City of Ketchum

CITY COUNCIL MEETING AGENDA MEMO

Meeting Date:	April 3, 2023	Staff Member/Dept:	Paige Nied, Associate Planner Planning and Building Department

Agenda Item:	Recommendation to review information and provide policy direction regarding snowmelt allowance within the public rights-of-way.

Recommended Motion:

No motion required. Requesting feedback on policy direction.

Reasons for Recommendation:

- Ketchum adopted Resolution 20-031 on December 21, 2020, which set a goal to achieve 100% clean energy for all energy use in the community by 2045. On January 24, 2020, the City of Ketchum adopted a Sustainability Action Plan which prioritizes goals to reduce greenhouse gas emissions and to increase the use of renewable energy technologies.
- During the September 19th, 2022, meeting, the City Council directed Staff to evaluate policy options for heated driveways for further discussion.
- Residential indoor and outdoor energy use is the largest contributor of greenhouse gas emissions in Ketchum, accounting for 50% of total emissions, according to a 2019 ICLEI (Local Governments for Sustainability) report.
- Ketchum needs to evaluate policy options that address both indoor and outdoor residential energy consumption to meet the city's sustainability goals.
- Snowmelt systems are one of many outdoor residential energy uses that can be addressed through policy direction.

Policy Analysis and Background:

INTRODUCTION

During their meeting on September 19th, 2022, the City Council reviewed three Right-of-Way Encroachment Agreements for residential snowmelt systems that extended into the public rights-of-way from private property. Two of the Council members did not support the proposed encroachments, outlining concerns that the residential snowmelt systems do not meet the city's sustainability goals or provide a public benefit. The City Council directed staff to evaluate the environmental impact of snowmelt systems and provide policy options for further discussion. As noted above, outdoor residential energy uses include snowmelt systems, hot tubs, pools, and spas. For this discussion, staff focuses solely on snowmelt systems. Future discussions could expand into the other residential outdoor energy uses if recommended by the Council. The purpose of this discussion is to provide the City Council with information and policy options to consider for residential snowmelt systems within the public rights-of-way.

Since the Council's directive on snowmelt systems, staff has reviewed the city's sustainability commitments, evaluated the current code requirements, discussed public benefits of snowmelt systems with city departments, reviewed other mountain town's standards regarding snowmelt systems, and developed a carbon emissions analysis to compare various snow removal techniques. In general staff has found the following:

- None of the peer communities restrict snowmelt in the rights-of-way, however many have mitigation programs to offset impacts.
- Of the three primary snow removal techniques: snowmelt systems, snow plowing, and snow blowing. The emissions produced by snowmelt systems were 21 times more than snow blowing and 14 times more than snow plowing.
- There is no significant benefit to city street maintenance operations with the allowance of snowmelt within the public rights-of-way in residential areas.
- There are public safety benefits in providing snowmelt in residential areas where driveway conditions limit access or create unsafe working conditions for emergency service personnel.
- There are public safety benefits in providing snowmelt in sidewalks in the Tourist and Community Core zone districts as these areas may have steep sidewalks and may not be cleared by adjacent property owners as required by code.

Snowmelt systems installed for downtown development projects in the Community Core Zone are in the public interest as they keep sidewalks clear of snow and ice during the winter and provide a safe pathway for pedestrians and promote active transportation. Heated sidewalks proposed for new development projects downtown must extend the snowmelt system to the curb and gutter. This extension allows the Streets Department to clearly identify the sidewalk so that they can easily avoid hitting the curb with their snow removal equipment, which helps reduce damage to sidewalk infrastructure.

Snowmelt systems installed for residential private driveways do not provide the same public benefits as snowmelt systems installed for downtown projects. Snowmelt systems reduce icy conditions on driveways and circulation areas creating a safe pathway for property owners accessing their individual homes. Thoughtful design and planning can also reduce icy conditions by siting the driveway in an area with maximum solar exposure.

