TOWN OF MOUNTAIN VILLAGE
SPECIAL GREEN TEAM COMMITTEE
MEETING WEDNESDAY,
DECEMEBER 11, 2019, 2:00 PM
2ND FLOOR CONFERENCE ROOM, MOUNTAIN VILLAGE TOWN HALL
455 MOUNTAIN VILLAGE BLVD, MOUNTAIN VILLAGE, COLORADO
AGENDA

Item #	Time	
1.	2:00	Call to Order
2.	2:00	Eco Action Partners (EAP) *Attending in person* • Exhibit A: EAP Response to Questions • Exhibit B: San Miguel / Ouray Regional Strategy and Action Plan – Mountain Village Actions. • Exhibit C: 2010-2020 Projection Wedge Chart for Region • Exhibit D: Collaborative Sustainability Action Plan & Implementation Methodology for Ouray and San Miguel Counties 2010-2020 • Exhibit E: RFP Submission EAP
3.	2:30	Lotus Engineering and Sustainability *Google Hangouts* Dial in Number: 1-575-323-9117 Participant Code: 689117615# • Exhibit A: Lotus Response to Questions • Exhibit B: RFP Submission Lotus Engineering
4.	3:00	AET Group Inc. *Go-to-meeting* Dial in Number: 1-866-215-2935 Participant Code: 4920276 • Exhibit A: AET Response to Questions • Exhibit B: RFP Submission AET
5.	3:30	Adjourn

MV GHG Proposal Questions – Responses from EcoAction Partners:

1. What is the process and/or tools for continuing education and data tracking after the initial year.
    1. Will all data and processes be proprietary?

EcoAction Partners can coordinate communication between MV staff & LEIF, LLC (owner of the copyright for the current software) in order to facilitate the development of an NDA for MV staff to use the software.

Once that is complete, EcoAction Partners will be able to share MV's GHG Inventory software for 2019 & other previous years, and to educate staff on its details. Depending upon the Excel software capacities of the staff member, and the depth of education desired, this could be a rather lengthy process, that will likely require multiple iterations of Q/A in order for the staff member to gain a comprehensive understanding.

It should also be noted that the process of collecting regional usage data and formatting it or performing related calculations in order to prepare it for entry into MV's GHG Inventory software, is the same process that EcoAP performs for the regional GHG Inventory, and plans to continue performing into the future. Thus it would be prudent to prevent duplicative efforts. In addition, during the annual update process, EcoAP updates emissions factors and methodology as needed, to maintain GHG Inventories for the region that are current and best-practice possible given the data available, as well as maintaining consistency among the inventories.

Depending upon whether MV staff will be responsible for gathering data, manipulating & entering data, and updating the software, or a portion of the above, or none of the above and only using the results for updating a GHG Inventory report & Climate Action Plan, would impact the process and budget for providing education and ongoing support. Thus, without more information, it is difficult for EcoAction to come up with a budget estimate for this process.

2. What is the process for evaluating recommendations? Are resources, plausibility, and comparable municipalities achievements taken into account.

In the 2017 & 2018 MV Community GHG Inventory reports, recommendations have been included as a comprehensive list, based on input and ideas from MV staff and Green Team. Some prioritization and elimination was performed based on estimated impact, feasibility, ease of implementation, and other input that was provided. Further analysis was not performed.

In the initial 2010 regional GHG Inventory, an Actions Matrix calculates estimated GHG reductions for various recommended actions and then displays them in a

for projected “Reduction Wedge” chart. The actions selected to be included here were based on input from EcoAction Partners and the Sneffels Energy Board as to what was most feasible to perform in our region. The Sneffels Energy Board developed the full Action List in the Regional Sustainability Action Plan based on a thorough process guided by the Governor’s Energy Office. These actions were later prioritized by the Board based on: Community-wide energy savings, Public acceptance / political feasibility, Ease of implementation, Cost to beneficiary, Co-benefits, and Return on investment / Cost of program. This entire process and regional plan will be reviewed and updated by the SEB during 2020.

The original 2010-2020 Reduction Wedge chart, full regional Sustainability Action Plan (STRATEGY) and MV’s specific Action Plan are provided for your reference as to what has been developed and utilized regionally.

3. Will there be a focus on Building codes?

Reducing building energy use is recommended to continue to be a high priority for MV. Thus, updating the Building Energy Codes with appropriate amendments for MV and updating the REMP program to current calculation values are important recommendations that will be provided. Detailed specific recommendations and technical support to the Planning and Building Department through the adoption process are not planned to be included under this GHG Inventory proposal, but are instead being negotiated with the Planning and Building Department separately.

Other recommendations for reducing energy use of existing buildings would also be proposed.

4. Will there be the opportunity for in person meetings?

Yes

5. What would the flow chat be, who will be involved in this project?

Kim Wheels will be the primary contact for this project. EcoAction Partners Board and new Executive Director (when hired) will provide review and support as needed. Olivia Pederson would assist with any graphic artist expertise needed for producing reports.

6. What are the additional costs for the following years?

Expenses in future years are in part related to the last paragraph response to #1.

If EcoAction Partners' services provided remain the same as outlined in our proposal (Detailed Proposal of Tasks & Costs on page 9), costs are estimated to be very similar in future years. Costs for future contracts would vary based on the scope of work, and estimate of the cost would be provided during contract negotiations.

San Miguel / Ouray Regional Strategy and Action Plan
Mountain Village Actions

I. COMMUNITY ENGAGEMENT (POLICY, RESEARCH & EDUCATION)

OBJECTIVE 1: Ensure that policy decisions at all levels (government, business, and individual) advance the New Energy Economy so that our communities will have economic opportunities related to energy efficiency and renewable energy and will develop and thrive in a sustainable manner. Implement a highly visual, public overall measure of progress.

I.1. GOAL: Adopt and implement public policies to increase energy efficiency, use of renewable energy, decrease water consumption, and reduce dependence on fossil fuels.

Local Government Action Items-All

1.) Where appropriate, support mixed-use and affordable housing developments on commercial projects to reduce transportation energy, with context appropriate regulations to mitigate adverse impacts (eg: conflicts between residential and more intensive commercial and industrial uses).
2.) Promote a leadership position and advocate on renewable energy supply and efficiency issues.
3.) Support community efforts to move towards greater energy independence.
4.) Actively work with other communities and any statewide efforts to improve regional, statewide, and national policies and laws influencing energy use.
5.) Review Local codes to ensure they are in line and not in conflict with the community's desire to become more sustainable.
6.) Assess feasibility of implementing a carbon (or energy) tax. (Use Boulder's Carbon Tax as example.) Implement if determined feasible and beneficial.
7.) Assess feasibility and possible results of implementing a 'Feed In Tariff' program that establishes a fixed rate for renewable energy power generated. Engage with SMPA on this topic.

Mountain Village

1.) Implementation of newly adopted Wildfire and Forest Health regulations; research of biomass energy production with dead wood from forests
2.) Comprehensive Plan is developed around a Sustainability Framework; review and revise LUO/Design Guidelines to allow for better environmental protections and incentives for renewable energy projects; investigate limits for maximum home sizes and energy taxes and incentives for new buildings

I.2. GOAL: Engage and advocate for collaborative, policy and legislative solutions at regional, state and federal levels.

Local Government Action Items - All

1.) Participate in and help develop effective regional, state, and federal solutions to reduce emissions.
2.) Engage utility companies and assist local agencies in achieving greenhouse gas reduction targets.
3.) Enable long-term solutions by investing in science and engineering education.
4.) Actively participate in WSJCEB.

Mountain Village

1.) Mountain Village presence at SMPA meetings, send letters, have an active role in SMPA renewable energy program

I.3. GOAL: Advocate for programs, policies and legislation to reduce global emissions.

Local Government Action Items - All

1.) Support USA participation in international greenhouse gas reduction efforts.
2.) Support other organizations that lobby for these goals, such as: Alliance for Sustainable Colorado, CML, CCI, Club 20, Colorado Counties, Inc., National Association of Counties, Colorado County Managers Association
3.) Provide letters of support and communications for federal renewable energy policy programs
4.) Support local, state organizations that improve renewable energy policies.

I.4. GOAL: Continue to improve and increase partnerships with utility providers, local/state/federal governments, and private industry, to maximize resources and outreach efforts for Southwest Colorado that ultimately contribute to the realization of the region's goals, inclusive of grant and loan opportunities to finance necessary and desired improvements.

Local Government Action Items - All

1.) Assist in promotion of energy efficiency and renewable technology rebate, tax credit, and loan programs offered by local utilities, the GEO, local and federal governments through the building permit process and other community interactions as allowable.

2.) Establish a communications network among the entities listed in the comprehensive regional network of Section 2.6.

Mountain Village

1.) Familiarize staff with rebate and incentive programs and share with community, provide information, assist with paperwork if possible

OBJECTIVE 2: Improve education of our regional population, both permanent and part-time, so that all are continually informed about actions they can personally take to reduce per-capita energy consumption, and understand the relationships between energy and water conservation, saving money, environmental preservation, and GHG reduction. Educational topics will include:

- Energy Efficiency – homeowners, renters, contractors, governments
- Renewable Energy
- Transportation
- Water Conservation
- Zero Waste
- Buying Local

I.5. GOAL: Education and Program Promotion

I.5.a. Market programs and conduct community outreach to increase participation in energy and water reduction efforts.

I.5.b. Provide education through a variety of venues.

I.5.c. Provide data needed by the community to understand the need for action to reduce global warming.

Community Action Items - All

1.) Partner with community-based non-profit organizations, such as TNCC, and others, such as libraries and schools, to undertake public outreach and education efforts that broaden community involvement in reducing greenhouse gas emissions.

1. a) TNCC shall develop regular educational topics and host free community education, making topics easily understood and end results easily attainable through:

- TNCC website
- Regular column in the regional newspapers
- KOTO interviews
- Green Business Roundtables
- Field trips and workshops; hands-on activities to educate attendees
- Public equivalent of the Green Business Roundtable (Sustainability Café)
- Develop focus groups to assist in picking topics which will be accepted by and generate interest in the citizens

1. b) Provide energy education for schools and establish a partnership program.

2.) Develop and publish quarterly updates to overall sustainability measures adopted by the CEB

- Make updated graphics and interesting-have links from all governmental web pages
- Make sure that the updates continue to point out why each has a different measure and the net positive effect that each measure will achieve.

2.) Market and encourage participation in incentive programs (such as…) that improve energy efficiency, increase renewable energy, reduce water consumption, or increase other sustainability goals.

3.) Foster and build public-private partnerships that help achieve greater energy efficiency and reduce greenhouse gas emissions.

3. a) Educate by showing specific action items (encourage walking vs. driving) Create an online calculator for high altitude driving that reflects the reduction effect
3. b) Educate by having tools that simply point out what specific steps in lowering carbon can mean to individual and community
3. c) Notification to public/private sector of specific programs that will work for them…not just a mass e-mail

Mountain Village

1.) Develop a Mountain Village "green" newsletter, community news with environmental focus
1.a) Community newsletter Green pages, updates on web site; increased environmental education programs and activities, field trips in community, install interpretive signage at renewable energy project sites
2.) Develop a strategy for reaching the residential sector of our community.
3.) Generate a community contact list of local "do-ers" for volunteer resources.

I.6. GOAL: Increase participation of public in Carbon Offset programs

Community Action Items - All

1.) Educate public about verifiable, reliable and effective options to offset energy use, and reduce their carbon footprint.
1. a) Promote SMPA's Green Blocks and Green Cents programs
1. b) Educate about and promote the Colorado Carbon Fund
1. c) Educate about and promote TNCC Green Fund – voluntary local option

Mountain Village

1.) Support and promote local offset funds: clearly define offsets, costs, where money goes, improve understanding and transparency of these programs.
2.) Strategize fundraising options for local TNCC Green Fund, including ads in community newsletter

II. OVERALL ENERGY CONSUMPTION

OBJECTIVE: Decrease per-capita energy consumption in San Miguel and Ouray Counties 20% by 2020 from 2005 levels, defining "per capita" as the total number of regional inhabitants, both full-time and part-time, and using Source Gas and SMPA utility data, through a broad-based, multi-sector, multi-disciplined approach that employs education and action focused on energy conservation, energy efficiency and renewable resources.

II.1. GOAL: Reduce energy consumption directly attributable to all governmental facilities and operations by 20% or more by 2020 (or sooner) from 2005 levels, through increasing energy efficiency in all buildings and operation.

Local Government Action Items - All

1.) Explore funding opportunities for assessing and implementing energy efficiency projects on government buildings.
2.) Energy audits will be performed on all municipal buildings to identify opportunities for decreasing energy use and saving money.
3.) The Town/County will invest in energy efficiency improvements on municipal facilities with a reasonable payback period. Other funding mechanisms will be explored for improvements with longer payback time periods.
4.) "Low hanging fruit" energy efficiency items such as lights, computers, and shop heaters will be implemented first.
5.) The Town/County commits to using best practices in energy efficiency and renewable energy in construction of all new buildings and operations.
6.) The Town/County will measure and track annual energy consumption in facilities and track annual progress toward lower emissions. Energy costs and trends will be transparent and reported annually during the annual budget cycle. Staff must see the energy bills
associated with their department.
7.) Coordinate regular meetings with jurisdictional energy staff to review challenges, accomplishments and opportunities to collaborate on improvements to government energy efficiency. Explore joint grant opportunities.
8.) Explore feasibility of and potentially implement an energy efficiency / savings contest among or within each jurisdiction with rewards / incentives for achieving energy use reduction.

Mountain Village

1.) Collect and establish baseline information and data for each town department/facility
2.) Perform energy audits for each
3.) Review existing Greenhouse Gas reports, data and confirm accuracy of data records

II.2. GOAL: Encourage and incentivize existing buildings (commercial & residential) to reduce energy consumption 20% below 2009 levels by 2020.

Local Government Action Items - All

1.) Implement a PACE (or similar) program, making funding available to residential and commercial property owners seeking to improve
their properties to conserve energy and water, and to generate solar energy.
2.) Pursue State and Federal funding programs designed to reduce energy demand through conservation and efficiency.

Community Action Items - All

1.) TNCC – Engage community members, Residential & Small Commercial, in actively tracking and reducing their own energy use and carbon footprint through utilizing the Eco-Audit Software Program
2.) Engage the Lodging & Resort Community in actively reducing their energy use. Implement an Energy Efficiency contest with Aspen's Resort Community, utilizing the EPA / ENERGY STAR guidelines for Hospitality.
3.) Explore and identify opportunities with the GEO, Housing Resources of Western Colorado, Delta Housing Authority, Rural Development, the Colorado Youth Corps, and other operational and/or financing organizations to market and grow existing weatherization and home rehabilitation programs throughout the region, and to expand these program concepts beyond the current income-restricted categories *(ie: weatherization opportunities for households earning greater than 200% of the Federal Poverty Guidelines, and home rehabilitation opportunities for households earning greater than 80% of the Area Median Income limits).*

Mountain Village

1.) Develop outreach and education plan for MV residents; encourage small renewable installations; develop tracking system for residential usage
2.) Engage resort hotels and lodging facilities, study FKL/ Fairmont model and Green Team

II.3. GOAL: Reduce energy demand of new building construction, including all renovations and remodels that require a building permit.

Community Action Items - All

1.) Require all new construction (commercial & residential) to meet or exceed the energy efficiency of the 2006 (or beyond) International Energy Conservation Code by 2011.

2.) Adopt policies and ordinance changes to reduce energy use by promoting domestic water conservation and requiring water efficient landscape improvements associated with new construction.

3.) Reduce greenhouse gas emissions from buildings and energy use. Require or request discretionary development projects to assess greenhouse gas emissions due to energy use, and to incorporate energy and water conservation measures into projects along with other features or programs.

4.) Encourage reduction of vehicle fuel consumption pertaining to construction projects, through carpooling of contractors/trades, reducing trips of trucks and other vehicles to jobsite, and other creative methods.

5.) Encourage construction schedule to be planned in a manner that eliminates the need for "wrap and heat" of the construction site or heating of the ground during cold months.

Mountain Village

1.) Investigate energy taxing for large usages, credits, efficiencies, innovative policies of construction; investigate maximum home sizes

II.4. GOAL: Work toward region becoming carbon neutral by 2035.

Community Action Items - All

1.) By 2012, find a community willing to set goal of becoming carbon neutral by 2020, as a model for region.

2.) Conduct feasibility studies for communities in region to become carbon neutral.

3.) Conduct feasibility studies and take actions toward communities going "off-grid".

4.) Calculate current Carbon Footprint of each entity in region.

Mountain Village

1.) Research carbon-reducing technologies.

III. RENEWABLE ENERGY - ELECTRIC

OBJECTIVE: Obtain 20% of the region's electricity from renewable energy by 2020. Sources will include a mixture of local small and large-scale renewable energy projects and purchase of RECs for renewable energy produced outside of the region.

III.1. GOAL: Increase the amount of RE produced on governmental facilities/properties to XX% of the total electricity used by 2020. Purchase remaining electricity through a Renewable Energy or Green Power production program.

Local Government Action Items - All

1.) Facilitate the development of small or large-scale RE systems on government property. Micro-hydro, geothermal, solar, biomass, wind, etc.

Mountain Village

1.) Produce 5% of government electricity by renewable sources by 2020; establish baselines, research ideas.
2.) Micro-Hydro – Currently engaged in feasibility study for placing turbines in PRV vaults on town water system. Research, apply for and obtain grant funds to implement in 2011.

III.2. GOAL: Increase the amount of non-government owned locally-produced RE in the region to XX MW by 2020.

Community Action Items - All

1.) Encourage / facilitate the development of large-scale systems (over 25 kW), up to a total of 5 MW in SMPA Territory (or higher as utility regulations change).
2.) Support SMPA's efforts to build a community-funded solar farm with completion by 2013, following the currently proposed solar project with Sun Edison.
3.) Encourage development of small-scale residential & commercial systems – through local incentives such as: waived building permits & taxes, financing programs.
4.) Adopt policies and ordinances to remove regulatory impediments and economic disincentives associated with the generation and use of energy from renewable sources. Develop and market policies, incentives and information that encourage the purchase and utilization of renewable energy technologies.

Mountain Village

1.) Encourage homeowners to install small home systems; provide incentives to residents
2.) Work with Telluride Ski & Golf Resort to improve energy efficiencies, investigate solar, wind, hydro options
3.) Greening the Gondola Campaign.

IV. TRANSPORTATION – GROUND AND AIR

OBJECTIVE: Reduce the overall amount of energy consumed per capita by ground and air travel.

IV.1. GOAL: Reduce fuel use directly attributable to all governmental facilities and operations 20% by 2020 (or sooner) from 2005 levels, through increasing vehicle efficiency and efficiency of vehicle operations.

Government Action Items - All

1.) Reduce overall fuel consumption for government vehicles, through fewer or more efficient trips, use of fuel efficient vehicles, carpooling to meetings and conferences, and increase pedestrian emphasis to local events and meetings.
2.) Assess feasibility of and build capacity for developing fueling stations for alternative fuel (e.g. biodiesel, compressed natural gas, hydrogen, etc.). Adopt policies and programs that help governments, businesses and organizations with fossil-fuel powered fleet vehicles switch to vehicles powered by clean, renewable energy sources.
3.) All new government vehicle purchases strive for most fuel-efficient models, using alternative fuel sources when feasible.
4.) The Town/County will make bus passes available to those employees who can commute by bus.
5.) Future Town/County facilities and operations will be sited based on access by transit, walking, biking, and evaluated for encouraging more compact land uses.
6.) Adopt policies and ordinances that encourage car-free tourism.
7.) Work with Region 10, existing RTA, to put a regional transportation district to the voters and facilitate other goals. (In 2008 Montrose County received a grant to perform a Transit Feasibility Study in conjunction with Delta, San Miguel and Ouray counties. This study was the basis for the Regional Transit Coordinating Council managed under Region 10 League for Economic Assistance. Subsequently, each county is charged with organizing a Transit Advisory Committee to examine this issue and come up with a work plan. San Miguel County organized its first meeting of this committee scheduled for September 27, 2010.)
8.) Create a Western San Juan Transportation District.
9.) Require that all new development projects have a net decrease in transportation related emissions compared to existing development conditions
10.) The Town/County will encourage employees to make in-town trips on bicycle or by foot when practical

Mountain Village

1.) Reduce fuel consumption 10% by 2020 (TMV already uses hybrid vehicles in fleet).
2.) Use less trucks and more 4-6 wheelers; use biodiesel or alternative fuels when possible; hire more locals
3.) Research and establish baseline data and tracking mechanisms for Town fuel usages, investigate options for more 4-6 wheelers and less full size trucks.

IV.2. GOAL: Reduce demand for fossil fuel by decreasing vehicle miles traveled, improving transit options, and improving the fuel efficiency of vehicles.

Community Action Items - All

1.) Evaluate parking standards in downtown areas to help reduce vehicle miles traveled.
2.) Adopt policies and ordinance changes to reduce vehicle miles traveled by supporting local hiring, food production, farmers markets, and community-based "buy local" campaigns.
3.) Reduce the volume of single occupancy traffic within the region, through educational outreach, promoting energy use reduction programs, and encouraging car-pooling and use of mass-transit.
4.) Improve mass transit transportation in the region. Improve convenience and maintain affordability, with lower emissions per passenger mile than the average private vehicle.
5.) Increase the use of highly fuel-efficient and low emissions-fuel engines and machinery in on-road and off-road vehicles.
6.) Increase the use of walking and bicycles, through expansion of town bike programs, improvement of bike/pedestrian trails, incentivizing bike travel by employers, etc.
7.) Identify, support, finance, and construct an integrated regional transportation and workforce housing program where efficient and affordable housing is built to house XX% of the local workforce, and which decreases the overall percentage of the commuting workforce XX% by 2020 throughout the region.
a) Confirm commuting workforce figures for the region and identify targeted household income ranges for the commuting workforce and pursue options for housing development.
b) Include affordable housing projects with mandatory energy efficient construction policy.

c) Expand the range of targeted alternatives to single-passenger transportation systems (car & van pool, etc.)
d) Expand and promote existing park and ride transportation *(eg: Ouray County Fairgrounds Parking Lot)*
8.) The Town/County will support efforts to create affordable in-town housing or on public transportation routes for employees, to reduce the need to commute.

Mountain Village

1.) Review and update Town vehicle efficiency study and examine historical data and reports on regional transportation issues
2.) Support development of additional levels of parking garage.
3.) Identify potential affordable housing development locations through Comprehensive Plan
4.) Work with Telluride to maintain free transportation on the Gondola.

IV.3. GOAL: Optimize utilization of air travel to decrease overall GHG emissions in region, using a systems-thinking approach toward environmental, economic and social sustainability of region.

Community Action Items - All

1.) Participate in local airport discussions and debates, issues, boards.
2.) Work with TRAA and TMRAO to increase capacity of planes and lower # of flights.

V. WATER

OBJECTIVE: Decrease overall water consumption community-wide in private and public sectors (residential, commercial, industrial, and governmental) by 10% below 2005 levels by 2020 through education, conservation, incentives, facilities management, and regulatory structure.

V.1. GOAL: Reduce water consumption directly attributable to all governmental facilities and operations by 5-10% by 2020 from 2011 levels

Government Action Items - All

1.) Establish a baseline for water use by each jurisdiction, starting in 2011 (or before if already measured). Install meters to measure use as needed. Focus on significant consumptive users of water if not feasible to measure all.
2.) Increase water efficiency in all buildings and government operations, utilizing reduced flow aerators, lawn-watering management improvement, water saver toilets, water heaters and any other new water efficient technology.
3.) Educate public works and parks personnel about water use reduction and conservation techniques. Identify training and workshop opportunities as appropriate. Distribute water savings information to Public Works and Parks crews throughout region.
4.) Assess the Town/County water supply, treatment, and distribution to identify water conservation opportunities, including assessment of evaporation and seepage through reservoir and open ditch systems. Installation of leak detection alarm systems that identify leakage early on and mitigate significant water losses may be an initial step to quantify this issue for all municipalities.
5.) Explore storm-water harvesting opportunities for irrigation of public spaces such as parks and open spaces.
6.) Reduce use of treated water for outdoor irrigation purposes around all Town/County facilities through ditch or piped raw water irrigation systems or other opportunities.

Mountain Village

1.) Establish baseline data and tracking mechanisms for governmental facilities; strategize educational campaign for Zero Waste, research local opportunities for composting, recycling construction waste, support local facilities and incentives for reuse and recycling.
2.) Consider a small local in-vessel composting unit for town use and education

V.2. GOAL: Reduce residential, commercial, agricultural and other non-governmental water consumption per capita 10% by 2020 from 2011 levels

Community Action Items - All

1.) Incorporate water usage figures and water conservation education in the government or water district's water billing scheme that includes average use and range of use within the Town for household comparisons and to create an atmosphere of friendly competition between water users (i.e. incorporate graphs and user friendly data so households and businesses can see how much water they use month to month and seasonally and compared with other users in Town).
2.) Educate community about water use reduction techniques through distribution of information, seminars, workshops, newsletters, etc. In particular, information and incentives to use low-water irrigation techniques for farm and ranching applications, native and low-water landscaping techniques, etc. Opportunities may exist through the University Extension Offices, the Gunnison Basin Roundtable and other statewide Roundtables, CDPHE, CO Water Conservation District, etc.
3.) Assess the Town water supply, treatment, and distribution to identify water conservation opportunities.
4.) Incorporate water conservation requirements (mandatory water restrictions) into local building codes for new construction. Codify mandatory water restrictions (eg: time of day watering and watering day assignments)
5.) Insure all water distribution systems measure water consumption and usage for all applications
6.) Explore or re-evaluate rate structure to discourage expansive use of water during the summer watering/ irrigation season.
7.) Adopt landscape ordinances that promote drought resistant plants, and restrict lawns and other high water demand plants unless reclaimed or grey water systems are used.
8.) Develop and adopt energy saving and environmentally sound domestic water conservation plans.
9.) Insure water rights acquisition and/or financing are incorporated into land use developments and annexations.
10.) Develop policy for private use of non-potable water sources and/or plan for expansion of non-potable water systems for distribution such that residences and businesses do not irrigate with treated, potable water.

11.) Explore opportunities to remove other discretionary water uses from treated water systems to non-treated systems (eg: fire hydrants, etc.)

VI. LANDFILL: WASTE REDUCTION & RECYCLING

OBJECTIVE: Divert 75% of overall waste from landfills by 2020, by reducing the amount of waste at the source, reusing materials, recycling, and composting.

VI.1. GOAL: Divert 75% of overall Town/County Government waste from landfills directly attributable to all governmental facilities and operations by 2020

Government Action Items - ALL

1.) Decrease the amount of solid waste generated.
2.) Decrease consumption of paper 20% by 2012 from 2010 levels.
3.) Aggressively implement recycling and composting at Town & County -sponsored events.
4.) Distribute recycling options throughout Town to accompany existing trash bins.
5.) Transition to a paperless office at Town/County Buildings:
1.) Purchase refurbished laptops or tablets for use by elected and appointed officials during public meetings and discontinue distribution of paper packets for meetings;
2.) Encourage electronic submissions for Town issued permits when feasible (building, encroachment, sign, solid fuel stove, licensing, etc.)

Mountain Village

1.) Establish baseline data and tracking mechanisms for governmental facilities; strategize educational campaign for Zero Waste, research local opportunities for composting, recycling construction waste, support local facilities and incentives for reuse and recycling.
2.) Consider a small local in-vessel composting unit for town use and education

VI.2. GOAL: Divert 75% of overall waste from landfills from residential, commercial, and other non-government entities 75% by 2020.

Community Action Items

1.) Educate community about waste reduction techniques. Including: Waste reduction at point of purchase through recycling; Composting Education –use of worm bins, back-yard composting techniques
2.) Incentivize reduced volume of waste compared to recycling / composting collection. Encourage home composting of organic waste.
3.) Support the development of recycling centers in the region.
4.) Expand recycling services to commercial properties in region by 2012 (or as contracts are up for renewal).
5.) Support development of regional composting facility that can serve all sectors.
6.) Establish collection services in all communities for segregated food waste from commercial sources.
7.) Increase use of and opportunities for hazardous waste removal.
8.) Improve utilization of recycling & proper disposal of large items, including appliances, electronics, etc.
9.) Enact ordinances and create incentives to achieve organic waste diversion of 75% by 2020.
10.) Create and support other programs, such as a Green Business Program, that help achieve the 75% overall waste diversion goal.
11.) Adopt environmentally preferable purchasing policies and explore joint- purchasing agreements with partner agencies, and local jurisdictions and businesses.
12.) Watch the "plastic bag elimination" initiative in Telluride and identify opportunities to implement similar or other programs throughout the region.
13.) Perform a feasibility study to investigate the opportunity to capture methane from waste products to utilize as an alternative fuel source. Coordinate with Montrose County to study landfill options.

Mountain Village

1.) Establish baseline data and tracking mechanisms for non-governmental waste production; education and outreach to community residential and commercial facilities; require all commercial businesses to recycle and participate in Zero Waste; support local transfer stations and recycling centers.

VI.3. GOAL: Reduce construction waste by at least 75% by 2020.

Community Action Items - All

1.) Develop a regional recycling and reuse facility for construction materials.
2.) Enact ordinances and create incentives to achieve waste reduction of construction and demolition debris.
3.) Encourage & educate to increase use of reuse stores and facilities.

4.) Decrease amount of complete home demolition through incentivizing remodeling.

Mountain Village

1.) Consider requiring new construction to recycle construction items; support the identification of location for local construction recycling center, education and outreach campaign for contractors; % of building permit fees to construction recycling program.

VII. AGRICULTURE AND FORESTS

OBJECTIVE: to utilize our regional natural resources wisely, increasing local food production utilizing available biomass wisely, and preserving our natural environment for future generations.

VII.1. GOAL: Increase food security and elevate regional produced food quantity, quality and availability to residents, visitors, businesses and schools in region.

Community Action Items

1.) Adopt policies and ordinances that support local agriculture, food production, farmer's markets and community gardens. The Town/County will strive to use locally grown food for Town/County sponsored functions when practical.
2.) Support efforts by local growers and restaurants to produce and use locally grown food, and remove associated regulatory hurdles as possible.
3.) Encourage responsible & sustainable agricultural and landscaping practices, minimizing toxic chemical use.
4.) Educate government staff and the community on the economic and energy impacts of the industrialized food supply chain and encourage the cultivation and purchase of locally produced foods.
5.) Educate public on local food shed – what it is and why important.
6.) Encourage Farm to School and Farm to Cafeteria programs.
7.) Perform Feasibility study for regional commercial kitchens, meat processing facilities, etc. to enhance the ability of local producers to process and market local food in the region. If appropriate pursue funding for items identified in study.
8.) Host fun food growing and harvesting events.

Mountain Village

1.) Create Mountain Village Farmer's Market
2.) Investigate and propose Community Garden and demonstration garden in Meadows area, identify local volunteer team for project implementation.
3.) Encourage/educate Urban / Vertical Farming opportunities in village core, including businesses and lodging community.

VII.2. GOAL: Utilize available energy resources wisely, protect our forests from harm, and preserve natural beauty.

Community Action Items-All

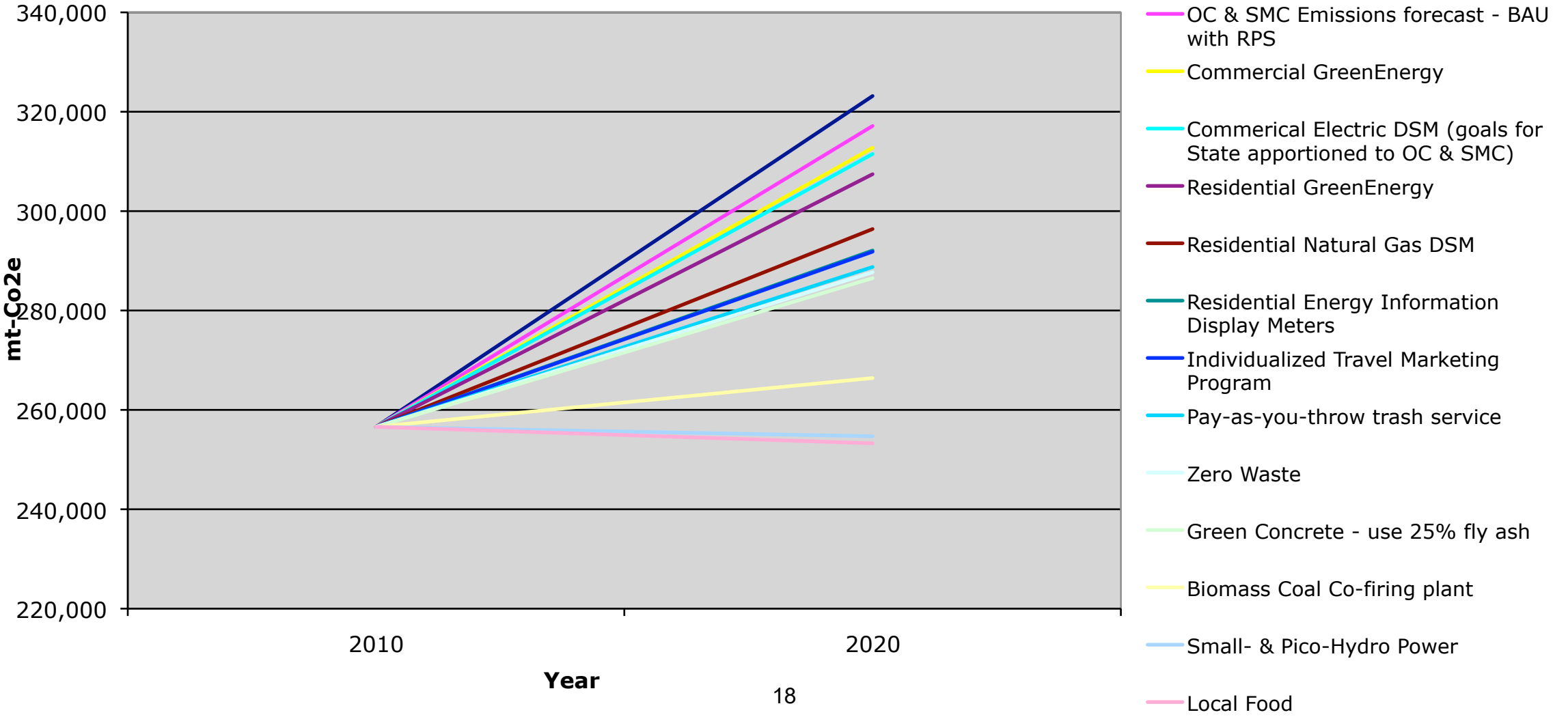
1.) Develop forest health and education curricula for regional schools.
2.) Assess the feasibility of and if appropriate, promote development of beneficial biomass projects in the region from forest dead wood.
3.) Support initiatives by Mountain Studies Institute (MSI) related to climate change resiliency & adaptation. Collaborate when appropriate.

Mountain Village

1.) Develop Forest Health and Wildfire Mitigation Policy educational efforts that lead to implementation.
2.) Assist landowners with grant possibilities for implementation of CWPP.

EXHIBIT 2.C

San Miguel County GHG Reduction Wedge



STRATEGY & ACTION PLAN

COLLABORATIVE SUSTAINABILITY ACTION PLAN & IMPLEMENTATION METHODOLOGY FOR OURAY AND SAN MIGUEL COUNTIES

2010-2020

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EXECUTIVE SUMMARY

The STRATEGY is a guide to multi-jurisdictional energy action planning providing a framework to facilitate streamlined, inter-entity collaboration in our region's efforts to effectively manage energy resources, reduce energy costs and meet energy, transportation fuel, water, and waste reduction goals. Our "region," in this document, is defined as Ouray and San Miguel Counties.

The STRATEGY offers a number of related recommendations in the form of a mission, vision, goals, targets, guiding principles, objectives, strategies for achieving objectives and potential action items. Over time, new action items may be generated, using the guiding principles of the STRATEGY. None of these recommendations are binding, and are only intended to guide the initial stages of development of energy-related programs and projects.

The content of the STRATEGY is informed by the findings of regional energy use data from local utilities and regional governments, San Miguel County's 2007 Emissions Inventories, and ideas developed at collaborative planning meetings held throughout 2010 of the Western San Juan Community Energy Board (WSJCEB). Recommendations prioritize the greatest opportunities revealed by our Inventories and regional guiding principles.

The WSJCEB recognizes that there are still gaps in our data gathering. Our Action Plan (see Section 3) identifies the specific pieces of data that still need to be obtained in order to establish a complete baseline of our region's energy, fuel, and water use and waste production. While we recognize that our data collection is thus far incomplete, we believe our analysis of priorities to be accurate. We will continue to gather and update data as is feasible and adjust priorities as needed in order to reach our goals.

The STRATEGY is designed as a reference tool for our region's governments and stakeholders as they implement our jurisdictional Energy Action Plans and develop energy-related programs and policies.

A primary barrier to implementation of energy-related programs in the region is our small and dispersed population. Single jurisdictions typically do not have the financial or human resources or population to leverage economies of scale. By developing partnerships and sharing resources, the communities of the region can build capacity for the implementation of energy programs and projects.

In addition, a great opportunity exists through developing this regional partnership, as we have existing shared resources throughout the region's population. Many people live in one town, but work in another. Both counties experience a high commuter rate of people traveling from surrounding counties to work in our region. Because we have shared impacts (transportation, housing costs, etc.) we must work together to fully understand and address a sustainable future for our economies, environment, and people.

As technology and funding evolve, the STRATEGY will also evolve to reflect the priorities and capabilities of energy conservation policy in the region.

1. Background and Opportunities Identified

1.1 Energy Planning Efforts

The narratives of energy planning in the region are varied. Energy Planning in San Miguel County began with commitments by several jurisdictions in the region to meeting the goals of the Colorado Governor's Energy Office's (GEO) "Climate Action Plan." Ouray County committed to an Energy Planning process in January 2010, with the beginning of the GEO's Community Energy Coordinator program.

After collaborating to create The New Community Coalition (TNCC) in 2007, San Miguel County jurisdictions directed TNCC to develop a Greenhouse Gas Emissions Inventory, which established a community-wide baseline of 2007 CO_{2e} emissions, for government energy use and also for community-wide emissions. The Ouray County jurisdictions began the data-gathering stages of establishing a baseline of energy use for Ouray County governments in the spring of 2010 and are nearly complete.

The San Miguel County Inventory revealed that human activity in San Miguel County in 2007 produced approximately 282,000 tons of "carbon dioxide equivalent" (CO_{2e}) emissions.

During the development of this document, TNCC was selected to participate in the Sustainable Communities Program by University of Colorado Denver's Center for Sustainable Infrastructure Systems (CSIS) in partnership with the Colorado Municipal League and the Wal-Mart Foundation. Through this program a GHG Inventory for both San Miguel and Ouray Counties will be performed, based on 2010. The Inventory will include utility energy, transportation including airline travel, waste, food, and other trans-boundary contributions to our regional GHG emissions. The report will include analysis of the impact of some of the planned action items in the Action Plan if implemented across the region. It will be completed in May, 2011.

While Ouray and San Miguel counties may be considered relatively small in size and population compared to other regions of the state, with a corresponding smaller contribution to energy consumption and GHG emissions, we understand Western Colorado is poised to grow significantly in population, and we believe the more pristine and rural nature of our region mandates immediate attention in order to optimally sustain the residents and business for the benefit of our communities and the larger Colorado economy.

We recognize that overall sustainability of the region is larger than just direct energy use reduction. Thus, we aim to address the many facets of energy use and GHG emissions reduction, including transportation reduction, water conservation, waste reduction, renewable energy development, local food production and other aspects of sustainability. In addition, implementation of this plan is expected to develop green jobs and establish a more stable local economy for the region.

This process is interdependent of the various entities and people within and without our region, and is very complex requiring support and understanding of diverse demands

and resources. The WSJCEB understands that while one jurisdiction may readily appear to be the largest consumer of electricity and natural gas for residential uses, they may also have the greatest resources at hand to address the objectives stated. On the other hand, the jurisdictions in Ouray County may appear to be the smallest consumer but at the same time, Ouray County is also poised to experience rapid growth and may have the fewest resources available to keep up with achieving goals. Short and long-term considerations will be evaluated throughout this process and a regionally-comprehensive viewpoint maintained of how best to collaborate for everyone's success.

The plan has identified a number of target goals (listed in Section 2.4 & Section 3) based on 2009 energy use data, the 2007 GHG emissions inventory for San Miguel County and other factors such as anticipated future growth in the region, commuters and the ability of the governments and community to take action.

1.2 Energy (Electricity, Natural Gas and Propane)

Electricity and natural gas use data for the region for 2009 was obtained with the cooperation and assistance of our local utility companies, San Miguel Power Association (SMPA) and SourceGas. These entities provided the data broken down by jurisdiction and by type of use. Staff members / elected officials in each of the government entities provided the government energy use baseline data. (Ouray County data is from November, 2009 thru October, 2010. SourceGas data is from September, 2009 thru September, 2010)

Table 1 and the pie charts of Figure 1 show the relative electricity, gas, and propane used by the different jurisdictional areas of Ouray and San Miguel Counties. This data includes building energy use as well as other end users such as the Telluride / Mountain Village gondola, ski area lifts, streetlights, etc.

Residential and Commercial gas and electricity use in Ouray and San Miguel County are large energy consumers. In comparison, energy use by the governments in each jurisdiction is relatively small. Thus, while the governments have identified actions to take to reduce their energy use specifically, the WSJCEB deems it highly important to engage the overall community in the process of implementing actions to achieve energy reduction goals.

Agricultural energy use was also obtained, however the numbers and overall percentage of energy use is negligible in our region.

Propane energy use was obtained from one provider (Ferrel Gas) for the region. Some of the governments track their propane use, but obtaining values per jurisdiction or by type of account throughout the region was not feasible for this report. It is anticipated that propane contributes a slightly larger portion of overall energy use, as many homes and agricultural lands are not served with natural gas. TNCC is working to obtain more data for use in the GHG Inventory.

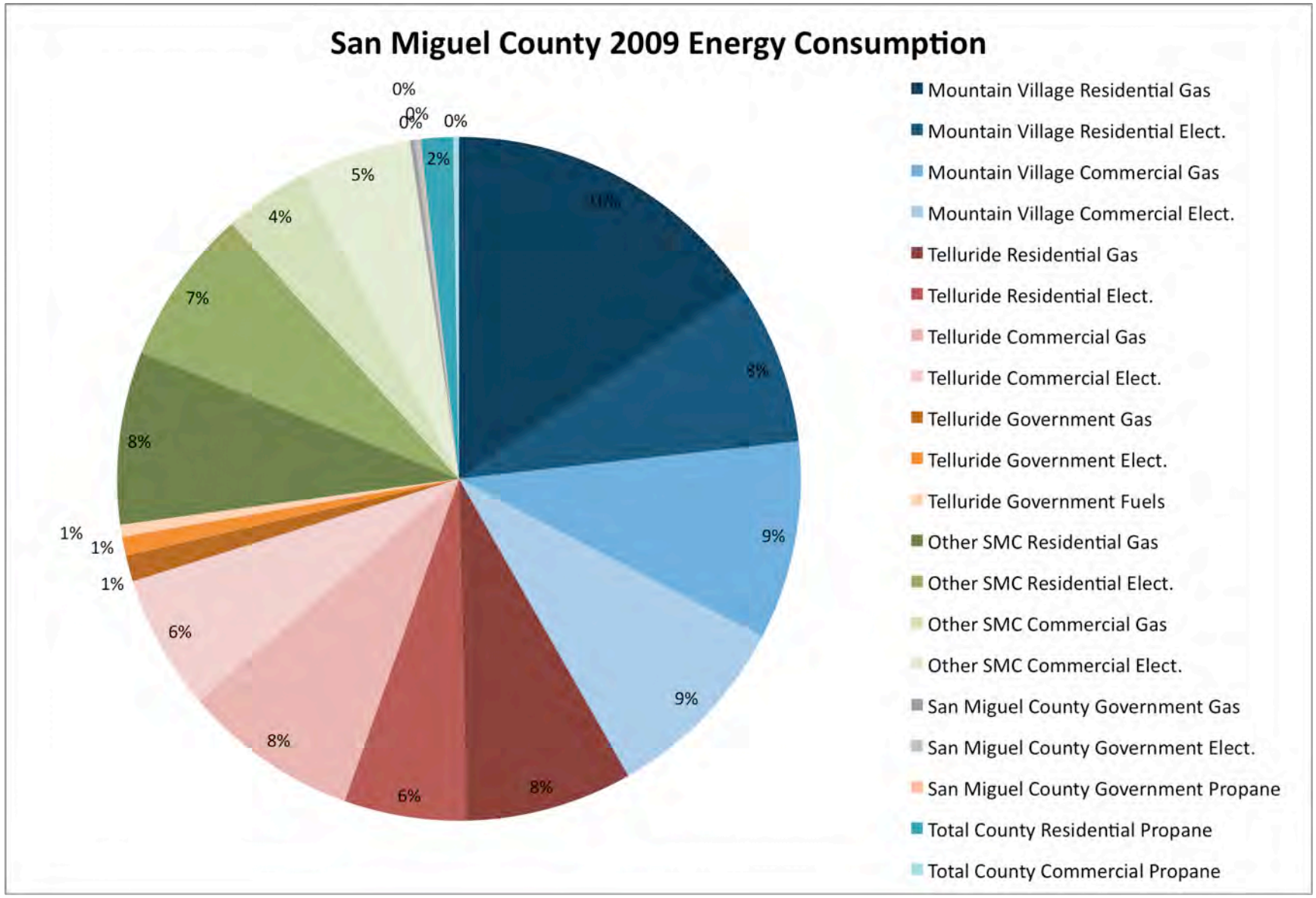
Table 1

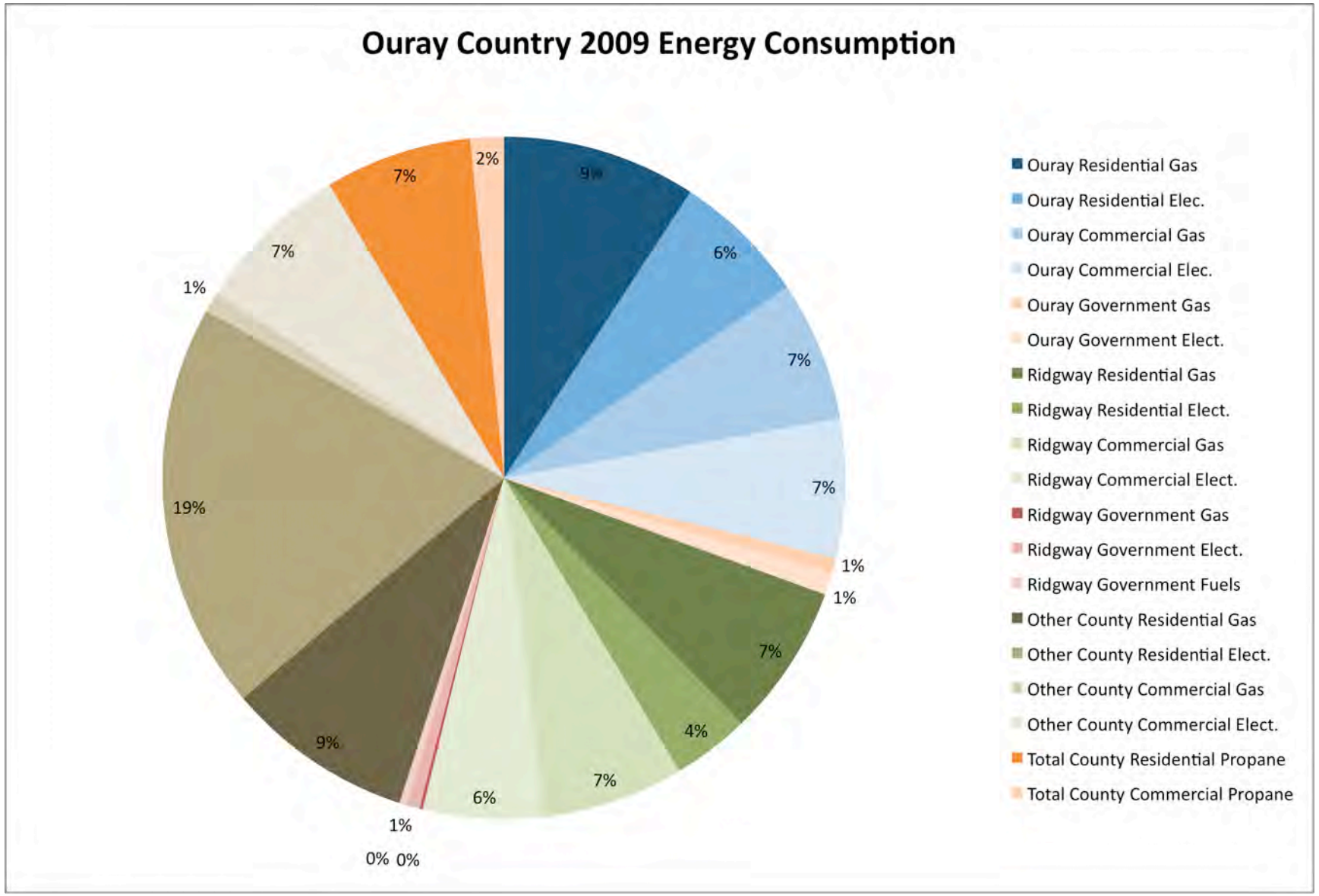
2009 Utility Energy Use for Ouray and San Miguel Counties			
	Gas	**Electricity**	**Propane**
	(therms)	(kWh)	(gallons)
Ouray Residential	257,288	5,387,132	
Ouray Commercial	186,171	5,575,702	
Ouray Government	20,000	890,000	
Ridgway Residential	202,800	3,083,082	
Ridgway Commercial	187,767	4,834,933	
Ridgway Government	4,267	508,251	
Other Ouray County Residential	248,889	16,373,431	220,000
Other Ouray County Commercial	25,840	6,252,703	50,000
Ouray County Government	11,804	258,158	
All Ouray County Total	**1,133,023**	**41,854,047**	**270,000**
Mountain Village Residential	1,530,588	22,778,601	
Mountain Village Commercial	921,642	27,099,499	
Mountain Village Government	187,471	5,279,158	
Telluride Residential	775,581	17,197,031	
Telluride Commercial	816,295	19,073,737	
Telluride Government	121,690	2,670,938	
Other SMC Residential	629,358	20,347,554	170,000
Other SMC Commercial	315,323	13,241,395	30,000
San Miguel County Government	22,754	620,953	
Norwood Residential	142,041	1,555,835	
Norwood Commercial	80,119	2,107,855	
Placerville/Sawpit Residential	29,477	137,555	
Placerville/Sawpit Commercial	8,212	49,425	
Ophir	0	527,858	
All San Miguel County Total	**5,393,080**	**127,392,466**	**200,000**

Note: Utility data was converted to the common unit of BTU's for the purposes of comparison in the pie charts below.

Equivalent Cost Estimate:

Using average rates for the utilities listed in the above chart, an estimate of total cost for energy use was calculated for 2009. San Miguel and Ouray Counties spent an approximate $31,000,000 on energy!


San Miguel County 2009 Energy Consumption
0%
0%
0%
0%
2%
5%
4%
7%
8%
1%
1%
1%
6%
8%
6%
8%
9%
9%
Mountain Village Residential Gas
Mountain Village Residential Elect.
Mountain Village Commercial Gas
Mountain Village Commercial Elect.
Telluride Residential Gas
Telluride Residential Elect.
Telluride Commercial Gas
Telluride Commercial Elect.
Telluride Government Gas
Telluride Government Elect.
Telluride Government Fuels
Other SMC Residential Gas
Other SMC Residential Elect.
Other SMC Commercial Gas
Other SMC Commercial Elect.
San Miguel County Government Gas
San Miguel County Government Elect.
San Miguel County Government Propane
Total County Residential Propane
Total County Commercial Propane


Ouray Country 2009 Energy Consumption
9%
6%
7%
7%
1%
1%
7%
4%
7%
6%
1%
0%
0%
9%
19%
1%
7%
7%
2%
Ouray Residential Gas
Ouray Residential Elec.
Ouray Commercial Gas
Ouray Commercial Elec.
Ouray Government Gas
Ouray Government Elect.
Ridgway Residential Gas
Ridgway Residential Elect.
Ridgway Commercial Gas
Ridgway Commercial Elect.
Ridgway Government Gas
Ridgway Government Elect.
Ridgway Government Fuels
Other County Residential Gas
Other County Residential Elect.
Other County Commercial Gas
Other County Commercial Elect.
Total County Residential Propane
Total County Commercial Propane

1.3 Transportation

Transportation data for San Miguel County is available for 2007 from the previous GHG Inventory. The data is fully explained in Appendix A of that study. In brief, transportation vehicle number studies included: a CDOT traffic survey performed throughout San Miguel County over 48 hr periods from 2003-2008, Town of Telluride and Town of Mountain Village traffic studies, and 2 monitoring stations were set up in Dolores and Montrose Counties to track commuting traffic in/out of the county. ICLEI software was used to analyze the data and obtain an overall energy consumption value.

For the purposes of this STRATEGY, we have estimated Ouray County transportation numbers using the San Miguel County GHG Inventory value. A rough estimate was obtained by calculating the total electricity and gas use for each county and applying the same percentage relationship between them to transportation. Considering that much of the commuter traffic to/from San Miguel County travels through Ouray County from Montrose, this was deemed a fairly reasonable method of estimation for the purposes of this report. Obtaining more accurate transportation data for Ouray County is a stated action item in Action Plan and will be obtained through the GHG Inventory.

