

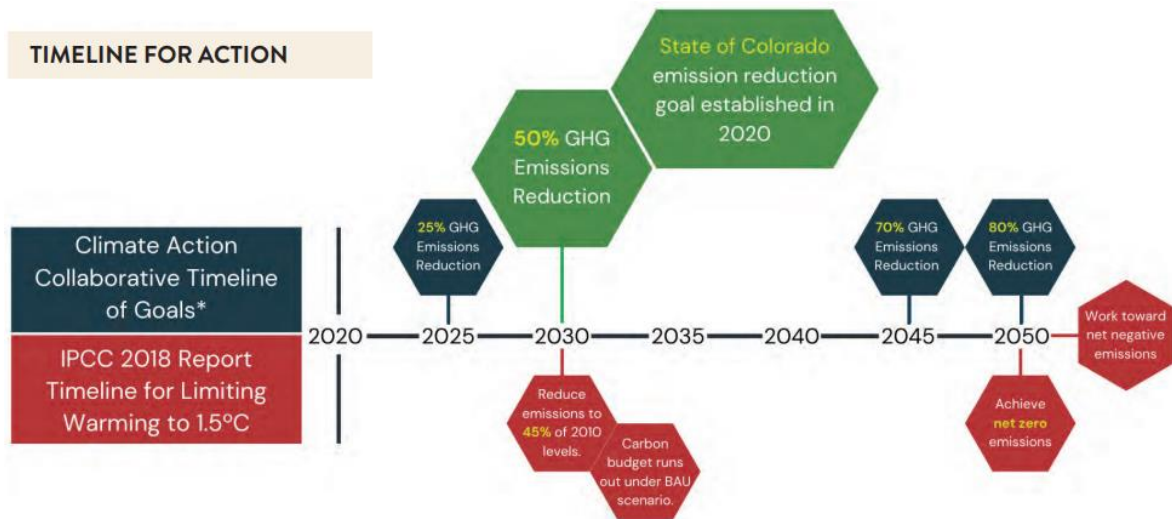


# Climate Action Collaborative for Eagle County Communities

*Minturn Water-Energy Nexus Report &  
Recommendations*

# Background:

County-wide greenhouse gas (GHG) goals: **50% reduction by 2030; 80% by 2050**



# Background:

- Water and wastewater treatment and distribution processes are extremely energy intensive, i.e., using treated water has greenhouse gas (GHG) emissions associated with it!
- Desire to better associate excessive water use and inefficient systems with GHG emissions
- CAC created a calculator to analyze the electricity and natural gas emissions associated with water and wastewater treatment and distribution
- Offering customer-facing and infrastructure recommendations that reduce water consumption and increase infrastructure efficiencies, thus reducing emissions

