Gunnison County, CO
7/22/2021 9:36:53 AM
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677808
Page 1 of 23
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THE COUNTY OF GUNNISON, COLORADO
RESOLUTION NO. 2021-21

A RESOLUTION ADOPTING THE "GUNNISON VALLEY GREENHOUSE GAS MITIGATION PLAN"

WHEREAS, the Board of County Commissioners of Gunnison County ("Board"), pursuant to C.R.S. § 30-11-107, has authority over the management and care of the buildings and property of Gunnison County ("County");

WHEREAS, pursuant to C.R.S. § 30-28-102 *et seq.* and other applicable law, the Board is authorized to enact land use and other regulatiosn to provide for the physical development of and building, construction and other business and residential activities on lands within the unincorporated areas of the County, including but not limited to the adoption of its Land Use Resolution ("LUR") and building codes;

WHEREAS, the Board, pursuant to the foregoing authorities and other applicable law, is empowered to pass resolutions designed to protect and promote the health, safety and welfare of County residents and visitors;

WHEREAS, there exists increasing scientific evidence that carbon dioxide and other greenhouse gases released into the atmosphere are currently impacting the Earth's climate and will continue to have profound and potentially devastating effects, increasing the risk of extreme weather events, increased risk and intensity of catastrophic wildfire, increased risk of forest depdredation due to insect invasion, changing rainfall and crop productivity patterns, increased risk of drought, loss of alpine meadows, and migration of infectious diseases;

WHEREAS, County actions to reduce greenhouse gas emissions can and will provide multiple local benefits by decreasing air pollution and reducing energy expenditures for the County, its businesses and its citizens;

WHEREAS, the County has adopted a Strategic Plan, last updated May 7, 2019, which includes a strategic goal to reduce greenhouse gas emissions by at least 20% from 2005 levels by 2030;

WHEREAS, the County, along with its partners in the One Valley Leadership Council have developed a plan to achieve a 50 percent reduction in greenhouse gas emissions to 2005 levels by 2030;

WHEREAS, achieving greenhouse gas emissions reductions across the entire Gunnison Valley Watershed area will take cooperative action among all local governing agencies, institutions, employers, and individuals; and

WHEREAS, the International Panel on Climate Change (IPCC) Fifth Assessment Report concluded that global emissions must be reduced by half by 2030 in order to limit global temperature rise to 3.6° Fahrenheit (2° Celsius);

NOW, THEREFORE, BE IT RESOLVED by the Board of County Commissioners of Gunnison County, Colorado that the Gunnison Valley Greenhouse Gas Mitigation Plan, as set forth in Exhibit A to this Resolution, be adopted.

The Board hereby directs County staff, pursuant to the County's Strategic Plan, to engage in efforts within their scope and respective fields of expertise to implement the Gunnison Valley Greenhouse Gas Mitigation Plan.

INTRODUCED by Commissioner Smith, seconded by Commissioner Mason, and adopted this 20th day of July, 2021.

BOARD OF COUNTY COMMISSIONERS
GUNNISON COUNTY, COLORADO

Jonathan Houck, Chairperson

Roland Mason, Commissioner

Elizabeth Smith, Commissioner

Attest: Melanie Bellis
Deputy County Clerk

GUNNISON COUNTY SEAL COLORADO

EXHIBIT A

Gunnison Valley Greenhouse Gas Mitigation Plan

1. Introduction

The One Valley Leadership Council Climate Change sub-group has developed a realistic pathway to achieve 50% emissions reduction from 2015 levels by 2030 for the Gunnison Valley watershed area. This plant focuses on mitigation of greenhouse gas emissions (GHG). However, responding to climate change will also require climate adaptation and resiliency efforts. Resilience and adaptation are not included in this plan, the purpose of this document is to outline a path to at least 50% reduction in GHG's from 2015 baseline. Forecasting detailed data sets is complex, sectors are interdependent so changes to one sector can affect changes to others. Also, data quality is variable across sectors with some data points available with very good accuracy with enough detail available to provide the ability to sort and cut data sets for analysis. But other data points are lower quality. For these reasons decision makers should understand that this plan provides a roadmap and a guide to local action but results will vary and polices will have to be adapted as we learn and continually measure progress with periodic emissions inventory updates.

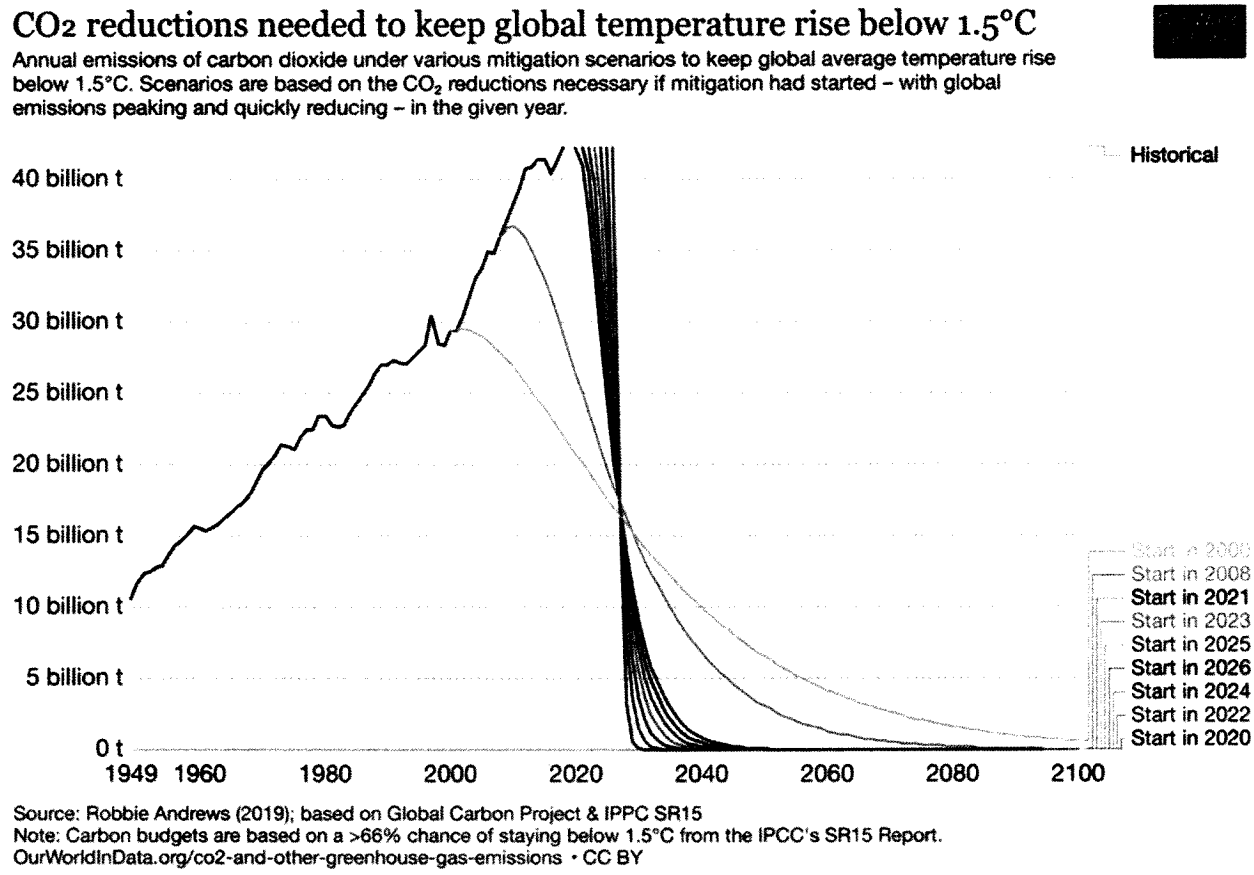
Roadmap to at least 50% GHG reduction by 2030			
Sector	**Measure**	**% sector reduction**	**% overall GHG reduction**
Buildings - Residential	Btu's/ sq.ft.	20%	15%
Buildings - Commercial	Btu's/ sq.ft.	25%	11%
Transportation	VMT	8%	11%
Transportation (EV)	% EV's in fleet	50% (incr.)	7%
Electric Utilities	CO_2e/kWh	80%	33%
Waste, organics landfilled	% organic waste diverted	100%	2%
Total Reduction from 2015 Baseline			**57%**

