per year.

Electrification of existing buildings should be considered whenever existing buildings are being remodeled or going through other construction projects to maximize the financial and environmental benefits of electrification.

The below tables identify Denver Water properties that consume large amounts of natural gas and propane. These facilities are viewed as top candidates for electrification based on existing fossil fuel use. Electrification projects at these locations can be considered pilot projects and would hopefully lead to a better understanding of what type of projects work best for electrification and provide data for creating a decision matrix for future electrification.

Recommended Stationary Combustion Reduction Goal:

	Natural Gas (therms)	Propane (gallons)
Annual Use	570,000	95,000
10% reduction	57,000	9,500
GHG Reduction (mt CO ₂ e)	303	55

Top Natural Gas Users		
Location	Annual Therms	Tons of CO ₂ e
Marston	136,536	724.5
Foothills	113,748	603.5
Recycling	70,799	375.7
Moffat	55,866	296.4
Ops Complex	27,698	147.0
Highlands	7,929	42.1

Top Propane Users		
Location	Annual Gallons	Tons of CO ₂ e
Williams Fork	10,978	62.4
Cheesman	10,162	57.7
Elevenmile	10,014	56.9

Ideally natural gas use at Denver Water facilities would be replaced by electric equipment and renewable energy sources to power the new electric equipment. Electrification of existing natural gas equipment should be pursued even if on site renewable can't be installed. The efficiency gains and emission reductions for new electric equipment connected to the current grid outweigh continued use of natural gas and propane at Denver Water facilities.

Opportunities for Further Development

- Carbon capture
 - What role do Denver Water forests and reservoirs play in carbon capture? Or is our management of forests and reservoirs contributing to global emissions? Due to the unique nature of Denver Water's watersheds and water storage, these natural systems will need additional studies and collaborations with internal and external subject-matter experts.
 - Is direct capture and reuse in treatment process viable?
 - What are benefits/drawbacks of purchasing directly removed carbon?
- Energy use
 - Current PPAs for hydro need to be reexamined.
 - Could excess hydroelectric energy be aggregated and offset energy use at other facilities instead of providing excess to grid through PPA?
 - What avenues can Denver Water use to take advantage of government funding for renewable energy and electrification?
 - Will water availability affect hydro production?
 - What role should energy storage (e.g. batteries, flywheels, pumped hydro) play in this plan?
- Costs
 - Sustainability will continue to work with Denver Water teammates, outside peers, and industry best practices in carbon accounting to estimate costs and savings associated with emission reduction improvements to our operations.

Summary

As a major water provider in the West, Denver Water views itself as having a special responsibility to the environment. It is a responsibility we take very seriously. We incorporate it into both our strategic thinking and daily operations. Denver Water has always been a leader on sustainability and conservation. Many of the organization's goals are aimed at curbing emissions:

- Reduce organization-wide greenhouse gas emissions 50% from 2015 baseline by 2025.
- Maintain energy neutrality while decreasing energy use (electricity and natural gas) 10% from baseline by 2025.
- Increase Denver Water energy portfolio by 1 MW of renewable energy by 2025.

Denver Water is currently aiming to hit the IPCC recommended 45% reduction in carbon emissions five years ahead of schedule, in 2025.

In our updated Strategic Plan, we list our guiding principles. One of these principles states that we take the long-term view, as we make decisions with sustainability of our community and environment in mind. As we seek to provide the best possible outcome for our customers and future generations, it will be imperative to take strong climate action now.

The Strategic Plan also calls out goals focused on having resilient infrastructure and efficient processes as a part of our overall goal of Excellent Operations. Our carbon negative plan will support these goals:

- Plan, build, operate and sustain our infrastructure to meet customers' current and long-term water needs, given a warming climate and uncertain future.
- Apply new insight and best practices to drive consumer value and continuous improvement in our day-to-day operations.
- Plan and operate our system and facilities to strengthen our resiliency.

Ultimately, Denver Water will be making capital investment to address climate change, regardless of the scenario we choose to pursue. While the investment into Scenario 2 is significant up front, the cost of inaction in the climate crisis will be far more costly to our operations and the communities we serve. It is imperative that Denver Water take bold action to try and mitigate the effects of climate change as much as possible.

We strongly recommend committing to zero carbon as early as possible. We present Scenario 2 with a 2040 goal as achievable strategy. Knowing current climate events are accelerating in severity and frequency, even since we started drafting this document, we would recommend considering a 2035 goal which would strengthen Denver Water operations making us more resilient and financially structured for the volatility associated with climate change. Forecasts for energy and fuel costs show extremes that could be minimized if we've divested from fossil fuels.

Carbon offsets and renewable energy credits will not make Denver Water a leader. To model best practices, Denver Water must focus on operating with renewable energy and without the combustion of fossil fuels as soon as we possibly can. The faster we mitigate now, the less adaptation required later. If

Denver Water takes a lead on climate emissions reduction, we will stay ahead of climate regulations and can lead conversations on future climate policy.

Water and wastewater utilities have huge potential to reduce our emissions; studies have estimated that at least 10%^{iv} of global GHG emissions can be attributed to the water sector. Our peers across the country, and globally, are making bold commitments and actions to address the climate crisis. This proposed carbon plan is an opportunity for Denver Water to act as a leader in the national water sector, and as a force for change towards a sustainable future.

DRAFT

Resources

<https://www.ipcc.ch/>

<http://uswateralliance.org/>

<https://www.nature.com/articles/ncomms14856>

<https://www.theclimateregistry.org/>

<https://www.energy.gov/articles/secretary-granholm-launches-carbon-negative-earthshots-remove-gigatons-carbon-pollution>

<https://www.denverwater.org/tap/how-much-water-snow-below>

ⁱ <https://theclimateregistry.org/wp-content/uploads/2022/11/General-Reporting-ProtocolV3.pdf>

ⁱⁱ <https://www.epa.gov/climateleadership/scope-3-inventory-guidance>

ⁱⁱⁱ <https://www.rff.org/news/press-releases/social-cost-of-carbon-more-than-triple-the-current-federal-estimate-new-study-finds/>

^{iv} <https://everydrop-counts.org/imglib/pdf/Water%20Climate%20Report%202020.pdf>