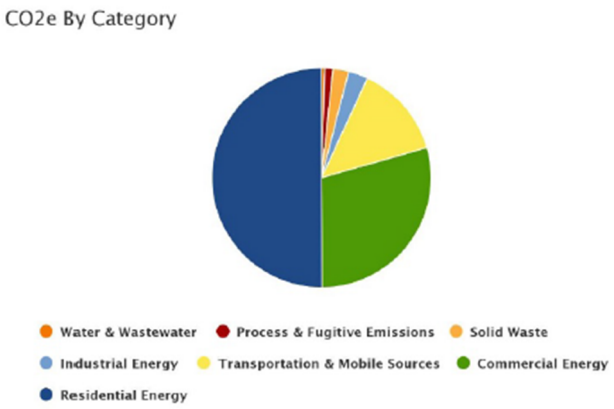
Below is a detailed analysis of the information staff has gathered to inform the policy options for residential snowmelt systems. Based on the information and the findings outlined above, staff believes that to advance the city's sustainability commitments, the city should either:

- Prohibit the use of snowmelt in public rights-of-way in residential areas unless required by the streets or fire departments to meet street standards or fire code requirements, OR
- Allow the use of snowmelt in public rights-of-way in residential areas but develop additional design requirements to increase the efficiency of the systems to reduce energy usage.

BACKGROUND

In 2018, Ketchum collaborated with other jurisdictions in the Wood River Valley and ICLEI to collect a current greenhouse gas emissions inventory. Residential energy use is the largest contributor of greenhouse gas emissions in Ketchum accounting for 50% of total emissions (see Figure 1 below for details). Greenhouse gas emissions from residential energy use is produced through the use of electricity, natural gas, and propane. Residential energy use in Ketchum produced 40,025 metric tons of carbon dioxide equivalent emissions in 2018.

Figure 1: Ketchum Community-Wide Emissions 2018



The City Council adopted the Ketchum Sustainability Action Plan on January 24, 2020, which prioritizes goals to reduce greenhouse gas emissions and to increase the use of renewable energy technologies (Attachment 1). On December 21, 2020, the City of Ketchum adopted Resolution No. 20-031 which established renewable energy goals for the community, including 100% clean energy for all energy use in the community by 2045 (Attachment 2).

The city-adopted building and energy codes regulate the efficiency of buildings but do not address exterior energy consumption. In 2015, the city adopted exterior energy conservation requirements for snowmelt systems as further discussed below.

ANALYSIS

Below is an evaluation of the Ketchum Municipal Code regulations for snowmelt systems and green building codes. Further, it examines peer mountain communities' regulation of snowmelt systems and exterior energy mitigation programs. Lastly, staff developed a carbon emissions analysis for the snow removal techniques of snowmelt systems, snow plowing, and snow blowing and provides policy options for the Council's consideration.

<u>Current Code Standards for Snowmelt Systems</u>

Ketchum's Zoning Regulations allow the use of snowmelt in-lieu of snow storage requirements provided certain design and construction standards are met. In February of 2021, Ketchum adopted the 2018 International Energy Conservation Code (IECC). Sections R403.9 and C403.12.2 require that snowmelt systems: (1) include automatic controls capable of shutting off the system when the pavement temperature is above 50°F and precipitation is not falling and (2) include an automatic or manual control that will shut off the system when the outdoor temperature is above 40°F. Additionally, Ketchum's green building code includes standards for snowmelt systems, which are specified in Ketchum Municipal Code 15.20.050.

Ketchum Municipal Code 15.20.050: Exterior Energy Conservation

- Prescriptive Path
    - Snowmelt Requirements
        - Insulate below and perimeter with minimum R-10 structural insulation
        - Minimum 92 percent efficiency boiler or Energy Star heat pump
        - Automated controls capable of shutting off the system when the pavement temperature is above 50 degrees Fahrenheit and no precipitation is falling and an automatic or manual control that will allow shutoff when the outdoor temperature is above 40 degrees Fahrenheit

    - Positive drainage off driveway (use geofabric under pavers).
- Performance path. Provide engineered, stamped drawings by an engineer licensed in the state of Idaho, showing that the system will perform using 25 percent less energy than a standard, current energy code compliant design.

Neither the IECC nor the city's Green Building code limits the size or restricts the use of snowmelt systems. The Fire Department requires residential snowmelt systems for nonconforming driveways, such as steep driveways with grades that exceed 10% slope or narrow driveways that do not meet the 20-foot-minimum-width for emergency service access. The snowmelt system can increase the fire protection of the home by providing a clear and unobstructed access along steeply sloped or narrow driveways for ambulances responding to emergencies.

Staff had internal discussions with all city departments and the Streets and Fire Department were in favor of retaining snowmelt within the Community Core Zone District and for properties with steeply sloped driveways but did not have other comments for residential snowmelt systems.

Mountain Towns Snowmelt System Regulations

Staff reviewed driveway snowmelt regulations in mountain towns across the west. Few of the communities specifically referenced snowmelt systems in their codes and none of the communities expressly prohibit installation of snowmelt on private property or the public rights-of-way. See the chart below for a sample of mountain towns regulations.