2. Background

This plan is based on quantitative GHG forecasting utilizing the Baseline Accounting and Forecasting Tool (BAFT) which was developed by Dr. Abel Chavez in 2015 for Gunnison County as part of the 2015 Emissions Baseline Report for the Gunnison County watershed area.

In the fall of 2019 the One Valley Leadership Council (OVLC) created a sub-group made up of representatives from each local government to explore the addition of climate action and environmental sustainability as an additional focus area of the collaborative One Valley Prosperity Project.

The sub-group concluded that collaborative action among local governments, utilities, and other stakeholders in the valley would be the most effective way to reduce greenhouse gas (GHG) emissions caused by activities in the valley. As a first step to



aligning action John Cattles utilized and expanded the forecasting capabilities of the BAFT tool in order to model policy scenarios for the major emissions sectors of the valley. The forecast model was then incorporated into a conference which was held on January 17th, 2020. The conference was attended by the majority of local elected leaders, professional staff, and concerned members of the public. During the conference the baseline emissions from the county were presented and the current trends were forecasted. From that baseline and business-as-usual forecast we then formed focus groups for each of the main sectors driving emissions in the valley: buildings, electric utilities, transportation, and waste. Each group discussed possible actions that could be taken to lower emissions from that sector and, using data provided to them as a guide, estimated a percentage reduction possible for each sector. Public feedback from the 2020 conference has been incorporated into this plan and utilized along with quantitative data to develop a road map to 50% greenhouse gas reductions by 2030.

According to the International Panel on Climate Change (IPCC) report from 2018, global emissions must be reduced by 45% from 2010 baseline. In order to reach the IPCC

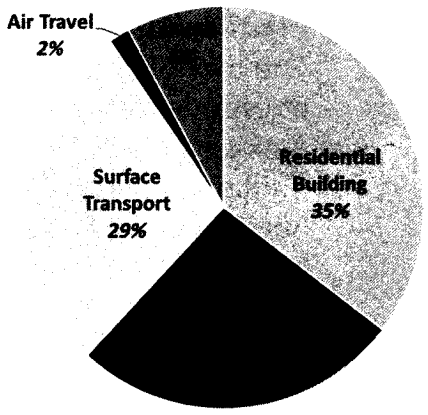
goals some emissions will have to exceed 45% reduction because other's will not reach the goal. Goals vary among the various governments in the valley from zero emissions goals to 20% reduction by 2030. The goal of this plan is to develop a sub-set of goals and strategies based on public input and data- based forecasting to achieve at least 50% GHG reductions form 2015 levels by 2030.

All of the measures, forecasts, goals, and strategies and recommendations contained in this document are derived from a 2015 baseline and 2030 target year. Measures will have to continue beyond 2030 in order to track with the IPCC recommendations however, the next 10-year period up to 2030 will require a most intense effort to begin to shift our economy, development patterns, and systems to a much less carbon intensive and ultimately carbon neutral future. When the One Valley Prosperity Project was launched one of the main themes was "What kind of community do we want to be?" The next 10 years of climate action will require us to think about future outcomes we want for our community that relate to our energy use and emissions impacts for instance; housing and building types and quality, development patterns and commuting needs, economic activities, and waste. What we do relating to each of these sectors will answer through our actions the question posed by Dr. John Hausdoerffer of Western State University: "What kind of ancestors do we want to be?"

3. Greenhouse gas baseline

Gunnison County is using a 2015 baseline of GHG emissions to measure progress against. In 2015 in-boundary emissions from Gunnison county were 273,165 metric tons CO_2 equivalent (CO_2e). Buildings account for 61% of total emissions, surface transportation (vehicles) accounted for 29%, and waste accounted for 8%. Within the building sector electric generation is the largest contributor to emissions accounting for 42% of the total in-boundary emissions in the valley. Air travel is only a small part of the emisions footprint in the valley at this time and so has not been considered for mitigtion efforts at this time.

Gunnison County 2015 In-Boundary GHG Emissions: 273,165 mt CO_2e



A forecast was scenario was developed assuming business as usual (BAU) including currently adopted policies at the State and local level as of the end of 2019. Under the BAU scenario emissions are expected to decrease by 6%. The prior forecast, developed at the time of the 2015 baseline report, estimated that emissions in the county would increase by 12% by 2030.