Air traffic in/out of the Telluride regional airport was not included in the San Miguel County GHG Inventory. Obtaining accurate air traffic transportation data for the airport is a stated action item in Action Plan and will be obtained through the GHG Inventory. GHG emissions attributable to air travel in/out of other counties will also be assessed.

The governmental jurisdictions are in varying stages of collecting and tracking fleet vehicle fuel use. All are committed toward establishing a regular tracking of fuel use and implementing actions to reduce usage.

Based on the values listed below, transportation in the region represents a significant challenge. Managing modes of transportation and demand as our communities grow is a critical component of the region's energy use.

The WSJCEB will ask the Region 10 Transit Authority to include energy conservation and emissions in their transit planning. Addressing transit is an important aspect of reaching our fuel use reduction goals.

Table 2: Transportation Data

	Diesel and Gasoline (MMBtu's)
San Miguel County	664,314
Ouray County	139,506

1.4 Waste

Reducing the production of waste is a major component of this sustainability action plan. The standard method of calculating GHG emissions related to waste in GHG Inventories is to estimate the amount of waste put into a landfill, and then to estimate

the amount of GHG produced by that waste annually. Unfortunately, we have not begun tracking volume of waste produced in our counties, and it actually gets hauled outside of our region. In the San Miguel County GHG Inventory, a rough estimate was calculated using standard ICLEI numbers for waste production for a population. This type of estimate would not give us an accurate baseline from which to track reduction. Therefore, we have made it an Action Item to work with waste hauling companies to come up with a method of tracking the volume of trash and recycling collected in the region. Data collection is a goal for the GHG Inventory.

1.5 Water

Water consumption in the counties has not been quantified. It will be critical to establish a method of tracking water use per jurisdiction and per house/business/government entity. The jurisdictions with water and/or wastewater treatment plants are committed to developing the methodology to track water use and convey usage to each user as an action item of this STRATEGY. Much of the unincorporated areas are not served on public water systems, so they will not be included in the tracking, however outreach efforts of education and water conservation incentives will include them.

2. Strategic Energy Plan

2.1 Mission

The Western San Juan Community Energy Board* will advance the New Energy Economy so that our communities will have economic opportunities related to energy efficiency and renewable energy and will develop and thrive in a sustainable manner.

*The New Community Coalition; Our local governments: San Miguel and Ouray Counties, the Towns of Telluride, Mountain Village, Norwood and Ridgway, and the City of Ouray; Our regional utility providers: San Miguel Power Association and Source Gas.

2.2 Vision

The Vision of the Western San Juan Community Energy Board (WSJCEB) is to preserve our clean air, water, and natural environment for future generations. We will achieve this through being a leader in reducing the per capita consumption of valuable natural resources through education, efficiency, and the implementation of renewable energy projects.

2.3 GAP Analysis

The WSJCEB went through a process of identifying the strengths, weaknesses, opportunities and threats (SWOT) within our region that will affect the achievement of our mission. From the ideas generated from the SWOT analysis, the WSJCEB performed a GAP analysis to identify the difference between the current status and the ultimate sustainability vision for the region. The following are the identified GAPs that must be bridged in order to reach our vision for the region.

Education of People: Everyone, including homeowners, renters, contractors, and governments, needs to be continually informed about what they can do to reduce per-capita energy and water consumption, and how reducing consumption is both money- and environment-saving. A highly visual, public overall measure of progress needs to be implemented. The areas of sustainability in which we need to focus are:

- Energy Efficiency
- Renewable Energy
- Waste
- Buying Local
- Water

Transportation: We need a coordinated regional approach to transportation. Lack of coordinated regional transportation causes:

- Higher overall energy consumption and greenhouse gas production
- Higher individual cost
- Even more wear and tear on our roads
- Decreased efficiency in identifying financial opportunities and resources for success

Leadership:

- We need Baseline Data– need per capita consumption data and a public measure of progress (see Education)
- We need coordination of projects to maximize focus, avoid duplication of effort, and leverage our shared voices to higher authorities (see Utilities, for example)

Utilities:

- Need enabling policies and incentives for utilities for development of renewable energy
- Partnership opportunities for achieving outcomes must be explored
- Tiered rate structure and other opportunities to encourage conservation and the use/support of renewable energy

Economic:

- Funding mechanisms are needed for project implementation to reach all:
  - governments
  - individuals
  - businesses
  - non-profit and independent sectors

2.4 Targets

In 2009, the Towns of Mountain Village, Norwood, Ophir and Telluride, along with San Miguel County adopted Colorado's Climate Action Plan, setting CO_{2e} emissions reduction targets of 20% below 2005 levels by 2020.

In 2009, San Miguel County signed on to the Cool Counties Initiative, setting a goal to reduce county geographical GHG emissions 80% below current levels (at time of adoption) by 2050.

While Ouray County governments have been collectively working toward energy conservation and renewable energy through development and encouragement of varied renewable energy systems (micro-hydro, geothermal, green building and energy codes, efficient lighting plans and systems, assessing the viability of alternative renewable energy systems, etc.), progress toward targets have remained un-quantified.

All jurisdictions are in different stages of acquiring baseline data and are working toward completing gathering of the data, in order to have a reliable baseline from which to track achievement of the target goals identified by this document.

The WSJCEB adopted the following general targets in development of the Goals and Action Plan in Section 3:

- Decrease per-capita energy consumption in San Miguel and Ouray Counties 20% by 2020 from 2005 levels
- Obtain 20% of the region's electricity from renewable energy by 2020.
- Reduce the overall amount of energy consumed per capita by ground and air travel.
- Decrease overall water consumption community-wide in private and public sectors by 10% below 2005 levels by 2020
- Divert 75% of overall waste from landfills by 2020

The above reduction targets are consistent with those set forth by the State of Colorado[1] Climate Action Plan and the recommendation of the Intergovernmental Panel on Climate Change, and similar to those set forth federally[2]. Throughout the STRATEGY, these targets are referred to by the headings below:

- **2020 Target:** Reduce carbon dioxide equivalent (CO_{2e}) emissions 20% below 2005 levels by 2020.
- **Long-Term Target:** Meet other longer-term state, national and global energy goals for the future.

[1] The State of Colorado's targets, as stated in the 2007 Climate Action Plan, are to reduce CO_{2e} emissions 20% below 2005 levels by 2020 and 80% below 2005 levels by 2050.

[2] The United State's targets, as submitted to the United Nations Framework Convention on Climate Change Secretariat in December 2009 under the Copenhagen Accord, are to reduce CO_{2e} emissions 17% below 2005 levels by 2020.

The 2020 Target is adopted with the realistic understanding that it will be incredibly difficult to achieve. Realizing such significant reductions in CO_{2e} emissions and energy usage in less than a decade in spite of new construction and population growth will necessitate a significant dedication of time, resources and funding to these efforts.

The Western San Juan Community Energy Board and TNCC have chosen to reinforce the adopted 2020 Target despite the challenge it presents due to the facts that: a) this target is recommended by the International Panel on Climate Change (IPCC) in order to avoid damaging effects that would result from the level of emissions in the atmosphere without this level of reduction; and b) this is the target adopted by San Miguel County's municipalities, by the State of Colorado and by numerous other municipalities, counties, states and countries worldwide.

It is important to improve our region's ability to track energy usage in order to accurately track progress toward these targets and report it back to the public. See section 2.8 on Tracking for more on tracking progress.

See section 2.7 on Program Development for target achievement scenarios.

In addition, in May 2009, the Towns of Mountain Village and Telluride mayors put forth a challenge called Telluride Renewed. The communities are challenged to offset 100% of Telluride's and Mountain Village's electrical needs with new renewable energy sources by 2020. Telluride and Mountain Village have begun to develop a plan to guide the achievement of this challenge.

2.5 Guiding Principles

In developing the STRATEGY, a number of principles guided the WSJCEB and TNCC.

- ***Voluntary*****:** To emphasize voluntary programs which inspire and motivate participation.
- ***Education & Understanding*****:** To accompany or precede all energy actions with appropriate educational efforts.[3]
- ***Fiscal Responsibility:*** To develop energy actions that are fiscally responsible within the context of each government's budget, reflect the economic circumstances of the region and its citizens, and strive to employ local labor and resources in ways that improve local economies and local government revenues.
- ***Commitment:*** To commit resources, as available, in order to meet this plan's goals and targets.
- ***Autonomy and Interdependence:*** To recognize and respect the interdependence of the region as well as the autonomy of each community.

[3] In keeping with this guiding principle, educational strategies and action items are positioned at the beginning of the plan, preceding all other recommendations. Educational components are also interspersed throughout the STRATEGY's recommendations.

- ***Transparency:*** To inform the communities regularly regarding the implementation of actions in this STRATEGY and regularly report on progress made toward achievement of goals. To regularly obtain input and feedback from the community.

2.6 Collaboration

The purpose of a collaborative STRATEGY is to bring together interdependent yet diverse communities for the purpose of identifying common goals and unique offerings and to more effectively leverage resources between appropriate governmental and non-governmental entities. Working together on energy planning will help our region to select optimal creative and shared solutions to effectively and efficiently implement energy-related programs, projects and policies. Below is a framework for this regional collaborative relationship. This should not be viewed as mandatory in any way; it is only suggested as an option to facilitate voluntary collaboration.

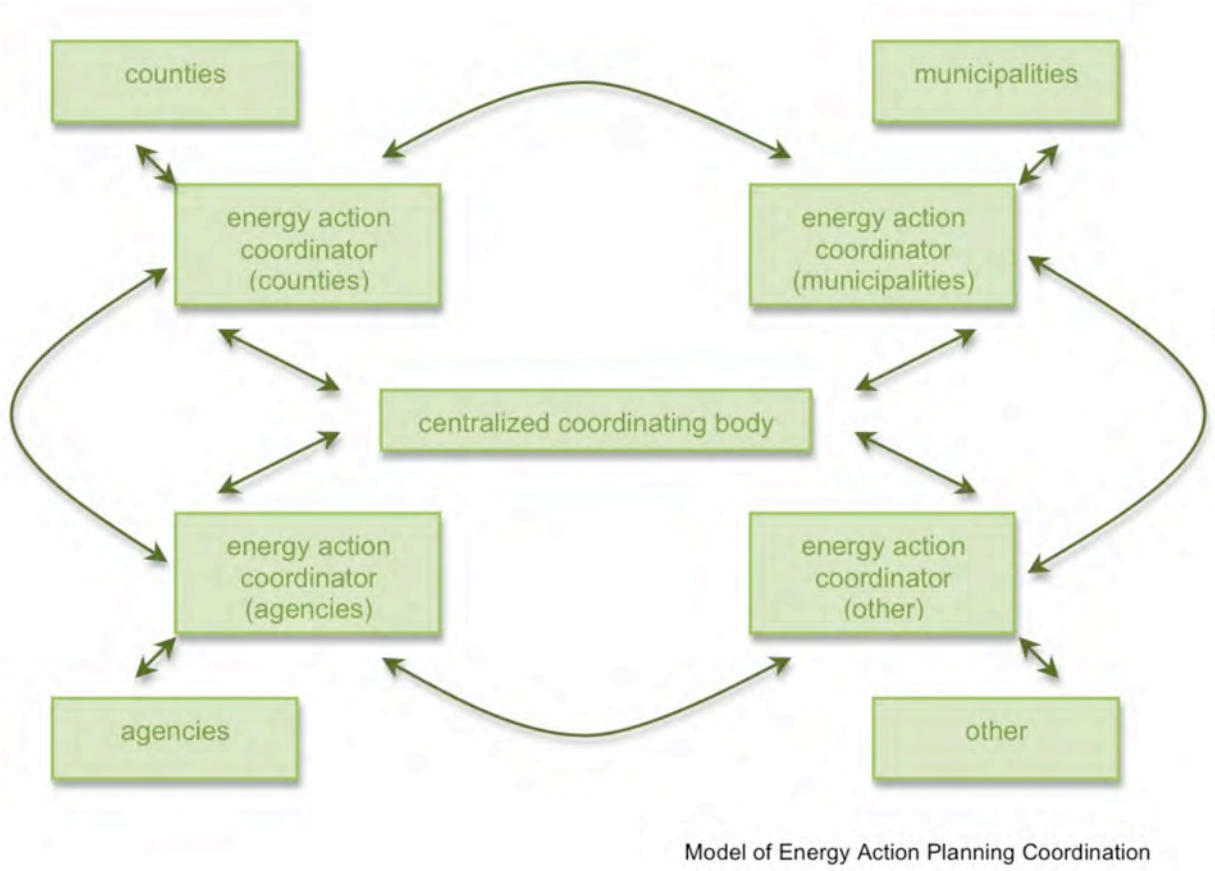
To facilitate this collaboration our region would create three levels of coordination between regional entities:

- **Centralized coordinating body.** The WSJCEB and TNCC will continue to serve as a central, community entity facilitating regional energy activities and the network of Energy Action Coordinators (EACs).
- **Network.** EACs, appointed by and representing individual regional entities, serve as liaisons between the central coordinating body and the entity they represent.

  This is not a new position or a designation necessitating any significant dedication of time. An EAC should be an existing staff person with an interest in energy issues who can allocate adequate time annually to participate in the network and report back to his/her agency.

  This network will facilitate frequent communication between EACs allowing agencies to stay current on jurisdictional and collaborative activities. The network will also give direction to the centralized coordinating body, offering feedback on programming and projects.
- **Reporting back.** EACs will update the board on recent activities and findings relative to the jurisdiction or organization they represent, update and monitor energy consumption data for government and private sectors, prioritize action items for their respective jurisdictions, etc.

Figure 1



Model of Energy Action Planning Coordination

Some benefits of participation in this network include:

- **Prevention of "reinventing the wheel"**: keeping entities up to date about past and current programs and efforts will allow them to share findings, materials and plans that will help to accelerate program development.
- **Partnership formation**: as entities learn about new projects or programs that neighboring entities are undertaking, they can inquire about joining forces, leveraging resources and forming other symbiotic relationships to strengthen their efforts.
- **A stronger front**: having a network in place and offshoot partnerships demonstrates to potential funders that our region is advanced in its energy planning efforts and works together to implement them, making our region more attractive to funders in jurisdictional and joint applications.
- **Experience**: the designated EACs will be able to gain knowledge and experience in the fast growing field of energy and sustainability planning and clean energy. The individual EAC and the organization will have the value of being able to benefit from and claim this experience.

- **Expanded organization**: local governments, colleges, companies and many organizations are creating and expanding Sustainability Departments or Sustainability Coordinator positions within their staffing structures. Designating an EAC is a chance for an organization to begin to join others in formally addressing these issues.
- **Potential for eventual compensation**: The WSJCEB will work with TNCC to identify strategies for continued funding for programs and projects in the region as the EECBG funds for the CEC position come to an end. A recommended plan of action will be adopted by end of 2011.
- And finally, the network needs **widespread participation** for success. It is important to have as many entities at the table as possible to build far-reaching, comprehensive and creative partnerships and involve as many sectors and entities possible.

A comprehensive regional network would span:

- **Local Governments:** County, municipal, elected officials, staff persons
- **Government Agencies:** Governor's Energy Office (GEO), Housing Authorities for Ouray and San Miguel Counties, United States Department of Agriculture (USDA), National Resource Conservation Service (NRCS), Bureau of Land Management (BLM), Forest Service (FS)
- **Educational institutions:** Colorado State University Extension Office (CSU),University Centers of the San Miguel, School Districts (Ouray, Ridgway, Telluride, Norwood), local private schools
- **Commercial Sector:** Mountain Village and Telluride Tourism Board (MTI), Rotary clubs, Telluride Ski & Golf (TSG), industry and banking representatives.
- **Utilities**: San Miguel Power Association (SMPA), SourceGas, Water and wastewater utilities such as municipalities, Tri-County Water
- **Owners Associations**
- **Building Industry**: Building Departments, Contractors, Engineers & Architects, Historic and Architectural Review Committee, Planning & Zoning Commissions, Realtor associations, TMV Design Review Board
- **Transit Groups:** Galloping Goose, local transit advisory committees
- **Waste Groups:** Waste Management (WM), Bruin Waste, Sunrise
- **Non-Profits and Other Groups**: TNCC, non-profit organizations, libraries, faith-based organizations, etc.
- **Citizens At Large / Local Business Owners**
- **Economic Development Organizations**

Several of the above sectors and groups are represented in the WSJCEB, a group that TNCC formed in early 2010. The Board, which has met every 3 weeks throughout the development of the STRATEGY, can support the consolidation of this regional network of EACs, providing a forum for idea-sharing and collaboration. The Board is also

responsible for assessing regional programs and maintaining progress of inter-community efforts, particularly funding opportunities.

The Board may develop issue-specific Working Committees as needed, such as:

- **Public Education & Outreach Committee.** To coordinate public education and outreach efforts, public school and college efforts and other education efforts where economy of scale or regional efforts are favorable.
- **Ad-Hoc Committees.** As collaborative projects, programs or funding opportunities occur, committees of EACs should be formed to facilitate their development.
- **Policy and Infrastructure Committee(s).** To facilitate the creation of Region-wide organizations, policies or other structures desirable or necessary to achieve energy efficiency/renewable energy objectives. Examples would be a Regional Renewable Committee.
- **Other Working Committees.** As needed.

As action items move into planning stages, planners should check in with their EACs to see which entities should be included or consulted.

2.7 Financing

To finance the implementation of the STRATEGY, the region should consider pooling financial and human resources to build capacity. Financial resources include monies, in-kind contributions and matching funds for grants. By leveraging and consolidating resources throughout the region, communities can achieve greater impact in capital intensive projects.

There are a few basic avenues of financing the implementation of the STRATEGY:

- **Governmental Budgeting.** During budgeting sessions, each government should evaluate whether to earmark a certain amount of funds, staff hours and/or other resources toward the implementation of energy action planning. The WSJCEB will advise government bodies each year during budget development of recommended funding allocations with significant input of the EACs for each jurisdiction and founded on a priority implementation plan, available grant and loan funding, or other available funding sources. Presentation will include annual report to participants and associated requested funding/assistance.

  In addition, obtaining annual data from utilities may require some funding. The utilities and governments will discuss this need and establish an agreement and allocate funding for this data update as necessary.

- **Pooled Governmental Budgeting.** Inter-Governmental Agreements (IGA) can combine the resources of interested local governments to fund energy action plan implementation collaboratively when appropriate.
- **Private investment.** Energy programs and projects may be achieved through private financing structured to realize energy cost savings.

- **State and Federal Resources.** Federal and State agencies recognize that funding energy projects and programs achieves many co-benefits such as rural development and job creation. Applying for these funds as a region is more attractive than applying as a municipality or county.
- **Continuous Revenue Streams.** To consistently fund the ongoing implementation of the EAPs and the STRATEGY, the jurisdictions could work together to create long-term, dedicated revenue streams from within the region. Obtaining this type of steady funding will be instrumental in sustaining energy programs into the future.
- **Utilities.** Grants, rebates, and other funding opportunities may be available through the utility companies.

2.8 Program Development

Energy-related programs should strive to be in keeping with the regional mission and goals and be associated with direct or indirect reductions in energy use. Programs should be developed using the guiding principles expressed in this STRATEGY.

When a program is being developed, planners can consult with appropriate entities by informing the Energy Advisory Board, opening up the opportunity for collaborating with regional EACs. This process will prevent entities from overlapping efforts, ensuring that efforts build upon one another regionally. This will also promote collaboration, allowing entities to stay current on program development and approach planners in the early stages with ideas for collaboration or partnerships. The centralized coordinating body can assist in obtaining funding, identifying partners and acquiring informational and technical resources.

The STRATEGY also presents cost-effectiveness calculations (see table 2) for prevalent measures for decision-makers to refer to when considering recommendations. This method should be used, in conjunction with the STRATEGY's and the jurisdictional EAPs' guiding principles, as a decision-making tool to prioritize the development of programs and the addition of new programs.

The cost-effectiveness calculation combines the projected project cost, projected energy savings, and projected carbon reductions into a single measurement. "Effectiveness" is defined as the net program energy savings ($) in the year 2020 divided by the tons of annual carbon emissions reduction in the year 2020. In other words, "effectiveness" reflects how much money a program saves as compared to how much carbon it reduces.

The higher the positive value of the "Effectiveness", the more effective a program is estimated to be. Positive effectiveness values represent the dollars saved per ton of CO_{2e} reduced. Negative effectiveness values represent the dollars spent per ton of CO_{2e} reduced.

These calculations are designed to serve as a decision-making tool and as a basis for comparing action items. Each recommendation requires further analysis to more accurately determine costs and benefits, based on current pricing.

The table was developed by representatives from the jurisdictional Energy Action Planning Committees in Gunnison/Hinsdale Counties to supplement software from ICLEI (Local Governments for Sustainability). The table does not discount future value or attempt to predict potential changes to the cost of energy and technology. The table also uses assumptions (i.e. a constant energy cost per unit) and generalizations to make calculations. However, it can still be used as a tool to gain a general understanding of the "bang for the buck" of these measures. The table below indicates the cost effectiveness of common energy efficiency and renewable energy measures.

The WSJCEB recognizes the following tables of data as valuable information applicable to our region, which is similar in many ways to Gunnison/Hinsdale. The WSJCEB and EACs will discuss the feasibility of utilizing these tables as templates for assembling similar tables specific to our region. We will complete these target numbers and units for our region at some time in the future when feasible. The point of the table is to demonstrate where the greatest savings may be achieved.

Table 3

Action Step No.	Action Step	Target Number of Units by 2020	Est. Cost of Action per Unit	Total Cost of Action 2010 to 2020	Est. Annual Tons CO_{2E} Reduction per Unit	Est. Annual Total Tons CO_{2E} Reduction 2020 On	Est. Annual Savings from Action per Unit	Est. Simple Payback Period per unit (Yrs)	Est. 10-Year Total (Cost)/Savings	Est. "Up-Front" Cost per Ton CO_{2E} Reduced	Effectiveness= net savings/tons CO2e
WEATHERIZING HOMES											
	Reducing air transfer (caulking, weatherstrip)	300	$400	$120,000	3.6	1,087.1	$430	0.9	$3,900	$110	$1,076
	Insulating crawlspace, attic, + R-10	300	$1,200	$360,000	2.0	608.9	$241	5.0	$1,209	$591	$595
	Insulating walls	300	$1,200	$360,000	1.7	519.8	$203	5.9	$827	$693	$477
	Installing insulated windowshades	300	$2,000	$600,000	1.1	323.6	$128	15.6	-$720	$1,854	-$667
	Installing energy efficient windows	50	$10,000	$500,000	0.5	26.5	$63	159	-$9,372	$18,884	-$17,698
WEATHERIZING COMMERCIAL											
	Reducing air transfer (caulking, weatherstrip)	30	$500	$15,000	7.7	229.7	$896	0.6	$8,457	$65	$1,104
	Insulating crawlspace, attic, + R-10	25	$4,800	$120,000	18.1	452.8	$1,059	4.5	$5,793	$265	$320
	Insulating walls	10	$2,400	$24,000	1.7	17.3	$203	11.8	-$373	$1,385	-$215
	Installing insulated windowshades	15	$1,440	$21,600	0.6	9.2	$72	20.0	-$720	$2,340	-$1,170
	Installing energy efficient windows	5	$12,384	$61,920	0.6	3.1	$35	350	-$12,031	$20,300	-$19,721
ELECTRIC USE REDUCTION											
	Replace incandescents - >6 per unit	500	$12	$6,000	0.4	216.1	$48	0.2	$473	$28	$1,094
	Install motion-sensors, power strips, etc. - >4	300	$70	$21,000	0.7	204.9	$77	0.9	$696	$102	$1,019
	Install E-Star refrigerator in home	300	$150	$45,000	0.3	93.2	$35	4.3	$199	$483	$639
	Install E-Star washer/dryer in home	300	$100	$30,000	0.1	37.5	$14	7.1	$40	$800	$322
	aggregate	$900	$320	$96,000	1.1		$126	4.1	$935	#DIV/0!	$636
HOT WATER HEATING ENERGY											
	Install E-Star hot water heater	100	$550	$55,000	0.3	29.2	$33	16.8	-$222	$1,881	-$759
	Install solar hot water system	100	$3,000	$300,000	2.4	236.2	$265	11.3	-$350	$1,270	-$148

What does the 2020 Target look like? Another consideration in the development of energy programming should be the "larger picture" of how each planned project or program will play into achieving the 2020 Target.

In his draft paper, *Assessment of the Gunnison Community's 2020 CO_2 Emissions Targets*, Western State College Professor Roger Hudson pondered several scenarios that would lead our region to success in reaching the 2020 Target. He played with energy intensity and carbon intensity variables, adjusting penetration levels in the building and transportation sectors, to make the Target. Below are three of these scenarios, which planners might find useful in developing long-term programming in their jurisdictions and in partnership for the region.

Table 4

Exhibit 9: Scenario A, Bottom Up Parameters and Projections, 2005 - 2020

	Scenario A	
	Initial Value	Change Rate
Gunnison community population	14,403	0.5%
Per Capita Gross Product ($1000)	$ 30.0	0.75%
Building Assumptions		
Number of Building Renovated / Weatherized	75	14.0%
Initial Energy Index of Buildings Renovated	130	-1.0%
% BEI Improvement from Renovation	30%	0.0%
New Building Construction	70	1.0%
BEI for New Buildings	60	-1.0%
General Building Energy Efficiency Improvement		1.0%
Percent Electricity from Wind	0.9%	21.0%
Taylor Dam Hydro Option		No
Geothermal Option		No
Transportation Assumptions		
Rate New Vehicles Enter Fleet	923	4.5%
Rate Old Vehicles Leave Fleet	513	2.5%
MPG of New Vehicles Enter the Fleet	28	2.0%
MPG of Old Vehicles Leaving the Fleet	12	2.0%
Average Vehicle Miles Per Year	16,644	-1.0%

Building Energy and CO2 Projections

By 2020, 3288 of the initial buildings, or about 30% of the initial buildings, will have received upgrades that improve their efficieny by 30%. By 2020, these 'fixed' buildings are 26% more efficient that the average building in 2005 and are being fixed at a rate of 470 per year. By 2020, new buildings use 48% less energy than the average building in 2005 and the average building efficiency has improved by 26% in 15 years. Hydro power generates 15% of total electricity and wind electricity has increased from 1% to 16%. Electricity from coal has dropped from 63% to 49%. Geothermal is at 0%. Building related CO2 emissions have dropped from 196007 tons in 2005 to 164720 tons in 2020, a decrease of 31287 tons, or a 16% decline from 2005.

Transportation Energy and CO2 Projections

The average fleet efficiency has increased from 18 MGP in 2005 to 26 MGP in 2020 but the number of vehicles has risen by 32%. Total miles travelled has increased by 16%, from 341 million miles to 395 million miles. The average annual miles per vehicle has dropped from 16644 miles to 14314 miles. 2016 CAFÉ performance for new vehicles is at 34 MPG. Transportation related CO2 emissions have dropped from 179825 tons in 2005 to 135351 tons in 2020, a decrease of 44474 tons, or a 25% decline from 2005.

Gunnison Community Energy and CO2 Projections	
The energy intensity rate of decline from 2005 to 2020 has reached	-2.4%
The carbon intensity rate of decline from 2005 to 2020 has reached	-0.34%

Total energy consumption has dropped from 3887 B Btu in 2005 to 3269 B Btu in 2020, a decrease of 619 B Btu, or a 16% decline from 2005.
Total CO2 emissions have dropped from 375832 tons in 2005 to 300070 tons **in 2020, a decrease of 75762 tons, or a 20% decline from 2005.**

Table 5

Exhibit 10: Scenario B, Bottom Up Parameters and Projections, 2005 - 2020

	Scenario B	
	Initial Value	Change Rate
Gunnison community population	14,403	1.5%
Per Capita Gross Product ($1000)	$ 30.0	1.50%
Building Assumptions		
Number of Building Renovated / Weatherized	75	22.0%
Initial Energy Index of Buildings Renovated	130	-1.0%
% BEI Improvement from Renovation	40%	0.0%
New Building Construction	70	2.0%
BEI for New Buildings	50	-1.0%
General Building Energy Efficiency Improvement		1.0%
Percent Electricity from Wind	0.9%	21.0%
Taylor Dam Hydro Option		No
Geothermal Option		No
Transportation Assumptions		
Rate New Vehicles Enter Fleet	1,128	5.5%
Rate Old Vehicles Leave Fleet	615	3.0%
MPG of New Vehicles Enter the Fleet	28	2.7%
MPG of Old Vehicles Leaving the Fleet	12	2.0%
Average Vehicle Miles Per Year	16,644	-1.0%

Building Energy and CO2 Projections

By 2020, 6389 of the initial buildings, or about 58% of the initial buildings, will have received upgrades that improve their efficieny by 40%. By 2020, these 'fixed' buildings are 42% more efficient that the average building in 2005 and are being fixed at a rate of 1214 per year. By 2020, new buildings use 57% less energy than the average building in 2005 and the average building efficiency has improved by 42% in 15 years. Hydro power generates 15% of total electricity and wind electricity has increased from 1% to 16%. Electricity from coal has dropped from 63% to 49%. Geothermal is at 0%. Building related CO2 emissions have dropped from 196007 tons in 2005 to 169278 tons in 2020, a decrease of 26730 tons, or a 14% decline from 2005.

Transportation Energy and CO2 Projections

The average fleet efficiency has increased from 18 MGP in 2005 to 29 MGP in 2020 but the number of vehicles has risen by 41%. Total miles travelled has increased by 25%, from 341 million miles to 425 million miles. The average annual miles per vehicle has dropped from 16644 miles to 14314 miles. 2016 CAFÉ performance for new vehicles is at 36 MPG. Transportation related CO2 emissions have dropped from 179825 tons in 2005 to 131973 tons in 2020, a decrease of 47852 tons, or a 27% decline from 2005.

Gunnison Community Energy and CO2 Projections	
The energy intensity rate of decline from 2005 to 2020 has reached	-4.1%
The carbon intensity rate of decline from 2005 to 2020 has reached	-0.31%

Total energy consumption has dropped from 3887 B Btu in 2005 to 3265 B Btu in 2020, a decrease of 622 B Btu, or a 16% decline from 2005. Total CO2 emissions have dropped from 375832 tons in 2005 to 301250 tons **in 2020, a decrease of 74582 tons, or a 20% decline from 2005.**

Table 6

Exhibit 11: Scenario C, Bottom Up Parameters and Projections, 2005 - 2020

	Scenario C	
	Initial Value	Change Rate
Gunnison community population	14,403	2.0%
Per Capita Gross Product ($1000)	$ 30.0	2.25%
Building Assumptions		
Number of Building Renovated / Weatherized	75	26.0%
Initial Energy Index of Buildings Renovated	130	-2.0%
% BEI Improvement from Renovation	40%	0.0%
New Building Construction	70	3.0%
BEI for New Buildings	50	-1.0%
General Building Energy Efficiency Improvement		1.0%
Percent Electricity from Wind	0.9%	21.0%
Taylor Dam Hydro Option		No
Geothermal Option		No
Transportation Assumptions		
Rate New Vehicles Enter Fleet	1,230	6.0%
Rate Old Vehicles Leave Fleet	820	4.0%
MPG of New Vehicles Enter the Fleet	28	2.7%
MPG of Old Vehicles Leaving the Fleet	12	2.0%
Average Vehicle Miles Per Year	16,644	-1.0%

Building Energy and CO2 Projections

By 2020, 8951 of the initial buildings, or about 81% of the initial buildings, will have received upgrades that improve their efficieny by 40%. By 2020, these 'fixed' buildings are 48% more efficient that the average building in 2005 and are being fixed at a rate of 1907 per year. By 2020, new buildings use 57% less energy than the average building in 2005 and the average building efficiency has improved by 48% in 15 years. Hydro power generates 15% of total electricity and wind electricity has increased from 1% to 16%. Electricity from coal has dropped from 63% to 49%. Geothermal is at 0%. Building related CO2 emissions have dropped from 196007 tons in 2005 to 182692 tons in 2020, a decrease of 13315 tons, or a 7% decline from 2005.

Transportation Energy and CO2 Projections

The average fleet efficiency has increased from 18 MGP in 2005 to 31 MGP in 2020 but the number of vehicles has risen by 32%. Total miles travelled has increased by 16%, from 341 million miles to 395 million miles. The average annual miles per vehicle has dropped from 16644 miles to 14314 miles. 2016 CAFÉ performance for new vehicles is at 36 MPG. Transportation related CO2 emissions have dropped from 179825 tons in 2005 to 115256 tons in 2020, a decrease of 64569 tons, or a 36% decline from 2005.

Gunnison Community Energy and CO2 Projections	
The energy intensity rate of decline from 2005 to 2020 has reached	-5.4%
The carbon intensity rate of decline from 2005 to 2020 has reached	-0.18%

Total energy consumption has dropped from 3887 B Btu in 2005 to 3166 B Btu in 2020, a decrease of 722 B Btu, or a 19% decline from 2005. Total CO2 emissions have dropped from 375832 tons in 2005 to 297948 tons **in 2020, a decrease of 77884 tons, or a 21% decline from 2005.**

It should be noted that Hudson demonstrates that developing the "Taylor Dam Hydro Option" and the "Geothermal Option" (or some other large-scale renewable energy generation), which are both checked "no" in all three scenarios, would obviate the need for the extensive programming depicted above in the building and transportation sectors.

2.9 Strategy for Tracking

The region should work toward consistent tracking and cataloguing of energy usage within all sectors and at all levels. This might be facilitated through the purchasing and distribution of a software program, through a contract with companies offering this type of service (e.g. Planet Footprint) or through incentives and/or disincentives for tracking. Working with utility companies (electricity, natural gas and propane) to track aggregate usage is an important first step to staying on top of our region's emissions.

If this is not possible, energy usage and emissions should be re-inventoried every three to five years to monitor progress toward targets. Jurisdictions should pool human and financial resources to cooperate in data-finding in order to facilitate the process.

It will be important to closely monitor the success of the action items in the plan, with respect to reductions, savings and participation rates. If certain programs are not

working effectively, they should be modified or eliminated. If others are working quite well at reducing emissions, they should be expanded or replicated in other jurisdictions.

Other metrics for success include: money saved, energy used, use of renewable energy sources (small and large-scale), water conservation, waste reduction, local food production, levels of community participation, and continued, positive, regional collaboration.

Reporting of the baseline data and the results of actions taken back to the governments and the communities will be determined during the first meetings of the Energy Action Coordinators. It is likely that the EACs, with approval from jurisdictions, may provide updates annually at a public meeting (e.g. Council meeting, Intergovernmental meeting).

It is important to note that this action plan and goals are a starting point, used to identify and assess baseline measures, based on information and technology we have today generally following national standards for such guidelines. As such, the plan is a living document, designed to be re-evaluated and reconfigured through time based on current knowledge, findings, resources, technology, and other factors.

3. **Objectives, Goals, and Action Plan**

Below is an index of high-priority sustainability programs and projects identified by the WSJCEB with community member input. Most of the action items are sought after by all of the communities in the region and will require collaboration for success. Other items, marked by specific jurisdiction, will be the sole responsibility of that municipality.

I. Community Engagement (Policy, Research & Education)

OBJECTIVE 1: Ensure that policy decisions at all levels (government, business, and individual) advance the New Energy Economy so that our communities will have economic opportunities related to energy efficiency and renewable energy and will develop and thrive in a sustainable manner. Implement a highly visual, public overall measure of progress.

I.1. GOAL: Adopt and implement public policies to increase energy efficiency, use of renewable energy, decrease water consumption, and reduce dependence on fossil fuels.

Local Government Action Items

All
1.) Where appropriate, support mixed-use and affordable housing developments on commercial projects to reduce transportation energy, with context appropriate regulations to mitigate adverse impacts (eg: conflicts between residential and more intensive commercial and industrial uses).
2.) Promote a leadership position and advocate on renewable energy supply and efficiency issues.
3.) Support community efforts to move towards greater energy independence.
4.) Actively work with other communities and any statewide efforts to improve regional, statewide, and national policies and laws influencing energy use.
5.) Review Local codes to ensure they are in line and not in conflict with the community's desire to become more sustainable.
6.) Assess feasibility of implementing a carbon (or energy) tax. (Use Boulder's Carbon Tax as example.) Implement if determined feasible and beneficial.
7.) Assess feasibility and possible results of implementing a 'Feed In Tariff' program that establishes a fixed rate for renewable energy power generated. Engage with SMPA on this topic.
Mountain Village
1.) Implementation of newly adopted Wildfire and Forest Health regulations; research of biomass energy production with dead wood from forests
2.) Comprehensive Plan is developed around a Sustainability Framework; review and revise LUO/Design Guidelines to allow for better environmental protections and incentives for renewable energy projects; investigate limits for maximum home sizes and energy taxes and incentives for new buildings
Ridgway
1.) Revisit current rate structure for water consumption such that increasing water demands pay higher rates for increased water consumption (ie: tiered structure)
2.) Revisit landscaping and weed mitigation requirements to insure support of xeriscape low-water landscaping for all uses (residential, commercial, industrial)
3.) Re-evaluate annually the Town's Renewable Energy Sales Tax refund policy and explore complementary opportunities and incentives

to encourage and facilitate the installation and use of renewable energy
4.) Establish formal policies for energy efficiency and conservation in all public buildings
Telluride
1.) Zero Waste Education-what will the net effect be if we become zero waste/Provide check list for businesses and restaurants
2.) Create Festival contract for SMC, TOT and TMV so that resource recovery is locked in at all levels of festivals

I.2. GOAL: Engage and advocate for collaborative, policy and legislative solutions at regional, state and federal levels.

Local Government Action Items

All
1.) Participate in and help develop effective regional, state, and federal solutions to reduce emissions.
2.) Engage utility companies and assist local agencies in achieving greenhouse gas reduction targets.
3.) Enable long-term solutions by investing in science and engineering education.
4.) Actively participate in WSJCEB.
Mountain Village
1.) Mountain Village presence at SMPA meetings, send letters, have an active role in SMPA renewable energy program
San Miguel County
1.) Continue to be a strong advocate for such policies and legislation providing they are practical and have viable chance of implementation.
Telluride
1.) Continue to work with SMPA Mayor's Forum and bring speakers to town to enlighten public related to what other communities are doing

I.3. GOAL: Advocate for programs, policies and legislation to reduce global emissions.

Local Government Action Items

All
1.) Support USA participation in international greenhouse gas reduction efforts.
2.) Support other organizations that lobby for these goals, such as: • Alliance for Sustainable Colorado • CML • CCI • Club 20 • Colorado Counties, Inc. • National Association of Counties

• Colorado County Managers Association
3.) Provide letters of support and communications for federal renewable energy policy programs
4.) Support local, state organizations that improve renewable energy policies.

I.4. GOAL: Continue to improve and increase partnerships with utility providers, local/state/federal governments, and private industry, to maximize resources and outreach efforts for Southwest Colorado that ultimately contribute to the realization of the region's goals, inclusive of grant and loan opportunities to finance necessary and desired improvements.

Local Government Action Items

All
1.) Assist in promotion of energy efficiency and renewable technology rebate, tax credit, and loan programs offered by local utilities, the GEO, local and federal governments through the building permit process and other community interactions as allowable.
2.) Establish a communications network among the entities listed in the comprehensive regional network of Section 2.6.
Mountain Village
1.) Familiarize staff with rebate and incentive programs and share with community, provide information, assist with paperwork if possible
Ouray
1.) Support the completion of local renewable energy projects such as the Ridgway Dam power plant and the Sun Edison PV array.
Ridgway
1.) Incorporate and update links and resource information on Town website, including links to SMPA, TNCC, GEO Recharge, DSIRE and others, as appropriate
San Miguel County
1.) Continue to promote rebate, tax credit and loan programs through Social Services and Commissioner's staff.
Telluride
1.) Arrange monthly reporting of energy consumption from SMPA and Source Gas at specific levels i.e. Government, Commercial, Residential
2.) Foster working relationships between regional and similar municipalities (i.e. Rico)

OBJECTIVE 2: Improve education of our regional population, both permanent and part-time, so that all are continually informed about actions they can personally take to reduce per-capita energy consumption, and understand the relationships between energy and water conservation, saving money, environmental preservation, and GHG reduction. Educational topics will include:

- Energy Efficiency – homeowners, renters, contractors, governments
- Renewable Energy
- Transportation

- Water Conservation
- Zero Waste
- Buying Local

I.5. GOAL: Education and Program Promotion

I.5.a. Market programs and conduct community outreach to increase participation in energy and water reduction efforts.

I.5.b. Provide education through a variety of venues.

I.5.c. Provide data needed by the community to understand the need for action to reduce global warming.

Community Action Items

All
1.) Partner with community-based non-profit organizations, such as TNCC, and others, such as libraries and schools, to undertake public outreach and education efforts that broaden community involvement in reducing greenhouse gas emissions. 1. a) TNCC shall develop regular educational topics and host free community education, making topics easily understood and end results easily attainable through: • TNCC website • Regular column in the regional newspapers • KOTO interviews • Green Business Roundtables • Field trips and workshops; hands-on activities to educate attendees • Public equivalent of the Green Business Roundtable (Sustainability Café) • Develop focus groups to assist in picking topics which will be accepted by and generate interest in the citizens 1. b) Provide energy education for schools and establish a partnership program.
2.) Develop and publish quarterly updates to overall sustainability measures adopted by the CEB • Make update graphic and interesting-have links from all governmental web pages • Make sure that the updates continue to point out why each has a different measure and the net positive effect that each measure will achieve.
2.) Market and encourage participation in incentive programs (such as…) that improve energy efficiency, increase renewable energy, reduce water consumption, or increase other sustainability goals.
3.) Foster and build public-private partnerships that help achieve greater energy efficiency and reduce greenhouse gas emissions.
3. a) Educate by showing specific action items (encourage walking vs. driving) Create an online calculator for high altitude driving that reflects the reduction effect
3. b) Educate by having tools that simply point out what specific steps in lowering carbon can mean to individual and community
3. c) Notification to public/private sector of specific programs that will work for them…not just a mass e-mail
Mountain Village

1.) Develop a Mountain Village "green" newsletter, community news with environmental focus
1.a) Community newsletter Green pages, updates on web site; increased environmental education programs and activities, field trips in community, install interpretive signage at renewable energy project sites
2.) Develop a strategy for reaching the residential sector of our community.
3.) Generate a community contact list of local "do-ers" for volunteer resources.
4.) Identify a staff person as Town contact for local environmental issues
Ridgway
1.) Incorporate water usage and conservation in monthly billings through town utility
2.) Partner with Green Business Roundtable efforts in Ouray, Telluride and Durango to include businesses in Ridgway and Ouray County
3.) Gather, create and distribute educational materials that promote water and energy conservation and efficiency, and update annually
San Miguel County
1.) Continue to work on community outreach through the Building, Environmental Health, and Social Service departments specifically.
2.) Provide air quality, climate demographic and GIS data.
Telluride
1.) Educate the populace on the reasons why government takes action on sustainability issues. (e.g. Banning Plastic Bags)
2.) Make all goals, especially Telluride Renewed goals, easily understood by the populace, so that they can react and see results at their level
2.a) Promote Energy Efficiency by showing what the quantifiable results can be with participation in specific programs
3.) Have a cleaner focus on issues

I.6. GOAL: Increase participation of public in Carbon Offset programs

Community Action Items

All
1.) Educate public about verifiable, reliable and effective options to offset energy use, and reduce their carbon footprint.
1. a) Promote SMPA's Green Blocks and Green Cents programs
1. b) Educate about and promote the Colorado Carbon Fund
1. c) Educate about and promote TNCC Green Fund – voluntary local option
Mountain Village
1.) Support and promote local offset funds: clearly define offsets, costs, where money goes, improve understanding and transparency of these programs.
2.) Strategize fundraising options for local TNCC Green Fund, including ads in community newsletter
Ridgway
1.) Create a local program fund to assist in implementation of Renewable Energy for the Town's utilities (water, sewer) – eg: "round up"/

monthly contributions to utility billings; SMPA Green Blocks program

II. OVERALL ENERGY CONSUMPTION

OBJECTIVE: Decrease per-capita energy consumption in San Miguel and Ouray Counties 20% by 2020 from 2010 levels, defining "per-capita" as the total number of regional inhabitants, both full-time and part-time, and using Source Gas and SMPA utility data, through a broad-based, multi-sector, multi-disciplined approach that employs education and action focused on energy conservation, energy efficiency and renewable resources.

Gaps/Needs

- We need coordination of projects to maximize focus, avoid duplication of effort, and leverage our shared voices to higher authorities
- GHG Inventory for Ouray County needs to be completed and regularly updated, both governmental and community/regional.
- GHG Inventory for San Miguel County needs to be completed and regularly updated, both governmental and community/regional. (SMC government use is tracked annually.)
- SMPA data needed annually – electricity use per jurisdiction, by sector
- SourceGas data needed back to 2005, and annually – gas use per jurisdiction, by sector
- Funding mechanisms are needed for project implementation. Financing program for people to invest in RE & EE improvements. Statewide PACE program.
- Tiered rate structure – prototype program being tested by SMPA

EXISTING GOALS:

- San Miguel County – Cool Counties Initiative – seeks to reduce county geographical GHG emissions 80% below current levels (at time of adoption) by 2050
- San Miguel County and Towns of Telluride, Mountain Village, Ophir, Norwood – Colorado Climate Action Plan – Reduce GHG emissions 20% below 2005 levels by 2020.

II.1. GOAL: Reduce energy consumption directly attributable to all governmental facilities and operations by 20% or more by 2020 (or sooner) from baseline year levels between 2005-2010 (selected by each jurisdiction), through increasing energy efficiency in all buildings and operation.

Local Government Action Items

All
1.) Explore funding opportunities for assessing and implementing energy efficiency projects on government buildings.

2.) Energy audits will be performed on all municipal buildings to identify opportunities for decreasing energy use and saving money.
3.) The Town/County will invest in energy efficiency improvements on municipal facilities with a reasonable payback period. Other funding mechanisms will be explored for improvements with longer payback time periods.
4.) "Low hanging fruit" energy efficiency items such as lights, computers, and shop heaters will be implemented first.
5.) The Town/County commits to using best practices in energy efficiency and renewable energy in construction of all new buildings and operations.
6.) The Town/County will measure and track annual energy consumption in facilities and track annual progress toward lower emissions. Energy costs and trends will be transparent and reported annually during the annual budget cycle. Staff must see the energy bills associated with their department.
7.) Coordinate regular meetings with jurisdictional energy staff to review challenges, accomplishments and opportunities to collaborate on improvements to government energy efficiency. Explore joint grant opportunities.
8.) Explore feasibility of and potentially implement an energy efficiency / savings contest among or within each jurisdiction with rewards / incentives for achieving energy use reduction.
Mountain Village
1.) Collect and establish baseline information and data for each town department/facility; perform energy audits for each
2.) Review existing Greenhouse Gas reports, data and confirm accuracy of data records
Ouray County
1.) Establish the necessary baseline by documenting County usage and expenditures for electricity, natural gas, propane, gasoline and diesel during the years 2008 and 2009. Establish a routine methodology for continued data tracking.
Ouray
1.) Establish the necessary baseline by documenting City usage and expenditures for electricity, natural gas, propane, gasoline and diesel during the years 2008 and 2009. Establish a routine methodology for continued data tracking.
2.) Reduce the City's electrical usage by at least 20% by the year 2015 by: a) Replacing incandescent and HID lamps in public lighting with CFL and LED lamps where feasible. b) Installing VFD units on all large pumps when the payback period is six years or less. c) Operating a 20 kW micro-hydro generating facility in the City Park using the Biota pipeline. d) Evaluating the feasibility and cost effectiveness of installing one or more micro-hydro generating facilities on the City's incoming water line.
3.) Reduce the City's natural gas usage by at least 20% by the year 2016 by: a) Installing a direct-exchange geothermal radiant heating system in the City Shop building using a small percent of the enhanced pool line flow. b) Evaluating the Community Center heat-loss sources and remediate where cost effective. c) Installing heat-exchanging ventilators in the Filter Building to replace the current and wasteful direct flow-through system.
4.) Reduce the City's Propane usage by at least 20% by the year 2015 by: a) Modifying the heating system at Box Canyon such that it can be completely shut down during the winter season. b) Evaluating the cost-effectiveness of maintaining a heated and lighted rest room along the north Ouray Corridor Trail during

the winter season.
5.) Explore the feasibility of utilizing geothermal heating for a Central District Heating system.
Ridgway
1.) Establish baseline use levels for all government buildings, facilities, utilities, and transportation fuels (as possible) from 2005 to present. Establish a routine methodology for continued data tracking.
2.) Participate in GEO ESCO program or similar option for retrofit and rehabilitation of all local government buildings including but not limited to Town Hall, the Public Works "Hut" and "Shop", the Post Office, and the Town's Water Treatment Facility.
San Miguel County
1.) Share the annual audit data in a meaningful form to individual department heads on a quarterly basis and develop action items for needed EE improvements short, medium and longer term. Review these improvement goals during the budget process to make sure funding is in place or that grants are explored and applied for.
2.) Review all new county construction projects for maximum EE, RE utilization and use of recycled or green building materials, above and beyond the energy codes.

II.2. GOAL: Encourage and incentivize existing buildings (commercial & residential) to reduce energy consumption 20% below 2010 levels by 2020.

Local Government Action Items

All
1.) Implement a PACE (or similar) program, making funding available to residential and commercial property owners seeking to improve their properties to conserve energy and water, and to generate solar energy.
2.) Pursue State and Federal funding programs designed to reduce energy demand through conservation and efficiency.

Community Action Items

All
1.) TNCC – Engage community members, Residential & Small Commercial, in actively tracking and reducing their own energy use and carbon footprint through utilizing the Eco-Audit Software Program. Encourage homeowner & business owner investment into energy efficiency through promotion of cost savings and comfort.
2.) Engage the Lodging & Resort Community in actively reducing their energy use. Implement an Energy Efficiency contest with Aspen's Resort Community, utilizing the EPA / ENERGY STAR guidelines for Hospitality.
3.) Explore and identify opportunities with the GEO, Housing Resources of Western Colorado, Delta Housing Authority, Rural Development, the Colorado Youth Corps, and other operational and/or financing organizations to market and grow existing weatherization and home rehabilitation programs throughout the region, and to expand these program concepts beyond the current income-restricted categories *(i.e.: weatherization opportunities for households earning greater than 200% of the Federal Poverty Guidelines, and home rehabilitation opportunities for households earning greater than 80% of the Area Median Income limits).*

Mountain Village
1.) Develop outreach and education plan for MV residents; encourage small renewable installations; develop tracking system for residential usage
2.) Engage resort hotels and lodging facilities, study FKL/ Fairmont model and Green Team
Ouray
1.) Update community resource information on rebates, incentives, programs, etc. on the Town website.
Ridgway
1.) Update community resource information on rebates, incentives, programs, etc. on the Town website, building permit packets, etc.
2.) Provide incentives for energy use reduction through building permit discounts or other fee reduction
Telluride
1.) Survey buildings in the commercial core and the government to see what specific additional steps can be taken to lower energy consumption.

II.3. GOAL: Reduce energy demand of new building construction, including all renovations and remodels that require a building permit.

Community Action Items

All
1.) Require all new construction (commercial & residential) to meet or exceed the energy efficiency of the 2006 (or beyond) International Energy Conservation Code by 2011.
2.) Adopt policies and ordinance changes to reduce energy use by promoting domestic water conservation and requiring water efficient landscape improvements associated with new construction.
3.) Reduce greenhouse gas emissions from buildings and energy use. Require or request discretionary development projects to assess greenhouse gas emissions due to energy use, and to incorporate energy and water conservation measures into projects along with other features or programs.
4.) Encourage reduction of vehicle fuel consumption pertaining to construction projects, through carpooling of contractors/trades, reducing trips of trucks and other vehicles to jobsite, and other creative methods.
5.) Encourage construction schedule to be planned in a manner that eliminates the need for “wrap and heat” of the construction site or heating of the ground during cold months.
Mountain Village
1.) Investigate energy taxing for large usages, credits, efficiencies, innovative policies of construction; investigate maximum home sizes
Ridgway
1.) Review and update Prescriptive Energy and Green Building Code to evaluate payback periods, upfront costs, new technologies
2.) Seek out rebate/ refund/ cost reduction opportunities to encourage building beyond existing code requirements
Telluride
1.) Enforce green building code and outdoor heating regulations

2.) Improve mass transportation via additional park and ride lots

II.4. GOAL: Work toward region becoming carbon neutral by 2035.

Community Action Items

All
1.) By 2012, find a community willing to set the goal of becoming carbon neutral by 2020, in order to have an example to work from for rest of region.
2.) Conduct feasibility studies for communities in region to become carbon neutral.
3.) Conduct feasibility studies and take actions toward communities going "off-grid".
4.) Calculate current Carbon Footprint of each entity in region.
Mountain Village
1.) Research carbon-reducing technologies.

III. Renewable Energy from Electricity – all sizes of systems, private / public

OBJECTIVE: Obtain 20% of the region's electricity from renewable energy by 2020. Sources will include a mixture of local small and large-scale renewable energy projects and purchase of RECs for renewable energy produced outside of the region.