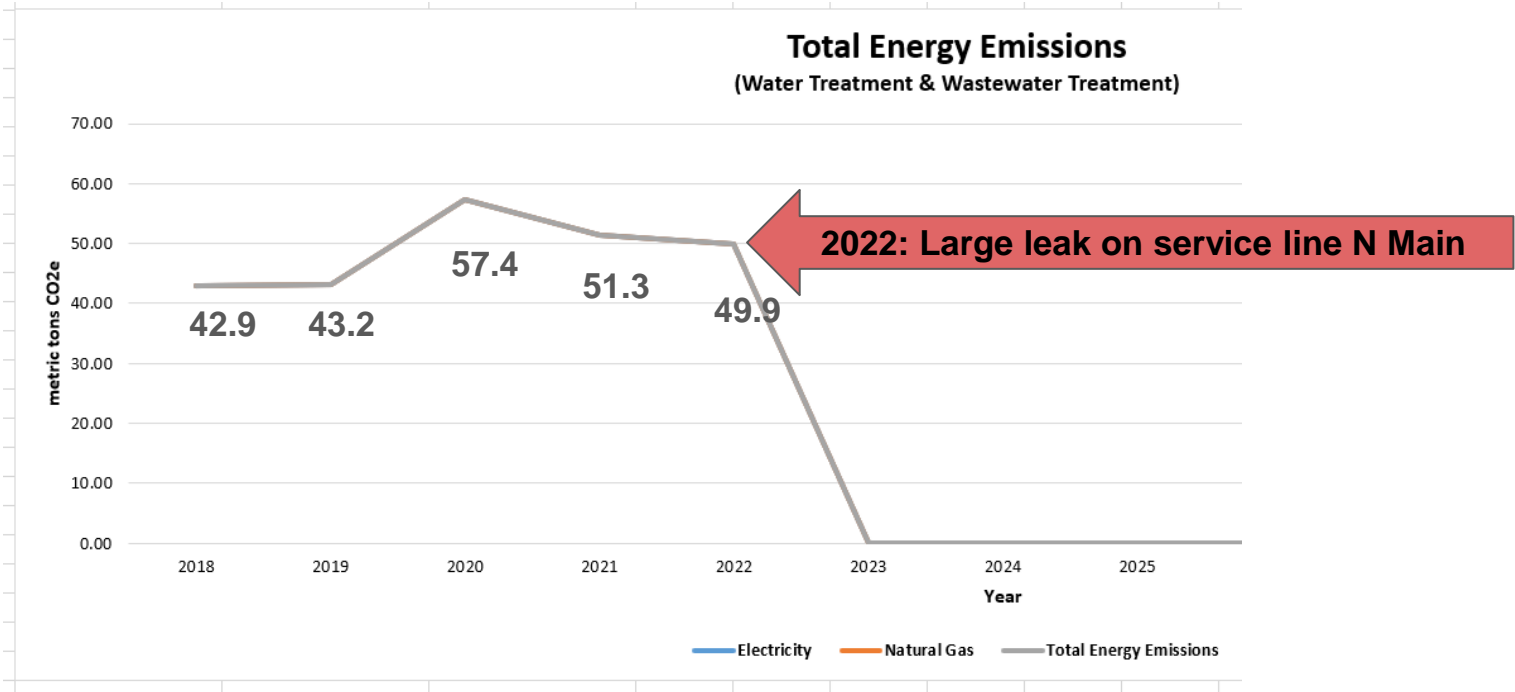
# Data Analysis

		Annual Data				
		2018	2019	2020	2021	2022
<b>Total Energy Emissions</b>						
<i>(metric tons CO2e)</i>	<i>Electricity</i>	42.90	43.22	57.37	51.34	49.91
	<i>Natural Gas</i>	0.00	0.00	0.00	0.00	0.00
<b>Total Energy Emissions from Water Treatment &amp; Distribution</b>						
<i>(metric tons CO2e)</i>	<i>Electricity</i>	42.90	43.22	57.37	51.34	49.91
	<i>Natural Gas</i>	0.00	0.00	0.00	0.00	0.00
<b>Total Energy Emissions from Wastewater Treatment</b>						
<i>(metric tons CO2e)</i>	<i>Electricity</i>	n/a	n/a	n/a	n/a	n/a
	<i>Natural Gas</i>	n/a	n/a	n/a	n/a	n/a
<b>Energy Emissions per kilogallon water treated &amp; distributed</b>						
<i>(lbs CO2e/kilogallon)</i>	<i>Electricity</i>	1.60	1.72	2.82	2.80	2.25
	<i>Natural Gas</i>	0.00	0.00	0.00	0.00	0.00
<b>Energy Emissions per kilogallon wastewater treated</b>						
<i>(lbs CO2e/kilogallon)</i>	<i>Electricity</i>	n/a	n/a	n/a	n/a	n/a
	<i>Natural Gas</i>	n/a	n/a	n/a	n/a	n/a