Three main changes have contributed to the current forecasted 6% decrease:

-Adoption of the International Energy Conservation Code (IECC) by each local jurisdiction

-Adoption of California low emissions vehicle (LEV) standards by the State

-Early retirement of fossil fuel generation by electric utilties with load replaced by renewables

The forecated decrease in emissions under the business-as-usual (BAU) scenario includes population growth, as estimated by the state demographer, along with the growth in homes and travel that goes with increased population. Three important factors will contribute to the decreased emissions in the BAU scenario:

1. Buildings will be more efficient:
   Each local jurisdiction in the county adopted the 2012 IECC in 2016. Buildings built to the 2012 IECC standards will use approximately 1/3 of the energy used by the average residential buildng in the county. By 2030, 17% of homes in the county will have been built after the adoption of IECC codes.

2. Vehicles will be more efficient:
   In 2018 the State of Colorado adopted California's low emission vehicle (LEV) standards. The affect of the standards have been modeled by Energy Information Administration (EIA). The forecasted fuel efficiencies for each vehicle type were updated in the baseline forecasting model resulting in a forecasted 28% decrease in emissions from the surface transportation sector despite an expected 17% population increase over the same period of time.

3. Electric Generation will be more efficient:
   The original 2015 baseline and 2030 forecast assumed a 10% decrease in emissions form the generation of electricity sold by Gunnison County Electric Association (GCEA). Emissions have in fact decreased faster than forecasted. Further reductions in electricity related emissions have been publically announced by GCEA's wholesale power provider, Tri-State, and will be discussed and forecasted in detail later in this report. The other electric utility in the valley, City of Gunnison Electric, has also set goals to greatly increase it's proportion of renewable power generation as well.

The results of these three changes have finally turned the tragectory of emissions from always increasing to decreasing. Understanding the factors contibuting to the emisions reducitons expected under the BAU scenario provides guidanance for more ambitious goals of cutting emissions in half. Opportunities fo deep emissions reductions will be discussed in more detail, by sector, forthcoming in this report.

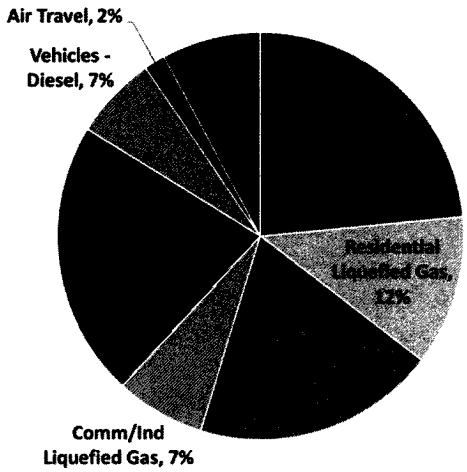
Gunnison County, CO
7/22/2021 9:36:53 AM
447
677808
Page 7 of 23
R 0.00 D 0.00

4. Buildings

a. Sector Impacts (sector contribution to overall emissions)

Buildings represent 61% of all emissions from activities in the county. Increasing the efficiency of buildings can have a strong positive effect on emissions. Also, 42% of all emissions in the building sector are from electricity generation. At this time, is almost all electricity used in the valley is consumed by buildings. Therefore, reduction in emissions from electricity generation will also reduce emissions from buildings.

Gunnison County 2015 In-Boundary GHG Emissions = 273,165 mt CO_2e



Buildings are the most effectively influenced sector of GHG emissions because local jurisdictions have authority to regulate building codes and development patterns. However, existing buildings represent a challenge. Once a building is built residents have little financial incentive to invest in energy efficiency because of current low energy costs and high property values which seem to be unaffected by relative efficiency of a building compared to others. Furthermore, the rental market, currently, has little to no incentive to invest in efficiency with a vacancy rate of nearly zero and continuingly increasing demand for rentals conspiring to limit consumer's ability to consider energy costs as a decision point when considering a lease.

Buildings: Energy efficiency

The 2015 baseline emissions report revealed that buildings in Gunnison County are less efficient that buildings in the same climate zone (climate zone 7). Total energy use in buildings was calculated from utility provided data and included in the 2015 baseline report and separated into residential and commercial sectors. Total energy was then divided by total square footage of buildings in each sector resulting in an Energy Use Intensity (EUI) which is a globally accepted standard for comparing buildings. EUI calculated as thousands of Btu's per square foot of building area per year (kBtu/sq.ft.). In Gunnison the average residential EUI is 51, the average residential EUI in climate zone 7 is 42 according to the EIA.[1] Based on data from the 2015 GHG baseline report and current energy prices the average homeowner in Gunnison pays $3,296/ yr for energy. The annual energy cost of an average home that meets the 2012 IECC code (energy code) would be $2,262. Over a 30yr life and accounting for 1% annual energy cost inflation the energy code home would save the residents $34,785. Commercial buildings in Gunnison average EUI is 140, the average of commercial buildings in

[1] U.S. Energy Information Administration, Residential Energy Consumption Survey 2015 table CE1.1

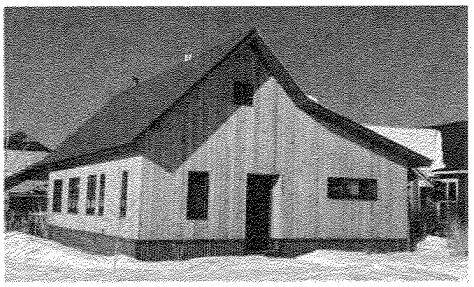
climate zone 7 in 2012 was 86[2]. Commercial property owners in Gunnison could nearly halve their energy costs if their buildings were just average efficiency for climate zone 7.

Residential Buildings

Gunnison Average Residential
EUI = 51

Climate Zone 7 Average
EUI = 42
(EIA 2012)

2012 Energy Code
EUI = 35



Ryan Residence EUI = 4

By 2030 17% of all homes in Gunnison County will have been built to 2012 Energy Code or better

Inefficient buildings create a financial burden for homeowners and businesses. Often inefficient homes and commercial properties affect those who can afford it least. Programs exist in the valley to provide some relief and improve equity for people burdened by inefficient buildings. The Gunnison Valley Home Energy Assessment Team (GV-HEAT) program has improved energy efficiency and health of buildings occupied by income-qualified homeowners and renters. GV-HEAT can assess homes, create a customized report of the home's energy use including problem areas, and then connects homeowners and renters with resources to improve the home's efficiency at low or no cost to the homeowner. The program could be expanded to provide a variety of services to increase home efficiency to all income levels with service cost varying based on income with the highest income levels receiving services at full cost or referrals and advice as appropriate.