Gaps/Needs

- Funding mechanisms are needed for project implementation. Financing program for people to invest in RE & EE improvements. Statewide PACE program.
- Need enabling regulations for utilities for development of renewable energy – i.e. increasing Policy 115 limit from 5% to 10% or greater.
- Need existing RE production within SMPA territory to establish baseline

EXISTING CHALLENGE: Telluride Renewed – Towns of Mountain Village and Telluride will use 100% new renewable energy to offset for electricity usage by 2020, through energy efficiency, local/regional renewable energy production, and purchase of renewable energy.

III.1. GOAL: Maximize the amount of Renewable Energy produced on governmental facilities/properties by 2020. Purchase remaining electricity through a Renewable Energy or Green Power production program.

1.) Local Government Action Items

All

1.) Facilitate the development of small or large-scale RE systems on government property. Micro-hydro, geothermal, solar, biomass, wind, etc.
2.) The maximum capacity of renewable energy that each jurisdiction can be produced will be determined by each EAC.
Mountain Village
1.) Produce 5% of government electricity by renewable sources by 2020; establish baselines, research ideas.
2.) Micro-Hydro – Currently engaged in feasibility study for placing turbines in PRV vaults on town water system. Research, apply for and obtain grant funds to implement in 2011.
Ouray
1.) Pursue funding for two 20 kW generators employing the City's water supply system.
2.) Actively support the continuing operation of the historic Ouray Hydroelectric Plant.
Ridgway
1.) Pursue micro-hydro power generation option with the Town's water supply and distribution utility.
2.) Explore opportunities to implement renewable technologies that offset existing and planned energy consumption *(eg: grid-tied solar system on Town Hall for new energy efficient pedestrian lighting in Town Park)*.
3.) Explore opportunities and financing mechanisms to convert the Town's Water Treatment facility and WWTP to solar powered utilities
San Miguel County
1.) SM County existing facilities and new construction commitment to utilize RE through offset purchase programs and through the use of geothermal, solar, and wind resource technology.
Telluride
1.) Develop a 100 kW solar farm at the Wastewater Treatment Plant
2.) Assess feasibility of and implement micro-hydro power projects at Pandora, Mill Creek, Keystone Hill, and Stillwell Tunnel. Also place mini-hydro turbines in existing pipelines where appropriate.

III.2. GOAL: Increase the amount of non-government owned locally-produced RE in the region to 15% by 2020.

Community Action Items

All
1.) Encourage / facilitate the development of large-scale systems (over 25 kW), up to a total of 5 MW in SMPA Territory (or higher as utility regulations change).
2.) Support SMPA's efforts to build a community-funded solar farm with completion by 2013, following the currently proposed solar project with Sun Edison.
3.) Encourage development of small-scale residential & commercial systems – through local incentives such as: waived building permits & taxes, financing programs.
4.) Adopt policies and ordinances to remove regulatory impediments and economic disincentives associated with the generation and use of energy from renewable sources. Develop and market policies, incentives and information that encourage the purchase and utilization

of renewable energy technologies.
Mountain Village
1.) Encourage homeowners to install small home systems; provide incentives to residents
2.) Work with Telluride Ski & Golf Resort to improve energy efficiencies, investigate solar, wind, hydro options
3.) Greening the Gondola Campaign.
Ouray County
1.) Encourage the responsible mining of strategic metals used in renewable energy and battery technology.
2.) Ensure the County Land Use Code accommodates the installation of renewable energy systems and/or farms
Telluride
1.) Work with MV and SMC to create a renewable energy source within the region or county.

IV. Transportation: Ground and Air
OBJECTIVE: Reduce the overall amount of energy consumed per capita by ground and air travel.

Gap: We need a coordinated regional approach to transportation.

- Lack of coordinated regional transportation causes:
  - Higher overall energy consumption and greenhouse gas production
  - Higher individual cost
  - Even more wear and tear on our roads

Needs:

- Develop and publish quarterly updates for (estimated) regional transportation energy usage, including personal, private company, school and public works, public for-hire, contractor vehicles, and air travel for the region.
- Establish baseline fuel consumption per jurisdiction.
- Develop a baseline of "commuter miles traveled" and increase use of pooled transportation by 20% by 2020.
  - Put together a committee focused on accomplishing the district which would include members from all affected counties and municipalities
- Accurate numbers to compare air travel in/out of Montrose combined with driving, to air travel in/out of Telluride airport. Improved “shop local” goal achievement.

IV.1. GOAL: Reduce fuel use directly attributable to all governmental facilities and operations 20% by 2020 (or sooner) from baseline year levels between 2005-2010 (selected by each jurisdiction), through increasing vehicle efficiency and efficiency of vehicle operations.

Government Action Items

All

1.) Reduce overall fuel consumption for government vehicles, through fewer or more efficient trips, use of fuel efficient vehicles, carpooling to meetings and conferences, and increase pedestrian emphasis to local events and meetings.
2.) Assess feasibility of and build capacity for developing fueling stations for alternative fuel (e.g. biodiesel, compressed natural gas, hydrogen, etc.). Adopt policies and programs that help governments, businesses and organizations with fossil-fuel powered fleet vehicles switch to vehicles powered by clean, renewable energy sources.
3.) All new government vehicle purchases strive for most fuel-efficient models, using alternative fuel sources when feasible.
4.) The Town/County will make bus passes available to those employees who can commute by bus.
5.) Future Town/County facilities and operations will be sited based on access by transit, walking, biking, and evaluated for encouraging more compact land uses.
6.) Adopt policies and ordinances that encourage car-free tourism.
7.) Work with Region 10 to put a regional transportation district to the voters and facilitate other goals. (In 2008 Montrose County received a grant to perform a Transit Feasibility Study in conjunction with Delta, San Miguel and Ouray counties. This study was the basis for the Regional Transit Coordinating Council managed under Region 10 League for Economic Assistance. Subsequently, each county is charged with organizing a Transit Advisory Committee to examine this issue and come up with a work plan. San Miguel County organized its first meeting of this committee scheduled for September 27, 2010.)
8.) Create a Western San Juan Transportation District.
9.) Require that all new development projects have a net decrease in transportation related emissions compared to existing development conditions
10.) The Town/County will encourage employees to make in-town trips on bicycle or by foot when practical
Mountain Village
1.) Reduce fuel consumption 10% by 2020 (TMV already uses hybrid vehicles in fleet).
2.) Use less trucks and more 4-6 wheelers; use biodiesel or alternative fuels when possible; hire more locals
3.) Research and establish baseline data and tracking mechanisms for Town fuel usages, investigate options for more 4-6 wheelers and less full size trucks.
Ouray
1.) Reduce the City's fuel consumption by at least 20% from 2010 levels by the year 2020 by: a) Installing a card-based fuel dispensing system. b) Purchasing vehicles with mpg ratings that exceed the current fleet average by at least 20%. c) Exploring opportunities to convert City vehicles to biodiesel, compressed natural gas, or other alternative fuel supplies.
Ridgway
1.) Explore feasibility of Town-owned bicycles, including electric powered bicycles) for town-wide transportation (policing, post office runs, posting properties, hardware store runs, etc.)
San Miguel County
1.) Goal to support and work with the newly formed Transit Advisory Committee & Regional Transit Coordinating Council through Region 10. As mentioned above, the County is working toward a regional public/private transit plan with Montrose, Ouray and Delta county. It's

also safe to say that SM County will continue to support public transit service through the existing Galloping Goose system to the west end of SM County.
4.) Examine options within County Land Use Code to encourage development of public trails and residential/commercial development near or on existing transit lines.

IV.2. GOAL: Reduce demand for fossil fuel by decreasing vehicle miles traveled, improving transit options, and improving the fuel efficiency of vehicles.

Community Action Items

All
1.) Evaluate parking standards in downtown areas to help reduce vehicle miles traveled.
2.) Adopt policies and ordinance changes to reduce vehicle miles traveled by supporting local hiring, food production, farmers markets, and community-based "buy local" campaigns.
3.) Reduce the volume of single occupancy traffic within the region, through educational outreach, promoting energy use reduction programs, and encouraging car-pooling and use of mass-transit.
4.) Improve mass transit transportation in the region. Improve convenience and maintain affordability, with lower emissions per passenger mile than the average private vehicle.
5.) Increase the use of highly fuel-efficient and low emissions-fuel engines and machinery in on-road and off-road vehicles.
6.) Increase the use of walking and bicycles, through expansion of town bike programs, improvement of bike/pedestrian trails, incentivizing bike travel by employers, etc.
7.) Identify, support, finance, and construct an integrated regional transportation and workforce housing program where efficient and affordable housing is built to house a high percentage of the local workforce, and which decreases the overall percentage of the commuting workforce by 2020 throughout the region. Actual percentage for this goal will be determined by the EAC's as implementation of this action is planned. a) Confirm commuting workforce figures for the region and identify targeted household income ranges for the commuting workforce and pursue options for housing development. b) Include affordable housing projects with mandatory energy efficient construction policy. c) Expand the range of targeted alternatives to single-passenger transportation systems (car pool, van pool, etc.) d) Expand and promote existing park and ride transportation *(eg: Ouray County Fairgrounds Parking Lot)*
8.) The Town/County will support efforts to create affordable in-town housing or on public transportation routes for employees, to reduce the need to commute.
Mountain Village
1.) Review and update Town vehicle efficiency study and examine historical data and reports on regional transportation issues
2.) Support development of additional levels of parking garage.
3.) Identify potential affordable housing development locations through Comprehensive Plan
4.) Work with Telluride to maintain free transportation on the Gondola.

Ouray
1.) Encourage the use of locally produced products and produce and shopping locally to minimize the transportation component of consumption.
Ouray County
1.) Encourage the use of locally produced products and produce and shopping locally to minimize the transportation component of consumption.
Ridgway
1.) Develop and construct a comprehensive pedestrian and bicycle transportation network focused on connectivity throughout the Town of Ridgway and incorporate the adjoining areas of Ouray County where feasible, including public parking facilities that encourage non-vehicular transport throughout the community. a) Continue pursuit of grant funding for completion of sidewalks connecting north, south, east, and west aspects of Town. b) Support the Uncompahgre Riverway Trail to connect pedestrian trails from Montrose to Ouray as well as other trail building efforts within and adjoining the Town. c) Plan and develop public parking lots for vehicles as well as incorporate bike-parking areas around Town to encourage non-vehicular transport throughout the Town.
2.) Pursue partnership, funding and opportunities to develop a comprehensive trail network between Ouray, SM and Montrose counties
3.) Make improvements to park and ride lot in Town
4.) Work with farmer's market to centralize the location closer to residential areas for pedestrians and bike
Telluride
1.) Explore opportunities to make switch over as funds become available to electric cars/trucks instead of fossil fuels
2.) Expand Townie program
3.) Work with Mountain Village to maintain free transportation on the Gondola.

IV.3. GOAL: Optimize utilization of air travel to decrease overall GHG emissions in region, using a systems-thinking approach toward environmental, economic and social sustainability of San Miguel County.

Community Action Items

All
1.) Participate in local airport discussions and debates, issues, boards.
2.) Work with TRAA and TMRAO to increase capacity of planes and lower # of flights.

V. Water

OBJECTIVE: Decrease overall water consumption community-wide in private and public sectors (residential, commercial, industrial, and governmental) by 10% below baseline year levels between 2005-2010 (selected by each jurisdiction), through education, conservation, incentives, facilities management, and regulatory structure.

NEED: Research and establish baseline data and tracking mechanisms for Town / County water usages with Water Departments

V.1. GOAL: Reduce water consumption directly attributable to all governmental facilities and operations by 5-10% by 2020 (percentage to be determined by EAC of each jurisdiction).

Government Action Items

All
1.) Establish a baseline for water use by each jurisdiction, starting in 2011 (or before if already measured). Install meters to measure use as needed. Focus on significant consumptive users of water if not feasible to measure all.
2.) Increase water efficiency in all buildings and government operations, utilizing reduced flow aerators, lawn-watering management improvement, water saver toilets, water heaters and any other new water efficient technology.
3.) Educate public works and parks personnel about water use reduction and conservation techniques. Identify training and workshop opportunities as appropriate. Distribute water savings information to Public Works and Parks crews throughout region.
4.) Assess the Town/County water supply, treatment, and distribution to identify water conservation opportunities, including assessment of evaporation and seepage through reservoir and open ditch systems. Installation of leak detection alarm systems that identify leakage early on and mitigate significant water losses may be an initial step to quantify this issue for all municipalities.
5.) Explore storm-water harvesting opportunities for irrigation of public spaces such as parks and open spaces.
6.) Reduce use of treated water for outdoor irrigation purposes around all Town/County facilities through ditch or piped raw water irrigation systems or other opportunities.

V.2. GOAL: Reduce residential, commercial, agricultural and other non-governmental water consumption per capita 10% by 2020 from 2011 levels. This measurement may be for the entire jurisdiction as a whole or categorized in more detail, depending upon each jurisdiction's capability to obtain and measure the data.

Community Action Items

All
1.) Incorporate water usage figures and water conservation education in the government or water district's water billing scheme that includes average use and range of use within the Town for household comparisons and to create an atmosphere of friendly competition between water users (i.e. incorporate graphs and user friendly data so households and businesses can see how much water they use month to month and seasonally and compared with other users in Town).
2.) Educate community about water use reduction techniques through distribution of information, seminars, workshops, newsletters, etc. In particular, information and incentives to use low-water irrigation techniques for farm and ranching applications, native and low-water landscaping techniques, etc. Opportunities may exist through the University Extension Offices, the Gunnison Basin Roundtable and other statewide Roundtables, CDPHE, CO Water Conservation District, etc.
3.) Assess the Town water supply, treatment, and distribution to identify water conservation opportunities.

4.) Incorporate water conservation requirements (mandatory water restrictions) into local building codes for new construction. Codify mandatory water restrictions (eg: time of day watering and watering day assignments)
5.) Insure all water distribution systems provide for measuring water consumption and usage for all applications
6.) Explore or re-evaluate rate structure to discourage expansive use of water during the summer watering/ irrigation season.
7.) Adopt landscape ordinances that promote drought resistant plants, and restrict lawns and other high water demand plants unless reclaimed or grey water systems are used.
8.) Develop and adopt energy saving and environmentally sound domestic water conservation plans.
9.) Insure water rights acquisition and/or financing are incorporated into land use developments and annexations.
10.) Develop policy for private use of non-potable water sources and/or plan for expansion of non-potable water systems for distribution such that residences and businesses do not irrigate with treated, potable water.
11.) Explore opportunities to remove other discretionary water uses from treated water systems to non-treated systems (eg: fire hydrants, etc.)

VI. Landfill: Waste Reduction & Recycling

OBJECTIVE: Divert 75% of overall waste from landfills by 2020 from 2010 levels, by reducing the amount of waste at the source, reusing materials, recycling, and composting.

NEED: Research and establish baseline data and tracking mechanisms for Town / County waste.

VI.1. GOAL: Divert 75% of overall Town/County Government waste from landfills directly attributable to all governmental facilities and operations by 2020, below baseline year levels between 2005-2010 (selected by each jurisdiction).

Government Action Items

All
1.) Decrease the amount of solid waste generated.
2.) Decrease consumption of paper 20% by 2012 from 2010 levels.
3.) Aggressively implement recycling and composting at Town & County -sponsored events.
4.) Distribute recycling options throughout Town to accompany existing trash bins.
5.) Transition to a paperless office at Town/County Buildings: 1.) Purchase refurbished laptops or tablets for use by elected and appointed officials during public meetings and discontinue distribution of paper packets for meetings; 2.) Encourage electronic submissions for Town issued permits when feasible (building, encroachment, sign, solid fuel stove, licensing, etc.)
Mountain Village
1.) Establish baseline data and tracking mechanisms for governmental facilities; strategize educational campaign for Zero Waste,

research local opportunities for composting, recycling construction waste, support local facilities and incentives for reuse and recycling.
2.) Consider a small local in-vessel composting unit for town use and education
Ouray
1.) Initiate a program of commercial cardboard recycling during 2011.
Ridgway
1.) Transition to paperless/ electronic document system
2.) Ramp up recycling efforts to reduce solid waste stream
Telluride
1.) Increase recycling efforts by all government departments, commissions, taskforces, and councils.
2.) Increase composting by all government departments, commissions, taskforces, and councils.

VI.2. GOAL: Divert 75% of overall waste from landfills from residential, commercial, and other non-government entities 75% by 2020.

Community Action Items

All
1.) Educate community about waste reduction techniques. Including: Waste reduction at point of purchase through recycling; Composting Education –use of worm bins, back-yard composting techniques
2.) Incentivize reduced volume of waste compared to recycling / composting collection. Encourage home composting of organic waste.
3.) Support the development of recycling centers in the region.
4.) Expand recycling services to commercial properties in region by 2012 (or as contracts are up for renewal).
5.) Support development of regional composting facility that can serve all sectors.
6.) Establish collection services in all communities for segregated food waste from commercial sources.
7.) Increase use of and opportunities for hazardous waste removal.
8.) Improve utilization of recycling & proper disposal of large items, including appliances, electronics, etc.
9.) Enact ordinances and create incentives to achieve organic (food and green) waste diversion of 75% by 2020.
10.) Create and support other programs, such as a Green Business Program, that help achieve the 75% overall waste diversion goal.
11.) Adopt environmentally preferable purchasing policies and explore joint- purchasing agreements with partner agencies, and local jurisdictions and businesses.
12.) Watch the "plastic bag elimination" initiative in Telluride and identify opportunities to implement similar or other programs throughout the region.
13.) Perform a feasibility study to investigate the opportunity to capture methane from waste products to utilize as an alternative fuel source. Coordinate with Montrose County to study landfill options.
Mountain Village
1.) Establish baseline data and tracking mechanisms for non-governmental waste production; education and outreach to community

residential and commercial facilities; require all commercial businesses to recycle and participate in Zero Waste; support local transfer stations and recycling centers.
Ridgway
1.) Identify supplemental funding to facilitate and implement a mandatory commercial recycling program
San Miguel County
1.) Continue to support hazardous waste disposal options throughout the county and increase options for disposal of toxic freon, lead and other materials present in many appliances and electronics.
2.) Improve options for household recycling throughout the county.
3.) Improve options for composting – west end of county has significant opportunity and the space and the right mix of resources for a composting center.
Telluride
1.) Implement and enforce a Waste Grease and Oil Ordinance that ensures proper disposal by commercial food service providers and, ideally, connects re-use services to the generators (i.e. biodiesel producers).
2.) Continue to provide for and/or support an annual Town / Regional Clean-up.
3.) Continue to provide for and/or support an annual or semi-annual Electronics Recycling Event.

VI.3. GOAL: Reduce construction waste by at least 75% by 2020.

Community Action Items

All
1.) Develop a regional recycling and reuse facility for construction materials.
2.) Enact ordinances and create incentives to achieve waste reduction of construction and demolition debris.
3.) Encourage & educate to increase use of reuse stores and facilities.
4.) Decrease amount of complete home demolition through incentivizing remodeling.
Mountain Village
1.) Consider requiring new construction to recycle construction items; support the identification of location for local construction recycling center, education and outreach campaign for contractors; % of building permit fees to construction recycling program.
Telluride
1.) Create and implement mandatory construction materials recycling specifications to include with all Town/Government Construction projects.
2.) Work collaboratively with the construction community to encourage adoption of these specifications on private projects.

VII. Agriculture & Forests

OBJECTIVE: to utilize our regional natural resources wisely, increasing local food production utilizing available biomass wisely, and preserving our natural environment for future generations.

VII.1. GOAL: To increase food security and elevate regional produced food quantity, quality and availability to residents, visitors, businesses and schools in region.

Community Action Items

All
1.) Adopt policies and ordinances that support local agriculture, food production, farmer's markets and community gardens. The Town/County will strive to use locally grown food for Town/County sponsored functions when practical.
2.) Support efforts by local growers and restaurants to produce and use locally grown food, and remove associated regulatory hurdles as possible.
3.) Encourage responsible and sustainable agricultural and landscaping practices, minimizing toxic chemical use.
4.) Educate government staff and the community on the economic and energy impacts of the industrialized food supply chain and encourage the cultivation and purchase of locally produced foods.
5.) Educate public on local food shed – what it is and why important.
6.) Encourage Farm to School and Farm to Cafeteria programs.
7.) Perform Feasibility study for regional commercial kitchens, meat processing facilities, etc. to enhance the ability of local producers to process and market local food in the region. If appropriate pursue funding for items identified in study.
8.) Host fun food growing and harvesting events.
Mountain Village
1.) Create Mountain Village Farmer's Market; investigate and propose Community Garden and demonstration garden in Meadows area, identify local volunteer team for project implementation.
2.) Encourage/educate Urban / Vertical Farming opportunities in village core, including businesses and lodging community.
San Miguel County
1.) County support for local food production through land use, and other permitting options.
2.) Create incentives for safe food production with Environmental Health Department.
3.) Encourage natural livestock option for ranchers through education by those succeeding with these options.

VII.2. GOAL: To utilize available energy resources wisely, protect our forests from harm, and preserve natural beauty.

Community Action Items

All
1.) Develop forest health and education curricula for regional schools.
2.) Assess the feasibility of and if appropriate, promote development of beneficial biomass projects in the region from forest dead wood.
3.) Support initiatives by Mountain Studies Institute (MSI) related to climate change resiliency & adaptation. Collaborate when appropriate.
Mountain Village

1.) Develop Forest Health and Wildfire Mitigation Policy educational efforts that lead to implementation.
2.) Assist landowners with grant possibilities for implementation of CWPP.
San Miguel County
1.) Work with public land agencies to find remedies and preventions for forest diseases, insects and fungal infestations affecting regional forest health.
2.) Develop either via government or non-profit support a Citizen Scientist program to engage citizens in forest stewardship.

ACKNOWLEDGEMENTS

The WSJCEB and TNCC would like to thank ORE and the Gunnison/Hinsdale County Community Energy Board for their efforts toward establishing the framework for this collaborative document.

The many authors of the STRATEGY would like to acknowledge the significant efforts of the community members who have contributed their time and energy to the energy-planning process. The creation of this document would not have been possible without the dedicated work, participation, input, and support from the people of this region.

TNCC would like to thank the WSJCEB members for their hard work and dedication throughout the process of developing this plan. WSJCEB members are:

Jurisdiction / Organization	**WSJCEB Members and staff EAC's**
Ouray County	Keith Meinert, 2010 County Commissioner Lynn Padget, County Commissioner Will Clapsadl, Facilities Manager, EAC
San Miguel County	Elaine Fischer, County Commissioner Nina Kothe, Facilities Coordinator, EAC
Town of Mountain Village	Bob Delves, Mayor Deanna Drew, Recreation Plazas & Environmental Services Coordinator, EAC Chris Hawkins, Director of Community Development
Town of Ouray	Bob Risch, Mayor, EAC
Town of Ridgway	Jen Coates, Town Manager John Clark, Mayor Pro-Tem Pat Willits, Mayor Bill Behan, Building Inspector, EAC
Town of Telluride	Stu Fraser, Mayor Karen Guglielmone, Public Works Project Manager, EAC
Town of Norwood	Sandra Esch, Town Trustee
San Miguel Power Assocation	Brad Zaporski, Renewable Energy Technician
SourceGas	Natalie Shelbourn, Senior Representative, Business Relations
Members-At-Large	Ken Haynes, Town of Norwood - Citizen Kurt Johnson, Telluride Energy
The New Community Coalition	Todd Brown – TNCC Board Member Kris Holstrom – Regional Sustainability Coordinator / TNCC Executive Director Kim Wheels – Community Energy Coordinator

Appendix: Important Terms and Acronyms

AFV	Alternative-Fueled Vehicle
Btu	British Thermal Units
CAPPA	Clean Air and Pollution Planning Assistant (ICLEI Software)
TELSKI	Telluride Ski & Golf
CCP	Cities for Climate Protection (ICLEI Program)
CEC	Community Energy Coordinator
CFL	Compact Fluorescent Light Bulbs
CH_4	Methane
CO_2	Carbon Dioxide
CO_{2e}	Carbon Dioxide Equivalent
DoE	Department of Energy (US)
DSM	Demand Side Management
EAC	Energy Action Coordinator
EAP	Energy Action Plan
EPA	Environmental Protection Agency
GEO	Governor's Energy Office (State of Colorado)
GHG	Greenhouse Gases
GWh	Gigawatt hour
HARC	Telluride Historic and Architectural Review Committee
HFCs	Hydroflourocarbons
ICLEI	International Council for Local Environmental Initiatives
IPCC	Intergovernmental Panel on Climate Change
KOTO	Telluride Community Radio Station
KURA	Ouray Community Radio Station
kWh	Kilowatt Hour
MPG	Miles Per Gallon
N_2O	Nitrous Oxide
PFCs	Peflourocarbons
PSAs	Public Service Announcements
PV	Photovoltaic
REMP	Renewable Energy Mitigation Program
SMA	Sheep Mountain Alliance
SMPA	San Miguel Power Association
SUV	Sport Utility Vehicle
TNCC	The New Community Coalition
UCSM	University Centers of the San Miguel
WSJCEB	Western San Juan Community Energy Board

EcoAction Partners 2019 Proposal to Update the Town of Mountain Village Corporate & Community Greenhouse Gas Emissions Inventory & Report

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Greetings!

EcoAction Partners is pleased to provide the following proposal to Update the Town of Mountain Village Corporate and Community Greenhouse Gas Emissions Inventory and Report.

EcoAction Partners has appreciated the long and successful working relationship with the Town of Mountain Village for well over a decade. And with that, EcoAction is pleased to provide this proposal so Mountain Village can meet the Compact of Mayors compliance requirements which include: 1) creating a greenhouse gas emissions inventory, 2) setting an emissions reduction target, and 3) developing a climate action plan.

The primary focus of this proposal is for Item One (1): Creating the Mountain Village Greenhouse Gas Emissions Inventory for both the Corporation of the Town of Mountain Village and the Mountain Village Community. EcoAction Partners' current Mountain Village Community Greenhouse Gas Inventory follows the Global Protocol for Cities, which also meets the Inventory Protocol for the Compact of Mayors. This includes tracking: stationary energy use, transportation energy use (ground and air), waste, wastewater, and fugitive emissions. Mountain Village's current GHG Inventory data and analysis are comparable and compatible with EcoAction Partners regional GHG Inventory analysis. EcoAction Partners proposes to continue to update the separate Mountain Village Corporate (previously Government) Energy Use & GHG Emissions Report, the emissions of which are included within the Community Inventory, but are separately and more-intensively analyzed in this dedicated report.

To meet the other requirements for the Compact of Mayors, EcoAction Partners invites Mountain Village to participate in the regional process for (2): setting emission reduction targets (that are currently proposed on page five), and (3): Updating the regional Climate Action Plan.

In addition to the Mountain Village Community Greenhouse Gas Emissions Inventory and the Mountain Village Corporate Energy Use & GHG Emissions reports, EcoAction proposes supplementary services that are available "ala carte" to best meet Mountain Village's needs. Finally, EcoAction would welcome the opportunity to work with Mountain Village communications & marketing staff to develop the GHG Inventory report in-house in an attractive, concise, easy-to-read report that outlines the GHG emissions baseline, targets and reduction plan. Or if preferred, EcoAction welcomes working with another contractor to assist in developing a Mountain Village Climate Action Plan.

EcoAction Partners brings our 10+ years of experience working with all the municipalities, utility providers and citizen groups in San Miguel and Ouray Counties on Greenhouse Gas Emissions and energy reduction programs to this proposal. Thank you very much for your consideration!

Heather Knox
EcoAction Partners Executive Director

EcoAction Partners' Consultant Qualifications:

Since our inception in 2006, EcoAction Partners (previously The New Community Coalition) has worked closely with Mountain Village toward increasing sustainable practices and reducing Greenhouse Gas emissions. Mountain Village, along with Telluride and San Miguel County, was a founding member of our organization, which was created to serve as the regional solution so each government did not have to have its own environmental sustainability department.

In 2009, EcoAction Partners secured a 4-year block grant from the previous Colorado Governor's Energy Office to support the New Energy Economy and advance energy efficiency and renewable energy in our region. To facilitate this grant, EcoAction formed the Sneffels Energy Board (previously the Western San Juan Community Energy Board), with all governments within Ouray and San Miguel counties, as well as utility partners (SMPA & Black Hills), businesses and citizens. The vision of Sneffels Energy Board is to preserve our clean air, water, and environment for future generations. The Sneffels Energy Board has met quarterly since 2009, and continues to meet today, to collaborate on setting and accomplishing regional sustainability goals, reducing consumption of valuable natural resources through project implementation, sharing information from the Colorado statewide sustainability network, researching successful programs from other communities as possible models to implement locally, providing community outreach and engagement, and addressing policy barriers on both a local and state level. Advantages of this regional approach include a stronger voice to influence political change, combined resources and greater economy of scale to apply for and implement grant programs, and sharing of experiences across the region. EcoAction continues to lead the Sneffels Energy Board and track regional progress towards reducing greenhouse gas (GHG) emissions and other sustainability practices.

As part of this grant, EcoAction Partners led the Sneffels Energy Board through the creation of the collaborative regional Sustainability Action Plan, (STRATEGY), completed in 2011. This Collaborative Sustainability Action Plan for Ouray & San Miguel Counties 2010-2020 is essentially a Climate Action Plan* to guide multi-jurisdictional energy action planning and collaboration to effectively manage energy resources and meet energy, transportation fuel, water, and waste reduction goals. The plan provides a mission, guiding principles, goals, objectives, and action items. This guide used the findings collected by EcoAction Partners on regional energy use, regional governments and utility partner input, and information from collaborative planning meetings. The Sustainability Action Plan prioritizes the greatest opportunities for sustainability initiatives and provides a methodology for ongoing collaboration. Since 2010, regional governments and communities have developed a strong understanding of the factors influencing use of our resources and have made progress to increase energy efficiency, decrease water consumption, increase local renewable energy, increase waste diversion and provide community outreach and education to increase participation in energy and water reduction efforts.

***Note:** At the time of development, the term "Sustainability Action Plan" was determined to be more agreeable and versatile regionally than "Climate Action Plan" since a portion of the population in the region, including some elected officials, did not believe in climate change.

Sustainability Action Plan Objectives:

- Community Engagement: Policy decisions & public visual measure of progress.
- Energy Consumption: Decrease per-capita energy consumption 20% by 2020.
- Renewable Energy: 20% of the region's electricity from renewable energy by 2020.
- Transportation: Reduce energy consumed per capita by ground and air travel.
- Water: Decrease water consumption by 10%
- Landfill Waste Reduction & Recycling: Divert 75%
- Agriculture & Forests: Utilize regional natural resources wisely, increase local food production.

In part because of the successful working group of the Sneffels Energy Board, EcoAction Partners was awarded a second grant to develop a baseline Greenhouse Gas Inventory for our region of San Miguel and Ouray Counties. Each of the main jurisdictions in the region (including Mountain Village) contributed $1,000 as matching grant funds for this inventory. This regional inventory was preferred by the Sneffels Energy Board, over each jurisdiction contributing $6,000 to obtain its own GHG Inventory.

This regional inventory was developed by the University of Colorado at Denver with data collection and assistance from Kim Wheels. Since the initial inventory was created, Wheels has managed and updated our region's GHG data, as well as creating and updating jurisdiction-specific inventories upon request and with adequate financial support. Gathering and analyzing our region's Greenhouse Gas emissions data has been an essential service that EcoAction Partners has provided to Mountain Village and our other government partners since 2010. As part of this process, EcoAction Partners has also analyzed and presented community-wide utility use for Mountain Village, including electricity, natural gas, and water use.

The creation of the Greenhouse Gas Inventory has allowed the Sneffels Energy board to have a baseline to track progress toward regional GHG emission reduction goals. In 2009, Mountain Village (along with Telluride, Norwood, Ophir, & San Miguel County) had adopted a goal to reduce GHG emissions 20% by 2020 from 2005 levels. Prior to this process, however, not all of our local governments were tracking their own government energy usage, let alone community-wide emissions. In addition, our utility companies did not have an easy methodology of providing data on utility use for the region, as it had never been requested before and their software had not been designed with this form of analysis in mind. GHG activity data had not been collected from other sources either, so this initial effort took a great amount of collaboration and participation by many partners. Thus, with the development of this baseline inventory, a methodology for activity data collection was established and all jurisdictions now have a 2010 baseline from which to track progress toward the goals in the Sustainability Action Plan, as well as their own governmental GHG emissions.

Since tracking began, regional governments have made significant progress in reducing their GHG emissions through energy efficiency projects of all government buildings and facilities, renewable energy projects, and Renewable Energy Credit (REC) purchases. Initially government energy emissions were approximately 3% of our overall GHG emissions. The most recent data (2018) shows regional government energy emissions are now 1.2%. Mountain Village government overall GHG emissions are 14% lower (2018) than the 2010 baseline levels.

Governments are making progress and leading the way, but in order to achieve community-wide GHG emissions reduction goals, the entire community must participate and make progress. Region-wide & per community, over 50% of emissions are associated with building energy use (electricity and natural gas), with the rest of the emissions resulting from vehicle transportation, airplane travel, food, and waste along with other consumptive uses. Annual analysis of community emissions by EcoAction Partners and the Sneffels Energy board has helped prioritize successful programs to engage the entire community.

In 2018 EcoAction was contracted to create a Mountain Village Community GHG Inventory and report with 2017 data, using the regional GHG Inventory methodology. The regional inventory was updated then, as it had been over previous years, to maintain consistency with the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories. EcoAction received support from LEIF, LLC, the firm that holds the copyright for the GHG Inventory software used, to ensure the software methodology and emissions factors were up-to-date with the GPC. This is the protocol followed by the Global Compact of Mayors (and the Global Covenant of Mayors) and includes tracking of: stationary energy use, transportation energy use (ground and air), waste, wastewater, and fugitive emissions. To develop the initial Mountain Village GHG Inventory, EcoAction Partners led a meeting of partners within San Miguel County, to discuss the allocation of regionally-shared resources, and the challenges associated with accurately splitting some of these. Addendums to the report identify this breakdown of SMC regional resources and the “Bases for data & calculations”.

The 2017 & 2018 Mountain Village Community GHG reports include energy use analysis, benchmark comparisons to similar communities and an explanation of the challenges of benchmarking accurately, and recommendations developed with staff and Green Team for achieving GHG reduction. EcoAction Partners presented the analysis to Town Council in December of 2018, and an updated version in October 2019, with 2018 data. These reports are attached for reference in Addendum A.

Additionally, since Deanna Drew’s departure from Mountain Village town staff, EcoAction Partners has been contracted by Mountain Village to update the Mountain Village government (now termed “Corporate”) “Energy Use and Greenhouse Gas” reports for 2017 & 2018. At the direction of Town Council and the Green Team, the report on 2018 government energy use included additional analysis completed in collaboration with Town Staff.

Now with 2020 impending, EcoAction Partners and the Sneffels Energy Board will be reviewing progress and updating our regional Sustainability Action Plan (Climate Action Plan) and updating GHG reduction goals. Proposed goals are in agreement with the newly adopted State of Colorado goals as follows:

- 26% reduction by 2025
- 50% by 2030
- 90% by 2050

These are the goals included in Colorado Communities of Climate Action (CC4CA), which the Town of Mountain Village adopted as part of the CC4CA Policy Agenda 2018-2019 in August 2019. This defines greenhouse gas (GHG) reduction targets as more than a 26% reduction by 2025, using 2005 as the baseline year for achieving this goal. EcoAction Partners recommends continuing to use 2010 as the baseline due to unavailability of previous years' GHG activity data.

Additional Actions/Experience:

In 2008, EcoAction Partners supported the development of the Zero Waste Action Plan (ZWAP) for the Town of Mountain Village to adopt, which outlines the Town's commitments to energy and climate protection, as well as resource conservation and waste management, water management, toxin reduction and community education and engagement.

Here is an excerpt introducing this report that EcoAction Partners (previously New Community Coalition) initiated: *"Gary Liss & Associates (GLA) wrote this Plan, with funding provided by the Town of Mountain Village and The New Community Coalition. GLA would like to acknowledge the leadership of Kris Holstrom and The New Community Coalition, who recognized the need for this Plan. Kris made all the arrangements to engage our firm, showed us all the existing facilities and services for solid waste, reuse and recycling in the area, and convened meetings with Town Councils of both Telluride and Mountain Village and with the community and stakeholders in the area. Through this extensive engagement process in February 2008, GLA obtained the information needed to develop this Plan. In addition, GLA obtained significant information from the San Miguel County Sustainability Inventory Prepared by ICLEI (Local Governments for Sustainability U.S.A.) in 2006."*

In 2007 & 2008, EcoAction Partners led a multi-jurisdiction effort among building departments to support development, adoption and implementation of consistent green & energy efficient building codes. Mountain Village and San Miguel County adopted a progressive code in 2008, and Telluride & Ridgway adopted revised versions in 2009. These building codes focused on reducing heat loss, energy efficiency measures, and required larger homes to comply with increasingly energy efficient standards. In addition, Mountain Village adopted the REMP program (modeled off of other mountain resort community programs) to address exterior energy use. Mountain Village has since updated to the 2012 IECC, maintaining progressiveness incorporated into the 2008 code. These energy efficiency codes help reduce the energy use & resulting GHG emissions associated with newly constructed buildings that last through the lifetime of each structure.

A calculation to assess the GHG emissions savings associated with the Gondola Transportation System was requested by town council & completed by EcoAction Partners based on 2010 gondola use.

In 2014, EcoAction Partners championed a new program with San Miguel County, called SMC Green Grants, modeled after the REMP program from Aspen, CO. The SMC Green Grants program used a one-time energy impact fee of $100K to demonstrate how building permit fees could be used tenfold to reduce Greenhouse Gas Emissions. SMC Green Grants funded a total of 18 projects that reduced GHG emissions 750 mt-CO2e annually for the life of the projects and included funding $12K to Mountain Village to upgrade the Gondola Terminal lighting to LED lighting, for an estimated annual energy savings of 130,000 kwh/year (approximately 8% of gondola's total electricity) which equates to approximately 143 mt-CO2e saved annually. Overall, the SMC Green Grants proved to be a successful way to reduce energy and GHG emissions within the community. Telluride initiated the Telluride Green Grants Program in 2019 with their REMP funds, and contracted with EcoAction Partners to administer the program for the community.

In 2015, Mountain Village Council member, John Howe, was the representative on EcoAction Board. He championed a new LED light bulb program to utilize the SMPA rebate and a government match on sales to encourage community members to switch to LEDs. EcoAction saw the success Mountain Village had with this program and took it on for the region. EcoAction has operated the Greenlights LED Program for the region since 2015 (including Mountain Village since 2016) selling a total of over 15,500 bulbs, reducing approximately 275 mt-CO2e of GHG emissions annually.

In 2017, EcoAction Partners released our EcoAction Report with 7 years of GHG Inventory Data & a program update. This report is an example of a similar report EcoAction would welcome producing with the Mountain Village Communications & Marketing team, or provide data & information for a report and climate action plan to be produced with another contractor.

In 2018 & 2019 EcoAction Partners calculated the GHG benefits of the Mountain Village Farm-to-Community program for reporting on the results of the program and to support continuation.

EcoAction Partners Leadership Team Bios:

Full resumes provided in **Addendum B**

Kim Wheels

Kim Wheels is the Energy Specialist for EcoAction Partners since the organization's inception in 2007. In this role she coordinates the regional Sneffels Energy Board, comprised of elected officials, government staff, utility representatives, and community citizens of Ouray and San Miguel Counties. This Board established a regional Sustainability Action Plan in 2011 and adopted goals to reduce energy use and increase renewable energy, reduce landfill waste, and achieve other sustainability objectives. Kim tracks the regional GHG emissions annually, and presents on progress toward reaching goals to the governments and communities. She also works to engage the community members and businesses in participating in EcoAction's programs to reduce carbon emissions and assists the building departments with maintaining updated Building Energy Codes.

Kim holds a B.S. in Mechanical Engineering from Worcester Polytechnic Institute in Massachusetts, which she followed with over 8 years of experience as a Mechanical Engineer with power and design engineering firms. She acquired her professional engineering license in 2002, and has completed courses in renewable energy and green building design with Solar Energy International. Upon first moving to Colorado, she worked with Resource Engineering Group in Crested Butte, CO incorporating energy efficiency, renewable energy systems, and sustainable design practices into the design of mechanical systems for homes and commercial buildings. Currently, in addition to her efforts with EcoAction Partners, she owns an energy services business (Lotus Energy Solutions) that provides Home Energy Ratings, energy audits, and other energy consulting services throughout the region.

Heather Knox

Heather Knox graduated with a B.A. from Colorado College, and settled in Telluride/Mountain Village in 1995. Heather worked for Mountain Village Metro District (the pre-cursor to the Town of Mountain Village) in a variety of roles including executive assistant for the soon-to-open Telluride Conference Center, then as a group coordinator/manager, and ultimately promoted to the position of Director.

Under Heather's leadership she was able to cut the annual tax payer subsidy for the Telluride Conference Center by 82% ($750K+). Heather finished her career for Mountain Village as the Director of Economic Development, which managed the Telluride Conference Center, the Guest Services Department, marketing & homeowner communications, and MV events and economic incentive grants.

Following this, for 6 years, Heather was the Executive Director of the Palm Theater, helping the Palm transition from a generous annual contribution for the naming of the theatre to self-sufficiency. Heather brought in a successful after-school dance program under a new non-profit, Palm Arts.

Heather followed her passion in 2013 and began working in environmental stewardship as the Executive Director of EcoAction Partners in 2014. EcoAction Partners mission is to track the region's Greenhouse

Gas emissions and implement programs to reduce energy and waste. This work is extremely meaningful. Heather is a member of the State of Colorado Pollution Prevention Advisory Board Assistance Committee, overseeing CO Recycling Resources Economic Opportunity grants and rebate programs with annual grants/rebates of $7.6 million. Heather also serves on the SMART (San Miguel Authority for Regional Transit) Community Advisory Committee.

Olivia Pedersen:

Currently working as a Freelance Graphic Designer, Olivia is studying to get her Masters in Sustainability. Through her studies Olivia has learned about sustainable frameworks & certifications and how to apply them to program development, product design and business models to build sustainable futures. Originally from Telluride, and having returned after a whirlwind of experiences, Olivia and EcoAction Partners are happy to have found one another. Olivia appreciates the work of EcoAction Partners for the vast amount of initiatives and programs EcoAction provides for bettering the region.

Olivia's graphic design background, allows her to prepare stimulating presentations with visuals and infographics that powerfully communicate programs and summarize results.

Personnel Billing Rates:

Name:	Position:	Rate:
Heather Knox	Executive Director	$85
Kim Wheels	Energy Specialist	$85
Olivia Pedersen	Graphic Designer	$65

References:

Town of Telluride:
Karen Guglielmone
970.728.0190
KGuglielmone@telluride-co.gov
Mayor: Delanie Young
dyoung@telluride-co.gov

Sneffels Energy Board:
Acting Chair: Todd Brown
970.708.7916
tbrown@telluride-co.gov

San Miguel County:
Kris Holstrom
970.708.0289
krish@sanmiguelcountyco.gov

Detailed Proposal of Tasks & Costs

	Cost	Timeline	Personnel
1A. MV Community GHG Inventory Tasks	$2,720		
Activity Data - gathering for the MV Community-wide Inventory - Activity data gathering across regional partners who provide it. This is part of the annual regional GHG Inventory update. Some transportation data is now only potentially available through the state. - Emissions factor update (electricity & natural gas) is part of the annual regional GHG Inventory update - Manipulation of data for use in GHG Inventory software	$1,020	January - May; timeframe varies based on response time from partners	K. Wheels
GHG Inventory - calculation & analysis of GHG emissions - activity data entry into software that has been developed by EcoAP for MV-specific GHG Inventory analysis of 2017 & 2018 data - Outcomes include: Calculated emissions data; anaylsis with pie charts - Benchmark review for all GHG sources; comparison to San Miguel County & Telluride Inventories for 2019	$680	providing Activity Data	K. Wheels
Utility Use analysis (charted over time, from baseline of 2010) - Electricity - reviewed for accuracy & charted to display different sources of electricity* *Regional electricity analysis process includes working with SMPA to obtain updated emissions value; Tri-State supply mix; & SMPA program data (community solar farm, net-metered system data, & Green Program RECs) - Natural gas - reviewed for accuracy, analyzed with number of accounts & performing temperature-normalized analysis - both of the above analyzed with respect to external factors: population (visitor & census), economy (new construction), weather (temperature & snowfall) - Water & Wastewater use (part of regional process) - analyzed over time, compared to regional communities, & benchmarked per capita & visitor population **TSG utility use can be separated from Community Use as done in past years for analysis purposes, upon request & when data necessary is provided by TSG	$1,020	April	K. Wheels
MV-Specific Transportation analysis - support to another contractor to help with this analysis - Analysis of MV-specific transit, CDOT, vehicle and other data available to determine a more accurate vehicle-related GHG emissions value. Incorporatation of results into GHG Inventory software service above	$680	contractor dependent	K. Wheels
Update the gondola-related transportation savings calculation, originally performed in 2010	$340	February-March	K. Wheels
MV Community GHG Inventory Report - MV benchmarks to SMC, Telluride, Telluride&MV combined, & Aspen (GHG values only available) - similar to 2017 & 2018 GHG reports developed - presentations & meetings with Green Team & Council - incorporation of recommendations developed in discussions with MV staff, Green Team, and from Sneffels Energy Board update of the regional Sustainability Action Plan	$2,550	May - June	K. Wheels with support from H. Knox & review by EcoAP Board
*Optional graphic design formatting of the report	$1,040	June	O. Pederson
Meetings & discussions to support any of the above tasks / services, if awarded to any other RFP awardee. To be billed hourly ($85/hr), as needed.			K. Wheels
1B. MV Corporate (previously termed Government) Energy Use & GHG Inventory Report* **- report format created by Deanna Drew, EcoAP began updating with 2016 data** ***note the corporate energy use & emissions are included within the total MV Community GHG Inventory. This report is an additional detailed analysis to support corporate emissions reduction.** Spreadsheets of monthly utility data fro 2010 through 2019 provided by MV staff Annual water & wastewater data collected separately through regional GHG Inventory process. Charts including 2019 data created - use & cost - electricity, natural gas, fuel, water, & CO2 emissions. Analysis of 2019 use performed with support & collaboration of MV staff Tracking of progress of all utility uses toward 20% by 2020 goal from 2010 benchline - incorporation of recommendations developed in discussions with MV staff, Green Team, and success stories from other jurisdictions as applicable	$2,720		K. Wheels with support from H. Knox & review by EcoAP Board
*Optional graphic design formatting of the report	$520		O. Pederson
2. Emissions Target Setting - regional review & update with Sneffels Energy Board: In 2020 EcoAction Partners will lead the Sneffels Energy Board through a review of progress toward reaching goals established in the regional Sustainability Action Plan. The adoption of new goals in accordance with CC4CA's statewide goals will be considered and discussed. (included in MV Sneffels Energy Board support of $1500)	$0	Jan-June	K. Wheels
3. Climate Action Planning - 2020 update of Regional Sustainability Action Plan with Sneffels Energy Board. In 2020 EcoAction Parters will lead the Sneffels Energy Board through the process regional Sustainability Action Plan progress review & update during 2020. (included in MV Sneffels Energy Board support of $1500) - Support CAP contractor in gathering & hosting MV stakeholder meetings for MV-specific CAP process - Provide support to any CAP contractor, with historical information regarding goals adopted, accomplishments, studies performed, and all other sustainability-related activities accomplished by or pertaining to MV since MV's participation in creating EcoAP in 2006	$1,700 $0 $1,020 $680	Thru 2020: Sneffels Energy Board sets timing contractor dependent	K. Wheels
Total of proposed services:	$12,270		

Addendum A

Mountain Village 2017 Greenhouse Gas Inventory Report

Prepared by EcoAction Partners
for the Town of Mountain Village

December 18, 2018

Overview:
In 2018, the Town of Mountain Village contracted with EcoAction Partners to create a Mountain Village-specific Greenhouse Gas Inventory. Working from the baseline regional San Miguel and Ouray County GHG Inventory that EcoAction Partners manages and updates annually, EcoAction Partners modified the calculations to focus on Mountain Village specific data to create the results shown in this report.

History:
The regional GHG Inventory was initially developed by the University of Colorado at Denver with data collection input from EcoAction Partners. It was funded through a matching grant in which Mountain Village, Telluride, San Miguel County, Ridgway, City of Ouray and Ouray County each contributed $1000. The calculations are in accordance with ICLEI protocol established by 2010. Since then it has been updated to align with the subsequent "Global Protocol for Community-Scale Greenhouse Gas Emission Inventories".

Mountain Village adopted a goal to reduce overall GHG emissions 20% by 2020, from 2005 baseline levels, however our regional GHG and energy-use baseline began to be tracked in 2010. Thus progress toward this goal is determined based on data from 2010 forward.

Shared regional resources:
As part of the analysis, Mountain Village desired clear understanding of how GHG emissions associated with shared regional resources were allocated between jurisdictions. Thus, EcoAction Partners created a summary of how these resources have been allocated in the past and coordinated a meeting of representatives from Mountain Village, Telluride, San Miguel County, and Telluride Ski & Golf, to review and discuss allocations for each of these resources. The agreed-upon outcome for each of these are detailed in Appendix A. The resources discussed include:

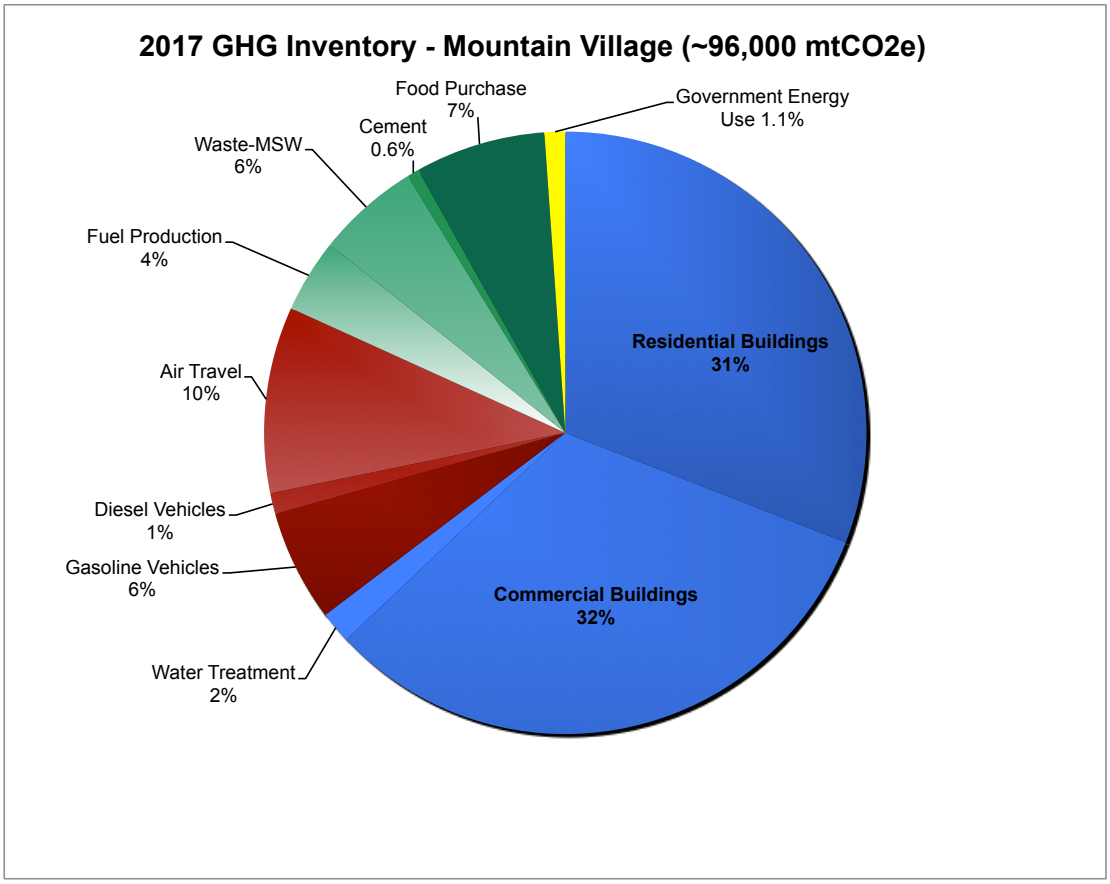
- Regional airports
- Waste Water Treatment Plant
- Gondola
- Telluride Ski and Golf's utilities including water use
- Festivals
- Transit services

2017 Mountain Village GHG Inventory Results
Mountain Village's total GHG emissions for 2017 were approximately 96,000 mtCO2e (metric tons of carbon dioxide equivalent).

Equivalencies:

- 96,000 mtCO2e is equivalent to over 105,000,000 pounds of coal burned.
- 96,000 mtCO2e is also equivalent to the energy used by 10,366 average U.S. homes in one year. (MV has 1675 residences)
- 96,000 mtCO2e is the amount of carbon that can be sequestered by just over 113,000 acres of U.S. forests in a year.

The detailed pie chart below breaks those emissions down per category, explained further below the pie chart. See Appendices for more detailed explanation of allocation per jurisdiction and calculation methodologies.