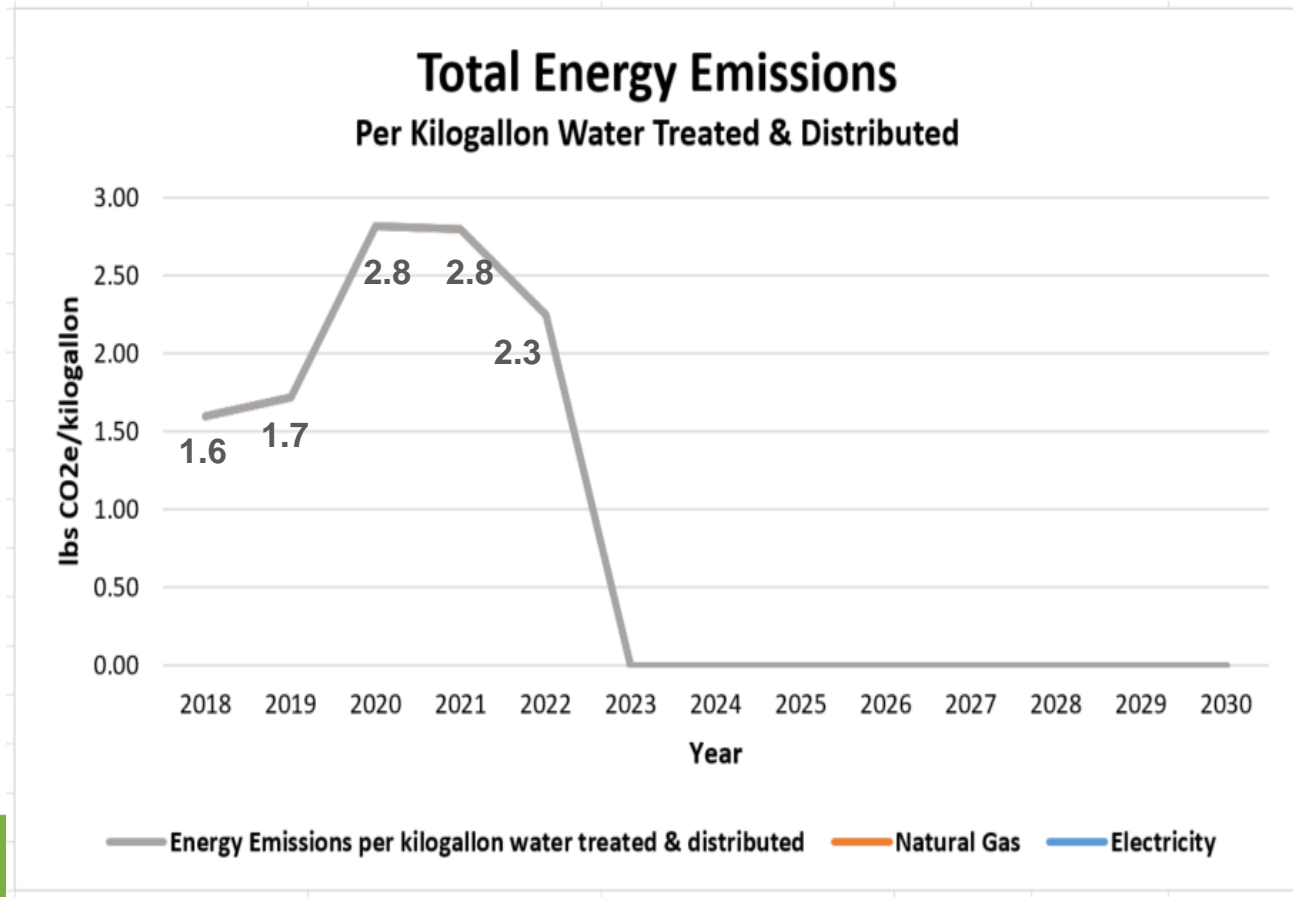
## Some Perspective:

- The average vehicle in the US emits 4.6 mT CO2e/year
- 1 gallon of gasoline = 19.6 lbs CO2e
- 1 kilogallon = 1,000 gallons

# Data Analysis



# Data Analysis



# Data Analysis - Anomaly

Year	Water Treated (kilo-gallons)	Total Energy Consumption (kWh)	Jan. (kWh)	Feb. (kWh)	Mar. (kWh)	April (kWh)	May (kWh)	June (kWh)	July (kWh)	Aug. (kWh)	Sept. (kWh)	Oct. (kWh)	Nov. (kWh)	Dec. (kWh)
2018	59,119.4	77,720	11,120	9,480	10,040	9,080	10,640	600	2,240	3,000	3,800	3,000	5,800	8,920
2019	<b>55,372.3</b>	84,080	9,360	10,200	12,280	9,280	6,800	4,880	3,920	3,400	3,560	4,960	5,480	9,960
2020	<b>44,843.4</b>	121,040	10,280	<b>22,520</b>	<b>19,720</b>	<b>20,160</b>	<b>16,720</b>	6,320	4,000	2,960	2,760	3,360	3,280	8,960
2021	40,379.2	107,640	13,640	12,160	12,800	12,400	10,760	9,320	5,440	4,960	4,200	4,640	5,800	11,520
2022	48,904.5	111,160	13,760	13,560	14,120	12,560	12,520	5,400	4,520	3,680	3,960	4,680	7,680	14,720

- The amount of water treated in 2020 decreased by nearly 11,000 kilogallons compared to 2019
- However, monthly electricity consumption between February and May 2020 was nearly double that of previous years
- The Town of Minturn could investigate this further to understand the reasoning