Buildings: Electrification

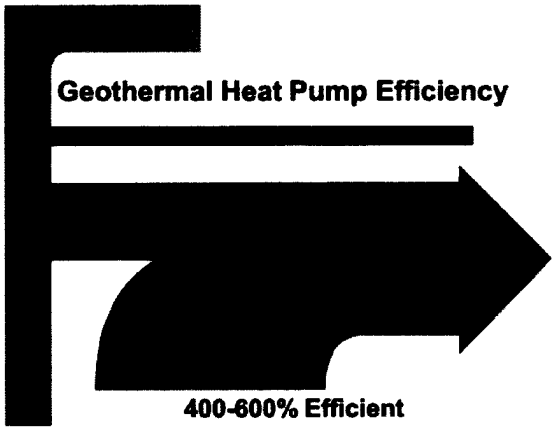
Currently natural gas provides the majority of energy utilized by buildings in the valley, doubling electrical energy with propane and wood providing a small fraction of overall building energy. Modern natural gas furnaces and boilers can achieve high efficiencies (90% +) when properly installed. Compared to emissions from the generation of electricity today, high efficiency natural gas equipment contributes less emissions. But, as electrical generation becomes cleaner in the next 10 years electricity will be cleaner. Furthermore, emissions from leaking natural gas infrastructure and drilling activities contributes a large amount of GHG's the State of Colorado estimated in 2019 that emissions from oil and natural gas activities represented 17% of the state's overall GHG's. The 2015 Gunnison Valley emissions inventory did not attempt to quantify natural gas emissions upstream from consumer use of natural gas in the valley.

[2] U.S. Energy Information Administration, Commercial Buildings Energy Consumption Survey 2012 table C10

Gunnison County, CO
7/22/2021 9:36:53 AM
447
677808
Page 9 of 23
R 0.00 D 0.00

However, it is a known problem and natural gas use can be cost effectively reduced and even eliminated in some cases by utilizing high efficiency heat pumps for heating buildings.

Electric heat pumps represent an opportunity to gain significant efficiency in buildings. Ground source (geothermal) heat pumps are proven and achieve efficiencies of over 400%. Air source heat pumps are now available that will operate in our environment at 100-250% depending on outside temperatures. The efficiency of heat pumps means they can heat and cool spaces while contributing to less emissions than natural gas even under current electric generation emissions factors. As electric generation becomes cleaner heat pumps multiply the environmental benefits through their efficiency.



Retrofitting existing homes is challenging so incentives either through subsidies for equipment, insulation, and air sealing are necessary. Market competition based on efficiency may be encouraged by simple disclosure of energy and efficiency metrics so those metrics will be easily compared and considered when purchasing or leasing.

b. Goal

Reduce average energy efficiency of residential buildings by 20% and commercial buildings by 25%.

If goals of 20% reduction in EUI for residential and 25% for commercial buildings were met it would result in a total GHG reduction of 52,157 metric tons CO_2e and a GHG reduction of 19% of the County GHG totals.

c. Policy recommendations

Policies recommended to achieve recommended goals are:

- Maintain adoption of IECC code at most current standard available.
- Create incentives for home owners and builders who voluntarily adhere to a more stringent than IECC building code like Passive House or the IECC Zero Code.
- Create an energy mitigation fee that applies to residential structures over a specified size (6,000 sq.ft.) or for high energy use amenities like snow-melt.
- Eliminate minimum size requirements set by home owner associations.
- Subsidize building energy audits for all income levels or make them free (could be priority to partner to increase capacity of GV-heat?)
- Incentivize air sealing through education for do-it-yourselfers and rebates (could be wrapped into building capacity for GV-heat?)
- Develop energy reporting standard for both residential and commercial buildings
    - -Commercial reporting to central website on annual basis

- -Residential home scoring or EUI disclosure at time of sale or lease. Make requirement for listing a standardized score or EUI prominently on MLS listing.

- Incentivize heat pump retrofit and other costlier improvements like windows and insulation through low-interest on bill financing.
- License builders and require annual training hours which include building science and efficiency.
- Award builders publicly with annual awards for lowest energy new construction and most energy reduced through renovation.

Policies to ban natural gas use are not encouraged at this time due to the limited and still emerging options for efficient electric heating. Incentivizing electrification as discussed in the previous section 3.7 and allowing contractors and homeowners to establish successful projects and best practices will create conditions for possible future action. Current building codes applied to modest size homes is already creating a market incentive against paying for natural gas taps on new construction because of the very small heating loads required. Conversely, a mandated ban on natural gas use resulting in poor projects or unintended consequences could set back nascent efforts to establish effective, efficient, and reliable electrification options in the near future.

5. Vehicle Travel

a. Sector Impacts

Vehicle travel accounts for 29% of county-wide GHG emissions. Emissions from the transportation sector continue to increase as actual fuel efficiency of vehicles is relatively stagnant because of the increasing popularity of SUV's and trucks and the increase in miles driven. These two factors influence emissions from vehicles:

- Fuel efficiency/ tailpipe emissions
- Miles traveled

The State of Colorado adopted the California Low Emissions Vehicle (LEV)[3] standard in 2018 which will have an effect on fuel efficiency and tailpipe emissions. The State has also adopted the Zero Emissions Vehicle (ZEV)[4] standard in 2019. The combination of the LEV and ZEV standards will lower emissions from vehicles by regulating vehicle efficiency and setting minimum sales quotas for ZEV's. National policies are also in place which will mandate increasing efficiency of vehicles over time. The effect of the Federal regulations has been modeled in the County's forecasting tool using data obtained from EIA forecast based on corporate average fuel efficiency (CAFÉ)

[3] Code of Colorado Regulations; 5 CCR 1001-24 (https://drive.google.com/file/d/1LmJQHfKUkzg6HuAKDZ0xzDO4MJMchxxA/view)
[4] Code of Colorado Regulations; 5 CCR 1001-24 (https://drive.google.com/file/d/1LmJQHfKUkzg6HuAKDZ0xzDO4MJMchxxA/view)