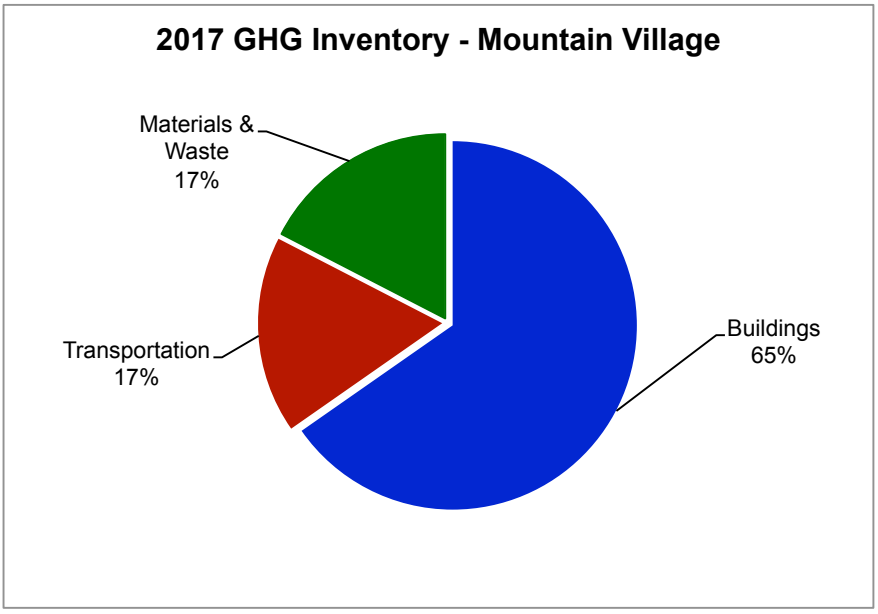
- Government Energy Use – Electricity and natural gas use by Town of Mountain Village government, including building energy use, streetlights, town plaza snowmelt, and other exterior uses. Note: Gondola electricity use is 100% offset by SMPA Green Blocks, so Gondola electricity use does not contribute to GHG emissions. Gondola natural gas use does contribute toward TMV GHG emissions.
- Residential Buildings – electricity and natural gas use for homes, including exterior lighting, snowmelt systems, and patio fireplaces. Renewable electricity associated with net-metered solar systems, SMPA solar farm purchases, and Green Blocks offsets decrease the emissions associated with residential building emissions.
- Commercial Buildings– electricity and natural gas use for commercial buildings and other use, including exterior lighting, snowmelt systems, patio fireplaces, and Mountain Village ski area operations. Renewable electricity associated with net-metered solar systems, SMPA solar farm purchases, and Green Blocks offsets decrease the emissions associated with commercial building emissions.

- Water Treatment – Electricity used by Town of Mountain Village for treatment and pumping of water
- Gasoline Vehicles – Emissions from gasoline vehicles
- Diesel Vehicles – Emissions from diesel vehicles
- Air Travel – Emissions associated with airplane fuel & enplanements at Telluride Airport & Montrose Regional Airport. (for allocations, See Appendix A)
- Fuel Production – Processing emissions associated with gasoline and diesel fuel before the fuel enters vehicles
- Waste – Emissions associated with Municipal Solid Waste taken to landfill to decompose
- Cement – Emissions associated with cement for Mountain Village, based on Colorado's total economy
- Food Purchase – Emissions calculated based on Mountain Village's total population of census and visitors

Additional Items:
These items contribute to reducing MV's GHG emissions and are incorporated into the overall total calculated value of 96,000 mtCO2e:

- Open Space Carbon Sequestration – Mountain Village's dedicated open space is a mixture of grasslands, wetlands and mixed forest. All of these areas sequester carbon and thus reduce GHG emissions by a total of approximately 0.31 mtCO2e, or 0.3% of MV's total GHG Inventory.
- SMPA Community Solar Farm – Mountain Village's total participation in the community solar farm is the equivalent of 0.16 mtCO2e, or 0.2% of MV's total GHG Inventory.
- Gondola electricity use has been annually offset with 2,000,000 kWh of SMPA Green Blocks, equivalent to 1600 mt-CO2e, or 1.7% of MV's total GHG Inventory.
- On-site Net-metered Solar PV Systems – Government, residential & commercial on-site systems produce a total of 108,000 kWh/year, reducing GHG emissions annually by approximately 87 mt-CO2e, or 0.1% of MV's total GHG Inventory.
- Gondola Transportation – Gondola use reduces vehicle transportation between Telluride and Mountain Village. In a previous study by EcoAction Partners for Mountain Village, it was estimated that gondola usage reduced GHG emissions by approximately 2,700 mt-CO2e in 2010, or 2.8% of MV's total 2017 GHG Inventory.

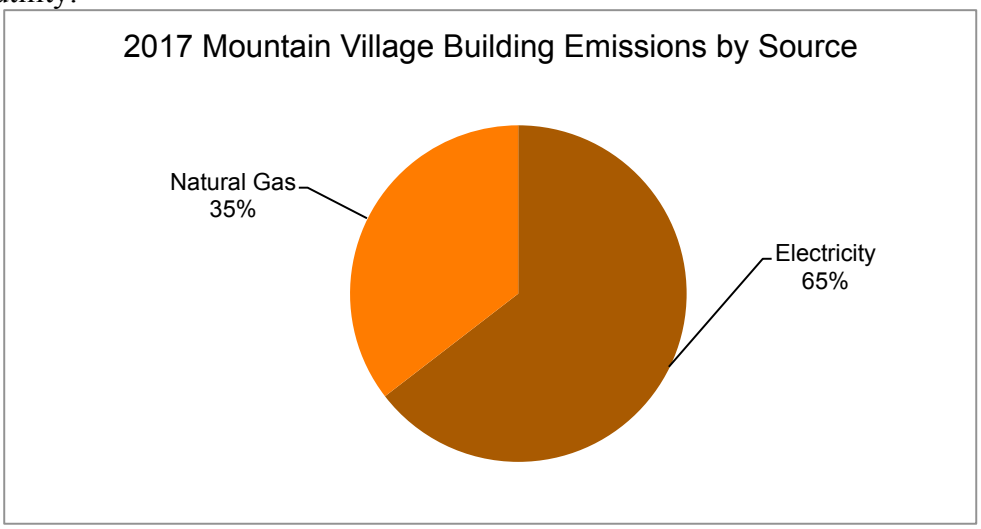
Simplified pie chart



The pie chart above simplifies the Mountain Village Inventory by showing 3 main categories:

1. Buildings – 65%
2. Transportation – 17%
3. Materials & Waste – 17%

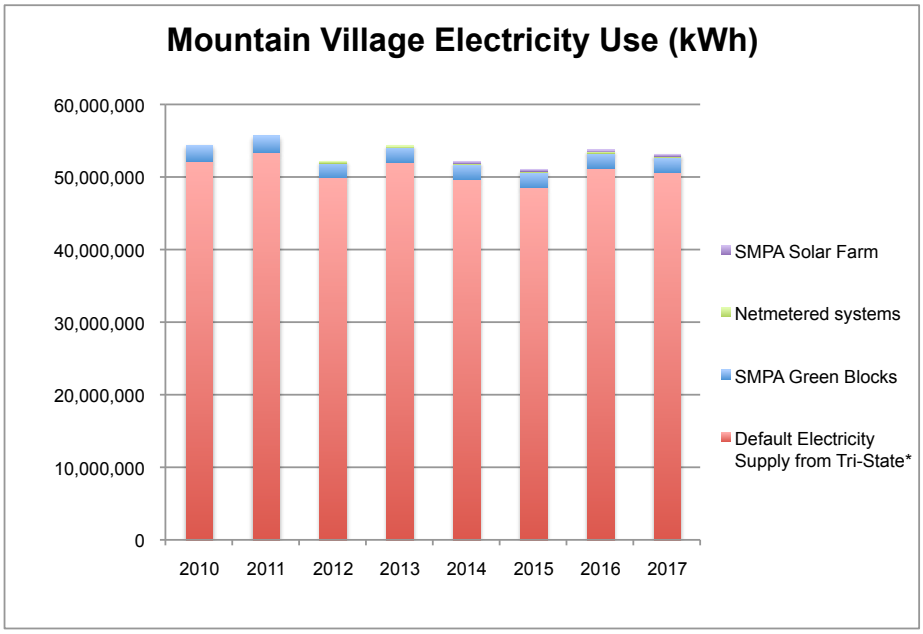
Clearly, building energy consumption is the largest category of GHG emissions. The next pie chart shows just the Building emissions portion of the above pie chart (government, residential, & commercial combined) broken down per utility:



Electricity emissions are impacted by overall usage and the emissions factor, which reflects the amount of renewable energy that is part of our overall electricity mix. This value is provided to SMPA from Tri-State annually, and has been steadily decreasing since 2010, from 2.12 to 1.776 lb-CO2e/kWh.

Natural gas emissions are also impacted by overall usage and the emissions factor, which is determined how the natural gas is produced. In 2010, Source Gas provided this factor at 5.4 kg-CO2e/therm. For 2017, the natural gas emissions factor was provided by Black Hills at 5.33 kg-CO2e/therm.

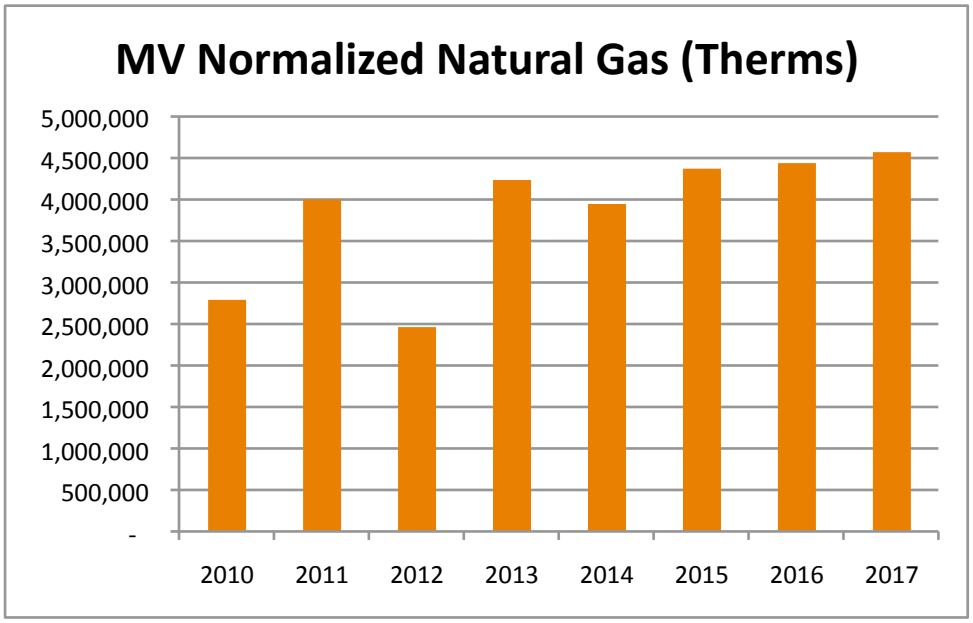
Natural gas and electricity data is provided annually from the utility companies, broken down by jurisdiction. It's accurate data that is easy to track and analyze progress toward reduction goals. Mountain Village's electricity and natural gas usage have been tracked since 2010, with analysis presented annually by EcoAction Partners to Town Council. The following graphs were presented in July of 2018:



**Default Electricity Supply from Tri-State Generation & Transmission Association, Inc. - Tri-State reports that 30% of this comes from a renewable energy source.*

Electricity use associated with MV's SMPA community solar farm purchases, net-metered solar systems, and SMPA Green Blocks offsets do not contribute to MV's GHG emissions. Electricity emissions in the pie charts are associated with Mountain Village's "Default Electricity Supply from Tri-State" which is over 50,000,000 kilowatt-hours annually. Notable is that overall use has decreased since 2010, despite an increase in people, buildings, and overall economy. Continuing to increase renewable energy in our electricity mix and decrease electricity use through conservation and efficiency will continue to reduce electricity-related emissions.

Mountain Village Electricity GHG emissions:
GHG emissions associated with the "Default Electricity" consumed is calculated using the Tri-State emissions factor for each year.
2010 – 52,191,724 kWh produced 50,300 mtCO2e
2017 – 50,622,946 kWh produced 41,000 mtCO2e
Thus, since 2010, MV has seen an 18.5% reduction in emissions from electricity use.



Natural gas use has been steadily increasing, when adjusted to account for varying winter temperatures. This increase is in line with increased building and snowmelt square footage being constructed in Mountain Village. Overall natural gas use can be reduced through efficiency and conservation measures, addressing new construction through energy efficient building codes and existing buildings through implementing Energy Conservation Measures, such as weatherization, increasing insulation, and improving tuning mechanical heating systems and controls.

Mountain Village Natural Gas GHG emissions:
(In 2010, some of MV's natural gas use was assigned by Source Gas to San Miguel County, resulting in an inaccurate baseline for Mountain Village. Thus, 2011 data is used for baseline purposes.) It is important to note that actual natural gas use is greatly influenced by temperature and snowfall from year to year, influencing actual related GHG emissions. Thus, normalized natural gas use (adjusted for temperature variations) is used to calculate GHG emissions associated with natural gas consumption:
2011 – 4,006,797 therms produced 21,600 mtCO2e
2017 – 4,573,998 therms produced 24,400 mtCO2e
Thus, an 11.5% increase in natural gas related emissions is seen comparing 2011 to 2017.

Per Capita & Comparison Discussion:
Many questions have arisen around analyzing, tracking and comparing GHG emissions on a per population basis. There are many factors to consider in doing so:

- Mountain Village's GHG emissions goal of 20% reduction by 2020 is not based on per capita emissions, but total overall emissions.
- Community GHG Inventories typically follow the GPC protocol (Global Protocol for Community-Scale Greenhouse Gas Emissions Inventories), however calculation methodologies selected for each are based on data available, so no two communities inventories are calculated exactly the same. Specific benchmarks that can be identified as comparable between communities are listed in the table below, but not all are provided in other community's GHG Inventory reports.
- In a resort community such as Mountain Village, some emissions categories are appropriate to analyze per capita, while others are influenced greatly by part-time residents and visitor population. Others are somewhere in between. Thus, the most fair "per person" analysis would be to calculate these emissions on a per category basis, not for overall total GHG emissions.

Comparisons (also refer to Local Benchmark Comparison table below):

- Mountain Village's per capita emissions in 2017 were 68.4 mtCO2e/capita.
- Mountain Village's emissions per population including visitors were 26.2 mtCO2e/person.
- Telluride's emissions in 2017 were 28.6 mtCO2e/capita.
- Telluride's emissions per population including visitors were 12.5 mtCO2e/person.
- For another perspective in comparing to Aspen, the combined Telluride & Mountain Village values are 41.5 mtCO2e/capita & 17.2 mtCO2e/person.

Aside from Telluride, Aspen is likely the most comparable town to Mountain Village that has recently completed a GHG Inventory. While Aspen's report did not show any of the comparable benchmarks to the "Local Benchmark Comparison" table below, a few noteworthy comparable aspects to this Mountain Village GHG Inventory are listed here:

- The City of Aspen's 2014 GHG Inventory reports total emissions of 394,341 mtCO2e.
- Aspen's population within Emissions Inventory Boundary was 8,427 residents, so on a per capita analysis, the City's emissions are 46.8 mtCO2e/capita
- Aspen's electricity is provided by Aspen Electric, which sourced 75% renewable electricity in 2014 (it has since increased to 100%), and Holy Cross Electric, which reports 25% of its electricity is from renewable sources. The resulting joint electric profile is 70% renewable energy.
- 100% of ski area emissions associated with electricity and natural gas used to run lifts and facilities on Aspen Mountain, Aspen Highlands, and Buttermilk ski areas are included in the Aspen GHG Inventory
- 100% of Aspen airport emissions are included in the Aspen GHG Inventory. Aspen's airport emissions have increased 15% since first reported in 2004.
- Aspen's report uses a more detailed commuter analysis than the MV GHG Inventory and assigns 50% of total vehicle miles traveled of commuter trips to Aspen.
- Aspen's GHG Inventory does not include emissions associated with food consumption, fuel production, or cement use.
- Aspen's long- term reduction targets are 30% below 2004 levels by the year 2020 and 80% below those levels by 2050.

The pie chart below depicts sources of Aspen's GHG emissions as tracked in the City's inventory. By comparing it to Mountain Village's pie chart, the differences in emissions tracked are evident.

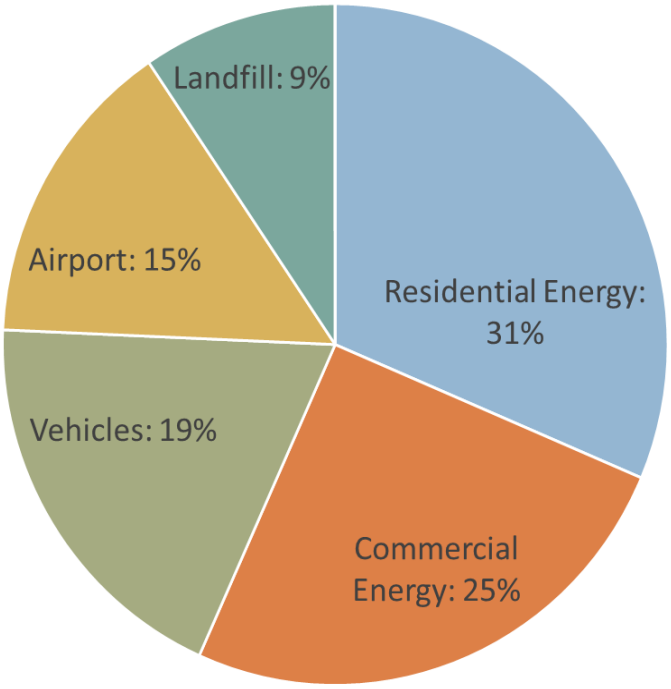


Figure 6. Percent of Aspen's GHG emissions by sector, 2014

**Sourced from 2014 ASPEN COMMUNITY- WIDE GREENHOUSE GAS (GHG) INVENTORY*

Recommendations for GHG Emissions reductions:
It is recommended that Mountain Village review the current adopted goal for 2020 and consider establishing new future targets for GHG emissions. In order to create an accomplishable action plan, it is recommended that MV consider targets per category, in addition to overall total emissions targets. Utilize the benchmark factors per emissions source in the table below as a reference for adopting targets and tracking emissions reductions.

The Regional Sustainability Action Plan (STRATEGY) developed in 2010 by the Sneffels Energy Board is a comprehensive document for San Miguel and Ouray Counties, and all of the jurisdictions within. The STRATEGY is a guide to multi-jurisdictional energy action planning providing a framework to facilitate streamlined, inter-entity collaboration in our region's efforts to effectively manage energy resources, reduce energy costs and meet energy, water, waste and transportation fuel reduction goals. Within it is an extensive list of region-wide and jurisdiction-specific actions for reducing GHG emissions and achieving region-wide sustainability goals. Mountain Village was represented throughout the development of this document by Bob Delves and Deanna Drew. It is available at http://www.ecoactionpartners.org/sustainability-action-plan

Recent discussions with MV staff and Green Team, resulted in the following list of ideas for MV to reduce emissions. A comprehensive plan would also address Transportation, Food, Waste & Consumption areas of the GHG Inventory.

Maximize partnership possibilities with other organizations

Renewable Electricity
- Collaborate with SMPA toward increasing local renewable electricity
- Support new Community Solar Farm development & include as an option for REMP
- Promote SMPA Green Blocks & efficiency programs along with MV Incentives

Community Programs to address existing homes & buildings

- Continue MV program development & implementation
    - Farm-to-Community Program
    - Composting Incentive Program
    - Incentivize smart controls for snowmelt systems and electric heat tape
    - Incentivize on-site renewable energy systems
    - Consider an incentive program for larger housing units / hotels to install smart energy controls

- Continued participation in EcoAction Partners' regional programs:
    - Green Lights
    - SMPA IQ Weatherization
    - Green Business Certification Program for Lodging, Restaurants, Retail, & other businesses
    - Green Property Manager Program to address part-time / unoccupied homes
    - Community Composting

Franchise fees for electricity & natural gas

- Develop new agreements with utilities & use funds for GHG-reduction projects & programs

Building Energy Code Adoption:

- 2018 IECC with amendments that progress energy efficiency
- Reconsider size categories & HERS scores
- Scale toward Net Zero home as size increases
- Require house electricity offset of 100%, through Green Blocks, on-site renewable energy, or other equivalent
- Consider adding natural gas offset requirement, through Green Blocks, RECs or equivalent
- Incentivize small homes < 3000 SF & net-zero, passive home construction through financial or expedited process
- Require solar panels or solar-ready provisions on all new construction
- Require smart energy control systems on new lodging units and larger residences

Renewable Energy Mitigation Program (REMP):

- Eliminate or reduce free 1000 SF of snowmelt allowed
- Address outdoor fireplaces and infrared heaters
- Continue double-incentive for on-site renewable energy mitigation

Local Benchmark Comparison:

Description of Benchmark	San Miguel County, CO (2017)	Telluride, CO (2017)	Town of Mountain Village, CO (2017)	Aspen, CO (2014)	Mountain Village & Telluride (2017)	Units of measurement	Notes
Total GHG Emissions	**244,000**	**67,500**	**96,000**	**394,391**	**163,500**	mtCO2e	
Avg. Res. electricity use	894	728	1268			kWh/hh/mo	
Avg. Res. Natural gas use	110	73	197			therms/hh/mo	*incl snowmelt systems
Avg. Res. Electricity (kWh/sf/yr)	4.70	5.19	5.23			KWh/sf/yr	
Avg. Res. Natural Gas/sq.ft/yr	0.28	0.30	0.36			therms/sf/yr	*incl snowmelt systems
Avg. Comm/ Ind./ Pub. Buildings Energy use intensity	227	335	343			Kbtu/ft²/year	
Vehicle Miles per person per day	17.0	27.0	28.0			VMT/person/day	*per census population
Water	189	168	266			gallons/person/day	*not including snowmaking
Wastewater	118	73	184			gallons/person/day	*per census population
Municipal Solid Waste	6.8	10.0	18.1			lb/person/day	*per census population
GHG Emissions per capita	**30.2**	**28.6**	**68.4**	**46.8**	**41.5**	Mt-CO2e/person/year	*per census population
GHG Emissions per capita + visitors	**17.2**	**12.5**	**26.2**		**17.2**	Mt-CO2e/person/year	*per capita incl Visitors

ECOACTION PARTNERS

Mountain Village GHG Inventory
Appendix A
San Miguel County Shared Resources Notes

SMC Shared Resources Meeting for GHG Inventories
Wednesday July 11, 10-12 at WPL Telluride Room
(Note this document was updated after the meeting with outcomes & findings)

The aim of this meeting is to reach consensus as to how the GHG emissions associated with each shared resource will be assigned between the Telluride & Mountain Village GHG Inventories. Allocations for Telluride's inventories from 2010-2017 are explained below, along with associated Mountain Village analyses. The SMC inventory includes all jurisdictions (including Telluride & MV) and thus is inclusive of these resources.

Allocation methodologies to consider for each resource:

- Location of utility meters determines how electricity and natural gas values are provided by SMPA and Black Hills Energy
- % of county population
- Is data available to parse resources between communities?
- Allocation of tourist impact to Telluride & Mountain Village versus rest of SMC or greater region?

<u>Regionally Shared Resources</u>

Wastewater Treatment Plant – Telluride & MV & SMC subdivisions

MV: 15% ownership, $30,000 toward solar PV system, 35% of use
Towns working toward Regional Sewer District (~5 years?)

- Electricity & natural gas: 100% to Telluride
- Biogas emissions (nitrogen & methane) from all 10,000+ visitors: 100% assigned to Telluride
- *Could allocate all of the above based on % of use. Group agreed to continue allocation to Telluride*

*WasteWater analysis charts (no impact to GHG Inventory emissions)
35% assigned to MV, 65% assigned to Telluride.
(For improved Telluride analysis – breakout of SMC subdivision population needed)

*Food GHG emissions are calculated using WWTP population accounting
35% assigned to MV
65% assigned to Telluride, minus SMC subdivision population of 1035

Gondola – eliminates vehicle traffic between MV & Telluride

100% of electricity & offset assigned to MV.
Natural gas & diesel use allocated to MV.

- TMVOA (through TMV electricity bills) purchases Green Blocks to offset electricity use by 100% (in 2017 offset was over by 30,000 kWh & adjusted by TMVOA for 2018 onward), so electricity use does not show up in GHG pie.

Telluride Ski & Golf – operations in MV, Telluride, & County land

electricity & natural gas allocated per meter location
(provided this way by SMPA & Black Hills Energy for all regional utility use)

- TSG operations include:
  - Office space & Businesses in MV core
  - The Peaks & other lodging
  - On-mountain operations
  - Conference Center
  - Telluride - Base of Gondola & Lift 7 operations
- *Could ask for TSG assistance in separating utility bills based on location of service, to reassign emissions accordingly*

Regional airports – serve region

- Telluride airport: 100% allocated to SMC, divided 50/50 between Telluride & MV
- 65% of Montrose airport to San Miguel County – group agreed to split 50/50 between Telluride & MV

Vehicle Transportation – data provided per county

Emissions assigned as % population of SMC

- Vehicle registration data & CDOT studies are basis for current Inventory
- Transit Services (some shared among jurisdictions)
- *Traffic count data for Telluride & MV would provide better data specific to community driving, but wouldn't account for distance of travel to each town*

Telluride Festivals – all 3 governments resources utilized

Electricity & water use tied to Telluride Town Park

- Located in Telluride Town Park
- Gondola used
- Camping in outlying areas, with school bus transportation
- People travel to region for festivals
- Benefits all businesses

Mountain Village Sunset Series – MV resources

- Located in Mountain Village
- Gondola used
- Regional benefit

Others – serve region, allocated by location

- Wilkinson Public Library - Telluride
- Telluride Medical Center – Telluride
- Telluride School District – Telluride
- Telluride Mountain School - SMC

Data Gaps

Trash & Recycling –

- Bruin provides data per jurisdiction. Has not provided for 2017. Telluride fined Bruin for lack of 2016 & 2017 data. Bruin data is only part of the waste picture.

- Waste Management – Private company, data not available. Could be requested through jurisdiction contracts, similar to MV's contract with Waste Management.
- 2017 Regional & SMC Inventories – data from EcoAction Partner's Regional Waste Diversion Study. 2015 data trash & recycling per jurisdiction

Transportation –

- Region 10 study data not applicable. It focuses on gaps in transit services.
- CDOT data tracks highway travel only, not all roads.
- Registered vehicles in counties relies upon average CO annual mileage.
- Off-Road vehicle use is increasing, but not accounted for.

Affordable Housing –

- Regional impacts on transit studies & transportation emissions
- GHG calculation could be done to compare impacts of reducing commute mileage for local employees

Food -

- Population-based calculation, including visitors. Telluride is based on 65% of WWTP, minus estimated SMC subdivision population served by WWTP (~1035). Mountain Village would be 35% of WWTP population.
- A food study would be helpful for more accurate food emissions & tracking reduction associated with farmers markets & programs.

Propane data –

- Estimate from 2010
- Private companies, updated data not currently available

Mountain Village GHG Inventory
Appendix B
Bases for GHG Inventory Calculations

Carbon Emissions Footprint Calculator for Cities ™

The workbook is provided to facilitate future updates to Ouray and San Miguel's Greenhouse Gas (GHG) Emissions Inventory. This inventory was completed for 2010 based on ICLEI/WRI protocols and the Demand-Centered Hybrid Life Cycle Analysis methodology (Ramaswami et al., 2008 - see Resource 3). EcoAction Partners uses the workbook to update our regional GHG Emissions Inventory annually.

General data:
Census Population – obtained annually from the Colorado DOLA website
Visitor Population
- SMC visitor values are calculated using the Telluride & Mountain Village Wastewater Treatment Plant BOD data.
- Ouray County visitor estimates are obtained from the visitor centers in Ridgway & Ouray

# of Households, SF of commercial & residential buildings – these values are not used in overall GHG emissions calculations, but are collected for other benchmarking purposes. The Ouray County & San Miguel County Assessors offices provide this data.

Energy (blue):

Residential & Commercial Building Energy Use:
Electricity
- SMPA provides data annually per community for residential, commercial & irrigation (provided in 1st quarter for previous year). Data is categorized as non-renewable sales, Green Blocks sales, SMPA community solar farm production, & net-metered system production.
- Tri-State emissions factor - provided to SMPA annually based on Tri-State's total mix of electricity sources (provided late in year for the previous year, thus GHG Inventory value is a year behind when presented to governments, but gets updated during the following year.)

Natural Gas
- Black Hills Energy Corporation (previously SourceGas) provides data annually – per community for residential, commercial & irrigation (provided in 1st quarter for previous year).
- Emissions factor – In 2010, Source Gas provided this factor and in 2017, Black Hills Energy Corporation provided the BHE value. Inventories from this transition onward utilize this Black Hills emissions factor.

Propane
- based on initial 2010 estimate from regional propane companies, who are not obligated to release information and have not provided data since.
- Emissions factor – LGOP default factor from 2010

Government Energy Use:
Government electricity & natural gas use – provided annually by governments: utility bill data, Green Blocks purchases, renewable system production, REC purchases

Water / Wastewater Treatment Electricity & Natural Gas - provided annually by governments from utility bills

Transit (red):

Vehicle Transportation:
Transportation tail-pipe emissions are calculated using total Vehicle Miles Traveled (VMT), which is derived using two different methods - vehicle registration and average daily traffic. VMT is divided by average regional vehicle fleet fuel economy to calculate fuel consumption, which is used to determine GHG emissions from surface transportation. The Colorado Department of Public Health and Environment (CDPHE) conducts on-road vehicle surveys to characterize the Colorado vehicle mix (95% gasoline, 5% diesel).

Vehicle Registration Method:
- # Vehicles registered in San Miguel & Ouray Counties updated annually
- Vehicle Miles Travelled (VMT) estimate per vehicle / year, per EPA – 12,000

Average Daily Traffic Method:
- Average Daily traffic counts of Vehicle Miles Travelled (VMT) per county per Colorado Department of Transportation (CDOT) studies (2009), based on 342 working days/year

Gasoline (95% per CDPHE)
- 20.1 average MPG per CDPHE (2010)

Diesel (5% per CDPHE)
- 6.3 average MPG per CDPHE (2010)

Airline Transport:
- Annual aircraft fuel (jet fuel and aviation gasoline) used is provided annually from the Telluride Airport and the Montrose Regional Airport (65% of passengers travel to OC & SMC).
- Emissions factors used are from the Department of Energy (DOE).
- Total number of enplanements (passengers) is also tracked to obtain emissions/person.

Emissions values for all fuels are sourced from The Carbon Registry, local government protocol, September 2008.

Materials and embodied energy (transboundary reporting):
This section will count all the GHG emissions associated with producing and transporting key materials to OC & SMC, including food, cement, and fuel. Just like electricity, these materials are produced outside the boundaries of the community but are essential to community life. WRI and ICLEI are continuously updating their guidelines on how to include these trans-boundary emissions, termed "Scope 3 Emissions."

Food:
This calculation was originally based on 2005 BLS Economic Census data for 2009$ for average annual household dollars spent on food. Recently, due to the relatively large percentage of households in the region that are not fully occupied year-round, and the annual influx of visitors that contribute to our regional food carbon footprint, all GHG Inventories (2010-2016) were converted in 2017 to use the average food carbon footprint for annual mtCO2e/person found in industry studies published online. This carbon footprint value is used with the regional visitor data (vs census) to calculate our annual food-related emissions.

Waste & Recycling: calculated using EPA WARM methodology

- We have 2 main waste haulers for the region.
- Bruin provides annually updated data for volumes of waste and recycling collected throughout the region.
- Waste Management provided total data in 2010 for collection in Montrose, Delta, San Miguel & Ouray Counties, but has not provided updated data since.
- The Sneffels Waste Diversion Planning Project was completed in December 2016 by EcoAction Partners. It includes an analysis of total volume of waste and recycling. This is the most accurate regional information currently available. Thus OC & SMC total waste data is based on this study.
- Values from the study are used with WARM* emissions data to calculate annual waste & recycling emissions.
  **Waste Reduction Model (WARM) was created by the U.S. Environmental Protection Agency (EPA) to help solid waste planners and organizations estimate greenhouse gas (GHG) emission reductions from several different waste management practices.*

Cement:

- Total cement consumed in Colorado in 2007 is multiplied by % of state census population located in OC & SMC.

Fuel Production:

- The fuel production emissions factor represents emissions from the production and shipping of fuels. Also known as Wells-to-Pumps, W2P, or WTP Emissions
- The emissions factor for Gasoline, Diesel, & Jet Fuel is multiplied by the total gallons of each fuel used in the region to obtain overall annual emissions.
- WTP Emissions values for all fuels are sourced from the 2017 GREET WTP analysis.

Water & Wastewater Treatment Emissions:
Regional governments provide annual gallons of water treated at each plant. These values are utilized with annual census & visitor data, using ICLEI Protocol for Fugitive Emissions from Wastewater equations (10.2, 10.8 and 10.10)* to calculate annual emissions associated with water and wastewater treatment.
*See ICLEI Local Government Operations Protocol v 1.0 for more information

Mountain Village 2018 Greenhouse Gas Inventory Report

Prepared by EcoAction Partners
for the Town of Mountain Village

November 1, 2019

Overview:
In 2018, the Town of Mountain Village contracted with EcoAction Partners to create a Mountain Village-specific Greenhouse Gas Inventory. Working from the baseline regional San Miguel and Ouray County GHG Inventory that EcoAction Partners manages and updates annually, EcoAction Partners modified the calculations to focus on Mountain Village specific data from 2017. This inventory was updated this year to create the 2018 results reported here.

History:
The regional GHG Inventory was initially developed by the University of Colorado at Denver with data collection input from EcoAction Partners. It was funded through a matching grant in which Mountain Village, Telluride, San Miguel County, Ridgway, City of Ouray and Ouray County each contributed $1000. The calculations are in accordance with ICLEI protocol established by 2010. Since then it has been updated to align with the subsequent "Global Protocol for Community-Scale Greenhouse Gas Emission Inventories".

Mountain Village adopted a goal to reduce overall GHG emissions 20% by 2020, from 2005 baseline levels, however our regional GHG and energy-use baseline began to be tracked in 2010. Thus progress toward this goal is determined based on data from 2010 forward.

Shared regional resources:
As part of the analysis, Mountain Village desired clear understanding of how GHG emissions associated with shared regional resources were allocated between jurisdictions. Thus, EcoAction Partners created a summary of how these resources have been allocated in the past and coordinated a meeting of representatives from Mountain Village, Telluride, San Miguel County, and Telluride Ski & Golf, to review and discuss allocations for each of these resources. The agreed-upon outcome for each of these are detailed in Appendix A. The resources discussed include:

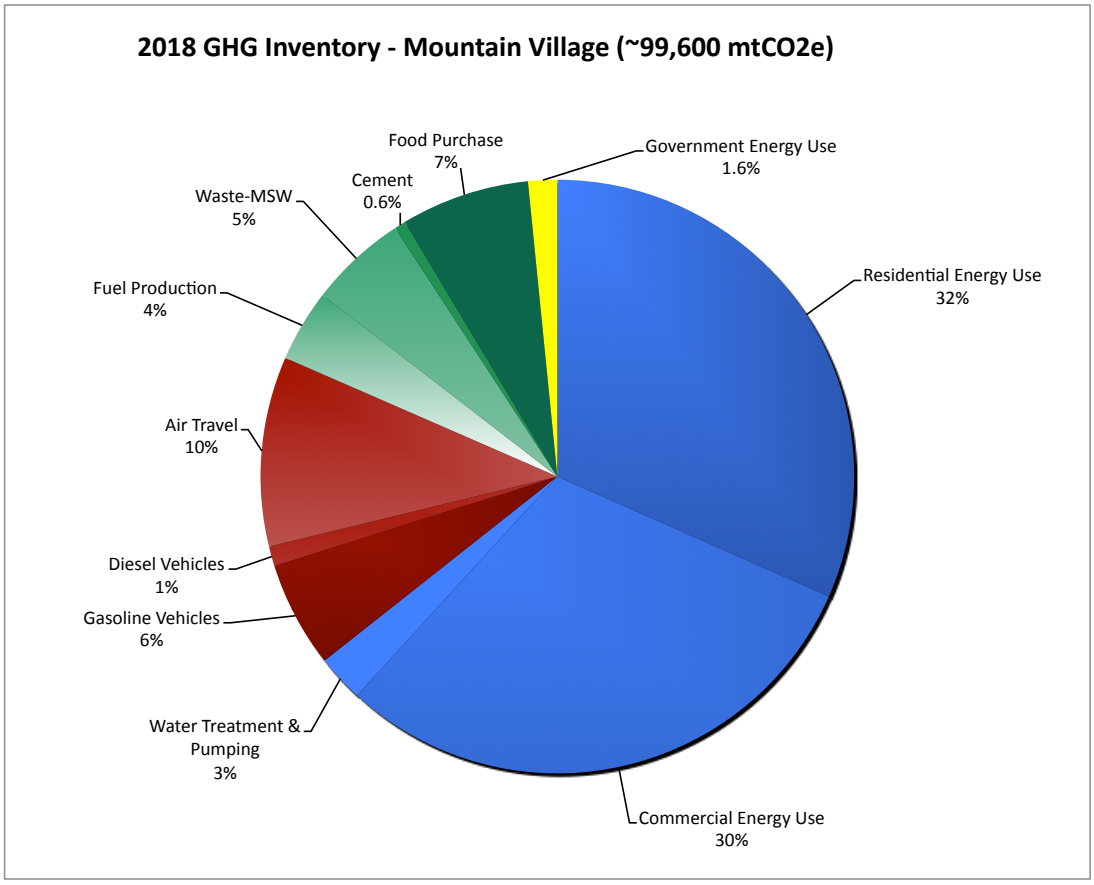
- Regional airports
- Waste Water Treatment Plant
- Gondola
- Telluride Ski and Golf's utilities including water use
- Festivals
- Transit services

2018 Mountain Village GHG Inventory Results
Mountain Village's total GHG emissions for 2018 were approximately 99,600 mtCO2e (metric tons of carbon dioxide equivalent). This is an increase of 3.75% over 2017 emissions of 96,000 mtCO2e.

Equivalencies:

- 99,600 mtCO2e is equivalent to over 108,885,000 pounds of coal burned.
- 99,600 mtCO2e is also equivalent to the energy used by 11,900 average U.S. homes in one year. (MV has 1675 residences)
- 99,600 mtCO2e is the amount of carbon that can be sequestered by over 117,000 acres of U.S. forests in a year.

The detailed pie chart below breaks those emissions down per category, explained further below the pie chart. See Appendices for more detailed explanation of allocation per jurisdiction and calculation methodologies.



- Government Energy Use – Electricity and natural gas use by Town of Mountain Village government, including building energy use, streetlights, town plaza snowmelt, and other exterior uses. Note: Gondola electricity use is 100% offset by SMPA Green Blocks, so Gondola electricity use does not contribute to GHG emissions. Gondola natural gas use does contribute toward TMV GHG emissions. Government portion of emissions increased from 2017 to 2018 (see Town of Mountain Village 2018 Government Energy Use and Greenhouse Gas Report for details).
- Residential Buildings – electricity and natural gas use for homes, including exterior lighting, snowmelt systems, and patio fireplaces. Renewable electricity associated with net-metered solar systems, SMPA solar farm purchases, and Green Blocks offsets decrease the emissions associated with residential building emissions.
- Commercial Buildings– electricity and natural gas use for commercial buildings and other use, including exterior lighting, snowmelt systems, patio fireplaces, and Mountain Village ski area operations.

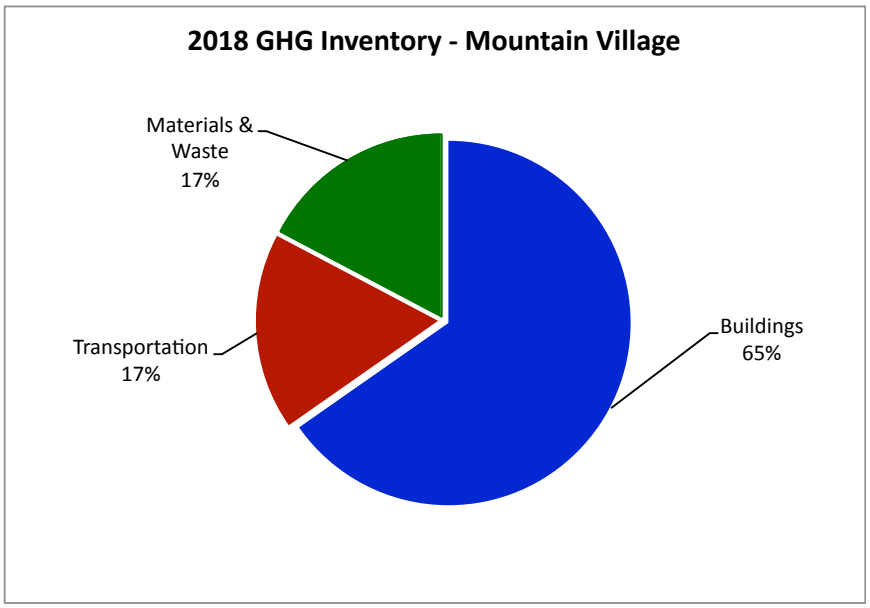
Renewable electricity associated with net-metered solar systems, SMPA solar farm purchases, and Green Blocks offsets decrease the emissions associated with commercial building emissions.

- Water Treatment & Pumping – Electricity used by Town of Mountain Village for treatment and pumping of water. Water electricity emissions increased from 2017 to 2018 (see Town of Mountain Village 2018 Government Energy Use and Greenhouse Gas Report for details on water use).
- Gasoline Vehicles – Emissions from gasoline vehicles
- Diesel Vehicles – Emissions from diesel vehicles
- Air Travel – Emissions associated with airplane fuel & enplanements at Telluride Airport & Montrose Regional Airport. (for allocations, See Appendix A)
- Fuel Production – Processing emissions associated with gasoline and diesel fuel before the fuel enters vehicles
- Waste – Emissions associated with Municipal Solid Waste taken to landfill to decompose
- Cement – Emissions associated with cement for Mountain Village, based on Colorado's total economy
- Food Purchase – Emissions calculated based on Mountain Village's total population of census and visitors

Additional Items:
These items contribute to reducing MV's GHG emissions and are incorporated into the overall total calculated value of 99,600 mtCO2e:

- Open Space Carbon Sequestration – Mountain Village's dedicated open space is a mixture of grasslands, wetlands and mixed forest. All of these areas sequester carbon and thus reduce GHG emissions by a total of approximately 312 mtCO2e, or 0.31% of MV's total GHG Inventory.
- SMPA Community Solar Farm – Mountain Village's total participation in the community solar farm is the equivalent of 170 mtCO2e, or 0.17% of MV's total GHG Inventory.
- Gondola electricity use is 100% offset with SMPA Green Blocks (~1,872,500 kWh), equivalent to 1500 mt-CO2e, or 1.5% of MV's total GHG Inventory.
- On-site Net-metered Solar PV Systems – Government, residential & commercial on-site systems produced over 115,600 kWh in 2018, reducing GHG emissions by approximately 93 mt-CO2e, or 0.09% of MV's total GHG Inventory. Electricity used while these systems were producing electricity does not get metered, so the numbers under-represent the total production of electricity by these systems.
- Gondola Transportation – Gondola use reduces vehicle transportation between Telluride and Mountain Village. In a previous study by EcoAction Partners for Mountain Village, it was estimated that gondola usage reduced GHG emissions by approximately 2,700 mt-CO2e in 2010, or 2.7% of MV's total 2017 GHG Inventory.
- Farm-to-Community Program – This program began in 2018 and offset approximately 6 mt-CO2e in it's first year. In 2019, the net total GHG emissions impact from the program is estimated to be a reduction of 16 mt-CO2e in GHG emissions. These estimates are conservative. See annual report for this program for other un-calculated benefits.

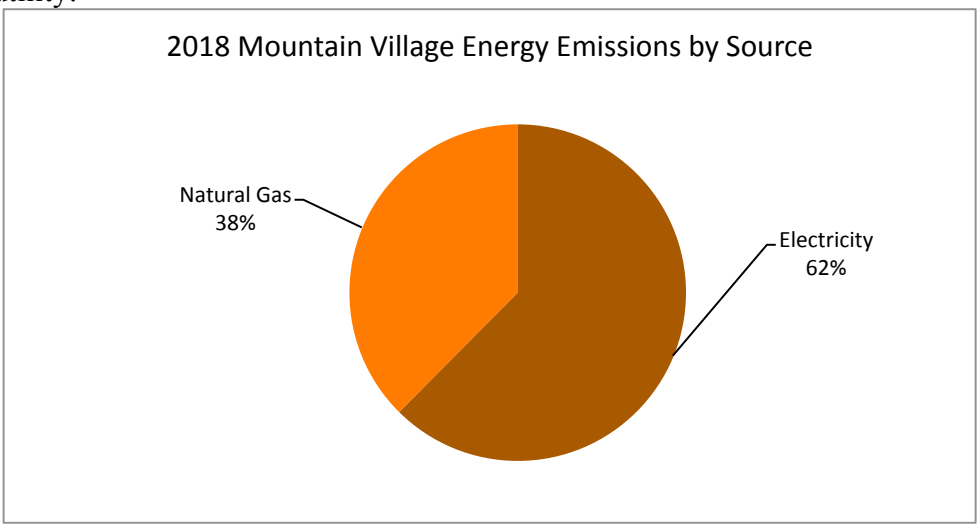
Simplified pie chart



The pie chart above simplifies the Mountain Village Inventory by showing 3 main categories:

1. Buildings – 65%
2. Transportation – 17%
3. Materials & Waste – 17%

Clearly, building energy consumption is the largest category of GHG emissions. The next pie chart shows just the Building emissions portion of the above pie chart (government, residential, & commercial combined) broken down per utility:



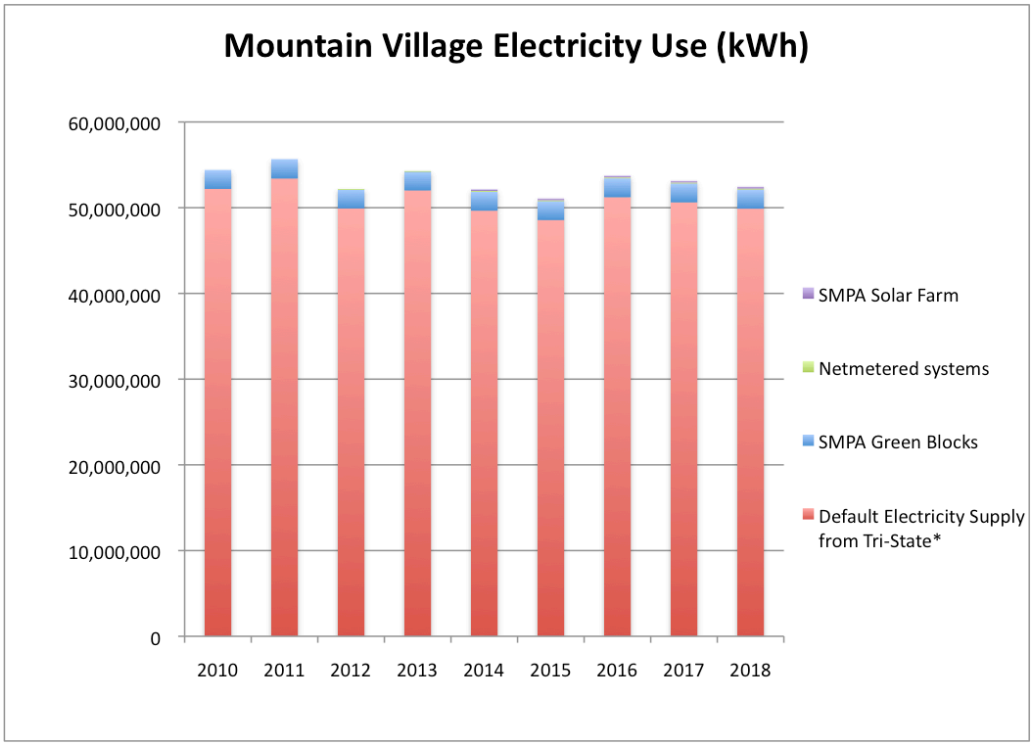
Electricity emissions are impacted by overall usage and the emissions factor, which reflects the amount of renewable energy that is part of our overall electricity mix. This value is provided to SMPA from Tri-State annually and has been steadily decreasing since 2010, from 2.12 to 1.595 lb-CO2e/kWh.

Natural gas emissions are also impacted by overall usage and the emissions factor, which is determined how the natural gas is produced. In 2010, Source Gas provided this factor at 11.88 lb-CO2e/therm. For 2017 & 2018, the natural gas emissions factor was provided by Black Hills at 11.68 lb-CO2e/therm.

Natural gas and electricity data is provided annually from the utility companies, broken down by jurisdiction. It's accurate data that is easy to track and analyze progress toward reduction goals. Mountain Village's

electricity and natural gas usage have been tracked since 2010, with analysis presented annually by EcoAction Partners to Town Council. The following graphs show electricity and natural gas use from 2010 to 2018.

Mountain Village Electricity Use:

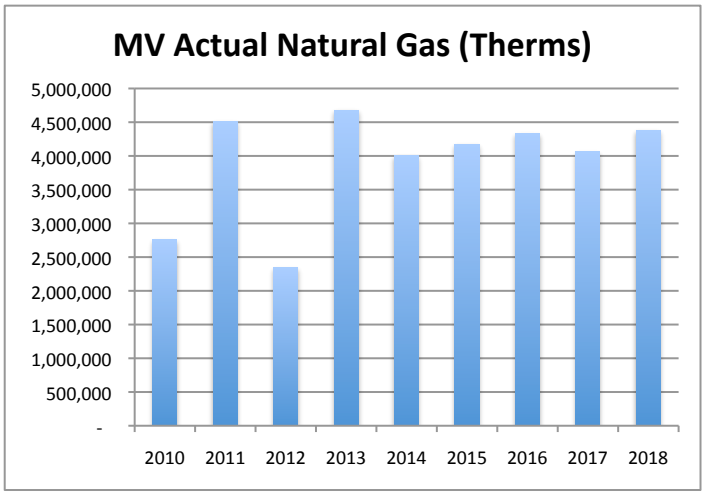


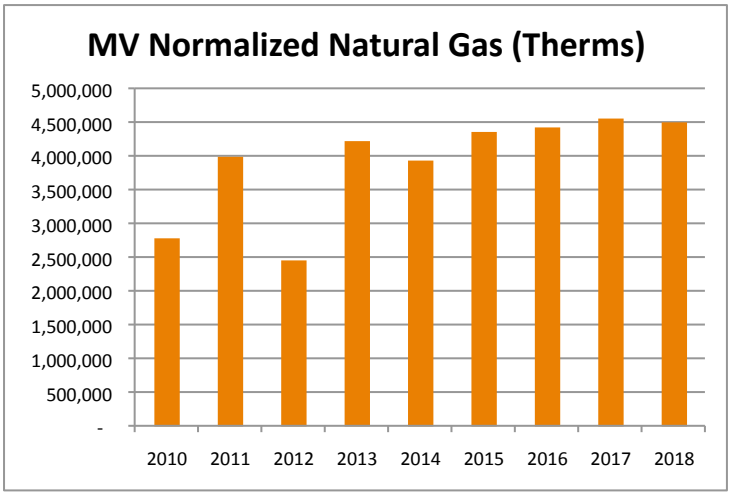
**Default Electricity Supply from Tri-State Generation & Transmission Association, Inc. - Tri-State reports that 30% of this comes from a renewable energy source.*

Electricity use associated with MV's SMPA community solar farm purchases, net-metered solar systems, and SMPA Green Blocks offsets do not contribute to MV's GHG emissions. Electricity emissions in the pie charts are associated with Mountain Village's "Default Electricity Supply from Tri-State" which is approximately 50,000,000 kilowatt-hours annually. Notable, is that overall use has decreased by 3.6% since 2010, despite an increase in people, buildings, and overall economy. Continuing to increase renewable energy in our electricity mix and decrease electricity use through conservation and efficiency will continue to reduce electricity-related emissions.

Mountain Village Electricity GHG emissions:
GHG emissions associated with the "Default Electricity" consumed is calculated using the Tri-State emissions factor for each year.
2010 – 52,191,724 kWh produced 50,300 mtCO2e
2018 – 49,885,933 kWh produced 39,300 mtCO2e
Thus, since 2010, MV has seen a 21.9% reduction in emissions from electricity use.

Mountain Village Natural Gas Use:





*In 2010, some of MV's natural gas use was assigned by Source Gas to San Miguel County, resulting in an inaccurate baseline for Mountain Village. Thus, 2011 data is used for baseline purposes.
*In 2018, Black Hills Energy updated their database to improve location accuracy of meters. As a result, some meters previously included within Mountain Village boundaries have been reallocated to San Miguel County.

Actual natural gas use is greatly influenced by temperature and snowfall from year to year, to a greater extent than electricity use. Thus actual natural gas use is reviewed with respect to these weather variations. Normalizing natural gas use is a calculation process performed to adjust for temperature variations. It does not adjust for snowfall.

In general, natural gas use has been increasing, when adjusted to account for varying winter temperatures. This increase is in line with increased building and snowmelt square footage being constructed in Mountain Village. Overall natural gas use can be reduced through efficiency and conservation measures, addressing new construction through energy efficient building codes and existing buildings through implementing Energy Conservation Measures, such as weatherization, increasing insulation, and improving tuning mechanical heating systems and controls.