# Data Analysis - Conclusions

- Minturn's emissions/gallon are similar to other calculations from across the Country
  - Spang et al. (2018) in California
- Minturn's slow-sand filter system uses relatively little energy and therefore produces relatively little emissions
- If Minturn constructs a process packaged water treatment plant or a membrane filtration water treatment plant, as has been proposed, it is likely that energy consumption, and therefore emissions, will increase
- Recommended to compare energy consumption and water treatment often to observe any anomalies or discrepancies in the data



# Recommendations for the Town of Minturn

## *Customer-Facing*



# Update Rate Structure to a Tiered System

## What is it?

A way to equitably incentivize water conservation by charging each single family equivalent (SFE) the same fixed fee; water users pay more per kilogallon on a tiered system, which disincentivizes excessive use.

## How it applies to Minturn

- Minturn utilizes a tiered structure for outdoor irrigation accounts- *great!*
- Minturn should incorporate a SFE fixed cost for all residential accounts, and charge per kilogallon of use on a tiered system. We recommend mirroring Eagle River Water and Sanitation District's tiered costs for water use.

# Update Rate Structure to a Tiered System

Example:

## WASTEWATER SERVICE CHARGE / SFE / MONTH

Wastewater Service Charge \$36.72

*Additional Charge Average Winter Use Greater than 5 Kgals (per kgal)* \$7.34

Capital Replacement Charge \$5.47

Debt Service Charge \$19.85

**Wastewater Service Charge per SFE** **\$62.04**

## INDIVIDUALLY METERED RESIDENTIAL / Kgal / MONTH

TIER 1 (0 - 6 kgals) \$3.70

TIER 2 (6 - 12 kgals) \$6.72

TIER 3 (12 - 18 kgals) \$13.28

TIER 4 (18 - 30 kgals) \$20.15

TIER 5 (Greater than 30 kgals) \$28.21

Cost: low ↓  
Benefit: high ↑

# Implement Smart Metering

## What is it?

Advanced metering infrastructure that measures and records water usage accurately and in real-time. Smart meters provide automated readings that are transmitted to utility companies for billing and analysis.

## How it applies to Minturn

- Minturn is almost complete with updating all water meters to smart meters. Data analysis from meters is critical to achieving benefits from meters.

Cost: high ↑  
Benefit: medium →

# Offer Rebates and Incentives for Water Efficiency

## What is it?

The Beyond Lawn Program offers rebates and incentives for irrigation assessments and grass lawn replacement. These incentives apply to those outside of Eagle River Water and Sanitation District boundaries.

## How it applies to Minturn

- Minturn should provide matching rebate funds to residents to further incentivize outdoor water conservation.

Cost: medium →

Benefit: medium →

# Promote Irrigation Assessments

## What is it?

- Effective strategy for customers to understand their outdoor water consumption and strategies for reduction.
- The Beyond Lawn program offers discounted irrigation assessments and rebates for upgrades.

## How it applies to Minturn

- Minturn should promote irrigation assessments on its website & at events, do an irrigation assessment of Town properties, and directly promote irrigation assessments to high outdoor water users.

Cost: low ↓  
Benefit: high ↑

# Recommendations for the Town of Minturn

## *Operational*



# Energy Efficiency, Electrification, and RE Enrollment

## What is it?

Water treatment facilities and distribution infrastructure should be electrified, as energy efficient as possible, and, when applicable, enrolled in energy utility renewable energy programs.

## How it applies to Minturn

- We do not recommend Minturn update current water treatment facilities as the Town will be investing in a new system.
- Minturn should ensure the new system is all-electric and highly energy efficient.

Cost: high ↑  
Benefit: high ↑



# Onsite Offsets

## What is it?

Investing in onsite renewable power generation can offset some of the power used and save you money over time. Pairing a system with battery storage will increase your operation's resiliency, allowing you to deploy storage in times of need or utilize it during peak hours to reduce utility costs.

## How it applies to Minturn

- Minturn is exploring a solar installation at the CTP; some or all of the energy generated should be used to offset the energy consumption of the new water treatment system.

Cost: high ↑  
Benefit: high ↑

# Final Thoughts

- The full list of recommendations for the Town of Minturn can be found in your Water-Energy Nexus Report
- Outdoor water conservation is critical for our drought-inundated climate, and has a GHG reduction impact
- Water and wastewater treatment and distribution are energy intensive, expensive processes! Let's do what we can to mitigate energy and cost burdens.





Thank you!  
Questions?

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