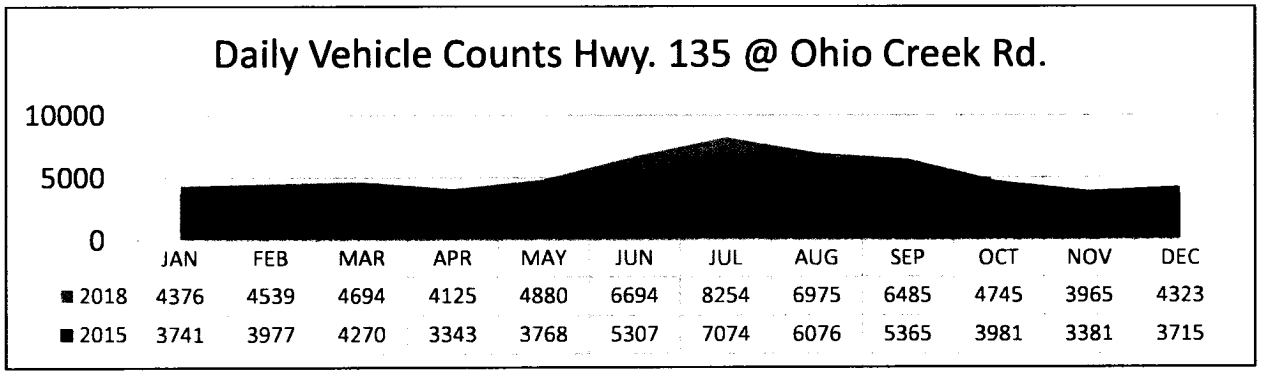
Gunnison County, CO
7/22/2021 9:36:53 AM
447
677808
Page 11 of 23
R 0.00 D 0.00

standards and projected vehicle sales.[5] The results estimate a 28% reduction in GHG's from the transportation sector by 2030. The federal CAFÉ standards are assumed in the BAU scenario. The State's additional standards are will further increase fuel efficiency and incentivize more electric vehicle sales. The State has a stated goal of having 940,000 electric vehicles (EV's) on the road by 2030, this represents nearly 50% of registered vehicles in Colorado.

Miles traveled in the County is the other variable accounting for vehicle emissions. For the purposes of the County's GHG baseline report an estimated vehicle miles per person per day (VMT) has been established. Total annual road miles in the county we estimated from Colorado Department of Transportation (CDOT) database[6]. The total miles were divided by population for an average VMT per capita of 26 miles per day in 2015.

The VMT trend between 2015 and 2018 is increasing traffic and increasing VMT per person:

- Average annual vehicle counts on Hwy 135 and Hwy 50 are up 18%.
- Increases of up to 30% in summer months.
- 10% increase at lowest traffic in shoulder seasons.



Growth in VMT from 2015-18' = 18% Population growth from 2015-18'= 4%

This data indicates that the trend of increasing VMT is likely connected to both tourism traffic but local commuter traffic as well. During the same 3-year time period county population grew by about 4%. Vehicle travel is growing faster than population. This trend aligns with long-standing national trends of increasing VMT, as a point of reference the national average VMT in 1980 was 18.5 in 2018 it was 27. The RTA bus is very successful with 224,718 one-way passenger trips logged in 2019. That works out

[5] Energy Information Administration (EIA); Annual Energy Outlook 2019, Table: Transportation (https://www.eia.gov/outlooks/aeo/data/browser/#/?id=7-AEO2019&region=0-0&cases=ref2019&start=2017&end=2030&f=A&linechart=ref2019-d111618a.5-7-AEO2019&sid=&sourcekey=0)
[6] CDOT Traffic Data Explorer: https://dtdapps.coloradodot.info/otis/TrafficData#ui/0/1/0/criteria//51/true/true/

to displacing an average of 387 cars per day or about 10% of the commuter vehicle traffic.[7]

b. Goal(s)

Reduce VMT by 8% by 2030.

Achieve 50% electric vehicle or renewable fuel vehicles by 2030.

Reducing VMT by 8% would reduce overall emissions by about 28,000 mt CO_2e annually. Achieving 50% EV's or alternative fuel registered vehicles would reduce emissions by about 26,500 mt CO_2e annually.

Transportation: RTA bus service

RTA Impact (2019)
- 224,718 one way passenger trips
- 141,332 one way car trips displaced/yr
- Avg. 387 cars per day

c. Policy Recommendations

Policies to reduce VMT:

- Increase mass transit availability
  - RTA buses per day summer and winter
  - Gunnison circulator bus
- Increase regional mass transit availability (Bustang) East and West out of Gunnison
- Promote Ridesharing
- Inconvenience driving
  - Paid parking
  - Slow speed limits
- Increased multi-modal space on streets/sidewalks
- Improve sidewalk connectivity
- Commercial development site planning accommodates for bikes and pedestrians
- Build Workforce housing near jobs and services
- Increase density and mixed uses in planning and zoning
  - Planning to include and transit/bike access to trailheads

Policies to increase electric and renewable fuel vehicles:

- Install or support the installation of electric vehicle charging stations
- Require electric charging stations in new multi-family housing
- Require electric vehicle charging ready spaces in new single-family homes and townhouses

[7] The lowest avg. daily vehicle count occurs in March, 2019= 3965 vehicles per day on Hwy 135 (CDOT Traffic Data Explorer)