Mountain Village Natural Gas GHG emissions:
To understand progress toward addressing GHG emissions, emissions associated with normalized natural gas have been used to calculate GHG emissions associated with natural gas consumption:
2011 – 4,006,797 therms produced 21,600 mtCO2e
2017 – 4,573,998 therms produced 24,400 mtCO2e
2018 – 4,502,366 therms produced 24,000 mtCO2e
Thus, an 11% increase in natural gas related emissions is seen comparing 2011 to 2017 & 2018.

Factors influencing Energy Use & GHG Emissions:
Multiple variables impact annual use of electricity and the resulting GHG Emissions. These include:

- Population – Census & Visitors
- Economy:
  - New Construction
  - Hotel Occupancy
  - Restaurants & Businesses
- Weather:
  - Winter (& Summer) Temperatures
  - Snowfall
- Emissions factors – Electricity, natural gas & other fuels

Charts tracking these variables from year-to-year follow this report, with further explanation of their influence provided in the annual GHG Inventory presentation given by EcoAction Partners.

Per Capita & Comparison Discussion:
The Mountain Village 2017 GHG Inventory report provided an extensive section covering a discussion regarding per capita analysis and comparisons to other jurisdictions' GHG Inventories. Since overall emissions and inventory results for Mountain Village have not dramatically changed between 2017 and 2018, this section was not recreated for this 2018 report. The 2017 Benchmark comparison table is included again at the end of this report for reference. The wastewater treatment plant benchmark line was revised, as it is not feasible to accurately separate wastewater gallons and visitor population values between Mountain Village and Telluride. The notes column was revised to improve clarity and address town council questions regarding the bases for the benchmark values and reasons for why Mountain Village values are higher than Telluride values.

Recommendations for GHG Emissions reductions:
It is recommended that Mountain Village adopt the new Colorado state goals for GHG emission reductions, and consider adopting a target of carbon neutrality by 2030.

The Regional Sustainability Action Plan (STRATEGY) developed in 2010 by the Sneffels Energy Board is a comprehensive document for San Miguel and Ouray Counties, and all of the jurisdictions within. The STRATEGY is a guide to multi-jurisdictional energy action planning providing a framework to facilitate streamlined, inter-entity collaboration in our region's efforts to effectively manage energy resources, reduce energy costs and meet energy, water, waste and transportation fuel reduction goals. Within it is an extensive list of region-wide and jurisdiction-specific actions for reducing GHG emissions and achieving region-wide sustainability goals. Mountain Village was represented throughout the development of this document by Bob Delves and Deanna Drew. It is available at http://www.ecoactionpartners.org/sustainability-action-plan.

This regional plan and the goals within it will be updated during 2020 by the Sneffels Energy Board. Mountain Village council & staff representatives are invited to be a part of this important discussion and planning process. Recommendations from the Green Team and Mountain Village staff will be valuable for the community-specific portion of the plan and will also contribute toward the regional planning process.

Discussions with MV staff and Green Team have resulted in the following list of ideas for MV to reduce community GHG emissions. A comprehensive plan to reduce GHG emissions would also address Transportation, Food, Waste & Consumption areas of the GHG Inventory. See the MV 2018 Town Government Energy Use & Greenhouse Gas Report for further recommendations.

Maximize partnership possibilities with other organizations

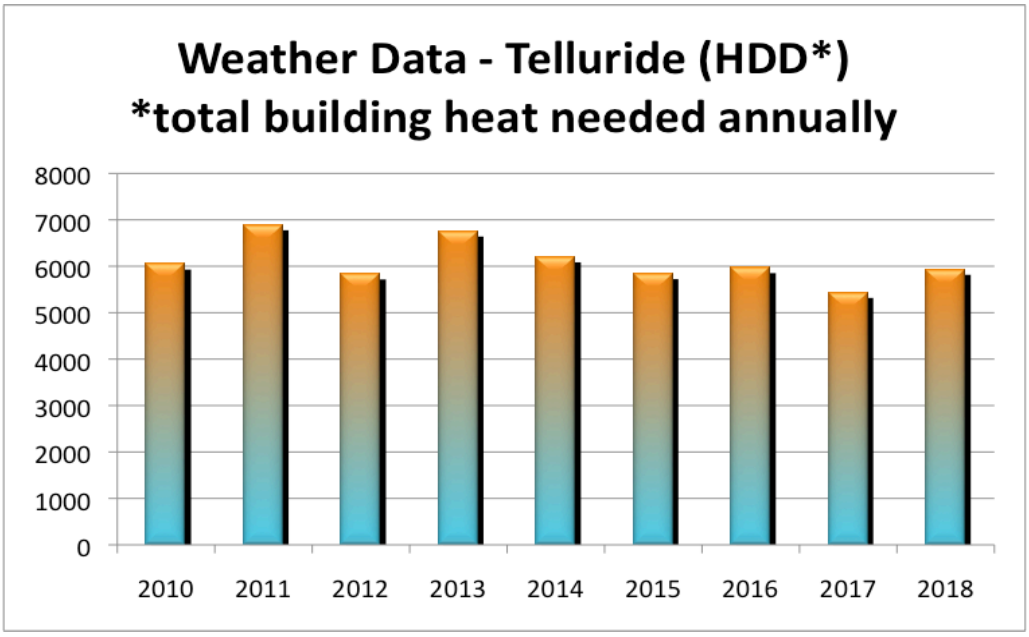
Renewable Electricity
- Collaborate with SMPA toward increasing local renewable electricity
- Support new Community Solar Farm development & include as an option for REMP
- Promote SMPA Green Blocks & efficiency programs along with MV Incentives

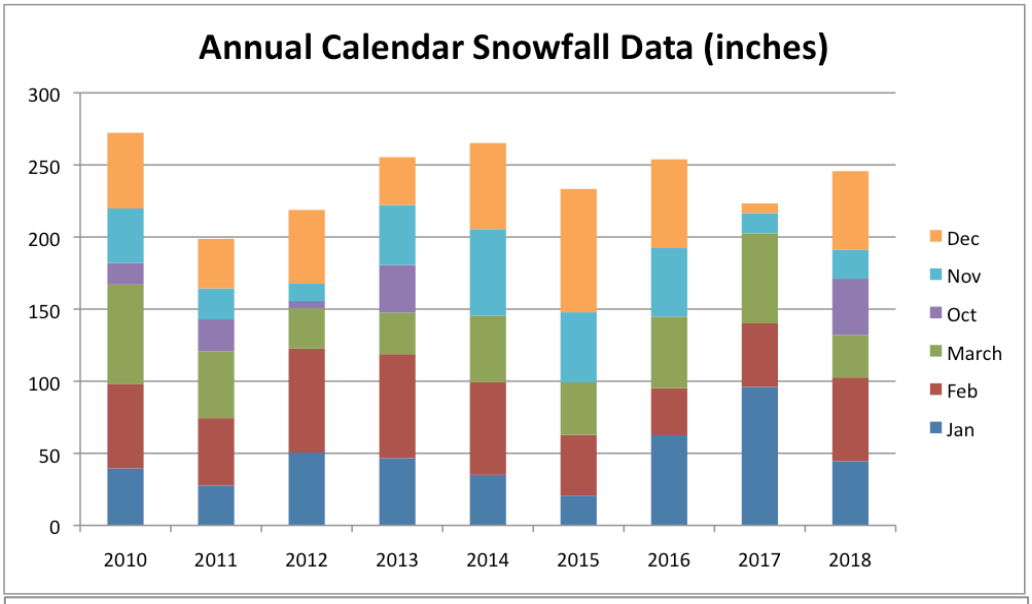
Community Programs to address existing homes & buildings
- Continue MV program development & implementation
    - Farm-to-Community Program
    - Composting Incentive Program
    - Incentivize smart controls for snowmelt systems and electric heat tape
    - Incentivize on-site renewable energy systems
    - Consider an incentive program for larger housing units / hotels to install smart energy controls

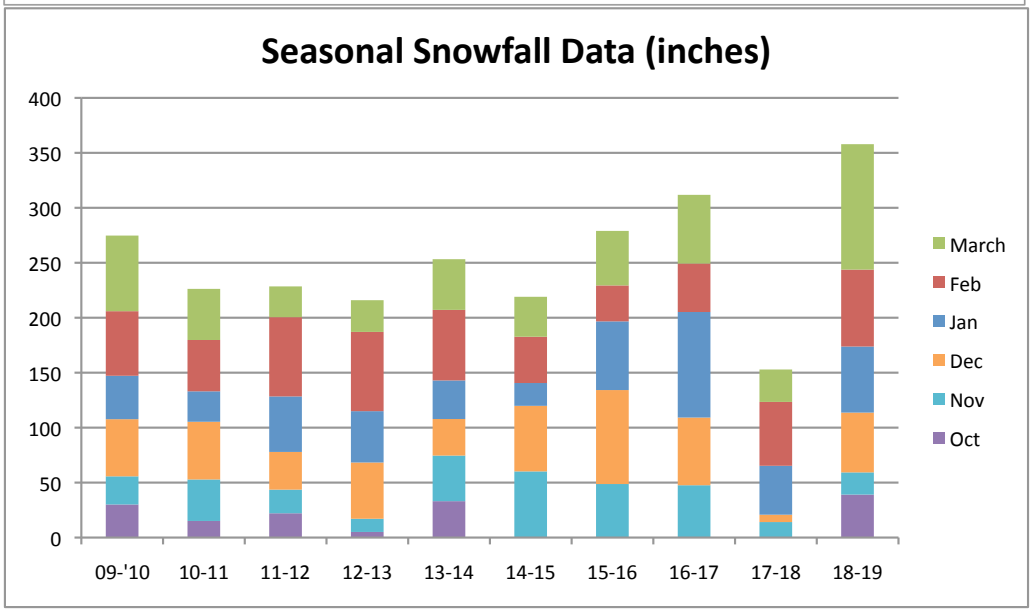
- Continued participation in EcoAction Partners' regional programs:
    - SMPA IQ Weatherization
    - Green Business Certification Program for Lodging, Restaurants, Retail, & other businesses
    - Green Property Manager Program to address part-time / unoccupied homes
    - Community Composting

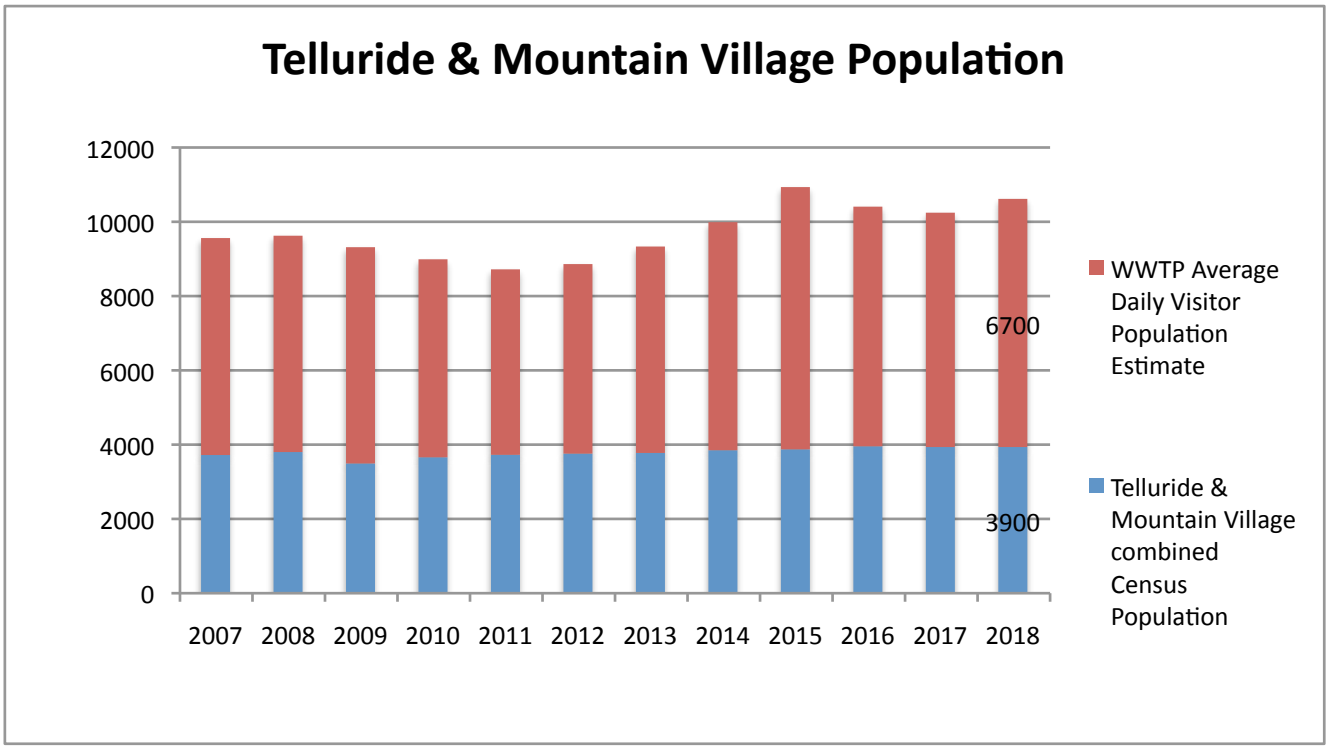
Building Energy Code Adoption:
- 2018 IECC with amendments that progress energy efficiency
- Reconsider size categories & HERS scores
- Scale toward Net Zero home as size increases
- Require house electricity offset of 100%, through Green Blocks, on-site renewable energy, or other equivalent
- Consider adding natural gas offset requirement, through Green Blocks, RECs or equivalent
- Incentivize small homes < 3000 SF & net-zero, passive home construction through financial or expedited process
- Require solar panels or solar-ready provisions on all new construction
- Require smart energy control systems on new lodging units and larger residences

Renewable Energy Mitigation Program (REMP):
- Update fees to offset carbon to match current costs & solar production values
- Eliminate or reduce free 1000 SF of snowmelt allowed
- Address outdoor fireplaces and infrared heaters
- Continue double-incentive for on-site renewable energy mitigation


Weather Data - Telluride (HDD*)
*total building heat needed annually
8000
7000
6000
5000
4000
3000
2000
1000
0
2010
2011
2012
2013
2014
2015
2016
2017
2018


Annual Calendar Snowfall Data (inches)
300
250
200
150
100
50
0
2010
2011
2012
2013
2014
2015
2016
2017
2018
Dec
Nov
Oct
March
Feb
Jan


Seasonal Snowfall Data (inches)
400
350
300
250
200
150
100
50
0
09-'10
10-11
11-12
12-13
13-14
14-15
15-16
16-17
17-18
18-19
March
Feb
Jan
Dec
Nov
Oct



Conversion Factors Used:

TriState (SMPA):	2.12 lb CO2e/kWh (pre-2012)	1.96 lbCO2d/kWh (2012)	1.93 lbCO2e/kWh (2013)
	1.99 lbCO2e/kWh (2014)	1.871 lbCO2e/kWh (2015)	1.776 lbCO2e/kWh (2016)
	1.595 lbCO2e/kWh (2017)		
Black Hills Energy:	11.68 lbCO2e/therm	**Source Gas (2010-2016):** 11.88 lbCO2e/therm	
Gasoline:	20.02 lbCO2e/gallon (tail-pipe emissions only per governmnet GHG protocol)		
Diesel:	22.44 lb CO2e/gallon (tail-pipe emissions only per governmnet GHG protocol)		

Local Benchmark Comparison from 2017:

Description of Benchmark	San Miguel County, CO (2017)	Telluride, CO (2017)	Town of Mountain Village, CO (2017)	Aspen, CO (2014)	Mountain Village & Telluride (2017)	Units of measurement	Notes
Total GHG Emissions	**244,000**	**67,500**	**96,000**	**394,391**	**163,500**	mtCO2e	
Avg. Res. electricity use	894	728	1268			kWh/household /month	
Avg. Res. Natural gas use	110	73	197			therms/household /month	including snowmelt systems
Avg. Res. Electricity (kWh/sf/yr)	4.70	5.19	5.23			KWh/sf/yr	
Avg. Res. Natural Gas/sq.ft/yr	0.28	0.30	0.36			therms/sf/yr	including snowmelt systems
Avg. Comm/ Public Buildings Energy use intensity	227	335	343			Kbtu/ft²/year	
Vehicle Miles per person per day	17.0	27.0	28.0			VMT/person/day	per census population
Water	189	168	266*			gallons/person/day	*not incl snowmaking; see water use chart in government report
Wastewater (this line revised from MV 2018 report)	118				73*	gallons/person/day	*per capita incl visitors & all emissions offset by Telluride government REC purchase
Municipal Solid Waste	6.8	10.0	18.1			lb/person/day	per census population
GHG Emissions per capita	**30.2**	**28.6***	**68.4**	**46.8**	**41.5**	Mt-CO2e/person/year	per census population; *Telluride's GHG value incorporates REC offsets
GHG Emissions per capita + visitors	**17.2**	**12.5***	**26.2**		**17.2**	Mt-CO2e/person/year	per capita incl Visitors; *Telluride's value incorporates REC offsets

Mountain Village GHG Inventory
Appendix A
San Miguel County Shared Resources Notes

SMC Shared Resources Meeting for GHG Inventories
Wednesday July 11, 10-12 at WPL Telluride Room
(Note this document was updated after the meeting with outcomes & findings)

The aim of this meeting is to reach consensus as to how the GHG emissions associated with each shared resource will be assigned between the Telluride & Mountain Village GHG Inventories. Allocations for Telluride's inventories from 2010-2017 are explained below, along with associated Mountain Village analyses. The SMC inventory includes all jurisdictions (including Telluride & MV) and thus is inclusive of these resources.

Allocation methodologies to consider for each resource:

- Location of utility meters determines how electricity and natural gas values are provided by SMPA and Black Hills Energy
- % of county population
- Is data available to parse resources between communities?
- Allocation of tourist impact to Telluride & Mountain Village versus rest of SMC or greater region?

<u>Regionally Shared Resources</u>

Wastewater Treatment Plant – Telluride & MV & SMC subdivisions

MV: 15% ownership, $30,000 toward solar PV system, 35% of use
Towns working toward Regional Sewer District (~5 years?)

- Electricity & natural gas: 100% to Telluride
- Biogas emissions (nitrogen & methane) from all 10,000+ visitors: 100% assigned to Telluride
- *Could allocate all of the above based on % of use. Group agreed to continue allocation to Telluride*

*WasteWater analysis charts (no impact to GHG Inventory emissions)
35% assigned to MV, 65% assigned to Telluride.
(For improved Telluride analysis – breakout of SMC subdivision population needed)

*Food GHG emissions are calculated using WWTP population accounting
35% assigned to MV
65% assigned to Telluride, minus SMC subdivision population of 1035

Gondola – eliminates vehicle traffic between MV & Telluride

100% of electricity & offset assigned to MV.
Natural gas & diesel use allocated to MV.

- TMVOA (through TMV electricity bills) purchases Green Blocks to offset electricity use by 100% (in 2017 offset was over by 30,000 kWh & adjusted by TMVOA for 2018 onward), so electricity use does not show up in GHG pie.

Telluride Ski & Golf – operations in MV, Telluride, & County land

electricity & natural gas allocated per meter location
(provided this way by SMPA & Black Hills Energy for all regional utility use)

- TSG operations include:
  - Office space & Businesses in MV core
  - The Peaks & other lodging
  - On-mountain operations
  - Conference Center
  - Telluride - Base of Gondola & Lift 7 operations
- *Could ask for TSG assistance in separating utility bills based on location of service, to reassign emissions accordingly*

Regional airports – serve region

- Telluride airport: 100% allocated to SMC, divided 50/50 between Telluride & MV
- 65% of Montrose airport to San Miguel County – group agreed to split 50/50 between Telluride & MV

Vehicle Transportation – data provided per county

Emissions assigned as % population of SMC

- Vehicle registration data & CDOT studies are basis for current Inventory
- Transit Services (some shared among jurisdictions)
- *Traffic count data for Telluride & MV would provide better data specific to community driving, but wouldn't account for distance of travel to each town*

Telluride Festivals – all 3 governments resources utilized

Electricity & water use tied to Telluride Town Park

- Located in Telluride Town Park
- Gondola used
- Camping in outlying areas, with school bus transportation
- People travel to region for festivals
- Benefits all businesses

Mountain Village Sunset Series – MV resources

- Located in Mountain Village
- Gondola used
- Regional benefit

Others – serve region, allocated by location

- Wilkinson Public Library - Telluride
- Telluride Medical Center – Telluride
- Telluride School District – Telluride
- Telluride Mountain School - SMC

Data Gaps

Trash & Recycling –

- Bruin provides data per jurisdiction. Has not provided for 2017. Telluride fined Bruin for lack of 2016 & 2017 data. Bruin data is only part of the waste picture.

- Waste Management – Private company, data not available. Could be requested through jurisdiction contracts, similar to MV's contract with Waste Management.
- 2017 Regional & SMC Inventories – data from EcoAction Partner's Regional Waste Diversion Study. 2015 data trash & recycling per jurisdiction

Transportation –

- Region 10 study data not applicable. It focuses on gaps in transit services.
- CDOT data tracks highway travel only, not all roads.
- Registered vehicles in counties relies upon average CO annual mileage.
- Off-Road vehicle use is increasing, but not accounted for.

Affordable Housing –

- Regional impacts on transit studies & transportation emissions
- GHG calculation could be done to compare impacts of reducing commute mileage for local employees

Food -

- Population-based calculation, including visitors. Telluride is based on 65% of WWTP, minus estimated SMC subdivision population served by WWTP (~1035). Mountain Village would be 35% of WWTP population.
- A food study would be helpful for more accurate food emissions & tracking reduction associated with farmers markets & programs.

Propane data –

- Estimate from 2010
- Private companies, updated data not currently available

Mountain Village GHG Inventory
Appendix B
Bases for GHG Inventory Calculations

Carbon Emissions Footprint Calculator for Cities ™

The workbook is provided to facilitate future updates to Ouray and San Miguel's Greenhouse Gas (GHG) Emissions Inventory. This inventory was completed for 2010 based on ICLEI/WRI protocols and the Demand-Centered Hybrid Life Cycle Analysis methodology (Ramaswami et al., 2008 - see Resource 3). EcoAction Partners uses the workbook to update our regional GHG Emissions Inventory annually.

General data:
Census Population – obtained annually from the Colorado DOLA website
Visitor Population
- SMC visitor values are calculated using the Telluride & Mountain Village Wastewater Treatment Plant BOD data.
- Ouray County visitor estimates are obtained from the visitor centers in Ridgway & Ouray

# of Households, SF of commercial & residential buildings – these values are not used in overall GHG emissions calculations, but are collected for other benchmarking purposes. The Ouray County & San Miguel County Assessors offices provide this data.

Energy (blue):

Residential & Commercial Building Energy Use:
Electricity
- SMPA provides data annually per community for residential, commercial & irrigation (provided in 1st quarter for previous year). Data is categorized as non-renewable sales, Green Blocks sales, SMPA community solar farm production, & net-metered system production.
- Tri-State emissions factor - provided to SMPA annually based on Tri-State's total mix of electricity sources (provided late in year for the previous year, thus GHG Inventory value is a year behind when presented to governments, but gets updated during the following year.)

Natural Gas
- Black Hills Energy Corporation (previously SourceGas) provides data annually – per community for residential, commercial & irrigation (provided in 1st quarter for previous year).
- Emissions factor – In 2010, Source Gas provided this factor and in 2017, Black Hills Energy Corporation provided the BHE value. Inventories from this transition onward utilize this Black Hills emissions factor.

Propane
- based on initial 2010 estimate from regional propane companies, who are not obligated to release information and have not provided data since.
- Emissions factor – LGOP default factor from 2010

Government Energy Use:
Government electricity & natural gas use – provided annually by governments: utility bill data, Green Blocks purchases, renewable system production, REC purchases

Water / Wastewater Treatment Electricity & Natural Gas - provided annually by governments from utility bills

Transit (red):

Vehicle Transportation:
Transportation tail-pipe emissions are calculated using total Vehicle Miles Traveled (VMT), which is derived using two different methods - vehicle registration and average daily traffic. VMT is divided by average regional vehicle fleet fuel economy to calculate fuel consumption, which is used to determine GHG emissions from surface transportation. The Colorado Department of Public Health and Environment (CDPHE) conducts on-road vehicle surveys to characterize the Colorado vehicle mix (95% gasoline, 5% diesel).

Vehicle Registration Method:
- # Vehicles registered in San Miguel & Ouray Counties updated annually
- Vehicle Miles Travelled (VMT) estimate per vehicle / year, per EPA – 12,000

Average Daily Traffic Method:
- Average Daily traffic counts of Vehicle Miles Travelled (VMT) per county per Colorado Department of Transportation (CDOT) studies (2009), based on 342 working days/year

Gasoline (95% per CDPHE)
- 20.1 average MPG per CDPHE (2010)

Diesel (5% per CDPHE)
- 6.3 average MPG per CDPHE (2010)

Airline Transport:
- Annual aircraft fuel (jet fuel and aviation gasoline) used is provided annually from the Telluride Airport and the Montrose Regional Airport (65% of passengers travel to OC & SMC).
- Emissions factors used are from the Department of Energy (DOE).
- Total number of enplanements (passengers) is also tracked to obtain emissions/person.

Emissions values for all fuels are sourced from The Carbon Registry, local government protocol, September 2008.

Materials and embodied energy (transboundary reporting):
This section will count all the GHG emissions associated with producing and transporting key materials to OC & SMC, including food, cement, and fuel. Just like electricity, these materials are produced outside the boundaries of the community but are essential to community life. WRI and ICLEI are continuously updating their guidelines on how to include these trans-boundary emissions, termed "Scope 3 Emissions."

Food:
This calculation was originally based on 2005 BLS Economic Census data for 2009$ for average annual household dollars spent on food. Recently, due to the relatively large percentage of households in the region that are not fully occupied year-round, and the annual influx of visitors that contribute to our regional food carbon footprint, all GHG Inventories (2010-2016) were converted in 2017 to use the average food carbon footprint for annual mtCO2e/person found in industry studies published online. This carbon footprint value is used with the regional visitor data (vs census) to calculate our annual food-related emissions.

Waste & Recycling: calculated using EPA WARM methodology

- We have 2 main waste haulers for the region.
- Bruin provides annually updated data for volumes of waste and recycling collected throughout the region.
- Waste Management provided total data in 2010 for collection in Montrose, Delta, San Miguel & Ouray Counties, but has not provided updated data since.
- The Sneffels Waste Diversion Planning Project was completed in December 2016 by EcoAction Partners. It includes an analysis of total volume of waste and recycling. This is the most accurate regional information currently available. Thus OC & SMC total waste data is based on this study.
- Values from the study are used with WARM* emissions data to calculate annual waste & recycling emissions.
  **Waste Reduction Model (WARM) was created by the U.S. Environmental Protection Agency (EPA) to help solid waste planners and organizations estimate greenhouse gas (GHG) emission reductions from several different waste management practices.*

Cement:

- Total cement consumed in Colorado in 2007 is multiplied by % of state census population located in OC & SMC.

Fuel Production:

- The fuel production emissions factor represents emissions from the production and shipping of fuels. Also known as Wells-to-Pumps, W2P, or WTP Emissions
- The emissions factor for Gasoline, Diesel, & Jet Fuel is multiplied by the total gallons of each fuel used in the region to obtain overall annual emissions.
- WTP Emissions values for all fuels are sourced from the 2017 GREET WTP analysis.

Water & Wastewater Treatment Emissions:
Regional governments provide annual gallons of water treated at each plant. These values are utilized with annual census & visitor data, using ICLEI Protocol for Fugitive Emissions from Wastewater equations (10.2, 10.8 and 10.10)* to calculate annual emissions associated with water and wastewater treatment.
*See ICLEI Local Government Operations Protocol v 1.0 for more information

KIM WHEELS

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Ophir, CO 81426

(970) 708-9674
email: kim@ecoactionpartners.org

SUMMARY

Energy consultant with experience in program management, renewable energy systems energy efficiency and building science. Excellent problem solving, project organization, and leadership skills. Enjoys challenging assignments and working in a team-oriented environment. Working to decrease regional greenhouse gas emissions and energy use with energy & green building program management at sustainability non-profit and as a business partner providing energy consulting services for the region.

ENERGY EFFICIENCY AND RENEWABLES EXPERIENCE

ECOACTION PARTNERS Telluride, CO — February, 2007 - Present

Community Energy Coordinator
Energy Program Specialist for EcoAction Partners, the region's sustainability non-profit organization. Coordinate Sneffels Energy Board of Ouray & San Miguel Counties, track and analyze GHG emissions and energy use for San Miguel and Ouray Counties, present on progress toward accomplishing goals in Sustainability Action Plan. Engage residents & businesses of each community through implementation of programs that decrease the region's energy use and greenhouse gas emissions. Current projects include: analyzing 2010-2018 GHG Inventory and energy data for Sneffels Energy Board 2020 update of the regional Sustainability Action Plan, compiling and communicating accomplishments across the region, increasing participation in Green Business Certification program, and engaging regional building departments in updating building energy codes.

LOTUS ENERGY SOLUTIONS, LLC Telluride, CO — June, 2008 - Present

Business owner & technical expert
Lotus Energy Solutions is a small local business focused on providing home and small commercial energy efficiency services for the San Miguel County region. Services provided include ENERGY STAR Certification for new homes including Home Energy Ratings (HERS) and Manual J calculations; Home Energy Audits with use of blower door, duct blaster, and infrared camera; & other Home Energy Consulting services designed to help our clients build and retrofit high performing homes. LES is a mission-based company with the intention of reducing regional carbon emissions through promoting energy efficiency and renewable energy technologies.

VERITAS SOLAR, LLC. Norwood, CO — August, 2006 – April, 2007

Renewable Energy System Designer
Designed solar electric and solar hot water systems for remote homes & cabins, utility grid-tied homes, & commercial buildings. Selected equipment, assist with installations, trouble-shoot installation/operation difficulties, and provide on-going maintenance and guidance to system owners.

Energy Efficiency Expert
Performed complete energy analysis of homes based on plans or on-site evaluations, utilizing computer-modeling software. Provided energy conservation and HVAC system design recommendations to architects, builders, and homeowners.

SOLAR ENERGY INTERNATIONAL Carbondale, CO

Renewable Energy Classes — June - August, 2006
Solar Hot Water; Solar PV Design and Installation; Micro-Hydro Systems; Wind Power Design and Installation; Passive Solar Design Principles; Natural Home Building

Renewable Energy Intern – Work/Trade Program — November, 2005
Assisted with various several energy projects including biodiesel processing and a Solar in the Schools program. Reviewed "Appleseed Biodiesel Processor" plans and assembled a biodiesel processor for upcoming course. Researched biodiesel-related websites and organized a reference list to be used in SEI biodiesel summer course. Assisted with design of a rack for solar panels to be mounted on roof of the Solar in Schools bus. Worked in exchange for partial tuition payment for renewable energy and natural home building courses.

OFFICE for RESOURCE EFFICIENCY Crested Butte, CO

Sustainability Non-profit Organization Volunteer February – May, 2006

- Developed a plan for the beginnings of a cardboard recycling program at Crested Butte ski resort. Researched availability of recycling services and options for other materials.
- Assembled a report on available renewable energy and energy efficiency grants and other financial incentives available in the region.

ENGINEERING EXPERIENCE

RESOURCE ENGINEERING GROUP, INC. Crested Butte, CO February – May, 2006

Mechanical Engineer
Designed mechanical systems for homes and commercial buildings, incorporating energy efficiency, renewable energy systems, and sustainable design practices. Provided complete plans and specifications for various types of HVAC systems including ground-source heat pump, active solar, and evaporative cooling. Utilized computer simulation software to analyze energy usage of homes. Designed systems for buildings of different construction types, including strawbale, ICF, and SIP Systems.

CARTER & BURGESS, INC. Ft. Worth, TX 1999- 2004

Mechanical Engineer, P.E., C.E.M. - Retail & Distribution Division
Responsible for leading and coordinating the mechanical engineering design performed by Carter & Burgess for Distribution Centers. Responsible for training new engineers in the program, dispersing design and drafting work among other engineers and drafters, coordinating design changes, performing quality control. Designed HVAC systems and develop special design changes to distribution center design. Prepared plans and specifications, performed code reviews, coordinated with vendors, reviewed equipment submittals, and responded to contractor information requests. Prepared reports certifying compliance with energy efficiency and air quality requirements.

- Continually determined and evaluated project workload, personnel availability, and coordination between team members for mechanical group. Responsible for developing quality assurance checklists, special project budget estimates, project timelines, and ensuring consistency of design among team members. Met regularly with Mechanical Discipline Leader to ensure smooth operation and coordination of mechanical group.
- Modified prototypical design to comply with California state codes, including energy efficiency standards. Specified higher efficiency HVAC equipment, modified ventilation airflows and ductwork design, and utilized non-metal-building walls where necessary to comply with local requirements and seismic-related design changes. Provided energy-efficiency documentation to local authorities to exhibit compliance with regulations.

E.I.T., Energy Services Group - Facilities Division
Provided energy design services for new central energy plants, as well as analysis for optimization, replacement and expansion of existing systems. Scope of the projects included evaluating current systems and equipment, analyzing the benefits of implementing modern energy-saving equipment, designing utility power plants, and recommending the implementation of energy management techniques. Performed energy audits and developed computer simulations to compare actual measured energy use to future predicted energy use. Clients included universities, manufacturing plant operators, retail store chains, military bases, district energy users, corporations, public institutions and other facility owners.

DUKE ENGINEERING & SERVICES Ft. Worth, TX 1997-1999

Mechanical/Systems Engineer
Performed consulting engineering work for utility companies in the power industry. Completed high quality engineering design and documentation required to maintain continuous operation at power plants. Duties included revising, developing, and verifying engineering calculations, drawings and reports; developing plant modification packages; database development and utilization.

Chairman: Recycling, Community Service, and Charitable Donation Committee of DE&S Ft. Worth Office

- Created and organized an office paper and aluminum can recycling program. Program was well-received and supported by office personnel. 5000 pounds of paper were recycled in the program's first six months. Program is still operating.
- Responsible for initiating and coordinating committee activities which increased DE&S's community involvement and company recognition in the Ft. Worth area. Organized office community service activities such as a Ft. Worth anti-graffiti painting party and DE&S participation in WalkAmerica for March of Dimes in Ft. Worth. Established a corporate membership with the local YMCA.

STONE & WEBSTER ENGINEERING CORPORATION Boston, MA 1996-1997

Career Development Engineer, Mechanical Department, Power Division

Participant in the Career Development Program which gave new engineers exposure to numerous aspects of company operation, site trips, and the ability to rotate between different engineering assignments.

- Lungmen Project Assignment: Designed turbine building steam systems of a power plant. Developing drawings, designed piping systems, established design parameters, and developed engineering calculations. Wrote letters to other companies involved in designing the plant in order to exchange design information. Became a successful, contributing team-member of a large, multi-disciplinary project.
- Piping, Valve, and Component Group Assignment: Developed design specifications and verified data on piping and instrumentation, process flow, and utility flow diagrams for a hazardous chemical disposal program. Performed flooding calculations for a plant turbine building. Developed database tables of piping and other plant components used in the design of power plants. Learned and applied practical engineering skills in a variety of engineering duties.

LICENSES/ORGANIZATIONS

Home Energy Rating System (HERS): *training May, 2008; certification in process*
Professional Engineer (PE)**:** Licensed in Mechanical Engineering since 1/2002
National Council of Examiners for Engineering and Surveying (NCEES)**:** Council Record; 12/2002

ENGINEERING EDUCATION

WORCESTER POLYTECHNIC INSTITUTE Worcester, MA
Bachelors of Science, Mechanical Engineering - Thermal/Fluid and Environmental Interests: May 1996; GPA 3.8

EDUCATIONAL PROJECT WORK

MAJOR QUALIFYING PROJECT (MQP): Construction of an air cushion vehicle (ACV) and development of a representative mathematical model. Modified an existing hovercraft design to accommodate instrumentation used to measure several operation parameters. Compared physical data to values obtained mathematically.

INTERDISCIPLINARY PROJECT: *A Study of Farming on the Innichberg: Preserving a Unique Culture*
On-site study of the mountain farming system economy and culture of Innichen/San Candido, Italy. Presented recommendations for improvement of farm economics and maintenance of the mountainside's delicate environmental balance. President's IQP Awards Competition Finalist.

HEATHER KNOX

PO BOX 2441, TELLURIDE, CO 81435 | 970.729.3362 | HKNOX9500@GMAIL.COM

EXPERIENCE

EcoAction Partners: Executive Director **Jan. 2014 – Present**

Directs EcoAction Partners, the regional sustainability organization serving the towns of Telluride, Mountain Village, Ophir, Norwood, Ridgway and Ouray, and San Miguel and Ouray Counties

Strategic Partnerships:

- Initiated the Green Lights LED Program with San Miguel Power Association and regional governments. Greenlights has allowed residents and businesses to purchase LED bulbs at up to 75% off by leveraging the SMPA LED light bulb rebate of up to 50% along with a government match. Through this regional program 15,500 LED bulbs were purchased and installed, reducing approximately 275 mt-CO2e of GHG emissions annually. The program served 9 regional governments in 2019 .
- Partnered with Energy Outreach Colorado and San Miguel Power Association, to implement the San Miguel Power Association Income Qualified Program (SMPA IQ). SMPA IQ brings home weatherization services to low and mid-income individuals in San Miguel, Ouray counties and sections of Montrose, Delores and San Juan counties. The weatherization program is the precursor for the SMPA IQ Solar program, which provides solar panels to further off-set utility costs for low and mid-income individuals and families. Since the inception in 2016, Energy Outreach Colorado has provided over $300K in funding for weatherization improvements to these needy homes.
- Proposed and created the Green Projects Grant Program (GPGP) for San Miguel County to put a $100K energy impact fee to work. All application, marketing and grant committee review materials were created and distributed. Matching grants to 18 public and private entities were provided reducing carbon by 1.5 million pounds for the life of the projects.
- Partnered with San Miguel Power Association and regional schools to expand the Truth or Dare educational challenge. Seven regional schools now participate in this program. Through small student actions, this one-week program reduces energy and waste, and educates students on what they can do to reduce their carbon footprint, and develop lasting habits.
- Served our regional festivals for Compost, Recycling & Trash services (CRT) for waste reduction: Mountain Film, Telluride Bluegrass Festival, 4th of July Celebration, The Ride, Blues and Brews, TMVOA Sunset Concerts, and others.
- Secured State of Colorado Resource Recovery, Recycling, Economic Opportunity Grant for implementation of an neighborhood composting program for the Town of Ophir.
- Participated in the Sneffels Energy Board: a regional group with SMPA and Black Hills Energy serving the governments of Telluride, Mountain Village, Norwood, Ophir, Ridgway, Ouray, and San Miguel and Ouray Counties.
- Operates bi-annual regional electronics recycling with San Miguel County and the Town of Telluride.

Heather Knox Consulting: Events, grants, & non-profit management consulting **2013**

Clients include:

- Telluride Adaptive Sports Program, as Grants Manager
- EcoAction Partners, as Transition Manager & Interim Executive Director

Telluride School District: Executive Director of the Michael D. Palm Theatre & Palm Arts **2007 – 2013**

Managed all aspects of the Michael D. Palm Theatre, a 30,000 square foot versatile performance facility with comfortable seating for 660, a 3,332 square foot stage, a full fly rail system with 38 line sets, 288 dimmed lighting circuits, performance sound equipment, and wide screen cinema with dual 35 mm projectors and a large format digital projector and surround sound, welcoming approximately 15,000+ annual visitors.

Highlights:

- 2008 – Navigated the Palm Theatre through the culmination of a five-year $100K annual funding commitment. Created a trustee program to provide $30K in annual operating support. Developed new revenue streams for long term sustainability.
- 2009 – Directed the creation of a new 501c3 organization, **Palm Arts, Inc.** to facilitate donations, secure special event liquor licenses, and support the Michael D. Palm Theatre. The ability to obtain liquor licenses increased Palm rental income by 20%.
- 2011 – Developed the business plan and pro forma for an after-school dance program when the previous local dance school closed. Palm Arts Dance Program now offers a full array of dance classes (23+ per week) for students, preschool through 12th grade. Liquor licensing and the dance program, now provide more than 20% of the Palm Theatre's annual operating budget.
- 2013 – Created a Summer Dance Series to bring professional dance performances back to Telluride in the summers. Series drew 1000 attendees over two performances and engaged new sponsors and donors.

Duties & Accomplishments:

- Selected national and international talent for the Live at the Palm Series (5-8 performances per season). Coordinated with the Rocky Mountain Arts Consortium (RMAC) on routing opportunities for the artists selected. Negotiated performance contracts and executed commitments; oversaw event marketing and ticket sales. Managed a $65-75K series budget; leveraged grant funds and sponsorship to maximize budget.
- Managed all event rentals for the 25+ groups who use the Palm theatre for 175 annual event days. Increased rental and services income by 30% over 3 years through new bookings, partnerships, and appropriately billing for services.
- Coordinated all aspects of the special event liquor license permitting process. Submitted event plans to the Board of Education for approval. Managed the liquor application process (applications, fees, postings, product purchases) and event-day staff management. TIPS Certified on safe liquor service practices. Liquor sales generate approximately $20K annually for Palm Arts.

- Introduced risk-free digital programming (50+ events per year) to increase use of the Palm Theatre. Digital programming brought $10K annually through earned income and fundraising program support.
- Provided professional oversight of the Palm Arts Dance School to ensure success; managed an annual budget of $120K.
- Launched a capital campaign and managed the construction and budget ($55K) for a dedicated dance studio.
- Researched and wrote grants for Michael D. Palm Theatre & Palm Arts. Increased grant funding by 70% from FY 2008 to FY 2013, despite an overall reduction in state, local and national grant funding available.
- Developed and managed the Palm Theatre's annual budget of $300K. Created long and short term equipment, maintenance and capital repair/replacement plans.

Town of Mountain Village **1997 - 2007**

Director of Economic Development **December 2005 – September 2007**

Directed all activities and operations of Economic Development in Mountain Village: developed and produced new and existing events, managed public relations and communications, coordinated destination marketing, directed guest services, provided economic analysis for strategic facility development and managed existing facilities.

Duties & Accomplishments:

- Managed the 50+ personnel in the departments that collectively comprised the Economic Development Department: Guest Services, the Telluride Conference Center, Mountain Village Events, Marketing and Communications, and the proposed Mountain Village Adventure Center.
- Determined levels of staff, equipment and resources needed to effectively accomplish departmental services and programs. Assessed needs and strategically planned for the future of the various departments.
- Developed and implemented departmental operating and capital budgets of $2.4 million annually.
- Developed a strategic grant process using Return on Investment Reports for Mountain Village Owners Association (now TMVOA) and the Town of Mountain Village; directed the grant process, which awarded $640K in grant funding to more than 35 organizations (2006).
- Directed the development and production of 25+ Mountain Village signature events and more than 35 outside promoted events (2006).
- Developed and executed town-wide customer service strategy for all business license holders. Worked in conjunction with Telluride Ski and Golf Co. and the Telluride Tourism Board to implement initiatives.
- Managed communications and marketing to all Mountain Village stakeholders through newsletters, press releases, advertising, website design and content, surveys, and event and facility marketing.
- Implemented directives from Mountain Village Owners Association Board of Directors and Mountain Village Town Council, and handled special projects on behalf of the Town Manager.

Director of the Telluride Conference Center **2002 - September 2007**
(Held concurrently with the Director of Economic Development from 2005)

Managed all aspects of the Telluride Conference Center, a 20,000+ square foot multi-use meeting and events facility with on-site audiovisual, catering and beverage service, which serves 10,000+ annual guests for conferences and events.

Duties & Accomplishments:

- Reduced annual deficit by 82% from $946K in 2001 to $178K in 2006 through creative revenue generation and a reduction in overhead.
- Implemented in-house food & beverage service (2002-2003). Created policies and procedures to ensure high quality catering service; created policies and procedures to ensure the security of the liquor license, inventory, and cash revenue. F&B netted $244K annually (2006).
- Managed all rental and event contracts for groups utilizing the facility.
- Developed and managed revenue and expense budgets of $662K and $840K respectively (2006).
- Hired and managed 30+ full time and part time staff.
- Created long and short term plans for facility upkeep, capital improvements, repair, replacement and maintenance.
- Standardized a consistent, high-quality customer experience for event coordinators and guests utilizing the facility.
- Worked closely with the Telluride Tourism Board on Telluride Conference Center marketing, advertising and Familiarization (FAM) Trips.
- Established a commission structure for lodging properties to incentivize group bookings.

EDUCATION

El Pomar Non-Profit Executive Leadership Program **June 2013**
One of twenty Colorado executives selected by application for this two-week program; certified.

The Colorado College Colorado Springs, CO **1990 – 1994**
Bachelor of Arts; Graduated with honors

REFERENCES AVAILABLE UPON REQUEST

EXPERIENCE

FREELANCE DESIGNER
California, Oregon & Colorado, 2014-2019
Website Designer - Telluride Outfitters 2019
Website Designer - Pilates Balance 2019
Layout Designer - Telluride Arts Transfer Warehouse
Potential Donor Info Booklet 2018
Website Designer - Original Thinkers Festival 2018
Layout Designer - Program, Original Thinkers Festival 2018
Website Designer - The Steeping Leaf Tea 2018
Graphic Designer - Arts + Architecture Festival 2018
Program, Website Design, Wayfinders, Swag
Logo Designer - Green Team, Town of Mountain Village 2018
Mural - Telluride Works Workspace 2018
Brand Identity Designer - Silo 2017
Graphic Designer - Adidas Film Deck, Sockeye 2017
Production Designer - Adidas Interactive PDF, Clever.ly 2016
Brand & Book Designer - New Era Healthy Eating 2016
Brand & Annual Report Designer - Quetzeltrekkers 2016
Environmental Design - Revant Optics Headquarters 2015
Movie Poster Designer - JK Serious Productions 2014, 2016

ADVENTURE CENTER SUPERVISOR
Telluride Ski Resort, Colorado, 2018 Winter
Manage Adventure Center day to day
Manage Employees
Manage Outfitter Relations
Manage Guest Services
Point of Sale

CHIEF EXPERIENCE OFFICER - GUIDE
G Adventures, USA, 2017
Provides authentic creative experiences for clients.
Plans & executes itineraries for transnational foreign group travel. Managed accommodation logistics on the road. Maintains vehicles, trailers, camping equipment and abide state regulations for commercial drivers. Represent "G Adventures" as a brand ambassador and the face of the company. Manages trip budget and track expenses.

WHITEWATER RAFT GUIDE
Blue Sky Rafting, Oregon, 2016 Summer
Provided excellent customer experience. Guided boat through white water strategy. Performed gear and vehicle maintenance.

GRAPHIC DESIGNER - IN HOUSE
Revant Optics, Portland, Oregon 2014 - 2016
Marketing Graphic Design for a broad range of initiatives for website, email marketing, blog, social media, events, products, and packaging.
Highlights:
+Developed brand story for product line launches.
+Created unique branded graphic pattern for packaging.
+Designed infographics to explain products and brand.

OLIVIA PEDERSEN

FREELANCE GRAPHIC DESIGNER

831-212-3065
www.oliviapedersen.com
oliviapedersendesign@gmail.com

EDUCATION

Bachelor of Science in Liberal Arts
emphasizing in Cultural Anthropology
& Human Interaction
Minor in Graphic Design
Master of Arts in Sustainable Design.
Portland State University
Portland, Oregon 2014
GPA 3.5

Master of Arts in Sustainable Design
Minneapolis College of Art & Design
Online Program (In Progress)

DESIGN EXPERTISE

Branding & Identity
Interactive Design (UX / UI)
Marketing & Communication
Layout Design
Packaging
Illustration & Infographics

SUSTAINABLE FRAMEWORKS EXPERTISE

Household & Lifestyle Sustainability
Cradle to Cradle
The Natural Step
Persuasive Design
Systems Thinking
Creative Leadership
Innovation Tools & Techniques
Biomimicry
Sustainable Packaging Design

THANK YOU FOR READING!

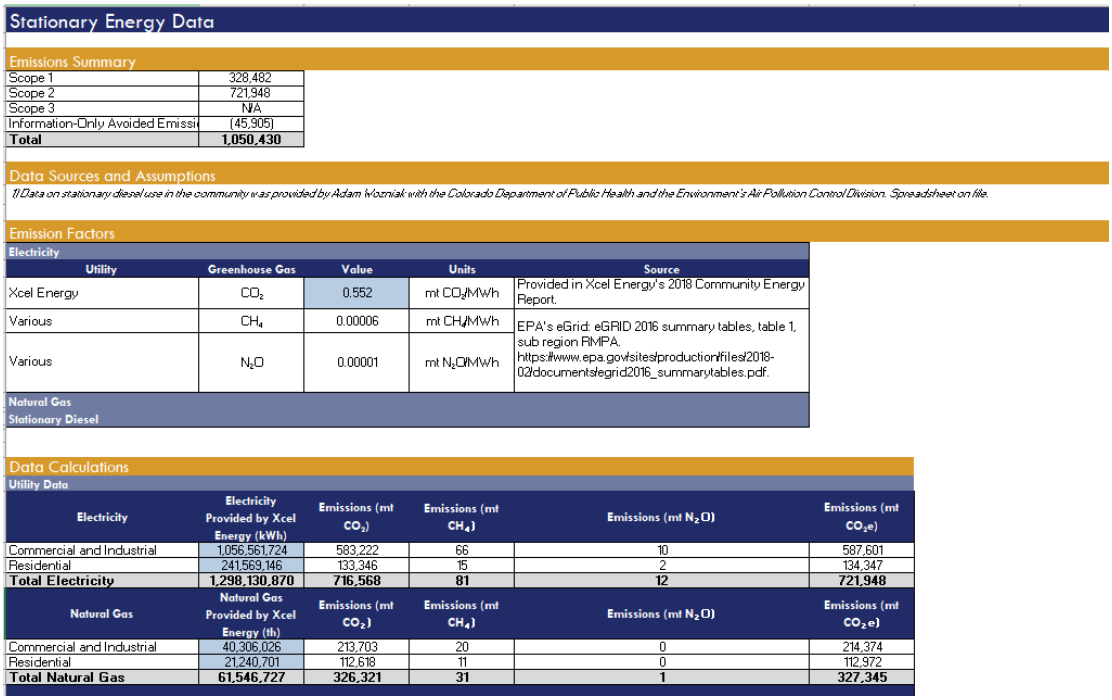
LOTUS RESPONSE TO THE TOWN OF MOUNTAIN VILLAGE'S PROPOSAL QUESTIONS

December 4, 2019

1. WHAT IS THE PROCESS AND/OR TOOLS FOR CONTINUING EDUCATION AND DATA TRACKING AFTER THE INITIAL YEAR?

We pride ourselves on our ability to empower our clients to complete this work with little to no additional assistance in future years. We provide a transparent Excel based greenhouse gas (GHG) accounting tool that can be easily updated by staff in future years. All tools are color coded to ensure that is easy for Town staff to understand which cells should be updated annually, may need to be updated (depending on protocol releases, changes in emission factors, etc.), and should not be touched (i.e. formula is in cell or text).

All values that should remain constant in the future and calculations are shown in white, and inputs that the staff will update are shown in blue. See below as an example.



Stationary Energy Data

Emissions Summary

Scope 1	328,482
Scope 2	721,948
Scope 3	N/A
Information-Only Avoided Emissi	(45,905)
Total	**1,050,430**

Data Sources and Assumptions

1) Data on stationary diesel use in the community was provided by Adam Wozniak with the Colorado Department of Public Health and the Environment's Air Pollution Control Division. Spreadsheet on file.

Emission Factors

Electricity

Utility	Greenhouse Gas	Value	Units	Source
Xcel Energy	CO_2	0.552	mt CO_2/MWh	Provided in Xcel Energy's 2018 Community Energy Report.
Various	CH_4	0.00006	mt CH_4/MWh	EPA's eGrid: eGRID 2016 summary tables, table 1, sub region RMPA. https://www.epa.gov/sites/production/files/2018-02/documents/egrid2016_summarytables.pdf.
Various	N_2O	0.00001	mt N_2O/MWh	

Natural Gas

Stationary Diesel

Data Calculations

Utility Data

Electricity	Electricity Provided by Xcel Energy (kWh)	Emissions (mt CO_2)	Emissions (mt CH_4)	Emissions (mt N_2O)	Emissions (mt CO_2e)
Commercial and Industrial	1,056,561,724	583,222	66	10	587,601
Residential	241,569,146	133,346	15	2	134,347
Total Electricity	**1,298,130,870**	**716,568**	**81**	**12**	**721,948**
Natural Gas	**Natural Gas Provided by Xcel Energy (th)**	**Emissions (mt CO_2)**	**Emissions (mt CH_4)**	**Emissions (mt N_2O)**	**Emissions (mt CO_2e)**
Commercial and Industrial	40,306,026	213,703	20	0	214,374
Residential	21,240,701	112,618	11	0	112,972
Total Natural Gas	**61,546,727**	**326,321**	**31**	**1**	**327,345**

In addition, we have budgeted time to create an Inventory Management Plan (IMP), which details every step that we followed to complete the inventory including data sources, data assumptions, calculations, process improvement, and key inputs to be especially aware of. The IMP can be used as a manual and reference guide when completing the GHG accounting tool. See an example IMP Table of Contents below.

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Lotus has an open-door policy. For a reasonable number of hours (less than five), Mountain Village is welcome to contact Lotus at any time for additional help and clarification. Beyond 5 hours, consultation will be charged at an hourly rate equivalent to what was shown in Lotus' proposal response.

a. Will all data and processes be proprietary?