City	Snowmelt Regulations
McCall, Idaho	No regulations regarding snowmelt systems.
Vail, Colorado	Permits heated driveways. Any heated portion of the driveway located within the public rights-of-way must be on a separate control zone.
Mammoth Lakes, California	Permits heated driveways. Areas of heated pavement are encouraged in pedestrian corridors, stairs, ramps, or terraces at building entrances and in heavily used pedestrian paths. Heated pavement areas are exempt from snow storage requirements.
Park City, Utah	Permits heated driveways. Park City requires an encroachment permit for snowmelt systems in the public rights-of-way. The encroachment permits are reviewed and approved by the City Engineer.

Many communities also have energy mitigation programs to offset outdoor energy usage. Of Colorado, Aspen and Pitkin County adopted the first renewable energy mitigation program in 2000 and Basalt, Carbondale, Crested Butte, Eagle County, Snowmass, Telluride, and Breckenridge have implemented similar programs. Many of these programs require 100% of the outdoor energy used by snowmelt systems, pools, hot tubs, and natural-gas fire pits be offset 100% by on-site renewable energy. In Pitkin County, the total energy used by a snowmelt system is converted into kilowatt hours of electricity to determine the amount of solar photovoltaic energy needed to offset 100% of the energy used by the snowmelt system. If unable to offset through on-site renewable energy systems, fees are calculated based on the cost of installing solar photovoltaic. Fees collected through the program provide grants to local homeowners and businesses for energy efficiency and renewable energy projects. These programs provide certain exemptions, including portable spas not more than 64 square feet and snow-melted areas critical for emergency access or accessible routes.

Teton County, Wyoming has an energy mitigation program to offset the disproportionate energy consumption of large buildings as well as nonessential building elements, including exterior snowmelt systems, pools, and hot tubs. These nonessential building elements must be offset through providing on-site renewable energy or paying a fee in-lieu. The fee in-lieu for snowmelt systems, pools, and hot tubs is $10 per square foot. Renewable energy credits are offered for the installation of photovoltaics solar systems, solar hot water systems, ground source heat pumps, super-insulated thermal envelopes, average fenestration U-factor less than 0.29, zone ductless primary heating systems, and whole house ventilation utilizing heat recovery systems.

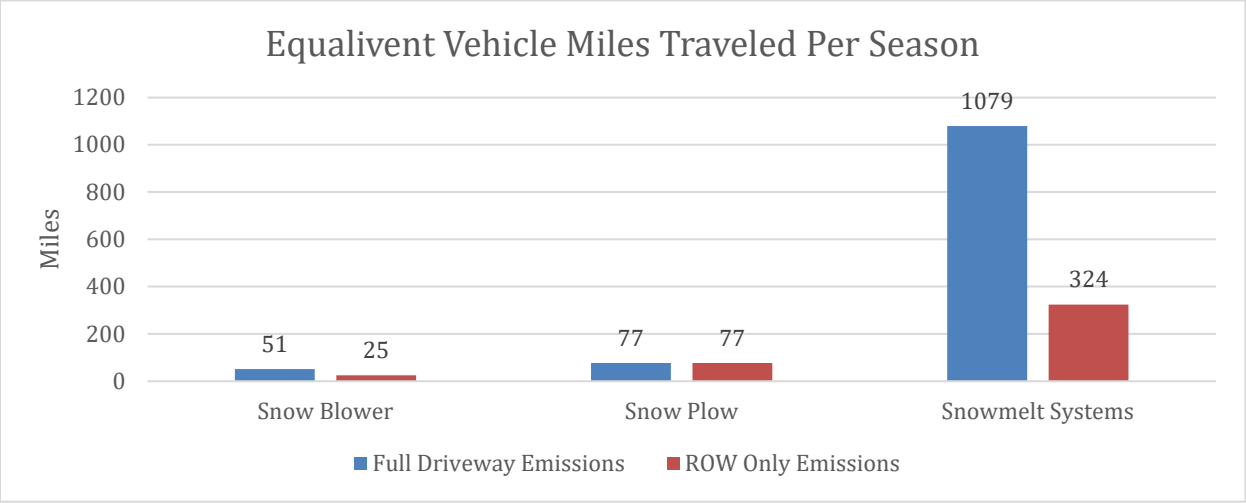
Blaine County adopted its Exterior Renewable Energy Mitigation Program through its BUILDSMART code amendments in 2016 (Attachment 3). The program requires that 50% of the energy used for new snowmelt systems, pools, and hot tubs is subject to a fee or can choose to produce on-site renewable energy credits from installing either solar photovoltaic, solar hot water systems, or micro-hydro to offset the payment option. The payment option is based on the amount of energy required to operate the exterior energy use systems.