Gunnison County, CO
7/22/2021 9:36:53 AM
447
677808
Page 13 of 23
R 0.00 D 0.00

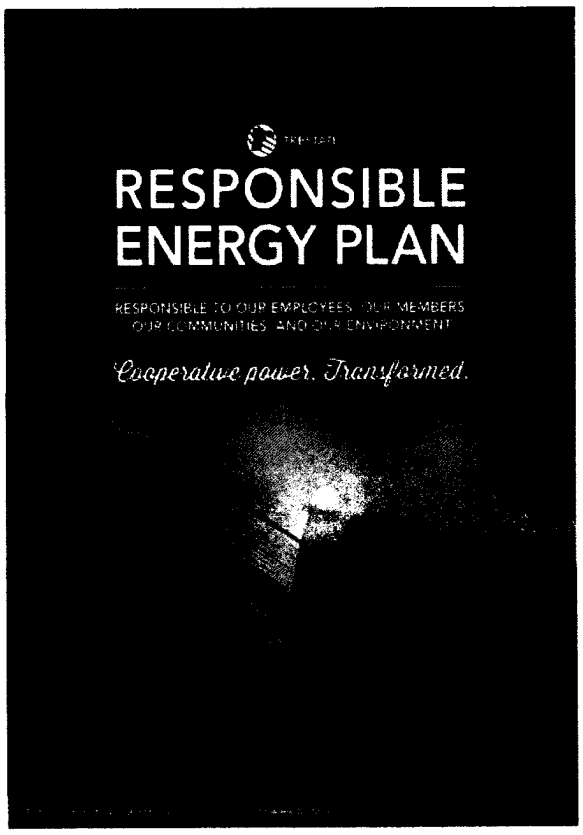
- Work with utilities to ensure electrical infrastructure is prepared for electric vehicle charging loads
- Convert local government fleets to alternative fuel sources
- Promote adoption of a Renewable Fuel Standard policy at the State level

6. Energy/ Utilities

a. Sector Impacts

42% of greenhouse gas emissions in the county are from electricity generation, 19% of the total county footprint comes from natural gas and propane. Nearly all utility energy is consumed in buildings with a small amount of electric power being used for ski operations and other commercial processes and operations. Building efficiency will reduce consumption of electricity and gas but the biggest opportunity to reduce emissions from the Energy/Utilities sector is by changing electric generation.

The electric sector in the Gunnison valley is served by GCEA and the City of Gunnison. Each receive power from wholesale power providers under long-term contracts that require all power purchased by the utility to come from the wholesale power provider with carve outs for small amounts of self-generated energy or power purchases from local renewable projects.



GCEA's wholesale power provider is Tri-State generation. In 2015 Tri-State's emission factor which is a measure of GHG emissions per kWh of power produced was 0.735 $kgCO_{2e}$/kWh. The City of Gunnison's wholesale power provider is Municipal Energy Agency of Nebraska (MEAN). The City also receives an allocation of hydro energy from the Western Area Power Administration (WAPA) which accounts for about 30% of the City's power supply. The resulting emissions factor of the City of Gunnison utilities from combined power from MEAN and WAPA in 2015 was 0.510 $kgCO_{2e}$/kWh.

Utility Scale Renewables

In late 2019 Tri-State announced its intention to reduce its emission in line with the State's goals. Tri-State also became regulated by the Public Utilities Commission which has the power to enforce emissions reductions mandated by the State. Tri-State's "Responsible Energy Plan" promises a 70% reduction in CO_{2e}

emissions by 2030 from the 2005 baseline. This major change in Tri-State's future strategy includes closing all if it's Colorado coal generation resources and building more than 1 gigawatt of additional utility scale renewable resources.[8]
In the fall of 2019 the City of Gunnison announced plans to negotiate a power supply contract with their wholesale power provider to provide the City with wind energy to replace the portion of their power supply that is derived from fossil fuels and compliment the large portion of hydro energy the utility already receives.

The changes in electric utility emissions factors will dramatically lower GHG emissions from the Gunnison Valley resulting in a reduction in emissions of over 30%. However, they also present an opportunity to go even further through beneficial electrification of the building and transportation sectors. As discussed in section 4; building electrification and the use of both ground source (geothermal) and air source heat pumps will reduce energy used by buildings and when that electrical energy comes from low carbon sources the cumulative effect is even greater GHG reductions. Similarly, cleaner electricity offers will make electric vehicles more impactful in reducing emissions. It a tacit trade; as utilities invest in renewables and the grid becomes cleaner there is more incentive to promote the use of electricity in place of fossil fuels for both buildings and transportation.

Locally both the City of Gunnison and GCEA have opportunities to build utility scale renewable projects up to a limit based on a percentage of their total use. GCEA is actively working to develop hydro power at the Taylor Dam and is also working to develop grid scale solar installations. The City of Gunnison is collaborating with the County to develop a grid scale solar array at the airport.

Distributed Renewables
Distributed renewables, owned or leased by the customer rather than the utility is another way to integrate renewables into the grid. Both electric utilities offer net-metering options for distributed renewables. The percentage of consumers who have taken advantage of the net-metering policies is small but as the cost of solar panels continues to fall and if finance rates continue to stay low, more consumers may invest in their own solar arrays.

Wholesale Utility Emissions Reductions
Generation and Transmission (G&T) utilities that serve the valley include Tri-State Generation and Municipal Energy Association of Nebraska. Tri-State has submitted plans to the Colorado Public Utilities Commission that would lower emissions by 80% from 2005 levels by 2030. For the City a reduction of 80% from 2015 levels is targeted for 2030 based upon the City's goal of 100% wind power to supplement the City's hydro power allotment. The City's electric emissions were not assumed to be zero because of an acknowledgement that the utility will still rely on some fossil fuel generation during

[8] https://www.tristategt.org/sites/tristategt/files/PDF/Responsible-Energy-Plan/Tri-State-Responsible-Energy-Plan.pdf

times that wind and hydro cannot meet demand. The 80% reduction from 2015 still represents a very low electric emissions factor.

a. Goal

Reduce emissions from electric generation by 80% from 2005 baseline by 2030.

Wholesale electric utilities achieving the emissions reductions discussed above will result in emissions factors of:

- GCEA: 0.227 $kgCO_2e/kWh$
- City of Gunnison: 0.157 $kgCO_2e/kWh$

These lower emissions factors are forecast to reduce emissions from the Gunnison Valley by about 68,000 mt CO_2e by 2030.

b. Recommendations

- Support local renewable projects by creating processes for review in land-use planning, renewable projects often cover large areas but have much different impacts than large commercial or residential development.
- Continue to monitor PUC proceedings and advocate for aggressive planning and enforcement of the transition to low-carbon electricity generation.
- Utilize publicly owned parcels (where appropriate) for grid scale renewable projects or community solar (subscription) projects
- Encourage on-site renewables like rooftop PV by creating an easy review process and removing barriers like architectural controls.
- Develop Renewable Energy Mitigation Program similar to Aspen with proceeds benefitting low-income households, potentially through GVHEAT

7. Waste

a. Sector Impacts

Waste represents around 8% of total emissions from the valley. Emissions related to waste mostly come from the decomposition of organic waste and the generation of methane with that decomposition occurs anaerobically which is generally the case in landfills. A couple of opportunities exist to mitigate waste related emissions:

- Reduce organic waste being landfilled by diverting it to composting or digestion facility (digestion would result in methane used to displace natural gas)
- Eliminate methane escaping into by flaring it on-site as it is generated at the landfill (generates CO_2)

Diversion of organic waste from the landfill is being done in several major cities and similar counties to Gunnison like Pitkin and Summit County, Utah. Diversion projects can produce feedstock for compost facilities or anerobic digesters that generate renewable natural gas. Both will have ancillary emissions impacts including; transportation and material handling to combustion of methane in the case of anerobic digestion. Challenges include:

- Land to operate large compost operation
- Logistics of further segmenting waste streams that already separate recycling from other waste
- Animal proof curbside containers
- Contamination and mixing of trash or recyclables with organics

b. Goal

Divert 100% of organic waste from the landfill by 2030.