No. All of our deliverables will be owned by the Town and can be used at the Town's discretion in whatever way they see fit.

2. What is the process for evaluating recommendations? Are resources, plausibility, and comparable municipalities achievements taken into account.

There are different ways in which we develop recommendations, and they depend on the Town's needs, budget, and local expertise. Given the budget and the Town's current activity, we designed a project that complements and builds on recent local initiatives; leverages wisdom gained from comparable, leading, and influential municipalities; and introduces additional opportunities to fill in missing gaps. A majority of these recommendations will be based on Lotus' extensive database of commonly pursued GHG reduction strategies (based on 5 years of GHG reduction modeling from strategies identified by Colorado municipalities), additional research, and engagement with Town staff and the Green Team Committee. We propose working with the Town staff and the Green Team Committee to identify key community values (i.e., equity, public health, cost, etc.) to vet against the recommended strategies in addition to our quantitative analysis of the potential GHG reduction impact. The final result will be a matrix that lists recommended strategies, estimated impact on GHG emissions, and impact on core community values. The final list will inform the Town's GHG reduction goal for the community.

3. Will there be a focus on Building codes?

It is likely that building codes will be among the recommended strategies. Updating, adopting, and enforcing building codes are common strategies identified by municipalities. Our modeling has shown (in addition to modeling done by others, such as NREL) that building codes have a noticeable impact on GHG reductions. However, the final list will be at the discretion of the Town.

4. Will there be the opportunity for in person meetings?

Absolutely. Emily Artale would be the Project Manager. She lives and works in Crested Butte (while the other Lotus staff live and work in Denver). She is able to drive to and from Mountain Village in one day (weather permitting) and is able to meet with Town staff and the Green Team Committee for in-person meetings.

5. What would the flow chat be, who will be involved in this project?

Every Lotus member will part of the project. Emily Artale, Co-Owner and Principal Engineer, will be the project lead and will draw primarily on the expertise of Julia Ferguson, Senior Associate, and Rachel Meier, Research Associate. Hillary Dobos, Co-Owner and Principal, will help strategize on specific topics and will perform redundant quality assurance and quality control checks.

Primary communication will occur between the Town and Emily Artale.

6. What are the additional cost for the following years?

Additional tasks in future years will be based on Lotus' estimated labor hours and hourly rates. No tasks have yet been identified.

Proposal to Complete Town of Mountain Village's Corporate and Community Greenhouse Gas Emissions Inventory and Report

November 13, 2019

lotus
engineering & sustainability

COVER LETTER

Dear Members of the Town of Mountain Village Selection Committee,

On behalf of Lotus Engineering and Sustainability, LLC. (Lotus), I am pleased to submit the enclosed response to the Request for Proposals (RFP): Complete Town of Mountain Village's Corporate and Community Greenhouse Gas Emissions Inventory and Report.

Lotus is a women-owned, data-driven, and client-centered boutique engineering and sustainability consulting firm. Since 2012, we have delivered sustainability solutions for public and private sector clients throughout the United States, with an emphasis on Colorado and the Rocky Mountain region. Collectively we have worked with over 50 government entities in the state of Colorado. We love working with mountain communities, and we understand their unique perspective. With an office in Crested Butte, we see the impacts that come with growth, tourism, and recreation. We understand that there is a unique challenge to preserve this beautiful alcove of our state.

We combine the pragmatic approaches of engineering and finance with the innovative approaches of sustainability. While the reduction in carbon emissions may be the end goal, we realize that community buy-in is not possible without the integration of community values. We excel at helping clients look at their environmental initiatives through various social and economic lenses.

We bring unparalleled expertise in greenhouse gas (GHG) emissions. In recent years, we have completed more GPC-compliant (the standard followed by the Compact of Mayors) GHG emission inventories than most any other consulting firm in Colorado. We use GHG inventories as a way to inform subsequent mitigation work, and we have led the development of half a dozen climate action plans in Colorado. Most recently and relevant to this work, we have completed GHG inventories for the City of Aspen, Routt County, Summit County, and Park City, UT. We have also lead Denver's 80 x 50 climate mitigation work, which is becoming one of the gold standards of climate action plans, and we developed Summit County's first-ever climate action plan (which was just adopted by all cities within Summit County).

We know that for climate strategies to elicit powerful policy improvements and changes to the status quo (i.e. make the difference that we seek) they must be grounded in reality, supported with defensible numbers, and be presented to the community in a graphics-rich and accessible format. It is our priority to deliver accurate, transparent, beautiful, and defensible work products to help the Town of Mountain Village achieve its goals, thereby building accountability and eventual success.

We are not just a consulting firm. We are a small, dedicated team that loves our work and would love doing this work with you. This energy is present in our approach, commitment, and deliverables.

We would be honored to work with the Town of Mountain Village.

Emily Artale
Principal Engineer and Co-Owner
Lotus Engineering and Sustainability
A: 1627 Vine St, Denver CO 80206
E: emily@lotussustainability.com
P: 303.709.9948

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Photo from Dominik Lange / Unsplash

Cover Photo from Town of Mountain Village Facebook Page

Introduction

We understand the Town of Mountain Village's (Town) goals are to pass a resolution committing the Town to the Global Covenant of Mayors (previously known as Compact of Mayors), including: 1) creating a greenhouse gas (GHG) emissions inventory, 2) setting an emissions reduction target, and 3) developing a climate action plan.

Our team knows how important this work is and how important it is that it is done well. Our expertise is built off real "feet on the street" experience. We have managed and administered sustainability programs and projects for the public sector as both consultants and employees, and we thrive at aligning the constraints and opportunities to produce an efficient and strategic configuration.

We know that strong, reliable GHG emissions inventories are essential for evaluating mitigation programs and policies, assessing the effectiveness and attainment of policies and measures, and making long-term, ambitious emission reduction commitments. Most recently, and relevant to this work, Lotus developed Summit County's first climate action plan and strategy and led the City and County of Denver's 80x50 Climate Action Plan stakeholder process.

We see ourselves as an extension of our clients' staff and help develop climate action plans that not only direct the community toward a more sustainable and vibrant future, but also engage community leadership, municipal staff, disenfranchised and frontline communities, and the community's network of stakeholders.

Organizational Structure

WHO WE ARE

Lotus is a women-owned, data-driven, client-centered boutique sustainability consulting firm located in Denver and Crested Butte, Colorado.

We make sustainability easier and more transparent by listening to and understanding our clients' needs by providing data, tools, and analysis to help them make informed decisions that move the needle. Our approach focuses on working with credible, organized information and facilitating a thoughtful process to develop strategies that will work best in the community. Given the need for communities to continually adjust their climate plans going forward, we strive to ensure that a community has greater skills and capacity to do this work upon completion of our time with them.

Lotus' small size allows us to be nimble and agile. We can make project decisions quickly, without getting additional approval. The consultants we present to you in this proposal are the people who will be working on your project, creating a streamlined and efficient process. We are detailed-oriented and highly organized to ensure that the right steps are taken in the right order and the end goals are achieved in an effective and efficient manner.

While our GHG emissions accounting and climate action and adaptation planning expertise is a great fit for this project, we believe our love of this work is just as important and it is what drives us every day.

COMPANY HISTORY

Lotus has been in business since 2012, building off each team member's previous positions in energy engineering, consulting, and government programs. Lotus supports public and

private sector clients with sustainability initiatives, climate action and adaptation plans, GHG emission accounting, program design and management, and market/regulatory analyses. Our broad knowledge base is complemented by our ability to communicate and address environmental, sustainability, and regulatory policy issues to a variety of stakeholders, whose interests and motivations might range from hedging risk, minimizing environmental impact, cost reduction, or public relations, among others.

We are a Denver certified women-owned business, emerging business enterprise, small business enterprise, and disadvantaged business enterprise.

MANAGEMENT STRUCTURE

Lotus is managed by two Principals who share 50/50 ownership of the company: Emily Artale; PE, CEM, and LEED AP, and Hillary Dobos; MBA. Two additional members of the team include Julia Ferguson; MURP, PMP, and our Associate, Rachel Meier; MENV. Both Julia and Rachel assist with all projects. We have two offices: one located in Denver and the other located in Crested Butte, CO.

The primary contact for this project would be:

Emily Artale
Principal Engineer and Co-Owner
Mailing Address: 1627 Vine Street, Denver, Colorado 80205
Mobile: 303.709.9948
Email: emily@lotussustainability.com

Emily lives and works in Crested Butte, CO and can make roundtrip visits to Mountain Village within one day without incurring additional travel expenses, unless requested.

KEY PERSONNEL

Our senior-level team brings exceptional expertise. Individual resumes are provided in *Appendix A*.

Emily Artale, Principal Engineer and Co-Owner of Lotus will ***lead the project, and provide research, analysis, and writing support to the project.*** As a professional engineer and program manager, Emily develops, facilitates, and implements programs that help solve energy efficiency and sustainability challenges. Emily has worked with public-sector clients to develop GHG emission inventories and analyze the reduction potential of GHG reduction strategies. Emily has led our GHG emissions inventory work for the Cities of Park City (UT), Denver (CO), Lakewood (CO), Westminster (CO), Longmont (CO), and Boulder (CO). She has performed GHG forecasting and GHG modeling for Cities of Denver (CO), Lakewood (CO), Westminster (CO), Longmont (CO), and the Counties of Summit (CO) and Boulder (CO). She has also led or participated in every CAP developed by Lotus. Emily is known for her critical thinking, technical review, data analysis, communications, and public speaking. Emily received her B.S and M.S. degrees in civil/environmental engineering from the University of Colorado at Boulder.

Emily is currently wrapping up GHG inventories for the City and County of Denver, Grand Canyon Trust, and Las Cruces, NM. She is providing GHG forecasting and modeling support on a variety of projects and will only be leading a couple of projects starting late 2019 and into early 2020. She will have availability to lead the GHG accounting and climate action planning for the Town of Mountain Village.

Hillary Dobos, Principal and Co-Owner of Lotus will ***provide project support and will be a task lead*****.** Hillary is known for her GHG accounting; project and program management; market and regulatory/policy creation and analysis; facilitation; communications (internal and external); and report writing. Hillary managed the Boulder County, CO, Summit County, CO, and Denver 80x50 projects, as well as supported or led efforts with City of Boulder (CO), Park City (UT), and the City of Lafayette (CO). The majority of these projects included forecasting GHG emissions as well as calculating them. Also, she has led private sector GHG work with clients ranging from local banks to Fortune 100 companies. Hillary also completed the first Colorado State Government GHG inventory and led the Colorado Carbon Fund – the first statewide voluntary carbon offset fund - which calculated emission for companies, individuals, and air travel. Hillary has served on various local and national boards focused on conservation, energy efficiency, C-PACE, and renewable energy. Hillary earned her B.A. in Art History and Economics from Bowdoin College and her MBA from the University of Colorado-Boulder.

Julia Ferguson, Lotus Senior Associate, will ***provide research, analysis, and writing support to the project*****.** Julia has worked on numerous GHG emissions inventories with Lotus including for Boulder County and the Cities of Boulder (CO), Longmont (CO), and Lafayette (CO) and Adams 12 Five Star Schools. She is a certified Project Management Professional and has worked extensively in the public and non-profit sectors where she has developed skills in proposal writing, marketing, project management, program design, and data analysis. She earned her Master's in Urban Planning with a focus on sustainable planning at Cleveland State University and her B.S. in Political Science at the University of Cincinnati.

Rachel Meier, Lotus Research Associate, will ***provide research support and GIS and data visualization work*****.** During her time with Lotus, Rachel has supported the completion of five GHG emissions inventories and forecasts. Additionally, she has helped create inventory management plans, GHG emission reduction strategy tables, and GHG emission inventory reports. Prior to joining Lotus, she supported sustainability and conservation efforts in the non-profit sector in her last two years of professional experience. Rachel earned a Masters of the Environment (MENV) in Planning and Community Engagement from the University of Colorado at Boulder and a B.A. in Environmental Studies and Geography from Gustavus Adolphus College.

Please see *Table 1* for a list of projects each staff member has worked on.

Qualifications

OVERARCHING GHG EXPERIENCE

We appreciate and understand the complexity of implementing sustainability programs across an entire community, which affect homeowners, visitors, employees, schools, religious institutions, and businesses. Sustainability covers a breadth of subtopics that can be a challenge to get ones' arms around, and available data and best practices are constantly changing. We have been doing this work for a long time, with deep roots in Colorado's sustainability field. We know how to do this work, and we also know what might change and how to build in flexibility.

We understand the primary (and secondary) barriers and challenges to collecting accurate GHG accounting data, creating a meaningful GHG emissions inventory, forecasting GHG

emissions, engaging stakeholders, and creating climate mitigation plans. Our broad expertise enables us to ensure that the Town meets their GHG accounting goals and mitigation targets.

Following are a few highlights of the expertise we bring to Mountain Village.

GHG ACCOUNTING, FORECASTING, AND MODELING

Lotus has extensive experience developing and implementing sustainability plans and programs both as consultants and as government employees working in the public sector. We have completed numerous municipal, corporate, and GPC-compliant community GHG inventories, and we have revised and reviewed additional GHG inventories to align with the GPC methodology. Several of these were performed for communities similar to Mountain Village, including the City of Aspen, Routt County, Summit County, and Park City, UT. Alongside our GHG work, we provide documentation, inventory management plans, and training to ensure that our clients can track their data moving forward without the help of consultants. Through research and reporting, communications, GHG modeling, and stakeholder engagement, we help communities identify what they need to do to plan for, mitigate, and adapt to climate change impacts. In return, we have a wealth of lessons learned on the best ways to set clients up for success. See below for a list of local government focused GHG emissions inventories and GHG emissions forecasts Lotus has completed.

For an expanded description of the projects in **bold**, see the *Project Examples* section. *Please note, the information provided in this table is proprietary and confidential and may not be distributed.*

Table 1. List of recent GHG accounting, forecasting, and CAP projects.

Date	Project Name/ Owner	Location	Budget	Scope of Work				Involved Staff
				GHG Inventory*	GHG Training	Forecasting	GHG Reduction Targets	
2018	Adams 12 School District	Adams County, CO	$17,500	X		X		Julia, Emily
2016-2019	Alpine Bank	Various	$3,000 annually	X				Hillary, Julia, Emily
2017-2018	Boulder County	Boulder County, CO	$52,000	X	X	X	X	Hillary, Julia, Emily
2018	City of Aspen	Aspen, CO	$18,000	X		X		Hillary, Julia,
2016-Present	City of Boulder	Boulder, CO	$9,965 - $12,847	X				Hillary, Julia, Emily

Date	Project Name/ Owner	Location	Budget	Scope of Work				Involved Staff
				GHG Inventory*	GHG Training	Forecasting	GHG Reduction Targets	
2019	City and County of Denver	Denver, CO	$7,625	X				Emily, Julia
2017	**City and County of Denver 80x50**	Denver, CO	$100,000			X	X	Hillary, Emily
2018	City of Lafayette	Lafayette, CO	$5,000	X				Julia, Hillary
2016, 2019	City of Lakewood	Lakewood, CO	$8,245	X	X		X	Emily, Hillary, Julia
2019	City of Las Cruces	Las Cruces, NM	$34,515	X	X		X	Emily, Julia, Rachel
2017	City of Longmont	Longmont, CO	$29,298	X	X	X	X	Emily, Hillary
2017	City of Park City	Park City, UT	$15,255	X	X			Emily, Hillary
2018	City of Westminster	Westminster, CO	$44,990	X	X	X	X	Emily, Julia
2016 - 2017	CLEER	Roaring Fork Valley	Various	X				Hillary, Emily
2016 - 2019	Eco-products	Various	$2.500 annually	X				Hillary, Julia, Emily
2019	Grand Canyon Trust	Colorado Plateau	$88,000	X	X	X		Hillary, Julia, Emily, Rachel
2019	Holy Cross Energy	Various	$39,000	X	X	X		Hillary, Julia, Emily, Rachel
2019	Routt County	Routt County, CO	$25,000	X	X	X		Hillary, Julia, Emily, Rachel
2018	**Summit County**	Summit County, CO	$62,000	X	X	X	X	Hillary, Julia, Emily

*Includes clients for which we revised and/or updated existing GHG inventories. We have also conducted multiple inventories for several clients, including Boulder, Denver, Lakewood, and Westminster. Multiple inventories may have been completed over various years and/or may include community and municipal inventories.

GHG Accounting

In recent years, we have completed more GPC-compliant (the standard followed by the Compact of Mayors) GHG emission inventories than most any other consulting firm in Colorado. We are fluent in GHG accounting.

Our specific qualifications include:

- We are ***experienced***. We have completed and evaluated over ***40 GHG emissions inventories*** for public and private sector clients using a range of protocols and methodologies.
- We have ***conducted QA/QC*** on a variety of data sets, including current and past GHG data, with a concentration on accuracy and transparency. This has led to the ***revision of several GHG inventories*** to meet current GPC requirements.
- We create a ***customized GHG emissions tracking tool*** that effectively supports your work.
- We are ***diligent about collecting accurate data***. We are well versed in data capture and tracking limitations, and we understand the barriers to creating a single, unified approach to GHG accounting. Through our expertise we can come up with ***creative, transparent approaches*** to collect accurate data. This will ensure that future GHG inventories will be able to be completed internally. In addition, when collecting data, we are ***highly organized*** and will have all questions for the entity prepared prior to outreach to ***ensure minimal repeated data requests***.
- ***We are detail oriented***. We methodically capture all communications from data contacts and document all data assumptions. This will help ensure that all work can be replicated.
- We ***are advisors and teachers***. We have created multiple ***inventory management plans*** (IMP) and can train our clients to ensure that they feel confident performing this work in-house in the future.

Climate Adaptation Planning

Lotus has been delivering climate action planning services since 2014, when we worked on the City of Lakewood's Sustainability Plan. We modeled the GHG reduction potentials for over 30 strategies as part of the Sustainability Plan. At that time, we also investigated using the modeling and forecasting sections of ICLEI's ClearPath. However, we opted to create a Lotus-customized modeling spreadsheet to enhance transparency and incorporate local data assumptions. While our model has been used with all our climate action planning services, it has evolved organically with each project, building on lessons learned and availability of new data. Since then, we have completed over half a dozen climate action planning for municipal clients with similar demographics as Mountain Village, such as Eagle County and Summit County.

Our specific qualifications include:

- We have extensive experience helping ***local leaders and residents*** grapple effectively with the reality that things are going to change in their community.
- We have ***projected emissions out to 2050*** while considering population growth (or decline), increased square footage, national policy, and a changing grid make-up. These models allow our clients to identify target sectors for policies and programs.
- We have helped ***clients set GHG emission reduction targets*** and, if that target is already set, identify strategies that will ultimately achieve those reductions.
- We have ***modeled the GHG emission reduction potential*** of various climate action strategies and compared those strategies against key community values. Also, we have ***estimated initial and ongoing costs and time commitments*** for programs and policies.
- We know how to help a community ***prioritize strategies*** based on the level of risk, the value of the affected system to the community, opportunities to take action, and available resources.
- We focus on helping communities take action by ensuring that ***robust implementation planning*** is part of the climate action plan.
- Two of our team members, Hillary Dobos and Julia Ferguson, ***managed sustainability programs*** while working in the public sector for the ***State of Colorado*** and ***Adams County, Colorado***, respectively. We know how programs work and how important it is to get ***internal buy-in*** from key staff across all departments and how to build on current and past initiatives such as the Town of Mountain Village's adopted CC4CA Policy, ZWAP, and other existing planning efforts in the community.
- When developing climate action plans, we encourage our clients to broaden the lens in which they view success and ***consider how their sustainability strategies need to benefit the entire community***. This often leads to discussions on larger policy changes and ensures larger community buy-in and acceptance.
- Sustainability communication is critical to success. We know that for this information to be effective, it must be understood by the public. We have a data visualization expert who can create ***meaningful graphics using Python, RStudio, and Adobe Illustrator***, in addition to GIS.
- We will ***compare the Town's actions with state-level climate action goals***, identify synergies and obstacles when they exist, and make recommendations as to how the Town can benefit from state commitments.
- We realize that there are different lenses with which to vet climate action strategies. We work with our clients to ***identify key community values that support the entire triple bottom line philosophy*** and use those to help prioritize which actions are most meaningful to the community (i.e., these may include social equity, air quality, cost to implement, etc.) in addition to those actions that will have the largest impact on reducing GHG emissions.
- Building partnerships is paramount to our advising services. We can help to ***foster existing relationships*** and also identify who may make a good partner for future endeavors.

Fluent in Sustainability Issues and Topics

- We have in-depth ***energy specific expertise***. The team's reputation is built off years of working with private and public-sector clients on renewable energy and energy efficiency initiatives. In addition, we have researched and directly worked on ***energy policy and regulations*** on a local (including Executive Orders, PUC regulations, legislation, and ordinances), state (i.e., RPS), and federal level (i.e., carbon taxes, CAFE Standards).
- The team has ***transportation specific expertise***, which spans alternative fuels from biofuels, renewable fuels, and electric vehicles.
- We have extensive experience completing ***waste and recycling projects***, including projects for improved facility and event waste diversion for government operations; supporting regional hazardous waste programs; sitting on the Governor-Appointed Pollution Prevention Advisory Board; and leading waste and recycling initiatives for the State of Colorado.
- We are forward-thinking and understand how difficult it can be to share this information with a non-technical and/or public audience. ***We work with our clients to brainstorm effective communication platforms in addition to traditional, formatted reports*** that may include websites, simplified handouts with data visualizations, informational videos, infographics, interactive PDFs, and other methods of storytelling.

Stakeholder and Community Outreach and Education

- Our team has ***demonstrated strength in stakeholder engagement and facilitation***. We understand the key role of a facilitator in generating feedback from participants, setting ground rules for civil and respectful discourse, and building consensus with multiple and diverse stakeholders.
- We excel at ***communicating*** technical data and reports to a broad, non-technical audience. We build on lessons learned from working with a range of clients to ensure that our work is framed in a way that the audience can relate to.
- We are committed to ensuring that the strategies developed in the Town's climate action plan are ***socially equitable*** and we know how to make that commitment real throughout the planning process.

PROJECT EXAMPLES AND REFERENCES

Below is a list of example recent projects completed by Lotus.

Note: The Lotus team is happy to provide additional project examples (if requested).

City and County of Denver's 80x50 Stakeholder Engagement and Plan

Overview of Work: The City and County of Denver's 80x50 Climate Action Plan establishes a path to reduce community wide GHG emissions by 80 percent by the year 2050. Lotus led the development of Denver's 80x50 Plan by conducting a review of processes and plans already established by the City; conducting a needs assessment; working with a diverse network of over 80 stakeholders and community experts in the fields of energy and transportation to identify the most relevant and impactful strategies for Denver to pursue; modeling the impacts of stakeholder-identified emissions reduction strategies; and drafting a Climate Action Plan that will support the City in achieving its goals. Denver's

80x50 Climate Action Plan can be accessed at https://www.denvergov.org/content/dam/denvergov/Portals/771/documents/EQ/80x50/DDPHE_80x50_ ClimateActionPlan.pdf.

Lotus additionally completed follow-up work for the City to model the impacts of additional strategies that the City is considering pursuing and is continuing to support Denver through annual GHG emissions inventories and a solid waste life-cycle analysis.

How the work has been used: The work is used every day within Denver's Department of Public Health and Environment. The team reports annually on how they are meeting the targets and strategies laid out in the plan. Also, they have created policies and codes to support the CAP. More information can be found here: https://www.denvergov.org/content/denvergov/en/environmental-health/environmental-quality/climate.html

Reference: Elizabeth Babcock, Manager Climate Action Team, City and County of Denver, 720-865-5385 | elizabeth.babcock@denvergov.org

Summit County, Colorado: Developing a GHG Emissions Inventory and Creating a Climate Action Plan

Overview of Work: Lotus completed Summit County's first GHG emission inventory and it was disaggregated by municipality. This analysis included carbon sequestration from forests. Alongside this work, we facilitated numerous stakeholder meetings over 6 months with key community stakeholders to create a CAP and forecasted emissions out to 2050. Once strategies were selected Lotus modeled key GHG reduction strategies to estimate GHG reduction potential and finalized the CAP.

How the work has been used: Many of the strategies and policies are being implemented in the community with each unique municipality signing on to 100 percent renewable energy pledges and several communities updating their codes. In April 2019, Summit County commissioners passed a resolution to adopt the CAP. More information can be found here: https://www.highcountryconservation.org/climate-action-plan/.

Reference: Jess Hoover, Energy Programs Manager, High Country Conservation Center, 970-668-5703 x 104 | jess@highcountryconservation.org

City of Longmont, Colorado: Developing the City of Longmont's 2016 Greenhouse Gas Inventory and Supporting Strategy Development

Overview of Work: The City of Longmont embarked on an aggressive journey to drastically cut GHG emissions. Lotus worked with the City to develop their first GHG emissions inventory and then modeled key GHG emission strategies, with an emphasis on considering equity issues. Lotus continues to work with the City today to update the model and consider additional strategies, such as building electrification.

How the work has been used: The City uses the GHG modeling and inventory to inform Council of high priority actions. Council used the work to justify additional spending on climate change issues and has recently allocated funds to develop roadmaps that will ensure engaging climate conversations with local stakeholders and community members.

Reference: Lisa Knoblauch, Sustainability Program Manager, 303-651-8403 | lisa.knoblauch@longmontcolorado.gov

Proposed Scope of Work

This effort will be a true partnership with the Town; we see our team as an extension of staff, bringing in specialized expertise and resources, while also providing a neutral face for the project.

The general tasks of the proposed project scope include:

- ✓ Task 1: Develop a 2018 Community-wide GPC-Compliant GHG emission inventory.
- ✓ Task 2: Develop a 2018 Corporate GHG emissions inventory.
- ✓ Task 3: Develop Inventory Management Plans.
- ✓ Task 4: Business-As-Usual GHG Emissions Forecast.
- ✓ Task 5: Create GHG Emission Reduction Targets.
- ✓ Task 6: Climate Action Plan.
- ✓ Optional tasks.
- ✓ Project Management.

Task 1: Develop a 2018 Community-wide GPC-Compliant GHG Emissions Inventory

The GPC protocol (the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories) is the required protocol for Compact of Mayors reporting. Task 1 includes the creation of a 2018 BASIC[1] GPC-compliant GHG inventory for the Mountain Village community and accompanying documentation.

Specific subtasks include:

- Customize a Lotus-derived data management and emission calculation spreadsheet. Key aspects of this tool include a summary of data sources; emission factors; emission calculations; and emission summary.
  - Non-GPC emission sources, such as avoided emissions from recycling and renewable energy, will also be included as information-only items.
  - A tab will be included that provides benchmarks for comparable communities.
- Collect data from the existing GHG emissions inventory and from additional sources as needed. To save costs, Lotus will enlist help from the Town via a Google doc (or other shared document platform) to collect data. It is assumed that most data is available. All emails, spreadsheets, and supporting documentation will be provided to the Town.
- Conduct QA/QC review on collected data to ensure that it aligns with best practices and industry knowledge.
- Calculate emissions and complete the 2018 GPC-compliant inventory.
- Compare and contrast the 2018 GPC-compliant inventory with the existing inventory in a brief memorandum.

1 A GPC inventory can be implemented at two levels: BASIC and BASIC+. We budgeted for a BASIC inventory; a BASIC+ inventory can be completed with additional budget. See Optional tasks. A BASIC inventory accounts for all emission sources noted in the RFP.

- Review all findings with the Town.
- Calculate key metrics for future comparison including, but not limited to, emissions by sector, emissions by source, emissions per capita, energy use intensity by building sector, residential electricity and natural gas use per capita.

Deliverables:

- ✓ Project kickoff meeting.
- ✓ GHG inventory tool customized for community emissions.
- ✓ 2018 GPC-compliant GHG inventory with inputs and all accompanying data sources, including emails and original reports and spreadsheets.
- ✓ Brief memorandum comparing and contrasting 2018 GHG inventories.

Task 2: Develop a 2018 Corporate Emissions Inventory

There is no Compact of Mayors required protocol for corporate (i.e. municipal) GHG inventories. Lotus uses the Local Government Operations Protocol for municipal inventories. Task 2 includes the creation of a 2018 municipal GHG inventory for Mountain Village town operations and accompanying documentation.

Specific subtasks include:

- Customize a Lotus-derived data management and emission calculation spreadsheet. Key aspects of this tool include a summary of data sources; emission factors; emission calculations; and emission summary.
- Collect data from the existing GHG emissions inventory and from additional sources as needed. To save costs, Lotus will enlist help from the Town via a Google doc (or other shared document platform). It is assumed that most data are available. All emails, spreadsheets, and supporting documentation will be provided to the Town. Lotus will ensure that collected data aligns with data collection practices employed by neighboring municipalities.
- Conduct QA/QC review on collected data to ensure that it aligns with best practices and industry knowledge.
- Complete the 2018 inventory for municipal operations.
- Compare and contrast the 2018 GPC-compliant inventory with the existing inventory in a brief memorandum.
- Review all findings with the Town.
- Calculate key metrics for future comparison including, but not limited to, emissions by department (or comparable breakdown as provided by the Town), emissions by source, and emissions per city employee.

Deliverable(s):

- ✓ GHG inventory tool customized for municipal emissions.
- ✓ 2018 municipal GHG inventory with inputs and all accompanying data sources, including emails and original reports and spreadsheets.
- ✓ Brief memorandum comparing and contrasting 2018 GHG inventories.

Task 3: Develop Inventory Management Plans

Task 3 includes developing a manual (i.e. inventory management plan [IMP]) describing how to create future community and municipal inventories in-house. Using the spreadsheet tools in Tasks 1 and 2 along with the IMP, staff will be fully equipped to complete future inventories without consultant assistance.

Specific subtasks include:

- Prepare an IMP that explains how the inventory was created and any assumptions that were made, provides a guide for future data collection, and informs calculation methodology.
  - The IMP will also make recommendations on which data should be updated on a regular basis and which data can be updated on a less regular basis.
- We have an "open-door" policy. In the event that you have reasonable follow-up questions after the contract expires, Mountain Village is always invited to call us directly for clarification. More involved assistance will be charged at an hourly rate.

Deliverable(s):

- ✓ Inventory Management Plan.

Task 4: Business-As-Usual GHG Emissions Forecast

Task 4 includes modeling a business-as-usual (BAU) projection until 2050.

Specific subtasks include:

- Select baseline year in connection with recommendations from Colorado House Bill 19-1261, CC4CA Policy, and ZWAP. (The Compact protocol, GPC, does not provide any recommendations relating to forecasting or GHG emission reductions.)
- Assess impact of historic data prior to current GHG inventory year and data quality. We recommend including medium to high quality data (as determined by the team) and sources that makeup a significant portion of GHG emissions.
- Model BAU emissions from past until 2050 considering changes in population, emission factors, etc.
- Provide a numerical comparison of data from baseline year to present, including relevant tables, graphs and charts.

Deliverable(s):

- ✓ BAU model.

Task 5: Create GHG Emission Reduction Targets

Task 5 will include identifying a list of key GHG emission reduction strategies based on research, Lotus' previous work, and work completed by the City's peers.

It should be noted that to be near the proposed budget submitted by Zoe Dohnal in an email dated October 28, 2019 in response to RFP questions, we present a consultant-driven GHG emission reduction effort, where we present recommendations based

on previous work, experience, and research. Recommendations will be supplemented by additional research and feedback from Town staff and the Green Team Committee. However, an involved stakeholder engagement effort will exceed the budget constraints; additional stakeholder engagement is listed under "Optional Tasks" below. Stakeholder engagement efforts can vary greatly, and, if the Town chooses, Lotus can present different options for consideration.

Specific subtasks for identifying GHG emission reduction strategies include:

- Research existing and proposed Town and neighboring municipality GHG initiatives and strategies to look for potential synergies.
- Combine research with Lotus' extensive database of common GHG emission reduction strategies (based on other local government work, state energy office recommendations, and recommendations from national laboratories).
- Work with Town staff and the Green Team Committee to identify relevant community values with which to vet against the GHG reduction strategies.
- Work with Town staff and the Green Team Committee to identify appropriate GHG reduction targets per strategy based on recommendations from Colorado House Bill 19-1261, CC4CA Policy, ZWAP, and leading peers and other influential communities.
- Conduct a high-level modeling effort to determine GHG emission impacts on the chosen target year. Reduction potentials will be linked to the 2018 community-wide and municipal GHG inventories and will include the business-as-usual GHG emissions scenarios.
- Create a realistic GHG emission reduction goal based on final model results.

Deliverables:

- ✓ Proposed GHG reduction strategies.
- ✓ Matrix of proposed strategies against community values.
- ✓ Two virtual discussions with Town staff and Green Team committee to discuss community values and GHG reduction targets.
- ✓ Survey with Town staff and Green Team committee to achieve final buy-in.
- ✓ Final summary of GHG reduction strategies, compared against community values, with reduction targets.

Task 6: Climate Action Plan

Lotus will prepare a summary report that documents the work performed to date, key findings from the inventory, community outreach and engagement strategy, a list of the final climate action strategies and associated GHG emission reduction targets, and the next steps.

To ensure that the final reduction targets are adopted by Town Council and the community, Lotus will recommend how to engage key local and regional stakeholders to build accountability. This engagement and accountability will drive successful implementation of future sustainability strategies.

Specific subtasks include:

- Create a final Climate Action Plan. The plan will include a summary of all work completed; key findings from the community and municipal inventories; recommended GHG reduction strategies along with GHG reduction targets and a comparison against community values; implementation timeline; and information on emerging legislation, policies, and other relevant data that could impact the future of the Town's plan. An executive summary will be prepared to allow the Town to share a report synopsis with the community. It should be noted that some clients prefer an online, website-based plan. If the Town prefers this, we can work with the Town's IT department to provide key data. A more formal update may be pursued as well, see *Optional Tasks*.
- In addition, Lotus will provide a guide for the Town on how to solicit stakeholder and community feedback to ensure successful implementation of the plan.
- The plan will be written and formatted so that it is easily understood and received by the public with visuals and clear and concise writing. Initial content will be provided as a Word document for feedback. It is assumed that there will be one round of edits. After feedback is completed a final plan will then be developed in InDesign.
- Present the draft plan to the Green Team Committee and final plan to the Council. Lotus will make the drive back and forth to the Town in one day.

Deliverables:

- ✓ Summary report formatted in InDesign.
- ✓ Executive summary formatted in InDesign.
- ✓ Summary PowerPoint presentations for Green Team Committee and Council.

Optional Tasks

The budget we have provided does not include the following items. We believe that the addition of these activities may enhance the project outcomes, and we would be happy to discuss adding these to our scope of work if the Town desires.

- Conduct a BASIC+ GPC-compliant inventory.
- Provide in-person GHG inventory training.
- Conduct in-depth GHG reduction modeling.
- Lead stakeholder engagement including in-person facilitated meetings and online surveys.
- Lead public engagement including in-person meetings and in-person and online surveys.
- Create two- to three-minute videos to provide another way for community members and organizational stakeholders to learn more about climate change and engage in the climate action planning process.
- Update Town's website to include climate action plan data and/or supporting information, such as key data visualizations, instead of or in addition to the formatted report.

- Enter GHG emissions data into ICLEI's ClearPath.
- Prepare standalone graphic design and visuals for final report.

Project Management

Specific subtasks:

- Regular check-in emails.
- Monthly phone call with the Town.
- At least one phone call to discuss the GHG inventory tool for Task 1 and Task 2.
- At least one phone call to review the final findings for Task 1 and Task 2.
- Review assumptions included in Task 4.
- Monthly invoice reporting.

Deliverable:

- ✓ Monthly invoice reports.

PROJECT PLAN

We see our team as an extension of your staff, bringing in specialized expertise to accomplish the goals set out in the RFP. We will work with your team to identify data contacts. Where appropriate, we will look to your team to make introductions between Lotus and potential data sources and provide feedback on each deliverable and assumptions as necessary.

Project Schedule

Assuming a January start date, Lotus proposes completing this work by July 2020. The proposed timeline is presented below. Note Lotus is willing to work with your schedule.

TASK	January		February		March		April		May		June		July	
	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half
Task 1: Develop 2018 GPC-compliant GHG emissions inventory														
Task 2: Develop 2018 municipal GHG emissions inventory														
Task 3: Develop inventory management plans														
Task 4: Business-As-Usual GHG Emissions Forecast														
Task 5: Create GHG Emission Reduction Targets														
Task 6: Climate Action Plan														
Project Management														

Table 2. Proposed project timeline.

Project Budget

Following is our cost and fee proposal. All proposed services are included in the costs shown below, unless otherwise noted (see the preceding section titled *Optional Tasks*). We are very excited to work with the Town, and we want to design a project that meets your needs. We are happy to modify our approach to better fit within the Town's scope if needed.

TASK AND SUBTASK	Lotus Labor Hours						Total Lotus Labor	Total Subconsultant Labor	Total Labor Costs	Mileage		Total Costs
	Emily		Hillary	Julia	Rachel	Graphic Design				Mileage	Per Diem	
	Regular	Travel	Regular	Regular	Regular							
	$ 120	$ 60.00	$ 120	$ 98	$ 75	$ 70						
Task 1: Develop 2018 GPC-compliant GHG emissions inventory	15			15	30		60	0	$ 5,520.00		$ -	$ 5,520.00
Task 2: Develop 2018 municipal GHG emissions inventory	15			15	30		60	0	$ 5,520.00			$ 5,520.00
Task 3: Develop inventory management plans	7			10	18		35	0	$ 3,170.00		$ -	$ 3,170.00
Task 4: Business-As-Usual GHG Emissions Forecast	6		8	6			20	0	$ 2,268.00		$ -	$ 2,268.00
Task 5: Create GHG Emission Reduction Targets	28		5		15		48	0	$ 5,085.00		$ -	$ 5,085.00
Task 6: Climate Action Plan	15	6	3	10	30	30	94	30	$ 7,850.00	$ 341.28	$ 10.00	$ 8,201.28
Project Management	8						8	0	$ 960.00		$ -	$ 960.00
TOTAL	**94**	**6**	**16**	**56**	**123**	**30**	**325**	**30**	**$ 30,373.00**	**$ 341.28**	**$ 10.00**	**$ 30,724.28**

Table 3. Proposed project budget.

Part of our mission is to empower our clients to complete future projects in-house and use the work in their everyday jobs. Our deliverables are very transparent; we keep records of all emails, phone calls, and original data sets to leave a paper trail for the next iteration.

We also have an open-door policy if previous clients have questions months after the contract has ended, and we are happy to answer a reasonable amount of additional questions at no additional fee after the project is completed. If the client requires changes and/or enhancements to final work products, we will charge an hourly rate – no retainer needed.

Appendix A: Resumes

EMILY ARTALE

Lotus Founder, Co-Owner and Principal Engineer

lotus
engineering & sustainability

ENGINEER
ENTREPRENEUR
PROGRAM MANAGER
ACTION-ORIENTED LEADER

Emily brings nearly 15 years of experience combining technical and pragmatic engineering with holistic and innovative problem-solving to the sustainability field. Her expertise in development, management, and analysis has resulted in measurable cost and greenhouse gas savings for her clients.

EXPERIENCE

LOTUS ENGINEERING & SUSTAINABILITY, LLC.
Crested Butte, CO
Founder, Co-Owner and Principal Engineer, 2012–present
Founded sustainability consulting firm

- Advises clients on sustainability issues, having provided expertise to over 30 organizations.
- Leads climate action planning process.
- Leads clients to integrate environmental justice issues with all sustainability strategies.
- Develops robust decision-analysis tools and models for GHG accounting, GHG scenario forecasting and community solar analyses.
- Evaluates energy projects, including renewable energy projects for local municipalities.
- Completes GPC-compliant GHG emission inventories for public agencies.
- Leads occupant engagement behavior impact modeling efforts.
- Develops, manages climate mitigation effort for Las Cruces, New Mexico focused on highlighting community values.
- Led the Colorado Energy Office's Demonstration Project for Low-Income Solar.
- Led City and County of Denver's 80x50 facilitation and strategy development process.
- Developed, managed Gunnison's GV-HEAT program, an income-qualified energy efficiency rebate program.

TRIDENT ENERGY SERVICES, INC.
Longmont, CO
Engineer, 2009-2012

Launched energy efficiency programs. Spearheaded the Main Street Efficiency Initiative, leading 50 businesses in achieving an average annual energy savings of 15 percent. Co-developed the Energy Management Assistance Program, improving the energy efficiency of local governments and schools. Executed energy audits and utility bill analyses.

NATURAL CAPITALISM SOLUTIONS
Longmont, CO
Project Manager, 2008-2010

Advised clients on executing sustainable practices. Worked with businesses and governments to implement sustainable practices in the areas of agriculture, manufacturing and energy. Co-authored paper with Hunter Lovins for the United Nations on lifting Asian countries out of poverty using sustainable manufacturing.

EMILY ARTALE

SKILLS

Critical Thinking
Technical review
Communications
Data analysis
Public speaking

EDUCATION

University of Colorado at Boulder
M.S., Civil & Environmental Engineering, 2005
B.S., Environmental Engineering, 2002

CERTIFICATIONS

LEED AP
Professional Engineer
Certified Energy Manager

EXPERIENCE

BROWN AND CALDWELL
Golden, CO
Project Manager, 2006-2008

Analyzed technical environmental data. Performed permitting and compliance activities for Denver-Metro local governmental agencies. Assisted with greenhouse gas emission inventory verification for major airline. Developed Excel-based tools used to calculate water pollutant levels and air emission values. Assistant coordinator for watershed groups.

CAMERON-COLE, LLC.
Boulder, CO
Engineer, 2005-2006

Devised technical solutions for large clients. Managed Clean Water Act and related groundwater and storm water discharge permitting and compliance for large companies. Assisted in designing industrial wastewater treatment plant improvements. Performed greenhouse gas emission inventories for Fortune 500 companies.

GET IN TOUCH

www.lotussustainability.com
emily@lotussustainability.com
303.709.9948

INTERESTS

Mountain biking
Cooking
Snowboarding

HILLARY DOBOS
Lotus Co-Owner & Principal

lotus
engineering & sustainability

FACILITATOR
ENTREPRENEUR
CREATIVE LEADER / PROBLEM SOLVER
PROGRAM MANAGER

Hillary has managed programs and projects for the public and private sector for almost 15 years. Hillary is known for her management skills, meeting and stakeholder facilitation, market and regulatory/policy creation and analysis, and communications (internal and external), and project and program management.

EXPERIENCE

LOTUS ENGINEERING & SUSTAINABILITY, LLC.
Denver, CO
Co-Owner and Principal, 2012–present
Provides leadership support to Lotus team

- Advises clients on sustainability, providing support to over 25 organizations.
- Leads climate action planning with local governments.
- Guides companies and public sector entities in accounting for greenhouse gas emissions, setting reduction goals and prioritizing mitigation strategies.
- Coaches government sustainability teams in creating successful programs.
- Advises organizations in identifying sustainability priorities, setting goals and achieving objectives.
- Creates technical reports on market trends, policy, and finance.

COLORADO ENERGY OFFICE
Denver, CO
Senior Program Manager, Various Programs, 2010-2012
Energy Performance Contracting
Managed the award-winning EPC program. Directed program that secured investments in energy, water, and fleet efficiency upgrades and renewable energy. Led program in supporting $40 million in projects in 2012 and $60 million in 2013, securing Colorado's position as a top-five state for EPC investment. Educated contractors in the EPC process and ensured that they maintained the highest levels of quality. Advised Energy Service Companies, fostering a successful EPC community.

Greening Government
Led state government agencies in reducing resource use, thus saving state funds. Devised and implemented reductions in energy, water, paper, and petroleum use. Assisted in creating and executing State Environmental Preferable Purchasing Policy. Developed, implemented, funded, and assessed state sustainability programs and developed future reduction goals and metrics. Tracked, calculated, and reported water and energy use in 2000+ state buildings, petroleum use in the 6000+ vehicle fleet, and State Government's greenhouse gas footprint.

HILLARY DOBOS

BOARDS

New Energy Improvement District Board, 2019-present

Pollution Prevention Advisory Board
Governor Appointed, 2011-2019

The Nature Conservancy
Elected to Young Professional Board, 2012-2018

Colorado Carbon Fund Board of Directors
Member, 2012-2014

National Energy Service Coalition Board
Elected State Representative, 2012-2013

Colorado Energy Service Coalition Board
Elected Public Chair, 2012-2013

State of Colorado Greening Government Council
Director, 2011-2013

SKILLS

Project/program management

Report writing

Communications

Policy creation and analysis

Facilitation

EDUCATION

University of Colorado
Leeds School of Business
MBA, Sustainability and Project Management, 2010

Bowdoin College
B.A., Economics and Art History, 2004

CERTIFICATIONS

Environmental Law and Regulation
University of Washington

GET IN TOUCH

www.lotussustainability.com

hillary@lotussustainability.com

303.800.5541

EXPERIENCE

Colorado Carbon Fund
Spearheaded all aspects of fund including fundraising and program development. Developed program to successful spin out of the Energy Office into a self-sufficient nonprofit in 2012. Increased demand for carbon offsets through calculating greenhouse gas emissions for dozens of companies and public sector clients, devising marketing campaigns and developing strategic partnerships. Monitored regional and national policy issues for implications on the state.

NATIONAL RENEWABLE ENERGY LABORATORY
Golden, CO
Project Engineer, 2009-2010

Researched and reported on variety of energy, policy and economic issues. Analyzed cap-and-trade, carbon tax, and renewable energy policy as well as market and technology assessments through data collections, literature reviews, industry reviews, and writing spearhead analysis. Co-authored and supported various NREL publications. Assisted in developing a detailed pro-forma levelizing cost of energy models for various solar technologies and financing structures.

CASCADIA CONSULTING GROUP, INC
Seattle, WA
Associate, Research and Analysis, 2005-2007

Devised, implemented and managed waste and recycling plans. Led projects ranging from $100k to over $2 million for governments and companies including NYC, Home Depot, U.S. Army, Pentagon, Delaware, and Starbucks.

AMERICORPS
School Partnerships Liaison, 2004-2005

Led key aspects of developing IslandWood School through promoting the program to teachers, parents and students, including many inner-city schools.

INTERESTS

Traveling with family

World Cup soccer

Reading

JULIA FERGUSON
Senior Associate

lotus
engineering & sustainability

URBAN PLANNER
INNOVATIVE LEADER
PROGRAM / PROJECT MANAGER
RELATIONSHIP BUILDER

Julia has managed sustainability projects and and programs for local governments and the nonprofit sector for over 10 years. Julia brings expertise in sustainability plan development and implementation, communication, and capacity building across organizations and regions. Her projects have resulted in operational savings, improvements in sustainability metrics and increased citizen engagement.

EXPERIENCE

LOTUS ENGINEERING & SUSTAINABILITY, LLC.
Denver, CO
Senior Associate, 2017-Present

Provide high-quality consulting services on all areas of sustainability to a diverse set of clients

- Leads stakeholder engagement and community outreach for the development of community sustainability plans, programs, and policies.
- Performs detailed analysis on carbon emissions, greenhouse gas inventories, and emissions modeling.
- Advises clients on sustainability planning, programming, and implementation through effective stakeholder engagement processes and thorough technical, financial and project analysis.
- Authors technical documentation related to sustainability analyses and reporting.
- Communicates sustainability strategy development to broad audiences and provides technical expertise for the implementation of sustainability goals and strategies.
- Secured funding and managed program implementation for community-based energy efficiency programs

ADAMS COUNTY GOVERNMENT
Brighton, CO
Sustainability Coordinator**,** 2014-2017

Developed, managed and implemented the County's comprehensive Sustainability Program. Drafted and coordinated the adoption of sustainability policies related to energy use, waste and other priorities; increased county diversion rates for events from 8% to 38% in one year. Led the coordination across departments to revise code and development regulations in support of sustainability and renewable energy development; as a result the county was awarded national-level SolSmart Gold designation. Identified and managed the implementation of energy efficiency and renewable energy projects and programs, generating over $100k in annual savings. Obtained grant funding and technical support for sustainability projects in transportation and renewable energy. Collaborated with and advised local governments and special district partners on sustainability projects and programs across jurisdictions.

GREEN CORPS
Cleveland, OH
Program Manager, 2013-2014

Managed all aspects of program development, implementation and expansion for a nonprofit. Managed budgeting and fundraising activities to achieve programmatic growth; managed a budget of $650K across five locations. Facilitated the acquistion and sustainable management of new land for urban farms. Led development and implementation of both staff professional development and a dedicated sustainability and environmental science curriculum for high school students.

JULIA FERGUSON

BOARDS

Solar United Neighbors Advisory Board
2019-Present

SKILLS

Project/program management

Data analysis

Grant writing

Policy creation and implementation

Presentations and reports

Stakeholder engagement and facilitation

EDUCATION

Cleveland State University
Levin College of Urban Affairs
Masters of Urban Planning, Design and Development, 2010

University of Cincinnati
B.A., Political Science, 2008

CERTIFICATIONS

Project Management Professional (PMP)

National Renewable Energy Lab (NREL)
Energy Executives Graduate

EXPERIENCE

Buckeye Community Manager, 2011-2013
Site Manager, 2009-2011

Oversaw all aspects of urban farms on former brownfield sites, as well as the development of community engagement programs for sustainability. Developed a new environmental and sustainability education program for community residents; increased community participation by 45%. Created collaborative relationships with funding partners and community agencies to increase the impact of educational programs. Practiced sustainable land cultivation and management techniques to increase production on urban farm sites and surpass weekly sales goals.

CLEVELAND STATE UNIVERSITY
Cleveland, OH
Sustainability and Community Engagement Assistant, 2008-2010

Researched and reported on variety of sustainability policy issues and impacts on private business. Conducted detailed research and authored reports on sustainable business practices; focus areas included sustainable materials management, waste reduction and sustainable packaging and transit. Planned, coordinated and directed campus and community events on sustainability policy and sustainable business development. Trained staff, faculty and students in sustainable materials management and sustainability policy development and analysis.

GET IN TOUCH

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julia@lotussustainability.com

216.346.7478

INTERESTS

Gardening

Cooking

Hiking

RACHEL MEIER
Research Associate

lotus
engineering & sustainability

ANALYST
DATA VISUALIZER
GEOGRAPHER
ORGANIZER

Rachel is the newest member of the Lotus team. She brings years of experience performing spatial analysis and data visualization to federal, state, and non-profit organizations. Rachel is known for her detail-oriented nature, passion for learning and strong organization skills.

EXPERIENCE

LOTUS ENGINEERING & SUSTAINABILITY, LLC.
Denver, CO
Research Associate, 2019-Present
Supports sustainability projects for a diverse array of public- and private-sector entities.

- Assists with greenhouse gas inventories and research in support of projects.
- Performs document and report reviews as a part of Lotus' quality assurance process.
- Creates data visualizations and public-facing communications materials for clients.
- Authors and creates documents and other products to support Lotus business development efforts.

THE NATURE CONSERVANCY
Santa Fe, NM
GIS Specialist, 2018-2019

Provided cartography and spatial analysis support for all chapter prorgams in the New Mexico chapter. Performed spatial analysis to support all programs including urban heat island analysis, electric vehicle charging station planning, and riparian habitat mapping. Developed a UAV program for monitoring conservation easements, preserves, and forest restoration efforts. Maintained and populated data and record databases, GIS library and manual files.

Boulder, CO
Intern, Climate Action through Conservation Project, 2016-2017

Led the spatial analysis team in developing a methodology for NGOs to use geospatial analysis and statistical data to model carbon stocks. Established an organizational system which helped maximize database management. Produced new maps, tables and other graphical outputs in ArcMap and Microsoft Excel to generate focus areas for future carbon sequestration efforts by TNC. Collaborated with colleagues to create a report outlining policy suggestions for TNC staff supported by spatial analyses.

COLORADO ENERGY OFFICE
Denver, CO
Student Project Lead, REV West Charging Station Analysis Project, 2017

Determined optimal locations for electric vehicle fast charging stations using QGIS, informing future construction of the REV charging corridor on Colorado's highways. Created maps and tables that will be used in the identification of funders for the fast charging stations throughout the corridor. Presented to the CEO project team on where to construct the stations, easing EV drivers' range anxiety, and increasing EV sales in CO and throughout the West.

RACHEL MEIER

SKILLS

Data analysis

Data visualization

Spatial analysis and cartography

Report writing

Grant writing

EDUCATION

University of Colorado-Boulder
Masters of the Environment (MENV), 2017

Gustavus Adolphus College
B.A., Environmental Studies & Geography, 2016

NATIONAL WEATHER SERVICE, TWIN CITIES FORECAST OFFICE
Chanhassen, MN
Student Intern, Landslide Mitigation Project, 2015

Conducted research and statistical analysis of historical rainfall totals to quantify a metric for predicting potential future landslides. Collaborated with state, local, research universities and NGOs to produce a joint report given to Minnesota Governor Mark Dayton, affecting future policies addressing actions taken to mitigate landslide damage across the state of Minnesota.