Carbon Dioxide Emissions Analysis of Snow Removal Techniques

The three most common snow removal techniques in Ketchum are snowmelt systems, snow plowers and haulers, and snowblowers. Each process involves machinery that produce carbon dioxide emissions. To understand the quantity of carbon dioxide associated with each, staff developed a carbon dioxide emissions analysis which evaluates the energy usage of snow removal and subsequent emissions associated with each. Please see Attachment 4 for the methodology used to evaluate the carbon dioxide emissions of the snow removal techniques. Emissions related with each were extremely difficult to quantify due to differences in machinery for snowblowers, miles traveled, vehicles used for snow plowers/haulers, and design and materials for snowmelt systems. Further challenges arose in measuring emissions produced because of the variables associated with snowfall events, such as: snowfall amount, type of snow (wet/heavy or dry/light), and event occurrence. Staff developed averages for each technique to determine how many pounds of carbon dioxide emissions each produced per driveway (including public and private property):

Snowmelt System = 1606 lbs. of CO_2 emissions
Snow Plowing Service = 115 lbs. of CO_2 emissions
Snow Blower = 76 lbs. of CO_2 emissions

To better understand the significance of carbon dioxide emissions produced by each snow removal technique, staff converted the pounds of CO_2 to its vehicle miles traveled equivalent. Vehicle miles traveled is a commonly understood measurement that will help illustrate emissions produced from snow removal of each technique. In general, the portion of driveways within the public rights-of-way is less than the portion on the private property. For comparison, the table below shows vehicle miles traveled for a full driveway length (including both public and private property) and vehicle emissions from only the public rights-of-way portion of the driveway.



Policy Options for City Council Consideration

Based on the information and the findings outlined above, staff believes that to advance the city's sustainability commitments, the city should either:

- Prohibit the use of snowmelt in public rights-of-way in residential areas unless required by the streets or fire departments to meet street standards or fire code requirements, OR
- Allow the use of snowmelt in public rights-of-way in residential areas but develop additional design requirements to increase the efficiency of the systems to reduce energy usage.

The policy recommendations above are specific to snowmelt within the public rights-of-way in residential areas. If the council has a desire to pursue additional restrictions on snowmelt systems or other outdoor energy uses, staff recommends these discussions be held in conjunction with the city's rewrite of the land use regulations.

Sustainability Impact:

Ketchum needs to evaluate policy options that address both indoor and outdoor residential energy consumption to meet the city's sustainability goals.

Financial Impact:

None	There is no financial requirement from the city for this action at this time.

Attachments:

1. Ketchum Sustainability Action Plan 2020
2. City of Ketchum Resolution No. 20-031
3. Blaine County, Idaho Code: Chapter 6 BUILDSMART amendments: 7-6-6 Appendix A, Exterior Renewable Energy Mitigation Program
4. Snow Removal Carbon Emissions Analysis

City of Ketchum

Attachment 1:

Ketchum Sustainability Action Plan 2020

Ketchum Sustainability Action Plan – 2020

Leading by Example in Environmental Stewardship and Conservation

The City of Ketchum developed a comprehensive sustainability plan to **lead by example** in their own operations, inspire the community and outline long-term targets towards a resilient future. Annual action plans will be developed to outline steps to be taken towards these targets.

The City strives to be vibrant, connected, sustainable and safe. **Sustainability is essential to the vitality and resilience of our community**. To achieve greater resilience, the City is focusing efforts in three categories: **energy, water and waste**.

The Ketchum Sustainability Advisory Committee (KSAC) is providing guidance for this initiative. Members of KSAC include Rebecca Bundy, Courtney Hamilton, Betsy Mizell and Scott Lewis. And, Katrin Sharp will be the staff liaison for this initiative.

The City has set sustainability goals, engaged stakeholders, established benchmarking to track performance, researched best practices and trends, and analyzed policies to develop a near-term and long-term sustainability strategy based on the professional advice of Sharon Grant, Eco Edge.

In addition, the City is committed to **transparency** and will report on performance related to sustainability goals to staff and the community via the City website and the "Word on the Street" newsletter as well as maximize communication through utility bills.

The 2020 Sustainability Plan is based on prioritizing goals due to limited funding and resources. Priority level 1 goals are most important to accomplish. Priority level 2 actions are nice to accomplish if there are remaining resources. Priority level 3 and 4 actions are dependent upon outside or additional funding. The actions are divided into three categories: energy, water and waste. And, there are additional "general" actions, which are outlined below.