If all organic waste was diverted from the landfill emissions would be reduced by about 15,500 mt CO_2e annually.

c. Policy Recommendations

- Promote back-yard composting through low or no cost compost barrels to consumers and education
- Create landfill fee for non-organic waste; revenue from which supports a composting facility
- Work with Waste Management to negotiate a landfill agreement and organic waste diversion plan (potentially reduced landfill rates in exchange for commitment to divert organics)

8. Discussion/ Summary

a. Connection/ links to other priorities

Sustainable Tourism

Tourism is a main driver of the economy in the Gunnison Valley. The Sustainable Tourism and Outdoor Recreation Committee (STOR) is working to address tourism-based impacts upon local landscapes through collaborative action of land management agencies, local government, and other stakeholders. The STOR group has not at this time addressed the impact tourism has upon GHG emissions. Opportunities exist to educate and encourage tourists and local recreationalists to lower their GHG footprint. Including developing a trailhead planning process that considers rideability and transit opportunities from population centers to reduce vehicle traffic at trailheads and VMT associated with activities.

Affordable Housing

Affordable housing is a crisis for the Gunnison Valley. There is not enough housing available at price points that can be attained by workers in the median and low-income ranges. Additionally, the condition of much of the existing housing stock that is affordable is poor and uses more energy to heat than the average home. Improving the efficiency of existing housing stock will reduce the cost burden to heat homes and make them more affordable. Creating housing that is near jobs that can support the housing costs will reduce traffic and the associated emissions. Creative use of deed restrictions, housing efficiency standards, and land use processes including maintenance codes may offer opportunities to incent and fast track workforce housing and redevelopment of existing, blighted housing.

Gunnison County, CO
7/22/2021 9:36:53 AM
447
677808
Page 17 of 23
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Land Use

Land use planning can both reduce additional emissions through tactics like limiting sprawl. Also, promoting land management strategies that will lead to more carbon sequestration in soils can be achieved through supporting research and education efforts and by maintaining open spaces and working ranches. Land agencies like BLM and Forest Service may also have opportunities to maximize carbon sequestration through land management strategies. Carbon sequestration in landscapes is an intentional, active process that will require people to achieve. It will support ranchers, foresters, and others who manage lands and may bring added value and revenue to struggling industries.

Economic Development

Local economic development and maintenance of existing economic engines is dependent upon the Gunnison Valley's landscapes and climate. Climate change poses a risk to our current uses and future growth because it increases the occurrence of unpredictable and unseasonal weather and precipitation. Greater variability and the likelihood of a dryer and hotter average climate threatens the stability of the ski industry, ranching, increases fire risk, and makes our forests more fragile and less resilient to recovering from human impacts. Though we cannot affect global climate change by the actions of this valley alone, we have a moral obligation and a financial obligation to the next generations to do what we can to reduce GHG emissions that lead to global anthropogenic climate change.

Organizational Alignment

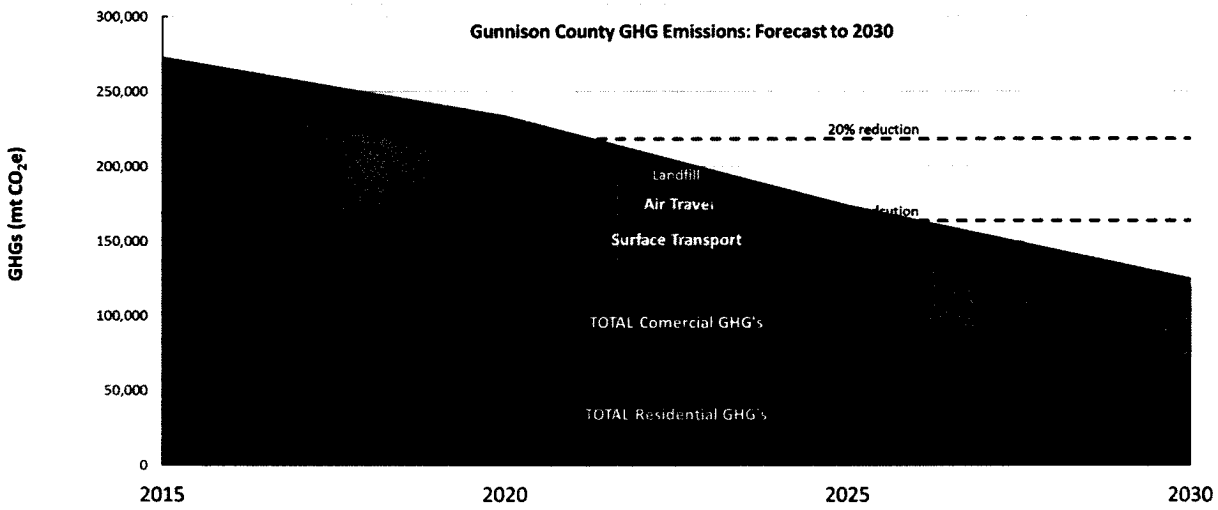
Each of the local governments in the Gunnison Valley has expressed interest and set goals around reducing emissions. Coordinated policy making among all of the local governments is necessary to reach the goals we need to achieve especially around the transit/ housing nexus and tourism related traffic and parking impacts. Building codes that are consistent and similar across the county will make adaptation by builders easier. As development continues to push out of the towns land use planning and coordination between municipalities and the County is and will continue to be necessary to minimize sprawl and meet growth demands.