GET IN TOUCH

www.lotussustainability.com

rachel@lotussustainability.com

612.558.6296

INTERESTS

Live music

Cooking & Baking

Hiking

Town of Mountain Village

Update Town of Mountain Village Corporate and Community GHG Inventory and Report

Green Team Interview Responses

Our Team

Stephen Boles

- Project oversight
- Senior GHG Analyst (solid waste, electricity gen.)
- GHG forecasting (community)
- GHG reduction opportunities
- Attend kick-off meeting and Council presentation
- Lead author of project deliverables

Selena Fraser-Arvai

- Senior GHG Analyst (industrial proc., wastewater)
- GHG forecasting (corporate)
- GHG reduction opportunities
- Contribute to GHG analyses and report writing

Shadnoosh Pashaee

- GHG Analyst (stationary energy, transportation energy)
- Contribute to GHG analyses and report writing

Evan Jones

- Internal peer review

Q1: What is the process and/or tools for continuing education and data tracking after the initial year?

1. Template GHG Calculation and Forecasting Tool (with user guide)

2. Training of Town staff

3. Annual review by AET Group (pro bono) of GHG emissions calculated by Town staff

4. Access to AET Group's proprietary 'Sustainability Implementation Process'

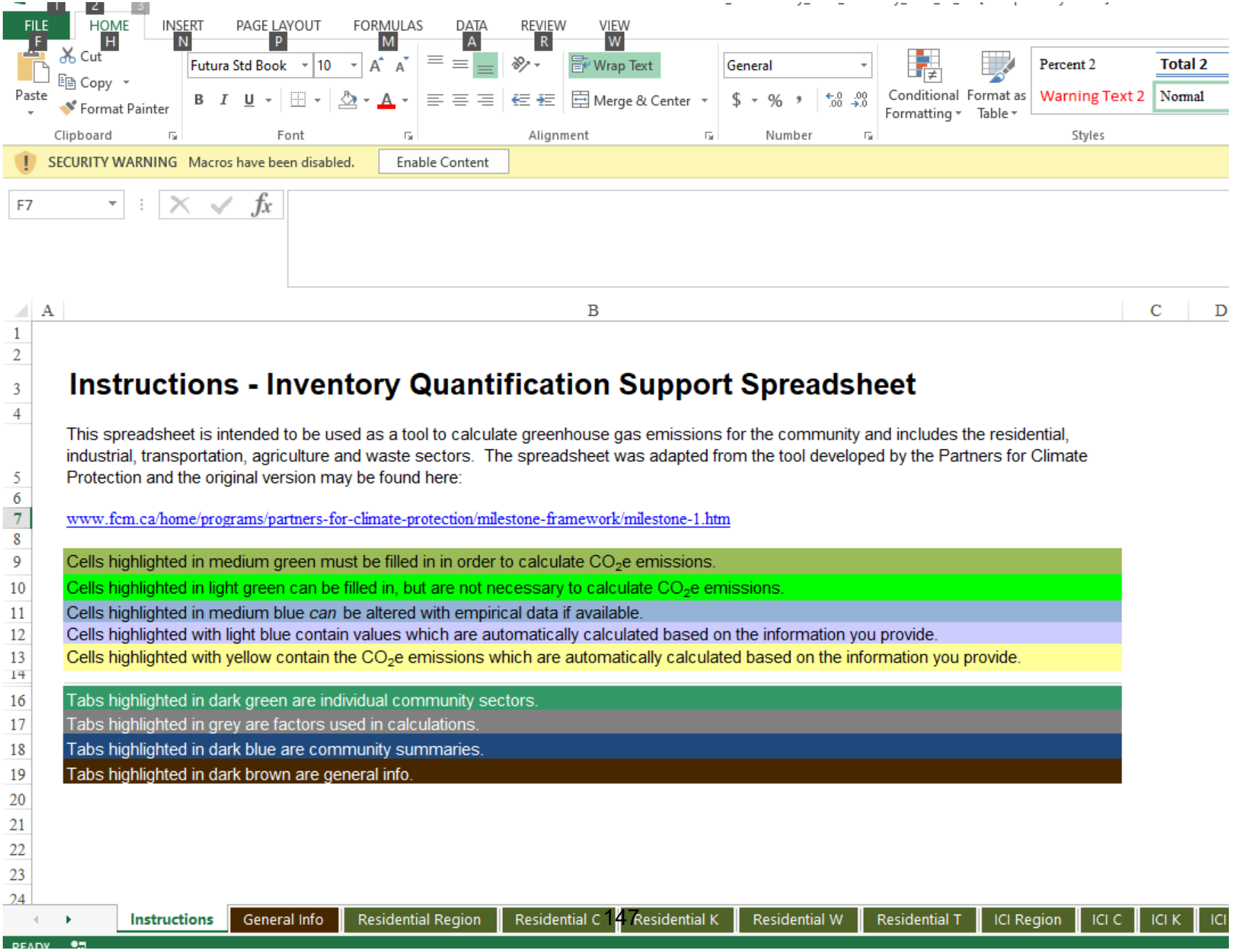
Q1: What is the process and/or tools for continuing education and data tracking after the initial year?

1. Template GHG Calculation and Forecasting Tool (with user guide)

GHG Calculation and Forecasting Tool will be spreadsheet based to provide familiarity and ease of updating

A ‘User Guide’ will be prepared as a quick reference manual to aid Town staff in how to update inventory data in future years

GHG Calculation and Forecasting Tool will use a color-based system to indicate where user input is required


FILE
HOME
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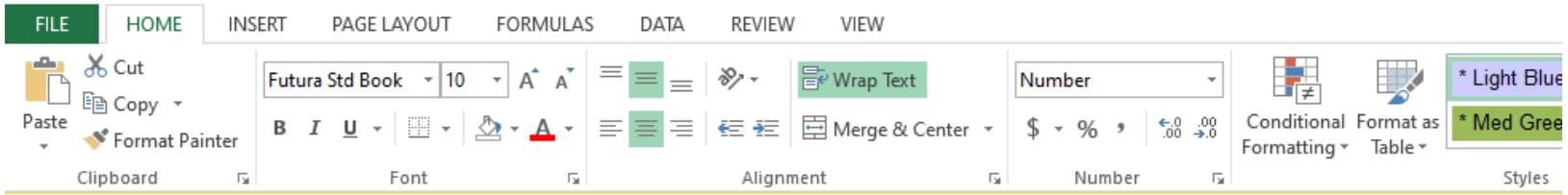
PAGE LAYOUT
FORMULAS
DATA
REVIEW
VIEW
Cut
Copy
Format Painter
Paste
Futura Std Book
10
Wrap Text
Merge & Center
General
Conditional Formatting
Format as Table
Percent 2
Total 2
Warning Text 2
Normal
Clipboard
Font
Alignment
Number
Styles
SECURITY WARNING Macros have been disabled.
Enable Content
F7
A
B
C
D
Instructions - Inventory Quantification Support Spreadsheet
This spreadsheet is intended to be used as a tool to calculate greenhouse gas emissions for the community and includes the residential, industrial, transportation, agriculture and waste sectors. The spreadsheet was adapted from the tool developed by the Partners for Climate Protection and the original version may be found here:
www.fcm.ca/home/programs/partners-for-climate-protection/milestone-framework/milestone-1.htm
Cells highlighted in medium green must be filled in in order to calculate CO_2e emissions.
Cells highlighted in light green can be filled in, but are not necessary to calculate CO_2e emissions.
Cells highlighted in medium blue *can* be altered with empirical data if available.
Cells highlighted with light blue contain values which are automatically calculated based on the information you provide.
Cells highlighted with yellow contain the CO_2e emissions which are automatically calculated based on the information you provide.
Tabs highlighted in dark green are individual community sectors.
Tabs highlighted in grey are factors used in calculations.
Tabs highlighted in dark blue are community summaries.
Tabs highlighted in dark brown are general info.
Instructions
General Info
Residential Region
Residential C
Residential K
Residential W
Residential T
ICI Region
ICI C
ICI K
ICI
READY



H19

=(G12*C32*C42/100)+(G12*D32*D42/100)+(G12*E32*E42/100)+(G12*F32*F42/100)

Transportation

Community Inventory

Annual Vehicle Kilometres Travelled (VKT) – Regional Roads within City of x[1]	563,096,036
Annual Vehicle Kilometres Travelled (VKT) – City of x Roads	
Total Annual VKT – Regional and City Roads	**563,096,036**

eCO_2 Emissions

	Cars	Light Truck	Heavy Truck	Bus	Total CO_2e	Total Fuel Used (L)
Gasoline	65,735	65,971	5,193	0	**136,899**	56,116,968
Diesel	175	1,757	55,206	48	**57,186**	21,310,651
Propane	1,603	0	0	0	**1,603**	1,037,899
Compressed Natural Gas	0	0	0	0	**0**	0
Ethanol Blend	0	0	0	0	**0**	0
Total	**67,512**	**67,728**	**60,399**	**48**	**195,687**	**78,465,518**

Notes and References

1. Traffic counts, road lengths and 2010 Annual Average Daily Traffic (AADT) provided by Region of Waterloo Transportation Department

Percentage Breakdown of VKT by Vehicle Type and Fuel (%)

	Cars	Light Truck	Heavy Truck	Bus	Total
Gasoline	53.17%	32.67%	1.20%	0.00%	**87.04%**
Diesel	0.15%	0.93%	10.59%	0.01%	**11.68%**
Propane	1.28%	0.00%	0.00%	0.00%	**1.28%**
Compressed Natural Gas	0.00%	0.00%	0.00%	0.00%	**0.00%**
Ethanol Blend (10%)	0.00%	0.00%	0.00%	0.00%	**0.00%**
Total	**0.546**	**0.336**	**0.1179**	**0.0001**	**100.00%**

Vehicle Efficiency for Different Fuels (L/100km)

	Cars	Light Truck	Heavy Truck	Bus
Gasoline	9	14.7	31.5	35.7

Q1: What is the process and/or tools for continuing education and data tracking after the initial year?

2. Training of Town staff

AET will provide 4 hours of training to Town staff on the use and updating of the GHG Calculation and Forecasting Tool

**training will be delivered by AET in-person during the time period that the final Climate Action Plan is presented to Town Council*

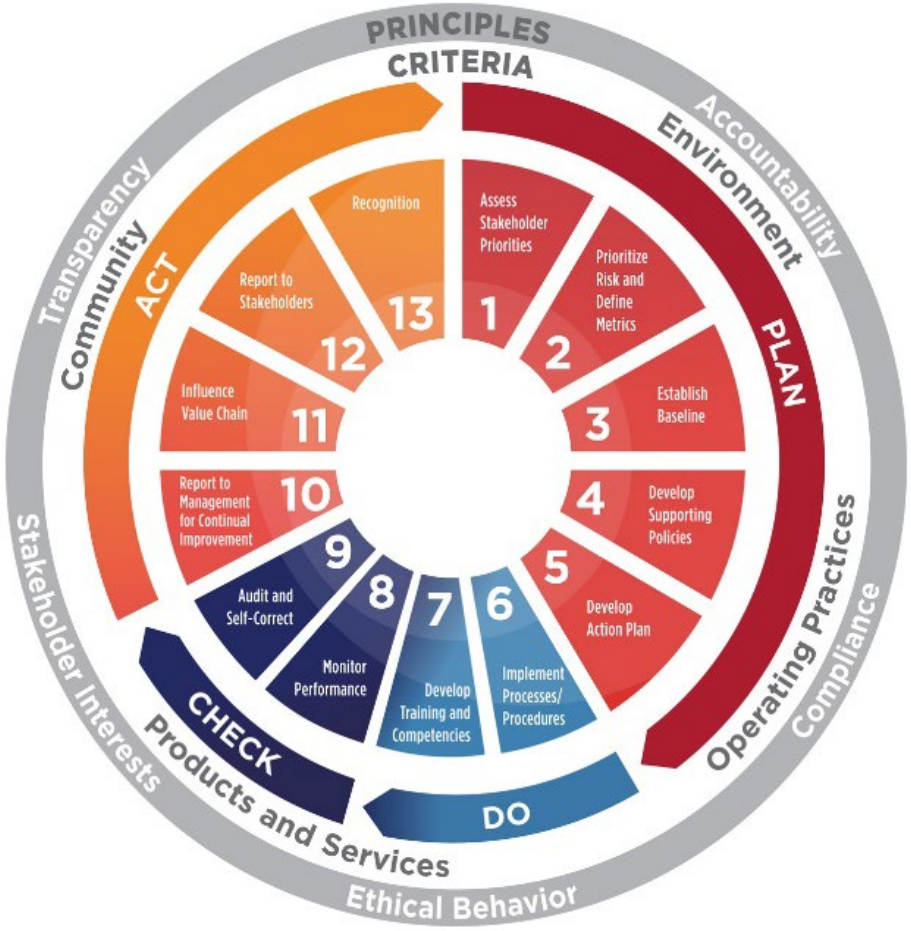
Q1: What is the process and/or tools for continuing education and data tracking after the initial year?

3. Annual review by AET Group (pro bono) of GHG emissions calculated by Town staff

AET will donate 8 hours each of the next 3 years (2021-2023) to conduct a free review of the GHG calculation and forecasting tool that has been updated by Town staff. The review will include:

- A check of calculations to confirm spreadsheet integrity has been maintained
- A check of emission factors to determine if updates are needed
- A check of 'reasonableness' of the data entered by Town staff

Q1: What is the process and/or tools for continuing education and data tracking after the initial year?



4. Access to AET Group's proprietary 'Sustainability Wheel' Implementation Process

Q1b: Will all data and processes be proprietary?

Product	Proprietary?
GHG Calculation and Forecasting Tool	No
'Sustainability Wheel' Implementation Process	Yes

While the 'Sustainability Wheel' is proprietary to AET Group, it is a value-added product that we provide freely to our clients to assist in the adoption and implementation of their sustainability efforts

We do ask that if the 'Sustainability Wheel' is published (documents, website) or shared with other organizations that AET be provided an opportunity to review how it is being shared or described

Q2: What is the process for evaluating recommendations?

1. Identification of potential GHG reduction opportunities
   - Benchmarking against comparable communities
   - Existing Town efforts (e.g. Zero Waste Action Plan)
   - AET experience with other organizations
   - Interviews with Town staff and community stakeholders

2. Webinar meeting with Town staff / Green Team to identify high-potential GHG reduction opportunities

3. Rank and prioritize high-potential GHG reduction opportunities

4. Assign implementation timeframe

Q2: What is the process for evaluating recommendations?

Ranking Criteria	LOW Range	MEDIUM Range	HIGH Range
Potential GHG Reduction	< 10%	10 – 25%	> 25%
Cost Savings	< 10%	10 – 25%	> 25%
Cost of Investment	$0 - $1000	$1000 - $25,000	> $25,000
Payback Period	0 – 6 months	6 – 24 months	> 24 months
Preliminary Prioritization	Within 1 year	1 – 3 years	> 3 years

Other criteria that should be considered:

- Availability of financial resources to fund opportunity (grants, municipal budget, etc.)
- Effort (human hours) needed to implement the opportunity, both short-term and long-term

Category	Finding	RANKING CRITERIA					Preliminary Prioritization (Short, Med., Long)
		Potential Environmental Reduction (L, M, H)	Potential Cost Savings (L, M, H)	Cost of Investment (L, M, H)	Payback Period (L, M, H)	Other Benefits	
BUILDING ENERGY	Install lighting controls	LOW	HIGH	MEDIUM / HIGH	MEDIUM / HIGH	Employee comfort	MEDIUM
	Replace / repair weatherstrip and window caulking	MEDIUM	MEDIUM	MEDIUM	MEDIUM / HIGH	Employee Comfort	MEDIUM
	Window attachments	LOW	MEDIUM	MEDIUM	MEDIUM / HIGH	Employee Comfort	LONG
	Efficient temperature zoning controls	HIGH	HIGH	HIGH	MEDIUM / HIGH	Employee Comfort	MEDIUM
	Energy Star equipment	LOW	MEDIUM	LOW / MEDIUM	MEDIUM	N/A	SHORT
	Maximization of natural light	LOW	MEDIUM / HIGH	MEDIUM	LOW / MEDIUM	Employee Comfort	SHORT
	Electrical outlet planning	LOW	MEDIUM	MEDIUM	MEDIUM	N/A	LONG
	Walk through energy assessments	TBD	TBD	MEDIUM	TBD	N/A	SHORT
	Floor space optimization	HIGH	HIGH	TBD	LOW / MEDIUM	N/A	ALREADY INITIATED
	Employee Engagement	MEDIUM / HIGH	MEDIUM / HIGH	LOW	LOW	Employee Morale	SHORT
	Employee comfort survey	N/A	N/A	LOW	N/A	Employee Morale	SHORT

Q3: Will there be a focus on building codes?

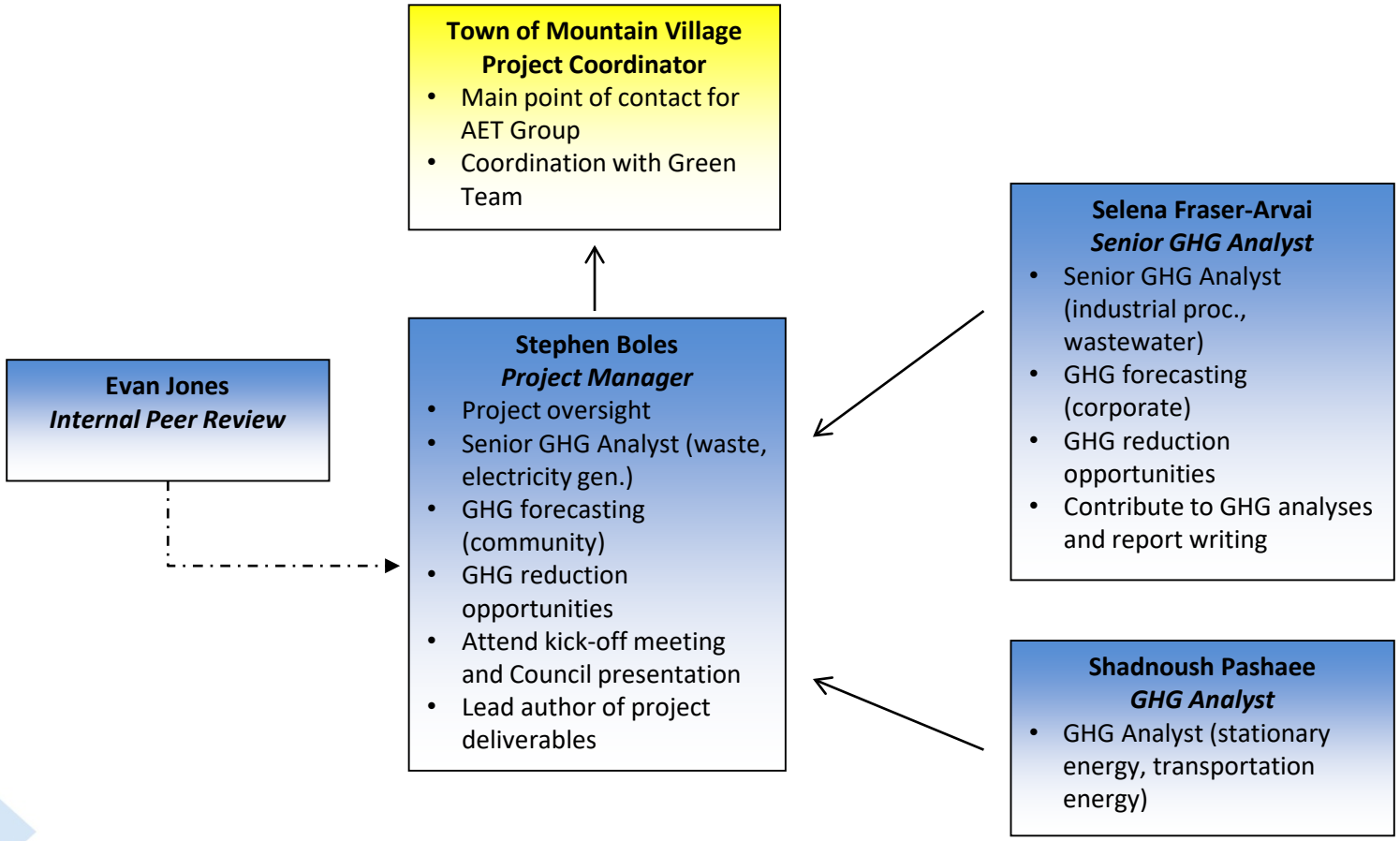
Building codes may be considered in some components of the project, for example:

1. GHG Reduction Opportunities
   - Enhancement or expansion of existing municipal programs (e.g. *Smart Building Incentive Program)*
2. GHG Forecasting
   - The effectiveness (uptake rate) of existing programs such as the *Smart Building Incentive Program* could be an impact variable that is considered in the GHG forecasting

Q4: Will there be an opportunity for in-person meetings?

Project Task	Type of Meeting
Task 1 (Kick-off Meeting)	• In-Person
Task 6a (Review GHG Reduction Opps. with Green Team & Town staff)	• Webinar
Task 6a (Present Draft Climate Action Plan To Green Team)	• Webinar
Task 6b (Presentation to City Council, Staff Training for GHG Tool)	• In-Person
Throughout Project (Bi-weekly update meetings)	• Tele-conference

Q5: Flow chart of roles and responsibilities for the Project



Q6: What are the additional costs for the following years?

AET will donate 8 hours each of the next 3 years (2021-2023) to conduct a free review of the GHG calculation and forecasting tool that has been updated by Town staff. The review will include:

- A check of calculations to confirm spreadsheet integrity has been maintained
- A check of emission factors to determine if updates are needed
- A check of 'reasonableness' of the data entered by Town staff

Costs would only be incurred if the Town requested a service that is beyond the free annual GHG tool review described above. *An example would be a request to conduct an investigation of an additional GHG reduction opportunity not included in the original Climate Action Plan. In these instances a work plan and pricing quote would be provided to the Town for review and approval prior to initiation of services.*

Thank you so much for this opportunity!

Your AET Team:

Steve, Selena, Shadnoosh, Evan

RFP: Update Town of Mountain Village Corporate & Community GHG Inventory and Report

Town of Mountain Village

November 13, 2019

Request for Proposals:

Update Town of Mountain Village Corporate and Community Greenhouse Gas Emissions Inventory and Report

Prepared for

Town of Mountain Village

Prepared by

AET Group Inc.

531 Wellington St. North
Kitchener ON N2H 5L6
T (519) 576-9723
www.aet98.com

November 13, 2019

COVER SHEET

November 13, 2019

Zoe Dohnal

The Town of Mountain Village
455 Mountain Village Blvd. Suite A
Telluride CO 81435

RE: **RFP to Update Town of Mountain Village Corporate and Community GHG Emissions Inventory and Report**

Proponent's Legal Name:	AET Group Inc.
Mailing Address:	531 Wellington Street North, Kitchener, Ontario N2H 5L6
Contact Name / Email (Admin.):	Scott Freiburger / sfreiburger@aet98.com
Contact Name / Email (Technical):	Stephen Boles / sboles@aet98.com
Telephone:	(519) 576-9723
Facsimile:	(519) 570-9589

I confirm I have the full authority and capacity to represent the proponent in all matters relating to the proposal and I confirm that the proponent agrees to be bound by all of the terms and conditions of this RFP.

_____

Authorized Signature

Scott Freiburger

_____

Print Name

Principal, Managing Director

_____

Title

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1. INTRODUCTION / UNDERSTANDING OF CLIENT'S NEEDS

The Town of Mountain Village (the 'Town') is seeking an innovative and qualified consulting team to assist in the completion of an inventory and forecasting for both its corporate and community-at-large greenhouse gas (GHG) emissions and a *Climate Action Plan* for the Town. The GHG inventory and *Climate Action Plan* to be delivered in this project will be strategic and comprehensive documents that will:

- guide the reduction of the Town's corporate and community energy use and GHG emissions, including alignment with existing plans and policies (e.g. Zero Waste Action Plan, Comprehensive Plan);
- guide the re-definition of long-term GHG reduction targets for the Town. Interim GHG reduction goals will also be defined to monitor progress in meeting the long-term targets;
- contribute to the awareness of Town staff and community stakeholders to the energy/GHG reduction issue;
- provide forecasting of the Town's GHG emissions to 2050, and;
- identify GHG reduction opportunities and monitoring procedures as well as an implementation framework.

AET Group Inc. (AET) is pleased to submit our proposal to provide the Town with a highly-experienced option for leading your project. As a collective group, our team:

- has several decades of GHG management experience in a range of government and industry sectors;
- has over 200 hours of energy and GHG management training;
- includes a range of professionals including Professional Engineers, Certified Energy Advisors, Certified Environmental Auditors, LEED Accredited Professionals, Greenhouse Gas Quantifiers, Greenhouse Gas Verifiers, and Building Science Specialists;
- has developed or verified the community GHG inventories for major North American municipalities, including the Regional Municipality of Waterloo, the City of Yellowknife, and the City of Montreal; and,
- has extensive experience working with municipalities having completed over 1,000 municipal environmental projects across North America (including many GHG management projects in the USA for clients including National Milk Producers Federation, Environmental Defense Fund, Eaton Corp., and Cigna Healthcare).

In addition to the above, AET's internal dedication to corporate energy conservation and sustainability is ingrained in our culture and has been recognized with numerous environmental and sustainability awards. We feel that our own internal dedication to corporate energy conservation and sustainability is well aligned with the Town of Mountain Village, making AET the perfect proponent to lead your project.

At AET we are always thrilled to be working for and aligning ourselves with forward-thinking progressive leaders like the Town of Mountain Village. We are confident that we have shown AET has the corporate capabilities, professional experience, and sustainability culture to ensure your project achieves the critical success that the Town and its stakeholders demands. We look forward to working with you!

2. QUALIFICATIONS

2.1 PROPONENT PROFILE (AET GROUP INC.)

Established in 1998, AET is a multi-disciplinary environmental consulting, auditing and scientific services firm providing professional services to the built and natural environments in the following core service areas: GHG, Air, Sustainability, Audits, Management Systems, Energy, Building Sciences, Compliance, Waste, Mitigation, Water and Home Flood Protection. AET is headquartered in Kitchener Ontario and has additional offices in Cambridge, London and Exeter Ontario.

AET has extensive experience working on GHG management projects for USA-based clients. AET was retained by the Environmental Defense Fund to develop GHG emission factors for use in carbon offset protocols for carbon sequestration from rice agriculture in the USA. AET is currently working with the National Milk Producers Federation to develop an industry-wide verification strategy for GHG emissions from the US dairy sector. For the past several years AET staff have led the verification of the corporate GHG inventories of several large US companies, including Eaton Corp., Cigna Healthcare, and Compass Minerals. In the area of municipal waste, AET has led waste characterization projects in ten states over the past several years. With over 1,000 projects completed across the USA, Canada, South America, Europe and the Caribbean, AET offers extensive experience, capabilities and a proven track record that assures that our clients receive extensive value, credible results and effective solutions. Quality service, solid performance and professional integrity are embodied in all aspects of our work which has allowed us to benefit from a high level of client satisfaction and repeat business. As a result of our extensive experience, technical proficiency and diversified capabilities, AET has positioned itself as a highly credible and sought-after consulting firm.

AET's team of 35 employees include certified sustainability professionals, certified GHG quantifiers and verifiers, communication specialists, LEED accredited professionals, professional engineers, climate change scientists, certified auditors, management system specialists, certified energy advisors, and building science specialists. AET's team has extensive experience working with public sector organizations on a range of sustainability and climate change projects including GHG inventory development, strategic plan development, sustainable procurement and life-cycle product analysis, GHG verifications, and group facilitation.

2.2 VALUE ADDED

AET is proud to showcase the following aspects of our proposal which add additional value to our submission beyond the competitive pricing that we have proposed.

1. Award-Winning Corporate Sustainability Commitments

AET's own corporate sustainability commitments are perfectly aligned with those of the Town of Mountain Village. AET sets an example for our clients by not only recommending sustainability practices but by adopting such practices within our own operations. This is most evident in the greening of our office building, sustainability policy, green purchasing policy and our role as a Tri-Pledging Partner of Sustainable Waterloo Region's Regional Sustainability Initiative which includes a pledge to reduce our GHG emissions by 40% by 2021, a reduction of water

usage by 30% by 2025 and an increase in our landfill waste diversion to 90% by 2023. AET has since been awarded Sustainable Waterloo Region's "Most Active Green Team" award three years in a row (2014, 2015, 2016).

AET's head office is powered by 100% renewable electricity and 100% renewable natural gas. To reach our goal of producing more energy than we consume, AET will be finalizing our Net Positive Building Plan that will include a 15.2kWh roof-mounted solar array with power banks and two electric charging stations that will be accessible to all employees and the community after business hours and weekends. All reports are printed on paper that is FSC certified, 100% recycled content, chlorine free and manufactured using biogas energy. As part of our sustainability commitments AET has registered to certify our head office with the Canada Green Building Council Zero Carbon Building Standard for existing buildings. Additionally, AET is in the process of completing the final steps to become a B-Corp Certified Corporation.

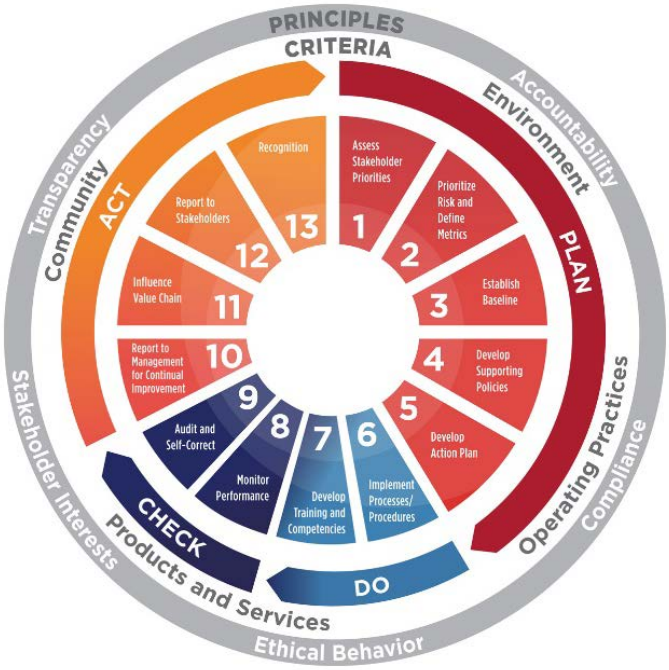
AET was awarded the 2009 and 2012 Environment and Sustainable Business Excellence Award from the Greater Kitchener Waterloo Chamber of Commerce. Through our commitment to sustainability, AET has received recognition in a number of local and national competitions including ECO Canada's Top Employer 2018, listed as one of Waterloo Area's Top Employers 2019, and being awarded one of Canada's Greenest Employers 2019.

2. Project Plant-A-Tree

In 2013, AET initiated and launched the "Project Plant a Tree" Program to give back to the communities in which we work. As a company committed to being green and giving back, AET is planting trees throughout the local communities in which we work to make the world a greener place for all of us to live. As part of AET's fight against climate change, AET is committing 1% of annual profits to planting trees through partnerships with local communities. "Project Plant a Tree" is a value-added component of our proposal for the Town of Mountain Village.

3. Proprietary Sustainability Implementation Process

AET's proprietary *"Sustainability Implementation Process"* is a guidebook and graphic tool that will provide the Town with an implementation path going forward. The process is based on the classic management systems "Plan-Do-Check-Act" approach for continuous improvement, yet has been enhanced with discrete steps and guidance based on AET's decades of experience working with clients in implementing sustainability projects. It is our intention that the Sustainability Implementation Process (shown below) will provide Mountain Village with a consistent and credible framework to follow after this initial project has been completed, thereby giving the Town's team invaluable ownership of the implementation phase of the project.



2.3 PROJECT EXPERIENCE

In Appendix A to this proposal, numerous projects have been selected to showcase our team's experience providing services of a similar size, complexity, and scope as the Town of Mountain Village's project. Projects have been selected for the following core areas of expertise desired by the Town:

- Municipal GHG emissions quantification
- Organizational GHG reduction plans and targets
- Data research, collection, and analysis
- Energy management planning and conservation
- Sustainability
- Community engagement programs

Select client references have been provided in Section 2.5 that will attest to the integrity of our team's management, competency, and commitment to quality.

2.4 CLIENT REFERENCES

The following client references have been provided that will attest to the integrity of our team's management, competency, and commitment to quality, as well as our experience providing services of a similar size, complexity, and scope as the Town of Mountain Village's project.

	Reference #1	Reference #2	Reference #3
Organization Name	Municipal Property Assessment Corp. (MPAC)	City of Yellowknife	Envirings Inc. (contract for Federation of Canadian Municipalities)
Contact Name & Title	Jeff Nicholson Manager, Facilities and Fleet Operations	Chris Greencorn Director, Public Works and Department	Mary Trudeau Director
Address	1340 Pickering Parkway Pickering, ON L1V 3C0	4910 52 Street Yellowknife NT X1A 2N4	111 Mason Terrace Ottawa, ON K1S 0L2
Industry	Public Sector (Property Assessment)	Municipal Government	Municipal Government
Telephone Number & Email	289-923-2098 Jeff.nicholson@mpac.ca	867-920-5637 cgreencorn@yellowknife.ca	613-231-3537 m.p.trudeau.water@gmail.com
Description of Engagement	Preparation of organizational GHG inventory and identification of GHG reduction opportunities	Quantification of community GHG emissions from waste and wastewater management; carbon sequestration assessment	Assessment of best practices for reducing GHG from municipal waste management in Canada
Reference for AET Team Member	Stephen Boles	Stephen Boles Selena Fraser-Arvai	Selena Fraser-Arvai
Time Period of Engagement	2019 – 2023 (4 months per year)	2019 (4 months)	2019
Budget	$15,775	$66,710	$35,000

2.5 PROJECT TEAM

AET has assembled a highly experienced team to lead the Town of Mountain Village's project. Biographies and role descriptions of all team members are provided below and an organizational chart displaying the relationship between team members is also provided. CVs for all team members are provided as Appendix B.

Project Manager

Stephen Boles (AET Group Inc.), B.E.S., MSc., EP (Sustainability)

- B.E.S., Bachelor of Environmental Studies (Geography), University of Waterloo
- MSc., Master of Science (Natural Resources Management), University of Alaska Fairbanks
- ISO 14064-3: Greenhouse Gas Verification using ISO 14064

Stephen is the Manager of GHG and Sustainability Services with AET Group. Stephen has been active in the climate change community as a scientist and consultant for over 20 years. Stephen received his Master of Science degree from the University of Alaska Fairbanks in 1998 and spent the next eight years working as a scientist at one of the world's leading climate change research centers at the University of New Hampshire. As a consultant, Stephen has led GHG management projects (GHG quantification, GHG verification) for dozens of clients in various industry sectors, including several Fortune 500 multinationals. In addition to his GHG management expertise, Stephen has managed projects in a range of other areas pertaining to sustainability, including carbon offset development, life cycle assessments, risk and opportunity planning, and corporate sustainability implementation. Stephen served on the international working group that conducted the review of the ISO 14064 family of standards.

Stephen is a dual citizen of the USA and Canada.

Stephen will serve as Project Manager and Lead GHG Analyst on this project and will oversee all technical aspects of the engagement and report writing.

Project Management Experience

Over the past three years, Stephen has effectively managed numerous projects concurrently with a similar scope and budget as the Town of Mountain Village's project. Several examples are provided in the table below:

Client	Project	Timeframe	Budget
City of Yellowknife	Water / Wastewater GHG Quantification	Oct 2019 - present	$66,710
Environment Canada	Organic Waste GHG Calculator	Nov 2018 – Nov 2019	$95,130
MPAC	GHG Inventory & Reduction Plan	Feb 2019 – May 2019	$15,775
Eaton Corp.	Zero Waste to Landfill Program Verification	July 2019 – Nov 2019	$21,405
Eaton Corp.	Corporate GHG Verification	Mar 2019 – June 2019	$22,165
Province of Alberta	Oil Sands Facility GHG Verification	Aug 2018 – Nov 2018	$24,600
Nat. Milk Prod. Fed.	Industry GHG Reporting / Verification Strategy	Jul 2018 – Dec 2018	$21,750
Province of BC	GHG Quantification Methodology for ICI Sector	Jan 2018 – Apr 2018	$12,000
Libro Credit Union	Environmental Assessment & Reduction Plan	Sep 2017 – Feb 2018	$17,500

Other Team Members

Selena Fraser-Arvai (Sub-contractor), B.Eng, M.Eng, P.Eng.

- B.Eng., Environmental Engineering, Carleton University
- M.Eng., Environmental Engineering, Carleton University
- ISO 14064-1: Greenhouse Gas Quantification using ISO 14064

Selena Fraser-Arvai is a registered P.Eng. with the Professional Engineers of Ontario and holds her own Certificate of Authorization (CofA) to practice engineering. Selena has over twelve years of experience solving a diverse breadth of environmental and energy related problems. She has provided her expertise to studies and projects related to GHG and CAC emission identification, quantification and verification; energy efficiency; climate change impacts and adaptation; environmental impact assessment; and environmental processes and systems. Selena has extensive municipal GHG quantification experience. Selena was the project manager on the update of the City of Yellowknife's 2009 GHG inventory and recently completed a project for the Federation of Canadian Municipalities to identify best practices in reducing GHG emissions from municipal waste management. Ms. Fraser-Arvai was one of the first recipients of the CSA-GHG Inventory Quantifier (CSA GHG-IQ) certification, after beta testing the program for the CSA in 2009.

Selena will serve as a Senior GHG Analyst on this project and will contribute to the GHG analyses and report writing.

Evan Jones (AET Group Inc.), B.A.Sc., B.Sc, GHG-IQ, GHG-V, P.Eng.

- B.A.Sc., Bachelor of Applied Science (Mechanical Engineering), University of Waterloo
- B.Sc, Bachelor of Mathematics and Physics, University of Toronto
- ISO 14064-1: Greenhouse Gas Quantification using ISO 14064
- ISO 14064-2: Carbon Emission Reduction – GHG Projects

Evan Jones is a Senior Project Manager at AET Group and is a CSA-certified GHG Inventory Quantifier (GHG-IQ) and a CSA-certified GHG Verifier (GHG-V). Evan is a registered P.Eng. with the Professional Engineers of Ontario and has over 20 years of work experience as a consultant and systems manager for one of Canada's largest real estate management firms. Evan has served as project manager for numerous GHG reduction projects that have been developed following the ISO 14064-2 standard, all of which are listed on the CSA CleanProject registry of carbon offset projects. Evan has also served as an instructor for CSA courses related to the ISO 14064 standard (including ISO 14064-2) and has taught over 300 students over the past ten years.

Evan will conduct an internal peer review of the completed GHG quantification and project documentation.

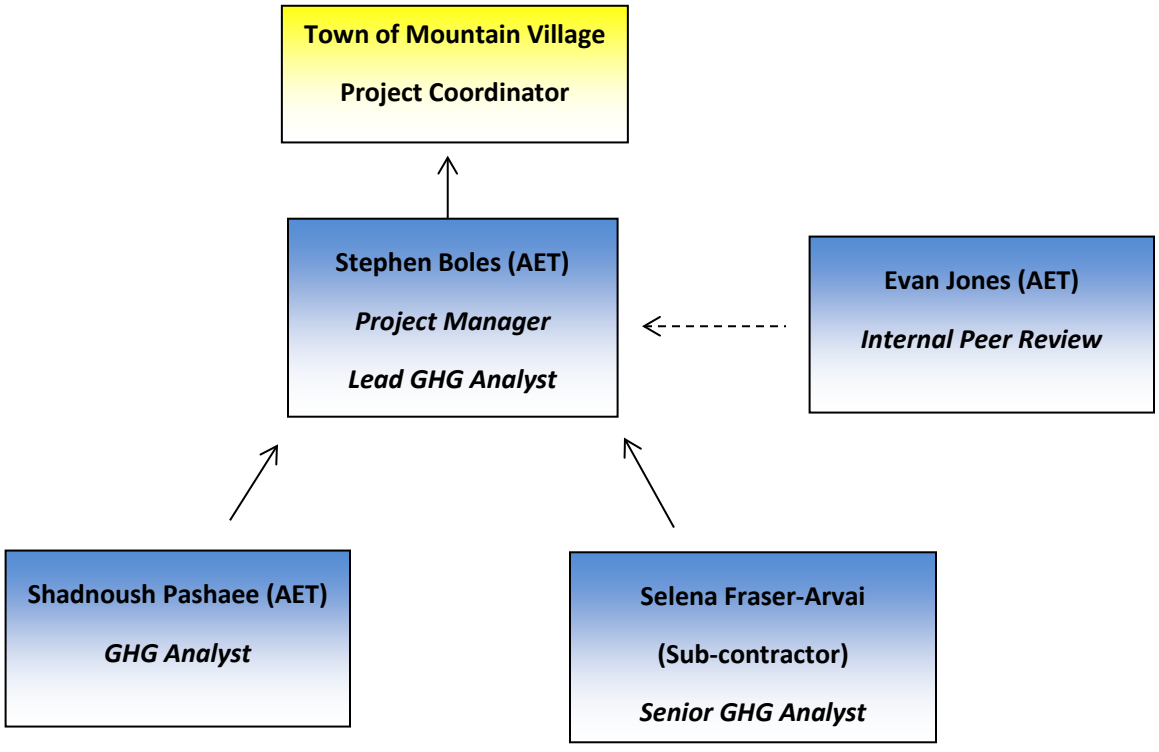
Shadnoush Pashaee (AET Group Inc.), B.Arch, M. Arch, M.S.

- Bachelor of Architecture, Yazd University (Iran)
- Master of Architecture, Azad Yazd University (Iran)
- Master of Science (Environmental Engineering), Concordia University (Montreal)

Shadnoush Pashaee is a Project Consultant at AET Group and has a diverse background in GHG management and energy efficient building design. Shadnoush's graduate project for her Master of Science degree from Concordia University involved the preparation of the GHG inventory for the City of Montreal. Prior to starting her graduate degree in Montreal, Shadnoush gained several years of experience in the field of building energy studies (energy auditing, energy modeling, efficient building design). Recently Shadnoush has been leading the quantification of GHG from the City of Yellowknife's water and wastewater management systems.

Shadnoush will serve as a GHG Analyst on this project and will contribute to the GHG analyses and report writing.

Project Team Organizational Chart



3. APPROACH

Our proposed approach for the Town's project has been framed around the following three deliverables as described in the RFP document:

DELIVERABLE 1: Corporate and Community GHG Emissions Inventory and Forecast Report

DELIVERABLE 2: GHG Emission Reduction Targets

DELIVERABLE 3: Climate Action Plan (Recommended Actions to Reduce GHG Emissions)

A detailed description of each task proposed to accomplish the Town's deliverables is provided on the following pages. In the approach described below, note that AET has presented Deliverable 2 (GHG Emission Reduction Targets) as a task included in the completion of Deliverable 3 (Climate Action Plan). A task-based timeline is provided in the Gantt chart that is included in Section 3.3 of this proposal. The Gantt chart also contains completion dates for project deliverables.

3.1 CORPORATE AND COMMUNITY GHG EMISSIONS INVENTORY AND FORECAST REPORT

Task 1: Review of Existing GHG Inventory, Input Data and Reporting Protocol

Prior to the project kick-off meeting, AET will take the following steps:

1. Conduct a thorough review of the Town's existing 2017 GHG inventory prepared by Eco-Action Partners.
2. Provide the Town with a list of data (e.g. project studies, fleet and building energy consumption data) that should be compiled by the Town and other data stakeholders and provided to AET such that an initial data review and gap assessment can be conducted. AET will review the data sources provided to identify data issues (if any) that will need to be resolved, including:
    - missing or incomplete sources of data,
    - data of questionable quality or accuracy,
    - validity of assumptions made in the data collection methodology.
3. Review the GHG reporting frameworks that the Town is committing to following. The Town has stated its corporate and community GHG inventory document must be prepared in compliance with the Global Covenant of Mayors (GCOM) and the Colorado Communities of Climate Action (CC4CA) programs. The GCOM protocol sub-divides corporate and community GHG emissions into the sectors shown on the following page. AET will conduct a thorough review of the requirements of the GCOM and CC4CA reporting programs and will provide a recommendation on the GHG quantification approach that positions the Town with the most robust inventory in terms of alignment with GCOM and CC4CA. AET's recommendation will be based on several considerations including relevancy of GHG sectors for the Town of Mountain Village, data availability, and establishment of an inventory structure that maximizes the efficiency of converting the existing 2017 GHG inventory into compliance with GCOM and CC4CA.

The Town is also encouraged to consider structuring its GHG inventory to be aligned with the City Inventory Reporting and Information Systems (CIRIS) and the *Global Protocol for Community-Scale Greenhouse Gas Emission Inventories* (GPC-GHG) developed by the Greenhouse Gas Protocol organization. AET will provide feedback to the

Town on how the GHG inventory can be structured with the maximum flexibility to respond to all leading municipal GHG reporting programs.

At the conclusion of this task AET will provide a Data Readiness and GHG Framework recommendations report.

GHG Sector	Corporate Operations	Community-at-large
Required Components		
STATIONARY ENERGY	Municipal Building energy use Street Lighting	Residential building energy use Industrial/Commercial/Institutional (ICI) building energy use
TRANSPORTATION	Municipal vehicle fleet Transit	On- and off-road vehicles Railway Aviation
WASTE	Waste from municipal operations	Wastewater treatment Solid waste management Biological treatment Incineration
ENERGY GENERATION		Electricity-only Combined heat-power Steam
Optional Components (include if significant)		
INDUSTRIAL PROCESSES AND PRODUCT USE (IPPU)		Industrial processes Product Use
AGRICULTURE, FORESTRY, AND OTHER LAND USE (AFOLU)		Livestock (enteric fermentation, manure management) Land conversion

Task 2: Kick-off Meeting

Soon after project award, representatives of AET and the Town will meet in Mountain Village to confirm a number of issues including:

- scheduling of key events,
- scope of work and deliverables,
- confirmation of roles and responsibilities,
- identification of sources and key contacts to be approached for providing input data,

- review of findings presented in the Data Readiness and GHG Framework recommendations report

In addition to the in-person kickoff meeting, AET proposes bi-weekly teleconference meetings through the duration of the project with the Town staff representative(s) to ensure the Town is kept apprised of the project progress and has the opportunity to provide input throughout.

Task 3: Data Collection and Processing

The collection of data will be initiated as soon as possible to avoid potential delays. It is anticipated that Town staff will assist with the identification of specific data contacts and coordination of data collection efforts from them. Organizations and/or individuals that may be approached for providing data for the corporate and/or community GHG inventory will be identified. A list of potential data sources is provided below:

- Municipal organizations (Town of Mountain Village, San Miguel County);
- utilities (e.g. Mountain Village Utilities, San Miguel Power Corp.);
- other energy providers (e.g. fuel oil, propane, renewables);
- public sector energy users (schools, hospitals);
- major private sector energy users;
- secondary data sources (e.g. census, EPA GHG Reporting Program, USDA).

A data transfer plan and timetable will be prepared at the outset of this task to monitor progress in the delivery of the required data sets to AET. The AET team has worked with numerous large and complex organizations in the planning and implementation of GHG management systems. These experiences have allowed us to develop data collection procedures tailored to complex organizations and projects that maximize efficiency, ensure consistent data reporting and high data quality, and reduce the burden of work on any one individual.

As data is delivered to AET, we will thoroughly review the data to determine that it is of acceptable quality for use in the project (lacking gaps, valid assumptions have been made). This process will benefit from the extensive experience AET has in both the development and verification of organizational energy and GHG inventories, in which we have developed leading expertise in data quality assessments. In instances where local data is not available or the data that has been provided by the local sources is deemed to be not of acceptable quality, our team will identify defensible sources of data to generate estimates, such as the *Commercial Buildings Energy Consumption Survey (CBECS)* published by the US Energy Information Administration. We have experience working with replacement or proxy data sources for many clients and have an expert knowledge of the most reliable sources of data that are available for use in energy and GHG emission assessments.

Task 4: Calculation of GHG Emissions / Development of Data Management and Calculation Tool

The Town's GHG emissions will be calculated as per the requirements of the GCOM calculation protocol. GHG emissions will primarily be calculated using activity data and emission factors. Emission factors are values that when multiplied with a source of activity data (data collected in data collection phase) result in the associated GHG emissions. AET brings extensive experience in the evaluation and selection of the most temporally and geographically relevant emission factors from the most trusted sources and has performed this service for

numerous clients in the industrial, municipal, institutional and commercial sectors. We will use emission factors from the US EPA, the Greenhouse Gas Protocol, and from other recognized sources such as the Intergovernmental Panel on Climate Change (IPCC).

A GHG inventory requires quantification of several different GHG, including carbon dioxide, methane, and nitrous oxide. Each type of GHG will be separately quantified and reported. In addition, all GHG emissions will be converted to CO_2e (carbon dioxide equivalent) using global warming potential values published in the IPCC assessment reports.

As part of the GHG calculations task, AET will conduct analyses and assessments of the corporate and community GHG data with a focus on the following:

- Energy consumption profiles by energy type (natural gas, electricity, propane, diesel, heating oil, transportation fuels, renewables) and sector;
- GHG emission profiles by energy type and sector;
- Corporate and community energy consumption and GHG emissions calculated both as absolute values and as intensity-based values (the intensity-based calculations will be performed using intensity-based indicator(s) defined by the Town and may include measures such as CO_2e / per capita).

Results of the calculations and analyses will be reported in the GHG Inventory report. A spreadsheet-based inventory management tool and a Data Management Manual will also be prepared for both corporate and community that contains all of the original sources of data, emission factors, GHG calculations, and GHG emission forecasts. The spreadsheet tools will be easy-to-use resources that can be maintained by Town staff going forward.

Task 5: GHG Emission Forecasting

AET will prepare a business-as-usual (BAU) GHG emission forecast to 2050 for both corporate and community as a whole, and also by GHG emission sector. The number of GHG impact variables that will be included in the forecasting analysis will include projected population, predicted electricity generation composition, and projected economic growth.

In addition to the BAU forecast, AET will prepare a 'beyond BAU' GHG emission forecast to 2050 using additional impact variables not included in the BAU forecast. Examples of other impact variables that could be considered by the Town for the 'beyond BAU' forecasting analysis include policy actions (adopted and proposed), fuel efficiency standards, and predicted renewable energy implementation. AET will work closely with Town staff to develop realistic assumptions for each of the impact variables on which the forecasts will be based. For each of the GHG impact variables that are selected a range of assumptions (conservative through optimistic) will be developed such that the GHG emission forecasts will encompass a range of potential values as opposed to one specific number.

Results of the BAU and beyond-BAU forecasting analyses, including the percentage change for each sector, will be reported in the GHG Inventory document. Details pertaining to the calculations and variables used in the forecasts will be described in the GHG Data Management Manual and associated spreadsheet tools that will be prepared for both the corporate and community GHG inventory.

Task 6: Benchmarking

Benchmarking is an effective way to compare an organization's GHG performance against its peers. Benchmarking can also be an opportunity to glean ideas for challenges or opportunities pertaining to achieving GHG reductions that could also be applicable to the Town of Mountain Village.

The Global Covenant of Mayors database will be used to identify five North American communities with a similar population that will be used for benchmarking purposes. There are currently 12 North American communities in the GCOM database with a population of under 10,000.

Mountain Village's GHG emissions will be benchmarked against absolute indicators (e.g. total GHG by scope and sector) and normalized indicators (e.g. per capital GHG by scope and sector).

Task 7: Preparation of Inventory Report and Data Management Manual

Note that draft versions of the GHG Inventory Report, GHG Data Management Manual, and GHG Inventory and Forecast Spreadsheet Tool will be provided to the Town for review and comment prior to the issuance of the final versions. Prior to the draft versions of the reports and spreadsheet tool being submitted to the Town, an AET team member (not involved with the completion of Tasks 1-4) will conduct an independent review of the inventory data and documentation as a quality assurance step.

1. **GHG Inventory Report** (combined document including both corporate and community inventories)
    - Executive Summary;
    - background and context to the project, including a discussion of any regulatory and voluntary GHG reporting programs that the Town is responding to;
    - a review of the GHG management frameworks and protocols that were followed;
    - a description of GHG emission sources that were included in the inventory;
    - a review of the data collection and GHG calculation process;
    - highlights of GHG emissions, summarized by sector;
    - highlights of the 2050 GHG emission forecasts, and,
    - results of the benchmarking assessment.
2. **GHG Data Management Manual** (combined document for corporate and community inventories)
    - a description of the protocol / framework that was followed;
    - parameters of the GHG inventory (emission sectors included, base year, etc.);
    - description of individual GHGs and their associated global warming potential values;
    - a full list of all data sources, including citations and contact information;
    - a full listing of all GHG emission factors and conversion equations (with their sources);
    - procedures used to address missing or incomplete sources of data;

- a description of all assumptions made in the development of the GHG inventory and forecasting;
- a description of any formulae used in the inventory and forecasting calculations; and,
- instructions on the interpretation, use, and maintenance of the associated spreadsheet database.

3. **GHG Calculation & Forecast Spreadsheet Tool**
    - source data, emission factors, and calculations (GHG emissions and forecasts); and,
    - 'User Guide' for updating the inventory data in future years.