Priority Level 1	General Actions
	Support the adoption and enforcement of building codes and ordinances related to sustainability
	Provide assistance to KSAC
	Include Green Scene in Word on the Street
	Provide Council bi-annual progress reports on meeting the City's sustainability goals
	Ensure all city facilities and events provide local, environmentally responsible and healthy food options

Priority Level 2	General Actions
	Include content on the City of Ketchum website related to sustainability
	Engage and coordinate with other jurisdictions in the WRV on sustainability issues
	Research and apply for grants to fund sustainability projects

Priority Level 3	General Actions
	Develop standard operating procedures for staff to follow to save energy, water and waste in municipal buildings

Priority Level 4	General Actions
	Conduct a community open house on sustainability
	Recruit new members for KSAC

Energy

Long-Term Energy Targets

1. Align with the 2030 Challenge and upgrade existing municipal buildings towards a 50% reduction in energy use by 2030 compared to a 2007 baseline and ensure new buildings are carbon neutral by 2030
2. Ensure critical loads are met with resilient sources of energy by 2030
3. Eliminate emissions from municipal vehicles by 2030
4. De-carbonize all city facilities, by 2030

2020 Energy Actions – to be completed by September 30, 2020

The primary focus will be on assisting the ICLEI grant to establish a GHG inventory for Ketchum.

Priority Level 1	Energy Actions
	Work with ICLEI to establish a GHG inventory for Ketchum
	Lead by example on the new fire station and obtain LEED Silver certification with the goal of a carbon neutral station in the future.
	Explore opportunities for public contributions towards Ketchum sustainability projects
	Adopt green building standards for r commercial buildings
	Conduct an audit of the new City Hall and pursue Foundational Services funding from Idaho Power through the Integrated Design Lab.
	Replace electric space heaters with mini-split heaters at the wastewater treatment facility
	Install destratification fans in the wastewater treatment facility

Priority Level 2	Energy Actions
	Convert power strips in city facilities to smart power strips
	Create and issue energy performance reports for each city facility
	Evaluate options for reliable, resilient back-up power at the Northwood pumping station

Priority Level 3	Energy Actions
	When replacing or purchasing new city vehicles, when feasible, replace vehicles with electric vehicles.

Priority Level 4	Energy Actions
	Consider ways to encourage more ride sharing opportunities in the Valley

Water

Long-Term Water Targets

1. Complete upgrades to the Ketchum spring line network by 2022
2. Reduce municipal water use by 40% by 2025
3. Reduce community water use by 40% by 2030

2020 Water Actions – to be completed by September 30, 2020

The primary focus will be on upgrading interior plumbing fixtures to low flow if additional funding becomes available and continue to support and track the impact of the Ketchum spring line replacement.

Priority Level 1	Water Actions
	Continue replacing the Ketchum spring line
	(Audit completed in 2019) Install low-flow indoor plumbing fixtures (e.g. toilets, urinals, lavatory faucets and showerheads) in all municipal facilities – ***if additional budget is identified in 2020***
	When replacing or planting new vegetation, use drought-tolerant species and minimize turf where appropriate

Priority Level 2	Water Actions
	Continue to monitor the water system to identify leaks
	Continue to provide monthly messages for paper water bills and explore ways to convey messaging with online bills
	Audit all irrigation operations and upgrade with high-efficiency options, fix leaks and implement a policy to monitor municipal irrigation systems at least every 2 weeks during operating season and correct any leaks, breaks, inappropriate water use or incorrect timing (based on LEED EB+OM)
	Educate the community and continue enforcing Section 13.08.130 of the Ketchum Municipal Code*
	Continue to provide recycled water for irrigation and snowmaking

*KMC Section 13.08.130 "The sprinkling or watering of outdoor plantings such as grass, lawns, gardens, ground cover, shrubbery, trees or other landscaping shall be prohibited between the hours of 10:00 a.m. and 5:00 p.m. daily, during the annual time period beginning June 15 and ending September 1".

Waste

Long-Term Waste Targets

1. Analyze converting all wastewater sludge to beneficial use by 2022
2. Eliminate single use plastic in the community by 2025
3. Become a zero-waste community by 2050

2020 Waste Actions – to be completed by September 30, 2020

The City will collaborate with Clear Creek, Blaine County, Southern Idaho Solid Waste and the community to facilitate recycling efforts in Ketchum and the region.