Rather than sustainability being another program or plan, what is needed is organizational culture change that considers sustainability, energy use, and emissions in all decisions and plans. These issues should be a fundamental filter for decision making just as cost and community preference are.

9. Conclusion

a. Forecasted greenhouse gas reduction of combined recommendations

When the greenhouse gas savings from all recommendations for each sector discussed are applied together the result is a forecasted emissions reduction of greater than 50% from 2015 levels by 2030.



These results are in alignment with the IPCC recommendations to stay within a 1.5-degree Celsius global warming scenario. This modeled path is possible but will take enormous effort by local and state government, business, and the citizens of the Gunnison Valley. The co-benefits of the actions needed to achieve this goal are: cleaner air, a vibrant economy, better housing, less traffic, and lower energy costs.

Final Thoughts

Citizens and leaders in the Gunnison Valley have been aware of the threat of climate change for a long time. Several efforts to measure the valley's carbon footprint and reduce it have been undertaken and progress has been made, but results are lagging goals. In 2016 Gunnison County commissioned a new carbon footprint baseline report that was completed by Dr. Abel Chavez and the Community Solutions Incubation + Innovation (CS2I) Lab and Western Colorado University based on 2015 GHG emissions levels. The report revealed little change in overall emissions from the prior report that was based on 2005 levels, however direct comparisons are difficult because methodologies have changed.

The 2015 GHG emissions baseline highlighted the need for additional action. Subsequently the Town of Crested Butte commissioned a GHG baseline report and developed a Climate Action Plan with aggressive goals to reduce emissions both in the Town's operations and community-wide. The City of Gunnison also incorporated climate goals into its 2019 Master Plan. With momentum developing and community demands for climate action becoming stronger the One Valley Leadership team along with community members and volunteers at the Gunnison Valley Climate Conference in January 2020 provided a broad outline and a path toward large reductions in greenhouse gas emissions. The conference attendees and stakeholders were able to model reductions of 50% which align with IPCC targets to contain climate change to 1.5 degrees Celsius. This is an important and encouraging outcome. The 50% reduction in emissions was not set as an aspirational goal but rather was derived from the hard work of analyzing each sector contributing to the valley's overall emissions and discussing practical application of strategies and modeling their likely impact on emissions. Change

Gunnison County, CO
7/22/2021 9:36:53 AM
447
677808
Page 19 of 23
R 0.00 D 0.00

of this magnitude will likewise not be affected through proclamation, but will instead require policy, regulation, and reinforcement of the goal in organizational decision making to reduce emissions at nearly every level of local government. Climate change mitigation must become incorporated into the culture of intuitions and our community to be successful. The effort put forth by this generation will result in outcomes enjoyed by the next, we have a moral obligation to ensure success.

SUMMARY OF ALL GOALS AND STRATEGIES

Strategies:	Sector:	Goal:	Responsible Organization
• Maintain adoption of IECC code at most current standard available. • Create incentives for home owners and builders who voluntarily adhere to a more stringent than IECC building code like Passive House or the IECC Zero Code. • Create an energy mitigation fee that applies to residential structures over a specified size (6,000 sq.ft.) or for high energy use amenities like snow-melt. • Eliminate minimum size requirements set by home owner associations. • Subsidize building energy audits for all income levels or make them free (could be priority to partner to increase capacity of GV-heat?) • Incentivize air sealing through education for do-it-yourselfers and rebates (could be wrapped into building capacity for GV-heat?) • Develop energy reporting standard for both	Buildings	20% residential efficiency improvement 25% commercial efficiency improvement	Gunnison County City of Gunnison Town of Crested Butte Town of Mt. Crested Butte

residential and commercial buildings ○ -Commercial reporting to central website on annual basis ○ -Residential home scoring or EUI disclosure at time of sale or lease. Make requirement for listing a standardized score or EUI prominently on MLS listing. • Incentivize heat pump retrofit and other costlier improvements like windows and insulation through low-interest on bill financing. • License builders and require annual training hours which include building science and efficiency. • Award builders publicly with annual awards for lowest energy new construction and most energy reduced through renovation.			
• Increase mass transit availability ○ RTA buses per day summer and winter ○ Gunnison circulator bus • Increase regional mass transit availability (Bustang) East and West out of Gunnison • Promote Ridesharing • Inconvenience driving	Vehicle Travel	Reduce VMT by 8%	RTA City of Gunnison All (land use to promote density)

○ Paid parking ○ Slow speed limits • Increased multi-modal space on streets/sidewalks • Improve sidewalk connectivity • Commercial development site planning accommodates for bikes and pedestrians • Build Workforce housing near jobs and services • Increase density and mixed uses in planning and zoning ○ Planning to include and transit/bike access to trailheads			
• Install or support the installation of electric vehicle charging stations • Require electric charging stations in new multi-family housing • Require electric vehicle charging ready spaces in new single-family homes and townhouses • Work with utilities to ensure electrical infrastructure is prepared for electric vehicle charging loads • Convert local government fleets to alternative fuel sources • Promote adoption of a Renewable Fuel Standard policy at the State level	Alternative fuel vehicles	50% EV or renewable fuel vehicles	ALL

• Support local renewable projects by creating processes for review in land-use planning, renewable projects often cover large areas but have much different impacts than large commercial or residential development. • Continue to monitor PUC proceedings and advocate for aggressive planning and enforcement of the transition to low-carbon electricity generation. • Utilize publicly owned parcels (where appropriate) for grid scale renewable projects or community solar (subscription) projects • Encourage on-site renewables like rooftop PV by creating an easy review process and removing barriers like architectural controls. • Develop Renewable Energy Mitigation Program similar to Aspen with proceeds benefitting low-income households, potentially through GVHEAT	Electric Utilities	80% emissions reduction	GCEA and City of Gunnison – Utilities

Gunnison County, CO
7/22/2021 9:36:53 AM
447

677808
Page 23 of 23
R 0.00 D 0.00

• Promote back-yard composting through low or no cost compost barrels to consumers and education • Create landfill fee for non-organic waste; revenue from which supports a composting facility • Work with Waste Management to negotiate a landfill agreement and organic waste diversion plan (potentially reduced landfill rates in exchange for commitment to divert organics)	Waste	Divert 100% organic waste from landfill	Gunnison County City of Gunnison Town of Crested Butte Town of Mt. Crested Butte