Task 8: Staff Training

AET will equip the Town with a tool that can be easily updated in future years. This will provide empowerment to the Town's employees to manage and own the GHG inventory project going forward. AET will use the following techniques to ensure this empowerment occurs:

- the GHG calculation and forecasting tool will be spreadsheet-based, ensuring a familiarity and ease of updating for Town staff in future years
- a 'User Guide' will be prepared as a quick reference manual to guide Town staff in how to update the inventory data in future years
- AET will provide 4 hours of training to Town staff on the use and updating of the GHG calculation and forecasting tool (to be delivered during the time period of the Council presentation)
- AET will donate 8 hours each of the next 3 years (2021-2023) to conduct a free review of the GHG calculation and forecasting tool that has been updated by Town staff

3.2 CLIMATE ACTION PLAN & GHG REDUCTION TARGET DEFINITION

Task 1: Identification of GHG Reduction Opportunities

AET will prepare a set of high-potential GHG reduction opportunities (for both corporate and community) based on the following sources of information:

- results of the benchmarking assessment against comparable communities;
- review of relevant documentation that showcases planned GHG reduction opportunities (e.g. Zero Waste Action Plan);
- input received from other key contacts at organizations that provided sources of data to the community GHG inventory (e.g. utilities, large energy consumers, etc.);
- consultation with Town staff and Green Team Committee, and,
- AET's extensive experience working with clients in the planning and implementation of GHG reduction strategies.

AET will prepare a "reduction opportunity description" template document to be distributed to corporate and community representatives. Town staff will assist with identification of individuals and organizations to approach. It is assumed that 8 individuals/organizations will be contacted to contribute for both community and corporate

reduction opportunities (combined). AET will conduct 1-hour telephone interviews with each of the 8 individuals/organizations.

Prior to initiating the next task (ranking and prioritization of opportunities) AET will have a two-hour webinar meeting with Town representatives to review the preliminary GHG reduction opportunities identified, including feedback obtained during the telephone interviews.

Task 2: Ranking and Prioritization of GHG Reduction Opportunities

Prioritization and ranking of GHG reduction opportunities must include a consideration of the significance of emissions sources, the amount of influence that the Town and/or community has over the emissions source, potential links to other corporate initiatives and priorities, and the cost and feasibility of implementing the reduction actions. Criteria used to evaluate opportunities might include:

- potential for meaningful GHG emissions reductions
- initial project costs and lifecycle costs
- expected financial savings
- availability of resources from various sources including corporate budgets and grants from government and utilities
- payback, return on investment (ROI)
- other benefits, e.g. maintenance savings; capital improvement; improved comfort or productivity; public relations value, etc.

Using the criteria listed above, and any additional criteria identified by the Town, each of the high-potential opportunities will be assessed within the context of a "feasibility matrix". The feasibility matrix will be used to assign the opportunities to one of the following categories of implementation priority: SHORT-TERM (0 – 5 years) / MEDIUM (5 – 10 years) / LONG-TERM (over 10 years).

Task 3: Definition of Reduction Targets

The results of the prioritization will be a primary consideration for the definition of GHG reduction targets. Other considerations in the definition of targets include alignment with the GHG reduction programs that the Town has committed to (CC4CA).

The feasibility matrix results will allow AET to recommend a realistic and achievable GHG reduction target (for both corporate and community) that correspond to each of the implementation priority timeframes. Long-term targets will be defined as well as "interim" goals. The interim goals will serve as the measurable outcomes that are to be accomplished in the interest of advancing the Town towards meeting its longer-term corporate and community GHG reduction target. AET will recommend targets that follow the "SMART" principles: **S**pecific, **M**easurable, **A**ttainable, **R**ealistic, **T**ime-Bound.

Task 4: Implementation and Monitoring Strategy

AET has extensive experience working with organizations in the development of their sustainability implementation and monitoring strategies. Our implementation strategies for sustainability initiatives are based on the classic Plan-Do-Check-Act approach common to management systems (e.g ISO 14001), resulting in a practical, systems-based approach to sustainability implementation that leads to continual improvement.

Given the range of reduction opportunities that will be identified, it is impossible at this time to provide details on the actual implementation steps that will be recommended. These will be described for each of the selected high-priority reduction opportunities in the Climate Action Plan document. However, AET can state with confidence that all implementation strategies that we develop for the Climate Action Plan will adhere to the following principles:

- Implementation must build upon existing efforts within the community to **avoid duplication**;
- Implementation must leverage, align, and guide the existing plans, policies, programs and initiatives that impact energy and GHG reduction planning;
- Implementation must include the definition of **performance indicators** that will be used to monitor progress in achieving the objectives of the Climate Action Plan;
- Implementation must facilitate **cross-departmental/cross-functional collaboration** by breaking down silos within the Town and community;
- Implementation must introduce a **consistent** approach to decision-making;
- Implementation must introduce **accountability** by ensuring individuals/departments/organizations are identified to provide oversight and management of the reduction opportunities;
- Implementation must lead to **continuous improvement** of the management of the reduction opportunity and lead towards achievement of goals that have been defined by the Town.

AET recognizes the need for a robust, defensible, and consistent monitoring procedure to enhance the accuracy and credibility of the Town's GHG reduction efforts. AET has helped numerous clients in the establishment of data monitoring systems that prepare them with a rich set of data and performance indicators that are verifiable and in compliance with industry best practice.

Task 5: Communication and Outreach Strategy

AET will develop a communications strategy to build momentum with the target audiences of the Climate Action Plan, including internal branches and departments of the Town, Council Members, members of the public and other stakeholders. We will build on the success of prior successful engagement and communication initiatives that the Town has led and will also take into account other innovative and effective communication strategies identified in the benchmarking assessment. The communication and outreach strategy may include:

- Development of short, key messages that can be included in staff e-mails, updates, newsletters, bulletin boards and shared on social media;

- Visual showcasing of the outcomes of this process. To implement this, a short video/PowerPoint deck and display materials may be recommended. The video will be appropriate for all audiences and can be showcased on the Town's web site, as well as its Twitter, Facebook and YouTube (and other social media) channels;
- Provide engaging training modules to rally staff around the goals and action items set out in the Climate Action Plan. For example, two high-impact modules could be delivered as lunch and learn sessions. The first could be "the need to lead and take action" which will engage staff as leaders in sustained energy management actions. The second module could be "early wins, sustaining long term action" which will engage participants in identifying actions which they have started, identifying any challenges and possible solutions, and collaborating on tracking and troubleshooting over the long term. It is suggested that this second module could be conducted regularly (biannually) to ensure that staff have the ability to collaborate to ensure sustained learning and action;
- An on-line information portal with links to key reports, opportunity to submit "best practices" which can then be shared corporately and publicly, and contact information to key staff who can assist in troubleshooting any issues as they arise;
- A mechanism to address questions & concerns of Staff and/or other key stakeholders

The goal of these tactics is to prepare for self-sustaining momentum as the program rolls out.

Task 6: Preparation of Climate Action Plan

Note that a draft version of the Climate Action Plan will be provided to the Town for review and comment prior to the issuance of the final version. The Climate Action Plan will contain the following:

- Executive Summary;
- Background and context to the project, including a discussion of any regulatory and voluntary GHG reporting programs that the Town is responding to;
- A review of the process for identifying high potential GHG reduction opportunities;
- Results of the GHG reduction opportunity identification process;
- Results of the ranking and prioritization of high-potential GHG reduction opportunities;
- Details of the process for re-defining GHG reduction targets;
- Details of the implementation and monitoring strategy for each high-potential GHG reduction opportunity;
- Recommended communication and outreach strategy; and,
- Recommended alignment of Climate Action Plan with other municipal policies and plans.

The draft version of the Climate Action Plan will be presented and reviewed with the Town's Green Team Committee via webinar. This will provide an opportunity for the Green Team Committee to ask questions and provide comments to AET prior to the issuance of the final version of the Plan.

The final version of the Climate Action Plan will be presented to Council (in-person) by AET. This will provide an opportunity for Council to ask questions and provide comments to AET prior to formal adoption and acceptance of the Plan.

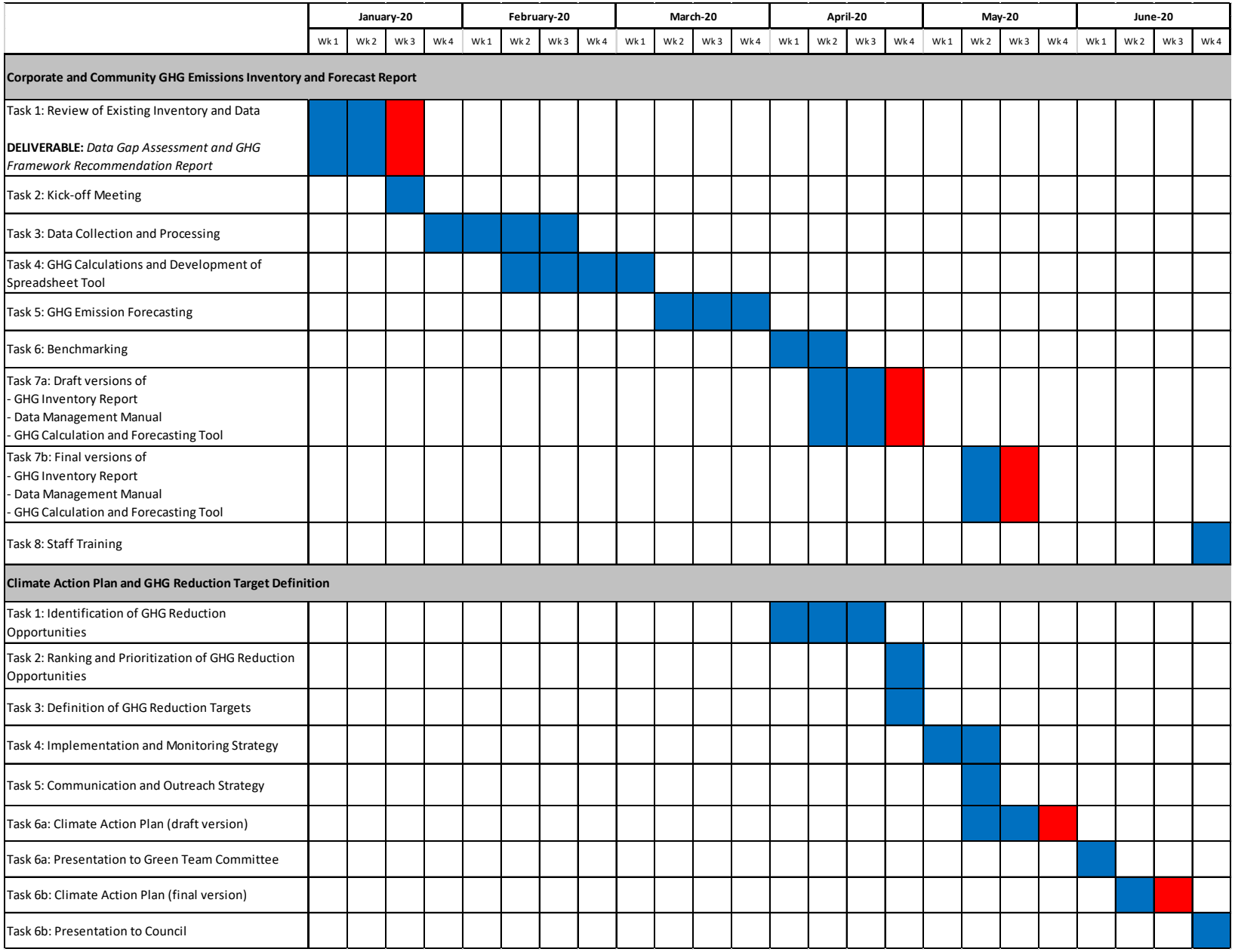
3.3 PROJECT DELIVERABLES

Please refer to the table below for a description of project deliverables and anticipated completion dates (assuming January 1, 2020 project start date).

Anticipated Completion Date	Deliverables
3rd week of January 2020	Data Gap Assessment and GHG Framework Recommendation Report
4th week of April 2020	Draft Versions of: ▪ GHG Inventory Report ▪ Data Management Manual ▪ GHG Calculations and Forecasting Tool
3rd week of May 2020	Final Versions of: ▪ GHG Inventory Report ▪ Data Management Manual ▪ GHG Calculations and Forecasting Tool
4th week of May 2020	Draft version of Climate Action Plan (including GHG reduction targets)
3rd week of June 2020	Final version of Climate Action Plan (including GHG reduction targets)

3.4 WORK PLAN SCHEDULE

The Gantt chart timeline on the following page indicates the performance and delivery dates for project tasks (blue cells) and deliverables (red cells).


January-20
February-20
March-20
April-20
May-20
June-20
Wk 1
Wk 2
Wk 3
Wk 4
Corporate and Community GHG Emissions Inventory and Forecast Report
Task 1: Review of Existing Inventory and Data
DELIVERABLE: Data Gap Assessment and GHG Framework Recommendation Report
Task 2: Kick-off Meeting
Task 3: Data Collection and Processing
Task 4: GHG Calculations and Development of Spreadsheet Tool
Task 5: GHG Emission Forecasting
Task 6: Benchmarking
Task 7a: Draft versions of
- GHG Inventory Report
- Data Management Manual
- GHG Calculation and Forecasting Tool
Task 7b: Final versions of
- GHG Inventory Report
- Data Management Manual
- GHG Calculation and Forecasting Tool
Task 8: Staff Training
Climate Action Plan and GHG Reduction Target Definition
Task 1: Identification of GHG Reduction Opportunities
Task 2: Ranking and Prioritization of GHG Reduction Opportunities
Task 3: Definition of GHG Reduction Targets
Task 4: Implementation and Monitoring Strategy
Task 5: Communication and Outreach Strategy
Task 6a: Climate Action Plan (draft version)
Task 6a: Presentation to Green Team Committee
Task 6b: Climate Action Plan (final version)
Task 6b: Presentation to Council

4. COST OF SERVICES

AET proposes to perform this work on a fixed price basis (including all expenses and disbursements) at a cost of **$42,200 (US Dollars)**. Our fees are based upon the specific scope of work described in this proposal. Variations to the scope of work or time schedule as defined herein if requested by the Town of Mountain Village may require modification of the cost and/or project schedule. Should these conditions be modified during the implementation of the project, no changes to the scope of work defined herein or changes in excess of AET's quoted fee will be incurred without the Town of Mountain Village's prior authorization.

A breakdown of the fixed price according to the primary project deliverables is presented below.

Project Deliverable	Cost ($)
Corporate and Community GHG Emissions Inventory and Forecast Report	$19,900
Climate Action Plan and GHG Reduction Target Definition	$22,300
TOTAL	**$42,200**

APPENDIX A: EXAMPLES OF RELEVANT PROJECT EXPERIENCE

Client	Regional Municipality of Waterloo
Project Date	2012
Expertise Demonstrated	Municipal GHG emissions quantification
AET Team Member	Stephen Boles
Description	AET conducted the third-party verification for the Regional Municipality of Waterloo's community greenhouse gas (GHG) inventory that was prepared to meet the requirements of Partners for Climate Protection (PCP). The verification project required AET to thoroughly review the Region's community GHG inventory and forecast models for data accuracy, data quality, and conformance with both the PCP program and the International Local Government GHG Emission Analysis Protocol.

Client	Municipal Property Assessment Corp. (MPAC)
Project Date	2019 - 2023
Expertise Demonstrated	Organizational GHG reduction plans and targets Energy management planning and conservation
AET Team Member	Stephen Boles
Description	MPAC is the largest assessment jurisdiction in North America, responsible for assessing more than 5 million properties in Ontario. AET was retained by MPAC for a five-year contract beginning in 2019 to develop and manage the organization's GHG inventory and to identify MPAC's GHG reduction opportunities. MPAC's GHG inventory includes GHG emissions from energy consumption in dozens of MPAC offices and hundreds of corporate fleet vehicles. AET identified a range of GHG reduction opportunities for consideration by MPAC, each of which was categorized against several ranking criteria including potential GHG reduction to be realized, implementation cost, payback period.

Client	City of Yellowknife
AET Team Member	Stephen Boles, Selena Fraser-Arvai, Shadnoush Pashaee
Project Date	2019 – 2020
Expertise Demonstrated	Municipal GHG emissions quantification

Description	AET Group has been retained by the City of Yellowknife to quantify the GHG emissions from the City's water and wastewater systems (which includes biomass energy use) and to identify opportunities to enhance carbon sequestration within the City's natural assets (forests, wetlands). Team members Stephen Boles and Selena Fraser-Arvai are leading this project.

Client	Federation of Canadian Municipalities (FCM)
AET Team Member	Selena Fraser-Arvai
Project Date	2019
Expertise Demonstrated	Municipal GHG emissions quantification Data research, collection, and analysis
Description	Ms. Fraser-Arvai (as a subcontractor to Envirings Inc.) served as a GHG expert for municipal sector reseach in waste and wastewater management. Selena was responsible for quantifying the GHG emission reduction potential from a compendium of best-practice activities in the waste sector.

Client	City of Montreal
AET Team Member	Shadnoush Paraee
Project Date	2018 - 2019
Expertise Demonstrated	Municipal GHG emissions quantification Data research, collection, and analysis
Description	AET team member Shadnoush Pashaee prepared the GHG inventory for the City of Montreal as part of her graduate project at Montreal's Concordia University. Shadnoush's project involved the development of quantification models for the following sources of GHG: stationary energy, transportation energy, waste, and wastewater treatment.

Client	Libro Credit Union
AET Team Member	Stephen Boles
Project Date	2017 – 2018
Expertise Demonstrated	Organizational GHG reduction plans and targets Energy management planning and conservation

Description	Libro Credit Union is a financial services organization serving customers across southern Ontario. AET Group was retained by Libro in 2017 to conduct a corporate environmental impacts assessment including water use, waste generation, and energy consumption. AET's assessment involved both desk-top assessments of Libro data and documentation and on-site energy and waste audits. The project also included the development of Libro's baseline GHG inventory and identification of GHG reduction opportunities. Each reduction opportunity identified by AET Group was categorized against several ranking criteria including potential GHG reduction to be realized, implementation cost, payback period.

Client	Ausable Bayfield Conservation Authority (ABCA)
AET Team Member	Stephen Boles
Project Date	2014
Expertise Demonstrated	Community engagement and outreach
Description	AET conducted an assessment of the carbon sequestration potential of existing forest lands and new forest planting projects within the watershed managed by the ABCA. AET also reviewed existing and future opportunities (e.g. carbon offsets) for the ABCA to generate additional revenue sources from the carbon sequestration of its managed lands. One outcome of this project was the 'Footprint to Forests' program, a local fund-raising effort to generate funds for increased tree planting initiatives in the ABCA watershed. AET was intimately involved in the planning and implementation of outreach efforts for the program.

Client	Environment and Climate Change Canada (ECCC)
AET Team Member	Stephen Boles
Project Date	2018 - 2019
Expertise Demonstrated	Data research, collection, and analysis
Description	AET Group was retained by ECCC to develop a public-facing tool for the calculation of GHG from the treatment and disposal of organic waste. The calculator will be used by both public-sector and private-sector stakeholders, including municipal governments. In the development of the calculator AET conducted an extensive review of existing calculation tools and best practices in organic waste GHG calculations. AET solicited feedback at various stages of the project from a stakeholder advisory group with pan-Canadian representation.

Client	County of Huron
AET Team Member	Stephen Boles
Project Date	2014 – 2015
Expertise Demonstrated	Community engagement and outreach Sustainability
Description	AET led the development of a 'Sustainable Manufacturing Toolkit' to introduce the principles of corporate sustainability to the manufacturing sector in Huron County. AET engaged extensively with stakeholders (Huron Manufacturing Association, Huron Sustainability Steering Committee) to obtain feedback on the toolkit and to promote its availability. Following the completion of the Huron County project, AET developed an improved version of the toolkit that could be applied to any industry sector. This proprietary sustainability implementation process has become a fundamental approach that AET follows with our clients and will be included as a value-added component of our work with the Town of Mountain Village.

APPENDIX B: CVs OF TEAM MEMBERS

BIOGRAPHY

Stephen is the Manager of Greenhouse Gas (GHG) and Sustainability Services with AET Group. Stephen has been active in the climate change community as a scientist and consultant for over 18 years. Stephen received his Master of Science degree from the University of Alaska Fairbanks in 1998 and spent the next eight years working as a scientist at one of the world's leading climate change research centres at the University of New Hampshire. He researched how changes in the management of agriculture and forestry land uses influence GHG emissions.

As a consultant, Stephen has led or participated in numerous environmental compliance engagements pertaining to both the federal and provincial levels. He has led GHG management projects (GHG quantification, GHG verification) for dozens of clients in various industry sectors, including several Fortune 500 multinationals. In addition, Stephen has managed projects in a range of other areas pertaining to sustainability, including carbon offset development, life cycle assessments, risk and opportunity planning, and corporate sustainability implementation. Stephen served on the international working group that conducted the recent review of the ISO 14064 family of GHG management standards.

EMPLOYMENT HISTORY

AET Group Inc. – Manager, GHG & Sustainability Services

Kitchener, Ontario, Canada — June 2015 to present

Stephen oversees business development activities such as proposal writing and client relationship development. Stephen also manages and provides consulting expertise for GHG and sustainability projects for a wide range of public sector and private sector clients

Kuzuka Ltd. – President

Exeter, Ontario, Canada — June 2006 to May 2015

Stephen was the founder and President of Kuzuka and grew the firm into a credible and sought-after GHG and sustainability services consulting firm. Stephen oversaw all business development activities such as proposal writing and client relationship development. Stephen also managed and provided consulting expertise for GHG and sustainability projects for a range of public sector and private sector clients

University of New Hampshire – Research Scientist

Durham, NH, USA — February 1999 to May 2006

Stephen spent eight years working as a scientist at the University of New Hampshire as a member of the research team that developed the Denitrification-Decomposition (DNDC) model for agricultural nutrient cycling applications. DNDC is currently being used by the Canadian federal government to improve agricultural GHG emission factors and has been adopted by the State of California as the primary tool for developing GHG emission estimates in the new rice agriculture offset protocol.

Education

- B.Sc., Bachelor of Science (Geography), University of Waterloo
- M.Sc., Master of Science (Natural Resources Management), University of Alaska, Fairbanks

Certification/Training

- CSA Greenhouse Gas (GHG) Verification Course
- Certified Environmental Professional (EP), Canadian Environmental Certification Approvals Board

Areas Of Expertise

- Environmental Compliance Auditing
- Greenhouse Gas Management
- Corporate Sustainability Management
- Greenhouse Gas Verification

SELECT PROJECT HIGHLIGHTS

Greenhouse Gas Management & Verification

Role: Lead Verifier
Client: Alberta Ministry of Environment and Parks
Location: Edmonton, Alberta, Canada
Duration: August 2015 – present
Activities: Stephen led government verifications of several carbon offset projects (conservation cropping, wind energy, energy efficiency, cattle feeding), facility emissions compliance reports (oil and gas sector) and renewable fuels standard compliance against the province of Alberta's GHG regulations (SGER, CCIR) and Renewable Fuels Standard.

Role: Lead Verifier
Client: Cigna Insurance
Location: Hartford, Connecticut, USA
Duration: December 2015 – present
Activities: Cigna is one of the largest providers of private health insurance in the USA. Since 2015 Stephen has led the verification of Cigna's GHG emissions.

Role: Lead Verifier
Client: Eaton Corp.
Location: Cleveland, Ohio, USA
Duration: November 2011 – present
Activities: Eaton Corp. is a manufacturer of automotive and electrical components, employing over 100,000 people in nearly 300 manufacturing facilities around the world. Since 2011, Stephen has led the verification of Eaton's global energy and GHG emissions and has served as the lead verifier of Eaton's corporate Zero Waste to Landfill program.

Role: Lead Verifier
Client: Regional Municipality of Waterloo
Location: Waterloo, Ontario, Canada
Duration: March 2012 – May 2012
Activities: Stephen led the verification of the Region of Waterloo's community GHG inventory as part of a program for Canadian municipalities to develop GHG inventories and GHG reduction plans, *Partners for Climate Protection*

Role: Lead Verifier
Client: SAI Global
Location: Toronto, Ontario, Canada
Duration: July 2014 - present
Activities: As a sub-contractor to SAI Global, Stephen is the lead verifier of GHG emission reports in multiple industry sectors (food manufacturing, paper manufacturing, institutional, pharmaceuticals) that must be verified to meet the requirements of the province of Ontario's mandatory GHG reporting regulation

Role: GHG Management Expert
Client: Algonquin Power and Utilities Corp. (APUC)
Location: Oakville, Ontario, Canada
Duration: 2014, 2018
Activities: APUC is a leading Canadian-based power-generation and utility company.

Stephen led a comprehensive review and assessment of APUC's GHG management and reporting system to identify areas of opportunity for efficiency and accuracy improvement.

Role: GHG Inventory Development
Client: Public sector property assessment organization
Location: Toronto area, Canada
Duration: 2019 - 2021
Activities: The client is a public sector organization that oversees Ontario property assessment. Stephen led the development of the organization's GHG inventory and reduction strategy.

Sustainability Projects

Role: Carbon Opportunities Consultant
Client: Ausable Bayfield Conservation Authority (ABCA)
Location: Exeter, Ontario, Canada
Duration: September 2011 – December 2011
Activities: Conducted an assessment of the carbon sequestration potential of existing forest lands and new forest planting projects within the watershed managed by the ABCA.

Role: Team Member (Corporate Sustainability Plan)
Client: Food manufacturer
Location: Toronto are, Canada
Duration: 2012 - 2013
Activities: Stephen was on a team that developed the corporate sustainability plan for one of Canada's most recognizable food manufacturers. The plan included an assessment of internal actions and supply chain initiatives.

Role: Project Manager (Environmental Impacts and Reduction Assessment)
Client: Southern Ontario credit union
Location: Southern Ontario, Canada
Duration: 2017
Activities: Stephen was the project manager for an environmental impacts assessment of a southern Ontario credit union that included energy, water, waste and air emission assessments along with recommendations on footprint reduction strategies.

Role: Project Manager (Organic Waste GHG Calculator)
Client: Environment and Climate Change Canada (ECCC)
Location: Gatineau, Quebec
Duration: 2018 - 2019
Activities: Stephen is the project manager in the development of an organic waste GHG calculator for ECCC. The tool will be an improved version of the existing ECCC Waste GHG Calculator, and will provide increased functionality to stakeholders in the management and planning of organic waste GHG reduction strategies.

Role: Project Manager (Industry Verification Strategy)
Client: National Milk Producers Foundation (NMPF)
Location: Washington DC
Duration: 2018 - 2019
Activities: Stephen is the project manager in the development of an industry-wide GHG verification strategy for the US dairy sector.

BIOGRAPHY

Evan Jones is a Senior Project Consultant within the GHG and Sustainability Division at AET Group (AET). Evan has reviewed over a dozen GHG reduction projects including building energy efficiency; wind power; landfill gas; reforestation; hydroelectricity; solar PV; integrated solar; transportation switching; biogas digester; and wood waste electricity generation under the Technology Early Actions Measures program. Additionally, Evan has verified over 75 building based GHG inventories for LEED EAcg applications and developed/adapted GHG project documents for Landfill Gas Capture and Solar Swimming Pool heating projects, all posted on the CSA CleanProject Registry. Evan is a registered Professional Engineer and holds a Bachelor of Applied Science in Mechanical Engineering along with a Bachelor of Science in Mathematics and Physics.

PROFESSIONAL EXPERIENCE

- As the Energy and Sustainability Information Manager for Brookfield Global Integrated Solutions (BGIS), Evan streamlined energy and GHG reporting for approximately 50,000 buildings in North America and completed on-going quality control, energy savings calculations, energy benchmarking, and improvement of software tools and associated written processes. Evan prepared GHG inventories for CIBC bank, TD bank, TELUS, BMO, Purolator, Canada Post, Bell Canada and was an active participant in the technical committee input into updating of ISO 14064 series of standards.

- As Principal for 3P Analysis and Consulting, Evan completed verification of building GHG inventories for LEED EAc6 applications and reviewed a variety of Greenhouse Gas projects including transportation switching, solar cooling and heating, and building energy and efficiency. Evan participated in federal government consultations into “Design and Implementation of a Greenhouse Gas Offset System for Canada,” and reviewed energy savings results for over two dozen buildings as part of Energy Performance Contracts carried out by Cinergy Solutions.

- As a Technical Representative for Voluntary Challenge and Registry Inc., Evan prepared technical summary documents for Champions in Action group. Evan reviewed and validated GHG projects related to biogas digester, wind generated electricity, wood waste electricity generation, and building energy efficiency. He developed specifications for a web-based individual GHG calculation tool; modified, enhanced, and maintained CO2 Tool spreadsheet for calculating GHG emissions; participated in a GERT pilot program and Technical Review of British Columbia Buildings Corporation energy efficiency project; assisted in development and presentation of workshop materials for small and medium sized companies under the Environmental Supply Chain Management pilot program; and assisted in the development of the Telework registry website and teleTRAC software tool.

- As an Energy Analyst Specialist for Vestar/Rose Technology Group, Evan participated in first Canadian emission reduction trade based on energy efficiency project and supervised the Energy Analysis Group, who were responsible for collecting, entering, and analyzing utility bill information for savings calculations and project development; maintenance of weather and utility rates; hourly building simulation; and various internal reporting activities. Evan developed section 6.1 of ASHRAE Guideline 14P Measurement of Energy and Demand Savings; continued the development

Education

- B.A.Sc., Mechanical Engineering, University of Waterloo
- B.Sc., Mathematics and Physics, University of Toronto

Certification / Training

- Professional Engineer, Ontario
- Designated trainer for all of CSA delivered GHG courses related to ISO 14064 standard.
- Certified GHG Inventory Quantifier and GHG Verifier
- Updated CSA GHG Verification course in 2016 with new material
- Certified ISO 9001 Integrated Management Systems Lead Auditor

Areas of Expertise

- GHG Verifications
- GHG Inventory Quantification
- Building energy use analysis, modeling, and savings calculations.
- Building energy benchmarking, data compilation, and analysis.

of a computer software to handle deregulated utility environments, additional cost criteria, greenhouse gas emission calculations and automated uploading of utility data; developed action plan to integrate waste audit/management services into company offering; and developed company internal waste reduction, composting and recycling programs. Through his work, Evan decreased the turnaround time of energy analysis requests from 5 to 2 days, created a chargeback system for utility rate and weather data maintenance, resulting in over $30,000 of direct profits in a two-year period, and developed automated electronic weather data retrieval software which saved over $40,000 annually.

PROFESSIONAL TRAINING

- "ISO 9001 Quality Management Systems (QM), Management Systems Auditing (AU) and Leading Management Systems Audit Teams (TL)", 5-day training, Feb 22-26, Markham, 2016

- "ISO14064-1 Essentials GHG Emissions Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals", 2-day training, covering ISO standard for GHG inventories. Nov 26-27, Toronto, 2007

- "ISO14064-2 Essentials GHG Emissions Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements", 2-day seminar covering ISO standard for GHG projects. Nov 28-29, Toronto, 2007

- "GHG Project Essentials and Validation and Verification Course", 5-day training, covering quantification, validation and verification of GHG projects. June 6-10, Toronto, 2005

- Participation in American Society of Heating, Refrigeration and Air-Conditioning Engineers committee developing Guideline 14 'Measurement of Energy and Demand Savings, 1997-2001

BIOGRAPHY

Shadnoush Pashaee is a Project Consultant within the GHG and Sustainability Division at AET Group (AET). Shadnoush has over 9 years of experience in the Construction and Environmental fields managing and leading a team. Her experience and strong interpersonal and organizational skills help assist with the success of GHG and Sustainability projects. Shadnoush holds a Master of Science, Master of Architecture, and Bachelor of Architecture.

PROFESSIONAL EXPERIENCE

- As a Research Assistant at Concordia University, Shadnoush developed a methodology on municipal GHG emissions and completed an assessment of GHG emissions in Montreal Islands, using the results to create a database for urban GHG emission assessments.
- As Head Designer at Kayson, Shadnoush managed construction sites, focusing her expertise on energy efficiency in buildings. She developed the initial Energy Audit based on client information and maintenance records and used the collected information to design building infrastructure details.
- As a Coordinator Assistant at Fildeh Company, Shadnoush completed extensive research on building energy efficiency and simulated energy performance in buildings.
- As a Permit Coordinator at Tehran Municipality, Shadnoush completed in-depth technical reviews of project documentation and performed quality control of building energy efficiency. She prepared applications for planning and building control departments and drew up land use plans designating residential, industrial, and green areas. Additionally, she supervised the construction of homes in consultation with housing associations.

PRESENTATIONS

- An Assessment of Greenhouse Gas Emissions from Municipal Activities, CSCE 2019, Laval.
- Assessment of Greenhouse Gas Emissions from Montreal Island, Energir 2019, Montreal.
- Role of Public Transportation in Mitigation Municipal GHG Emissions, Tehran Municipality 2016, Tehran.

CONFERENCE PAPERS

- S. Farahani, C. An Assessment of Greenhouse Gas Emission from Municipal Activities, 17th International Environmental Specialty Conference, CSCE 2019, Laval, QC, Canada, 2019.
- S. Farahani, N. Sadeghi Factors Contributing to Energy Efficiency in Buildings, 1st International Civil Engineering and Energy Conference, Iran, 2016.

Education

- M.Sc., Concordia University. Thesis: Assessment of GHG emissions in Montreal Island
- M.Arch., Azad Yazd University. Thesis: Design a center by consideration of energy efficiency
- B.Arch., Yazd University

Awards

- Split Concordia Merit Scholarship, Concordia University
- Ministry of Science Scholarship, Yazd University

Areas of Expertise

- GHG Emissions
- Project Organization
- Team Management
- Energy Efficiency
- Auto Cad
- Matlab
- Revit

Selena Fraser-Arvai, P.Eng., M.Eng.

Education

- M.Eng., Environmental Engineering, Carleton University, 2008
- B.Eng., Environmental Engineering, Carleton University, 2005

Certifications and Training

- Licensed Professional Engineer, Province of Ontario, 2012
- World Bank Cities & Climate Change Leadership, 16-hr e-Training Course, 2011
- GHGenius Training, 8-hr Lifecycle Modelling Training Course, 2011
- Canadian Standards Association (CSA) Certified Greenhouse Gas Inventory Quantifier (GHG-IQ Certificate #0024B), 2009
- CO_2 Introductory Training and Offset Project Development, 16-hour Training Course, 2009

Experience overview

Ms. Fraser-Arvai has twelve years of experience identifying, quantifying and verifying GHG and CAC emissions. She has provided her GHG expertise to numerous projects spanning voluntary quantification to mandatory reporting for government compliance, in all major sectors (including industrial, commercial, residential, transportation and waste). She has also carried out GHG reduction estimation and validation to comply with government program funding requirements.

She has recently provided her GHG quantification expertise to a project that involved developing GHG reduction estimates of best-practice initiatives in the waste sector for the Federation of Canadian Municipalities (FCM).

She has acted as associate verifier, lead verifier and/or designated signing authority for GHG verifications for both compliance purposes as well as GHG offset projects.

Her expertise is rounded out with experience in assessing climate change impacts and adaptation measures; environmental impact assessment; environmental processes and systems; and program, policy and project evaluation.

Ms. Fraser-Arvai is registered as a Professional Engineer in the Province of Ontario.

Project Experience

Selena Fraser-Arvai Consulting

GHG Review, Roseburg Forest Products, 2019. Sub-contractor to Welburn Consulting. Ms. Fraser-Arvai ensured Roseburg Forest Product's voluntary application under Environment and Climate Change Canada's Output Based Pricing System adhered to all regulatory guidelines and requirements.

GHG Quantification and Review Services, Shopify, Inc. 2019. Ms. Fraser-Arvai provided GHG quantification and review services for a sub-set of Shopify Inc.'s operations.

GHG Expert for Municipal Sector Research in the Area of Waste, Federation of Canadian Municipalities (FCM), 2019. Ms. Fraser-Arvai was part of Envirings Inc.'s team, responsible for quantifying the GHG emission reduction potential from a compendium of best-practice activities in the waste sector.

QA/QC Services, Welburn Consulting, 2018-2019. Ms. Fraser-Arvai provided QA/QC services for several projects involving emissions reporting for compliance purposes (Ontario).

Updating GHG Quantification Methodologies CN Railways, 2018. Sub-contractor for Delphi Group. As a sub-contractor to Delphi Group, Ms. Fraser-Arvai was tasked with reviewing and updating the GHG quantification methodologies used for reporting on CNs Scope 3 emissions.

Electric Mobility Assessment, City of Toronto, 2018. Sub-contractor for Delphi Group. Ms. Fraser-Arvai was a sub-contractor for the Delphi Group on a project identifying electric mobility needs and barriers for the City of Toronto.

Low-Carbon Heating Options for Ontario, Ontario Ministry of the Environment and Climate Change (MOECC), 2018. Sub-contractor for Posterity Group. Ms. Fraser-Arvai was a sub-contractor for the Posterity Group, providing technical GHG expertise related to GHG quantification methods and protocols.

Accelerating the Deployment of Zero-Emission Vehicles (ZEVs), Natural Resources Canada (NRCan), 2017-2018. Sub-contractor for Delphi Group. Ms. Fraser-Arvai was a sub-contractor for the Delphi Group on a project aimed at identifying barriers to accelerating the deployment of zero-emission vehicles in two regions of Canada.

While employed at Marbek/ICF-Marbek/ICF

GHG Verification, Multiple Clients, 2017. Ms. Fraser-Arvai was the lead verifier and/or designated signing authority for several vintage- year 2016 GHG offset projects and compliance verifications in Alberta, Canada.

GHG Inventory, Constellation Brands, 2017. Ms. Fraser-Arvai was responsible for data synthesis and analysis for various transportation modes used by Constellation Brands.

Compliance Instrument Tracking System Service (CITSS) Support, Western Climate Initiative (WCI), 2017. Ms. Fraser-Arvai was responsible for managing the internal team providing as well as client liaison and ensuring contractual arrangements were upheld.

CME Smart Green Program Support, StormFisher Environmental Ltd., 2017. Ms. Fraser-Arvai was responsible for overseeing a team tasked with estimating the energy and GHG savings potential of various energy efficiency projects that could be carried out at StormFisher's biogas facility. The project included the analysis as well as preparing a technical report for submission to the CME.

Final GHG Report, City of Medicine Hat, 2017. Ms. Fraser-Arvai was responsible for compiling existing information into a final GHG report for a solar concentrator (energy generation) project carried out by the City of Medicine Hat, for submission to the CCEMC.

Strategic Environmental Assessment (SEA), Infrastructure Canada, 2016. Ms. Fraser-Arvai was co-researcher and report writer for an SEA for Infrastructure Canada, which involved detailed analysis of environmental effects (positive and negative), completed in accordance with the Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals (2010); work also includes recommendations to mitigate adverse environmental effects or enhance positive effects.

Hotels/Motels & Greenhouses Market Characterization and Achievable Potential, Niagara Peninsula Energy Inc., 2014. Ms. Fraser-Arvai was responsible for researching and reporting on CDM measures in the hotel/motel sector and carrying out interviews with prospective channel partners and influencers.

Retail Council of Canada (RCC) Energy Bright Initiative, 2014. Ms. Fraser-Arvai was responsible for client liaison and assisting these clients in applying for and receiving rebates related to energy efficiency improvements in the commercial sector.

Guidance Document for Canadian Jurisdictions: Options for Addressing Air Pollutant and Greenhouse Gas Emissions from the In-use Diesel Fleet, Canadian Council of Ministers of the Environment (CCME), 2014-2015. Ms. Fraser-Arvai was responsible for researching and reporting on information to assist in developing policy and program option profiles, evaluating these policy and program options, developing case studies, and producing recommendations for best practices in the Canadian context.

Identifying Priority Emission Sources Responsible for Local Anthropogenic Fine Particulate Matter and **Ozone in the Calgary Region Airshed Zone, Calgary Region Airshed Zone (CRAZ), 2014.** Ms. Fraser-Arvai was project manager and responsible for reporting, analysis and review. The project identified emission sources which could be targeted by CRAZ to improve air quality in the region.

Development of CO2 Emission Quantification Methods for Primarily Natural Gas-Fuelled Electricity Generating Units, Environment Canada, 2014. Ms. Fraser-Arvai was responsible for researching, reporting, and identifying the most appropriate CO2 and energy production methodologies for EGUs fuelled primarily with natural gas.

Verification of Specified Gas Emitters Regulation Assertions in the Upstream Oil and Gas Sector, Shell Canada Limited, 2014. Ms. Fraser-Arvai was associate verifier, responsible for reviewing proponent documentation and verifying GHG emission assertions for three sour gas processing facilities in Alberta.

Verification of Emissions Trading Regulation Credit Applications in the Power Generation Sector, ATCO Power, 2011-2012. Ms. Fraser-Arvai was associate verifier, responsible for reviewing proponent documentation and verifying NOX and SO2 emission quantification and credit applications for six power generating facilities in Alberta.

Verification of Specified Gas Emitters Regulation Assertions in the Power Generation Sector, ATCO Power, 2011-2012. Ms. Fraser-Arvai was associate verifier, responsible for reviewing proponent documentation and verifying GHG emission assertions for three power generating facilities in Alberta.

Verification of GHG Offset Projects, Multiple Clients, 2012. Ms. Fraser-Arvai was associate verifier for a number of GHG Offset Projects situated in Alberta, Canada, including projects pertaining to Acid Gas Injection, Enhanced Oil Recovery and Landfill Gas Combustion for energy.

Canadian Offset Supply, Alberta Environment and Sustainable Resource Development, 2012. Ms. Fraser-Arvai was responsible for developing and implementing a method to estimate the technical and realized potential of the number of carbon offsets that could come on-line over the time frame of 2013-2020 for the following offset types: Solution Gas Conservation, Wind Energy, Carbon Capture and Storage and Nitrous Oxide Reductions from Agriculture. The analysis was done at the Provincial level.

Saskatchewan Offset Supply, Saskatchewan Ministry of Environment, 2012. Ms. Fraser-Arvai was responsible for estimating the number of offsets that could come on-line in Saskatchewan over the time frame 2013-2020 for the following offset types: Solution Gas Conservation, Wind Energy, and Landfill Gas Capture and Utilization.

Estimating the Impacts of Proposed NO_X Emission Limits on NO_X Emissions in Alberta and Northeastern British Columbia, Canadian Association of Petroleum Producers (CAPP)/Encana, 2012. Ms. Fraser-Arvai was responsible for estimating NO_X emission reduction potential for several proposed emission limit scenarios on reciprocating engines that run on natural gas.

Assess BLIERS for Petroleum Refineries, Environment Canada, 2011-2012. Ms. Fraser-Arvai was responsible for gathering and synthesizing information from U.S. EPA Consent Decrees of key emission sources to assist Environment Canada in setting Base Level Industrial Emission Requirements (BLIERs) for the petroleum refining sector.

Background Study on Existing Quantification Methods for Estimating and Monitoring of Criteria Air Contaminants (CAC) from Cement Manufacturing, Environment Canada, 2011. Ms. Fraser-Arvai was responsible for researching the various quantification methods, template development, analysis and reporting.

Third-Party Review of the Home Energy Savings Program and Ontario Solar Thermal Heating Incentive Program, Ontario Ministry of Energy, 2012. Ms. Fraser-Arvai was responsible for reviewing the methodology utilized by the Ministry of Energy in calculating the GHG emissions savings of the Home Energy Savings Program (HESP) and the Ontario Solar Thermal Heating Incentive Program (OSTHI). Ms. Fraser-Arvai reviewed the methodology for adherence to accepted GHG quantification practices and emission factors and provided recommendations for improvement.

Costing Climate Impacts and Adaptation: A Canadian Study on Human Health, National Round Table on the Environment and the Economy (NRTEE), 2010. Ms. Fraser-Arvai was responsible for carrying out the majority of tasks related to this project with specific duties including identifying and extracting appropriate climate models and data, liaising with subject matter experts, assisting in the development of damage functions, developing a tool to quantify heat-related impacts, the monetary valuation human health impacts using Health Canada's Air Quality Benefits Assessment Tool (AQBAT), developing high level cost curves for air pollutant reductions, estimating adaptation costs and benefits, presentation preparation and delivery, report preparation and client liaison.

City of Yellowknife Greenhouse Gas Emissions Inventory (2009) Update, City of Yellowknife (sub-contract to Cambria Marshall Cote Ltd.), 2011-2012. Ms. Fraser-Arvai was project manager. Ms. Fraser-Arvai reviewed the model used to develop the previous GHG Inventory for applicability and subsequently updated it and then used the updated model to develop the 2009 GHG Inventory for the City of Yellowknife. She was also responsible for report preparation and client liaison.

Energy Management Literature Review and Needs Analysis for the Commercial and Institutional Buildings Sector. Natural Resources Canada-Office of Energy Efficiency, 2011. Ms. Fraser-Arvai was responsible for data analysis on survey results and preparing presentation materials for the client.

Assessing the Carbon Footprints of Events and Organizations, Tree Canada, 2010. Ms. Fraser-Arvai was responsible for quantifying GHG emissions associated with specific activities and assisted in data collection template design.

Validation of Emission Reductions of Sustainable Development Canada Projects in the Transportation Sector, Sustainable Development Technology Canada (SDTC), 2009. Ms. Fraser-Arvai was responsible for validating the emission reduction claims of two HDDV technologies as well as report preparation.

SPECIATE support for US GHG Inventory, US EPA, 2011. Ms. Fraser-Arvai was responsible for mining the US EPA SPECIATE database for black carbon emission rates from mobile sources, which were used to update emission factors used to develop the US GHG Inventory.

Analysis of Options to Accelerate Removal or Repair of Gross Emitting Light-Duty Vehicles in Alberta, Alberta Environment, 2009. Ms. Fraser-Arvai was responsible for researching various policy and program options aimed at removing gross-emitting vehicles from roadways. Using information on the performance of the policies/programs in other jurisdictions, Ms. Fraser-Arvai developed a tool to estimate the expected emissions reductions and cost for the three different program scenarios.

Environmental Impacts of Combined Heat and Power. Canadian Energy Partnership for Environmental Innovation (CEPEI), 2012. Ms. Fraser-Arvai was responsible for reviewing emission related tools and documents.

Program Evaluation: eco–Nova Scotia, Department of Environment / eco–Nova Scotia, 2011. Ms. Fraser-Arvai was responsible for the technical evaluation of energy savings claims of various projects proponents, developing and updating emission factors to be used in the analysis, developing an in-house database to track information on the various projects, developing an energy savings and emission reductions tool, as well as quantifying the monetary benefits associated with air pollutant emission reductions (in terms of human health).

Evaluation of Natural Resources Canada's Commercial, Institutional and Industrial Energy Efficiency Programs, Natural Resources Canada, 2009-2010. Ms. Fraser-Arvai was involved in nearly every aspect of the study and was responsible for developing an in-house database of all projects within each program, secondary data analysis, auditing of the claimed energy savings, survey development, calculating and justifying final energy and GHG savings, report and presentation preparation and client and sub-contractor liaison.

Analyzing the Economic Impacts of Climate Change for Canada, Environment Canada, 2009. Ms. Fraser-Arvai was responsible for researching the models and methods, analysis and reporting.

Assessing the Economic Value of Protecting the Great Lakes, Ontario Ministry of Environment, 2010. Ms. Fraser-Arvai was responsible for carrying out the literature review and report writing in the first phase of this project. In the third phase, she was responsible for estimating the total cost of low impact design measures that were assumed in the Rouge River Watershed modelling study. This involved researching costs associated with measures such as green roofs, infiltration beds, etc. and carrying out engineering calculations for sizing each of the measures, based on assumed precipitation and flow rates in the area.

Economic Forecasts and Water Use Information for Canada's Natural Resource Sectors, National Round Table on the Environment and the Economy (NRTEE), 2009. Ms. Fraser-Arvai was responsible for researching the economic forecasts in the agriculture, mining, forestry and energy sectors, analysis and reporting.

Evaluation of the Sask-Power Project: Benefit Assessment of Mercury Emission Reductions, Sustainable Development Technology Canada, 2009. Ms. Fraser-Arvai was responsible for researching and identifying damage costs associated with mercury emissions.

Consulting Services for Air Quality Benefits Assessment Tool (AQBAT), Regional Municipality of Peel, 2009. Ms. Fraser-Arvai was responsible for monetizing health impacts using Health Canada's Air Quality Benefits Assessment Tool (AQBAT). In addition, Ms. Fraser-Arvai developed training materials and conducted a training session for the Region staff in order to develop internal capacity to perform Air Quality Benefits Assessment Modeling.

Estimated Environmental Impacts of Canada's Green Municipal Fund Implementation Projects, Federation of Canadian Municipalities (FCM), 2008. Ms. Fraser-Arvai was responsible for updating emission factors used in the analysis as well as updating the method used to quantify environmental impacts (air) of waste projects.

Support to Rail Air Emission Regulations, Transport Canada, 2011. Ms. Fraser-Arvai was responsible for noting and synthesizing comments received at the consultation sessions, preparing summary reports as well as the economic valuation of air quality improvements and report preparation.

Quantification of Air Quality Benefits of Rail and Marine Technologies, Sustainable Development Technology Canada (SDTC), 2010. Ms. Fraser-Arvai developed the study methodology and was responsible for carrying out the human health impact and valuation modelling using Health Canada's Air Quality Benefits Assessment Tool (AQBAT).

Evaluation of Total Cost of Air Pollution Due to Transportation in Canada, Transport Canada (subcontract for RWDI), 2008. Ms. Fraser-Arvai was responsible for modelling the human health benefits associated with air quality improvements (in monetary terms) using Health Canada's Air Quality Benefits Assessment Tool (AQBAT).

Clean Air Portfolio Evaluation, Sustainable Development Technology Canada (SDTC), 2009. Ms. Fraser-Arvai developed the analysis method and was responsible for identifying the sectors which would likely lead to the greatest benefits in terms of air quality improvements. The method involved comparing Environment Canada's Air Pollutant Emissions Inventory against data measured by Environment Canada's National Air Pollution Surveillance (NAPS) Network. Ms. Fraser-Arvai was also responsible for the economic valuation of air quality impacts associated with emissions from heavy-duty diesel vehicles in Canada using Health Canada's Air Quality Benefits Assessment Tool (AQBAT).

Low Impact Development Discussion Paper. CVC, TRCA and LSRCA, 2011. Ms. Fraser-Arvai provided research and writing support for the project.

Light Emitting Diode (LED). Natural Resources Canada, 2009. Ms. Fraser-Arvai was responsible for researching LED technology and preparing content for the Office of Energy Efficiency's website.

2009-2010 Multi-Family Building (MFB) Program Evaluation, Ontario Power Authority (OPA), 2011. Ms. Fraser-Arvai was responsible for evaluating the savings claims of the Toronto Hydro energy efficiency projects, which included a number of on-site visits.

Canadian Integrated Watershed Management: A Scoping Study. Canadian Council of Ministers of the Environment (CCME), 2011. Ms. Fraser-Arvai was responsible for researching IWM in Canadian and International jurisdictions.

Reducing the Carbon Footprint of Canada Day. National Capital Commission (NCC), 2011. Ms. Fraser-Arvai provided expert technical support to the project.

Enbridge Gas Distribution High Performance New Construction Program Support, Enbridge Gas Distribution, 2011. Ms. Fraser-Arvai was responsible for project evaluation including technical evaluation of pre-approved applications.

Municipal Energy Performance Benchmarking Project, Local Authority Services, 2010. Ms. Fraser-Arvai was responsible for the technical evaluation of survey responses, including energy use of various facilities involved in the study.

Advancing Opportunities in Energy Management in Ontario's Industrial and Manufacturing Sector, Canadian Manufacturers and Exporters (CME), 2009. Ms. Fraser-Arvai was responsible for the technical analysis of information provided by facilities, including energy using equipment.

National Renewable Diesel Demonstration Initiative (NRDDI) Final Report, Natural Resources Canada, 2009-2010. Ms. Fraser-Arvai was responsible for developing assessment templates, reviewing reports and analysis.

Inventory & Assessment of Sustainable Community Best Practice Implementation Guides for the Canadian Housing Sector, Canada Mortgage and Housing Corporation (CMHC), 2009. Ms. Fraser-Arvai was responsible for researching existing guidance and preparing templates.

While employed at GENIVAR (now WSP)

Interprovincial Crossings Environmental Assessment Study - Air Quality Assessment, Transports Quebec/Ontario Ministry of Transportation/National Capital Commission, 2008. Ms. Fraser-Arvai performed the air quality assessment for the Interprovincial Crossings Environmental Assessment Study, for both GHGs and CACs.

Jockvale Widening Environmental Assessment - Air Quality Assessment, Ontario Ministry of Transportation, 2008. Ms. Fraser-Arvai performed the air quality assessment for the Jockvale Widening Environmental Assessment.

Research jointly funded by Carleton University and Environment Canada

Real World Test Cycle Development, Emission Rates and Fuel Consumption for Selected Off-Road Spark-Ignited and Compression-Ignited Engines, Environment Canada/Carleton University, 2008. Ms. Fraser-Arvai researched the impacts of emissions test cycles on fuel consumption and emission rates for a sample of off-road engines.

Speciated Hydrocarbon and Carbonyl Compound Emissions from Selected Off-Road Spark-Ignited Engines, Environment Canada/Carleton University, 2008. Ms. Fraser-Arvai developed speciation profiles for a sample of off-road vehicles, which were based on the emissions test results of the above project. The speciation profiles were compiled for submission to the U.S. EPA SPECIATE database.

Professional Affiliations

Professional Engineers Ontario (PEO)

Air & Waste Management Association (A&WMA)

Canadian Standards Association (CSA)

Employment History

Independent Consultant	Independent Consultant	2017-present
ICF	Senior Associate	2012–2017
ICF Marbek	Associate	2011–2012
Marbek Resource Consultants	Consultant	2008–2011
GENIVAR	Junior Engineer	2008
Environment Canada/Carleton University	Graduate Research Assistant/Emissions Analyst	2006-2008
Carleton University	Engineering Recruitment Officer	2005–2006