Priority Level 1	Waste Actions
	Continue to sponsor community events for spring and fall yard waste collection for composting
	Evaluate the Franchise Agreement with Clear Creek and present options to the City Council for consideration
	Examine recycling options for Ketchum and present recommendations to the City Council

Priority Level 2	Waste Actions
	Continue to collaborate with other jurisdictions and organizations on waste and recycling issues
	Work with regional and local agencies to evaluate options for disposal and beneficial use of wastewater bio solids

Priority Level 3**	Waste Actions
	Amend the commercial building code to require recycling of construction waste and collaborate with other jurisdictions to implement
	Participate in the waste stream audit being done by SISW and collaborate with other local and regional agencies on ways to reduce waste streams
	Participate in a tour of Ohio Gulch transfer station and landfill in Burley
	Work with Clear Creek Disposal to include messaging on bills to encourage waste reduction
	Support the ERC in developing a recycling ambassador program based on Boise's Curb It Pro program and in reducing dog waste that threatens river quality

**All priority level 3 goals are earmarked in the WRWF grant application, without which current budget and resources are insufficient to address these actions.

City of Ketchum

Attachment 2:

City of Ketchum Resolution

No. 20-031

CITY OF KETCHUM
RESOLUTION NO. 20-031

A RESOLUTION OF THE MAYOR AND CITY COUNCIL SUPPORTING THE STATED GOALS TO POWER BLAINE COUNTY WITH 100% CLEAN ENERGY BY 2045 AND 100% CLEAN ELECTRICITY BY 2035

WHEREAS, clean energy is defined as wind, solar, geothermal, and existing functional hydropower and any energy technologies that are carbon-free, equitable, and have a low environmental impact; and

WHEREAS, clean energy represents an enormous economic opportunity to create jobs in an emerging industry, increase economic security expand prosperity for local residents, reduce air pollution and associated public health risks, reduce the strain on water resources, and save money for consumers; and

WHEREAS, cities and states all over the United States representing over 100 million people have adopted 100% clean power pledges; and

WHEREAS, there is scientific consensus regarding the existence of climate change, and that the combustion of fossil fuels creates greenhouse gas pollution, causing the warming and disturbance of the global climate; and

WHEREAS, locally, our changing climate has already led to increased variability of the snowpack leading to water scarcity for residents and farmers, increased frequency of wildfires and smoke and warming of streams that threatens coldwater fish; and

WHEREAS, rooftop solar, low-income community solar, energy efficiency, energy storage and demand-control technologies offer the opportunity to distribute resources equitably, address poverty, stimulate new economic activity, and lessen the energy cost burden upon those most impacted by high energy bills; and

WHEREAS, distributed solar energy paired with energy storage is an important strategy to build disaster resilience into our communities, and to assist with disaster recovery. Ensuring equitable distribution of these resources is imperative to adequately prepare for disasters, particularly those exacerbated by climate change; and

WHEREAS, Idaho Power has committed to 100% Clean Energy by 2045 and is committed to working with our cities and county to help us achieve our clean energy goals; and

WHEREAS, the elected officials in Blaine County support the value that a healthy environment is intrinsically tied to the wellbeing of a community and the strength of its economy.

NOW, THEREFORE, THE CITY OF KETCHUM, IN CONJUNCTION WITH THE CITIES WITHIN BLAINE COUNTY (BELLEVUE, CAREY, HAILEY, KETCHUM, AND SUN VALLEY) AND BLAINE COUNTY ESTABLISH THE FOLLOWING RENEWABLE ENERGY GOALS FOR MUNICIPAL FACILITIES AND FOR THE COMMUNITY AT LARGE:

I. One Hundred Percent (100%) clean energy for municipal electricity use by 2030, including at least 75% clean energy by 2025; and

II. One Hundred Percent (100%) clean energy powered vehicle fleet and clean energy powered maintenance equipment, where technologically and economically feasible by 2030; and

III. One Hundred Percent (100%) clean energy for the communitywide electricity supply by 2035; and

IV. One Hundred Percent (100%) clean energy for all energy use by 2045.

BE IT FURTHER RESOLVED, a regional stakeholder group will be formed including representatives from each city government, the county, citizens, businesses, and local experts from our non-profit community to create a roadmap to achieve our clean energy goals.

I. This group should be formed by January 2021;

II. An action plan to achieve 100% clean energy should be submitted to the public by August 2021; and

III. The plan should be approved by city governments and the County by January 2022.

PASSED AND ADOPTED on this 21st day of December, 2020.

NEIL BRADSHAW, Mayor

ATTEST:

KATRIN SHARP, Deputy City Clerk

CITY OF KETCHUM SEAL BLAINE COUNTY, IDAHO

City of Ketchum

Attachment 3:

Blaine County Code 7-6-6: Appendix A - Exterior Renewable Energy Mitigation Program

7-6-6: APPENDIX A - EXTERIOR RENEWABLE ENERGY MITIGATION PROGRAM (EREMP):
Add appendix A to read as follows:

"Exterior Renewable Energy Mitigation Program (EREMP)"

Section A101 Scope And Administration.

Section A101.1 Scope. Snowmelt, outside pool, or outside spa systems and equipment may be installed only if 50% of the supplemental energy meets the requirements of the exterior renewable *energy mitigation program* (EREMP) of appendix A. This applies to all installations for which an application for a permit or renewal of an existing permit is filed or is by law required to be filed with or without an associated building permit.

Section A101.2 Mandatory Requirements. R-10 insulation shall be installed under all areas to be snow melted and R-5 insulation shall extend up the sides of the slab.

Section A101.3 Exterior Renewable Energy Mitigation Program (EREMP) Option. Exterior energy use for residential exterior snowmelt systems, outdoor spas, and outdoor pools are calculated as directed by section 201.

Section A101.4 On-Site Renewable Credits Option. Renewable credit options are calculated as directed by section 301.

Section A102 Credits For On-Site Renewable Energy. Applicants interested in exterior energy use systems can choose to produce on-site renewable energy with solar photovoltaics and/or solar hot water and/or micro-hydro to offset the payment option. The energy efficient technology of ground source heat pumps is also permitted for supplemental on-site energy.

Section A103 Payment Option. The *EREMP* payment option is the difference in energy use calculated in section A201 and on-site renewable credits calculated in section A301 and shall be paid at the time of issuance of the building permit. The payment, if any, is based on the amount of energy required, expressed as dollars per square foot, to operate the exterior energy use systems. No payment shall be made to an applicant that exceeds the energy use with on-site renewable credits. All monies collected pursuant to this section shall be recorded in a separate fund and shall be spent in accordance with a resolution by the board of Blaine County commissioners.

Section A104 Pre-Existing Systems. Pre-existing snowmelt, pools or spas which are being overhauled or renovated qualify for exterior energy credit. This credit can only be applied towards an installation of exterior energy on the same parcel. The calculation of the credit shall be based on section A301.

Section 105 Residential Repairs. Repairs to building components, systems, or equipment which do not increase their pre-existing energy consumption need not comply with EREMP. All replacement mechanical equipment shall be Energy Star© rated.

Section A201 Exterior Energy Use Calculations.

Section A201.1 Snowmelt. Fifty percent (50%) of the total square footage associated with snowmelt energy consumption shall be calculated as an *EREMP* payment option at $34.00 per square foot divided by the boiler efficiency (AFUE).

Section A201.2 Outdoor Pool. Fifty percent (50%) of the total square footage associated with outdoor pool energy use shall be calculated as an *EREMP* payment option at $136.00 per square foot divided by the boiler efficiency (AFUE). Outdoor pools with not more than 200 square feet of water surface are exempt.

Section A201.3 Outdoor Spa. Fifty percent (50%) of the total square footage associated with spa energy use shall be calculated as an *EREMP* payment option at $176.00 per square foot divided by the boiler efficiency (AFUE). Package spas with not more than 64 square feet of water surface area are exempt.

Section A202 Total EREMP Payment. The total *EREMP* payment is the total sum of exterior energy use of sections A201.1, A201.2 and A201.3.

Section A301 On-Site Renewable Credits.

Section A301.1 Photovoltaic. On-site renewable credit shall be calculated as $6,241.20 per 1 kilowatt of the system design. Solar electric (photovoltaic) systems tied to the electric grid are eligible for on-site renewable credit. Systems must be sited, oriented and installed for solar electric panels to supply at least 90% of rated capacity of the installed kW. System designer/installer must be certified by NABCEP (North American Board Of Certified Energy Practitioners) or the system must be installed per the manufacturer's design specifications.

Section A301.2 Solar Hot Water. On-site renewable credit shall be calculated as $224.65 per 1 square foot of the system design.

Section A301.3 Ground Source Heat Pump. On-site renewable credit shall be calculated as $6.84 per 100,000 BTU per year of the system design. In order to use a GSHP for on- site renewable credit the GSHP system must supply at least 20% of the peak load for heating the building and all the exterior energy uses. Each ground source heat pump system shall be tested and balanced and the design engineer shall certify in writing that it meets a design coefficient of performance of 3.0 exclusive of source pump power. The ground loop system must be designed by a CGD (certified geoexchange designer certified by the Association Of Energy Engineers) or a professional engineer with IGSHPA (International Ground Source Heat Pump Association). The mechanical system must be installed by a certified IGSHPA contractor or an energy design professional.

Section A302 Total EREMP Renewables. The total *EREMP* on- site renewable credit is the total sum of sections A301.1, A301.2 and A301.3.

Section A401 Public Domain Software. A free calculation program known as *EREMP* 2012 international energy conservation code shall be made available to the public.

Example Calculation For Exterior Renewable Energy Mitigation Program

Snowmelt example: 800 sq. ft. of snowmelt requested

(50% required to meet EREMP)

($34.00*(800*.50))/0.91 (efficiency rating of boiler) = $14,945

EREMP payment option for exterior energy use will be $14,945

On-Site Renewable Credits

40 square feet of solar hot water panels*$224.65 per square foot = $8,986

EREMP payment option will be $5,959

Or

2.58 kW photovoltaic system *$6,241.20 per kilowatt = $16,102

EREMP payment option will be $0

(Ord. 2016-03, 4-12-2016)

City of Ketchum

Attachment 4:

Snow Removal Carbon Emissions Analysis

Carbon Dioxide (C02) Emission Estimates for One Typical Lot in Ketchum

Estimated by R.Mattison 3/28/2023

Snowmelt System

Energy Usage Calcuation	Full Driveway	ROW Only	Unit	Notes
Driveway Size	600	180	square ft	20ft x 30ft full driveway, 20ft x 9ft ROW only
Heat Flux Rate	150	150	BTU/hr*sf	estimate based on on-line research
Calculated energy usage	90,000	27,000	BTU/hr	
Heating Time Calculation				
Annual average snow	102	102	inches	Link: https://www.currentresults.com/Weather/Idaho/Places/ketchum-snowfall-totals-snow-accumulation-averages.php
Assumed snowfall rate	1	1	inch per hour	
Pre/post heating factor	1.5	1.5		factor to include false runs and heating prior and after snowfall
Calculated heating time	153	153	hrs of heating time per season	
CO2 Emission Estimate Calculation				
Annual energy usage	13.77	4.13	BTU per year	
CO2 emission coefficient for natural gas	116.65	116.65	Lbs CO2 emissions per Million BTU	Link: https://www.eia.gov/environment/emissions/co2_vol_mass.php
Calculated CO2 emission estimate	**1,606**	**482**	**Lbs CO2 emissions per year**	

Snow Removal Service

Miles Traveled Calcuation	Full Driveway	ROW Only	Unit	Notes
Miles traveled per event	100		miles	Average miles traveled data from 4 local companies (pers.com P. Nied)
No. of events	13		times plowed	Ave of data for winter '21 and '22 from 3 local companies (pers.com. P.Nied)
Total miles traveled per year	1300		miles	
Miles Traveled Per Lot Calculation				
Average # of properties serviced	16.875		per snow plow vehicle	Based on data from 1 local company (8 trucks service 135 homes) pers.com P.Nied
Calculated miles traveled per lot	77.04		miles, per year	
Carbon Emission Estimate Calculation				
Fuel efficiency of plow	12		mpg	
Gasoline usage	6.42		gallons per year per home	
CO2 emission coefficient for natural gas	17.86		Lbs CO2 per gal finished motor gasoline	Link: https://www.eia.gov/environment/emissions/co2_vol_mass.php
Calculated CO2 emission estimate	**115**		**Lbs CO2 emissions per year**	
	14		x times CO2 emission per year then snowmelt system	

Snow Blower	Full Driveway	ROW Only	Unit	Notes
Time to remove 1-inch snow	10	3.33	min	Estimate from Juerg Stauffacher (pers. com P.Nied)
Annual average snow	102	102	inches of snow per year (annual ave for Ketch	Link: https://www.currentresults.com/Weather/Idaho/Places/ketchum-snowfall-totals-snow-accumulation-averages.php
Total annual time snowblowing	1020	340	min	
Total annual time snowblowing	17	6	hours	
Fuel efficiency estimate	4	4	hrs/gal	Estimate from Juerg Stauffacher (pers. com P.Nied)
Estimated annual fuel usage	4.25	1.42	Gal	
CO2 emission coefficient for natural gas	17.86	17.86	Lbs CO2 per gal finished motor gasoline	Link: https://www.eia.gov/environment/emissions/co2_vol_mass.php
Calculated CO2 emission estimate	**76**	**25**	**Lbs CO2 emissions per year**	
	21		x times CO2 emission per year then snowmelt system	